

# Interactive Education Application Development Using FOSS for Government School in Oman

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**Abstract**— Education technology, driven by usage of computers in teaching and learning created a new environment for the learners in recent years. Software and hardware enabled interactive teaching tools and techniques, activity based learning using computers, further enhanced teaching and learning process to a newer dimensions. Information and communication technology (ICT) tools ensured teaching and learning process more interesting especially for the primary education systems. This paper identifies and evaluates various education technology paradigm, technologies, tools and techniques with reference to primary education systems. The paper also identifies contribution and usage of free and open source software (FOSS), its influences in imparting basic education and scope of future research on usages of free and open source platform in primary education system.

**Index Terms**— Edutainment, FOSS (Free and Open Source Software), Unified Modeling, Livecode.

## I. INTRODUCTION

Use of computers in education for teaching led to better results, when compared with the traditional methods of teaching in the classroom environment[1]. Use of computers as an educational tool also ensured constant and continuous engagement of student communities for seeking knowledge, materials and resources. Today, education technology using computers are playing a critical role in all file of education[2]. Use of the computer as an educational tool and the trends led to the development of a more positive attitude towards computer utilization in education. Hence, computer as an educational tool, helps to raise the level of student performances.

Computers as an educational tool helps students in training and exercise to perform mathematical operations. Use of computers as an educational tool provides special attention to each student according to their abilities, aptitudes and scientific level, which helps the student to be in control of the learning process and to be self-reliant in the collection of subjects materials. Use the computer means learning helps the teacher to clarify the concepts of the student, and in the

diagnosis of weaknesses with him and treated through the potential of the computer without the other and other teaching aids, such as the use of sound and image, movement and interaction between the student and the program implemented by the computer. Use of computers as an educational or an edutainment tool to help students problem-solving skills and the development of logical thinking to their development.

## II. OMAN GOVERNMENT EDUCATION SYSTEM

The Ministry of Education is the institution responsible for the management of school education at all academic levels for grades 1-12. It has been observed that, till recent time, one of the government school in Oman located at Al Batinah region in Wlayat Shinas, use traditional methods for teaching various category of basic education system consists of cycle 1 from grade 1-4 and second cycle from grade 5-9. The school comprises of 29 classes with 831 students and approximately 90 teachers uses various traditional tools of teaching like Flash Cards (Pictures), Word cards, CD Player, Posters, Stories and Big Books.

## III. EXISTING SYSTEM

English language center have many things to use during day of teaching, such as: Overhead Projector, Power Point, CD player, Interactive / Smart board, YouTube videos. Also These materials are available in language center, such as: Teacher Book, Skills Book, Class Book, Flash Cards (Pictures), Word cards, CD Player, Posters, Stories, Big Book stories for cycle one classes. Despite having various teaching and learning resources, the over all approach in imparting basic education was using traditional methods.

### 3.1 Existing System Evaluation

It has been observed that usage of computers for interactive learning[3] created more interest among the students. Delivery of various activities using computer games further enhanced students analytical skills[4] towards the syllabus, curriculum and the contents. Incorporation of games as a medium for understanding of complex problems and relevant solutions helped the students to explore similar approach across the entire curriculums. Usage of computer also enhanced the quality of contents. This is primarily because, incorporation of multimedia objects helped to create visually rich objects using various graphic

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components.

Real time development of interactive computer games for educations have been developed and tested the utilization aspects. Student participated and reflected their opinions through question – answer surveys. One of the sample data captured by questionnaire is showcased in Figure 1.

Wether education game helps in enhancement of academic levels ?

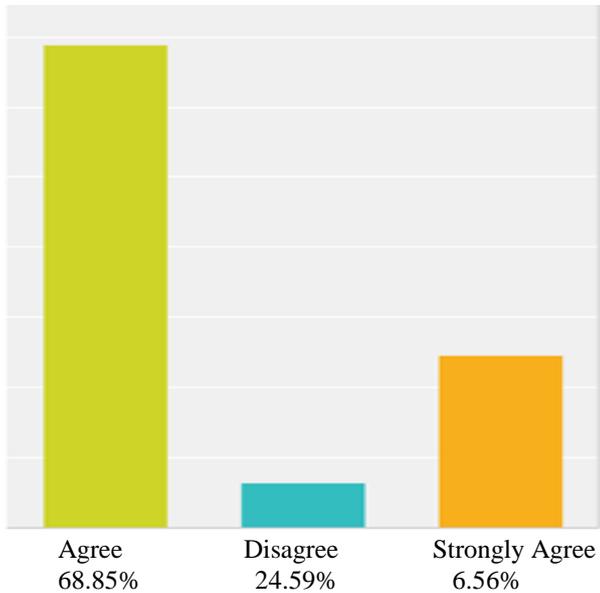


Figure 1 – Sample Survey

IV. PROPOSED SYSTEM

An interactive application developed for teaching English language [4,5]has been initiated as shown in Figure 2.

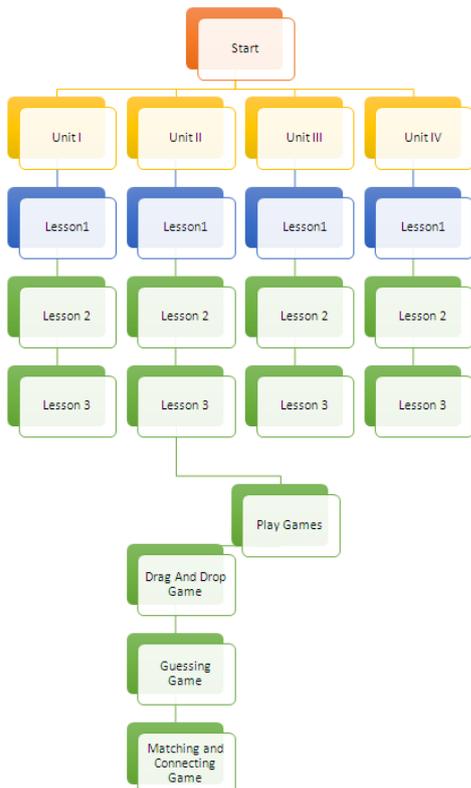


Figure 2 – Proposed System Block Diagram

Teaching English language for first-grades students need more several teaching ideas and Multi Media Technology tools and techniques[6]. Suitable lessons have been identified and feasibility study done on developing interactive lessons on English languages. Different types of games also explored and relevant contents have been mapped for suitability. UML diagrams for user interaction prototype has been designed as per requirements as shown Figure 3.

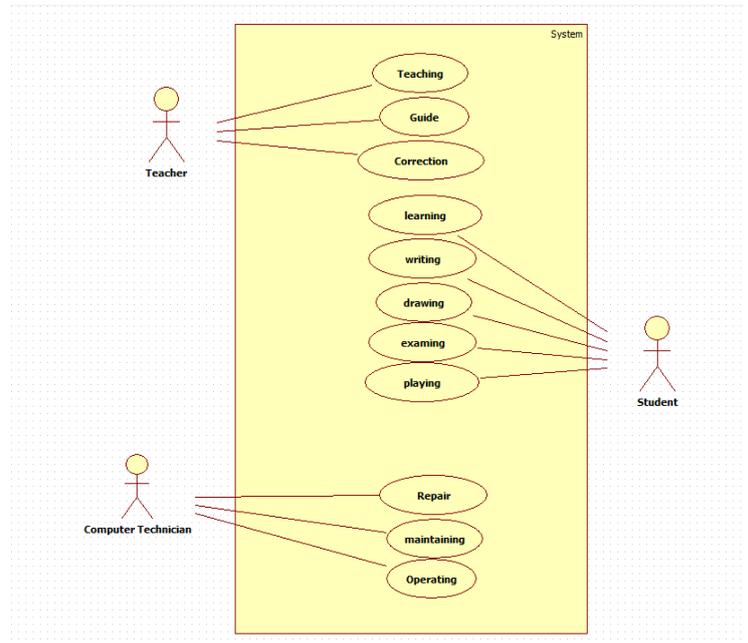


Figure 3 – UML Diagram

V. FOSS FOR SYSTEM DESIGN

Finally During system design various FOSS tools have been identified and evaluated[7]. Livecode community edition, which is an open source software found most suitable , because of easy coding and flexibility in implementations. Advantage of livecode is, livecode helps to build faster and create native applications for most of the famous operating systems platforms including mobile platforms. Livecode is a multi-platform development tool with deployment options. Below are the few advantages and features of Livecode as a FOSS tool for interactive education application development.

a. Visual development environment

Drag the fully featured controls you need from the Tools Palette onto your app. Place them where you want, resize, and customize their properties to change their appearance and behavior.

b. Edit live applications

In LiveCode your application is always running. You can add objects or change the code and instantly see the effect.

No other language does this. Editing live applications creates a powerful workflow, so you can build your apps faster and more easily than ever. Simply toggle between 'run' and 'edit' mode.

#### c. One code base

LiveCode is cross platform so you won't have to write extra code for each platform you deploy to. This avoids having to write your app multiple times for multiple platforms saving you crucial developer time.

#### d. A natural expressive language

The LiveCode language is designed to be expressive, readable, memorable and as close as possible to the way you speak and think. That means you write up to 90% less code compared to traditional languages.

#### e. Maintainable code

Code is written once and read hundreds of times. The simple and straightforward aspect of the LiveCode language makes your code base easy to read and maintain, with less need for comments.

#### f. Readymade useful extensions

LiveCode comes with a selection of controls and libraries but if they aren't enough, you can download and install extensions created by members of the LiveCode community and third-party vendors.

#### g. Make your own extensions

If you can't find the perfect control or library, you can write your own. The LiveCode development environment has tools to help you develop, test, debug and package your extensions.

#### h. Powerful extensions

Developers can also access the host platform when writing extensions, whether it's using a specific API, UI component or system level operation. Extensions can be written in LiveCode as well as other programming languages such as C, C++ and Java.

#### i. Live code for education

It is simple, powerful programming language that empowers students to develop their computer science skills.

LiveCode is the only tool that lets students aged 13+ create their own mobile apps. Technology is a big part of our lives and every student interacts with technology on a daily basis. Our aim here with LiveCode is to open doors to technology and we pride ourselves on creating a platform that truly engages today's students.

#### j. Teaching Programming that Excites Students

For the first time, students just get it. Quickly and easily students can build apps that they can deploy to their Android phones, iPhone, iPads and desktop computers. Students can easily get up and running with LiveCode and see their ideas come to life on the screen and on their devices. LiveCode closes the gap between student's favorite game or app and their work, allowing them to realize they could build the next big app.

#### k. LiveCode is Easy to Learn and to Teach.

With a growing requirement for programming in worldwide curriculums, LiveCode covers all areas of teaching programming in one package. From development to animation, graphics to data management, LiveCode can do it all. With LiveCode's simple to use, natural language removes the traditional jargon and symbol heavy code that is a barrier to so many students.

LiveCode has a proven track record of increasing class sizes and pass rates. With schools throughout the world teaching with LiveCode, including at least a third of Scottish schools, we continually hear how LiveCode is so easy to teach and how much the students are enjoying learning in LiveCode.

#### l. Build the Skill Base of the Future

LiveCode supports all the popular devices your students use. What better way to make your course relevant than to teach students how to create a mobile App that will run on the device they have in their pocket? We've heard time and time again how excited students are to create their own mobile Apps. You can create any type of App you like – for example, a game, simulation, utility, business or social App. For a complete solution to teaching programming, that inspires and excites students, look no further than LiveCode.

## VI. SYSTEM DESIGN

Once the FOSS tool identified system design initiated and basic authentication screen for the system is shown below



in figure 4.

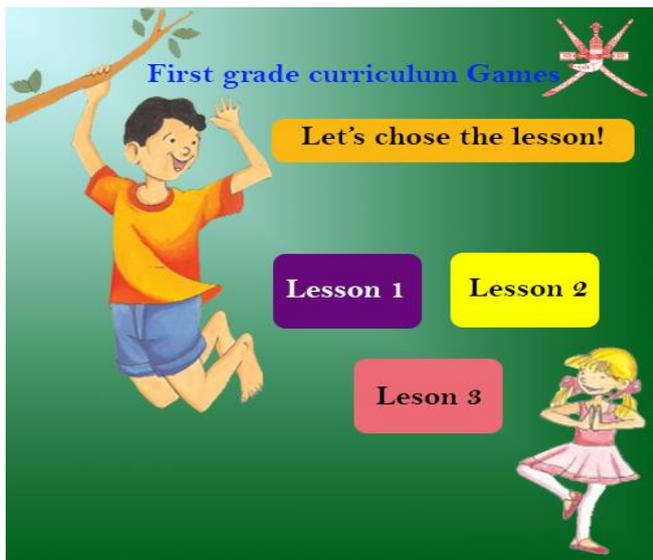
**Figure 4 – Basic Authentication Screen of the system**

Once the basic screen development finished, categorization of contents analyzed and menu based screen for the contents created as shown in below figure 5.



**Figure 5 –Content Unit Screen**

Further various lessons have been identified and screens for interactive lessons have been developed as shown below figure 6.



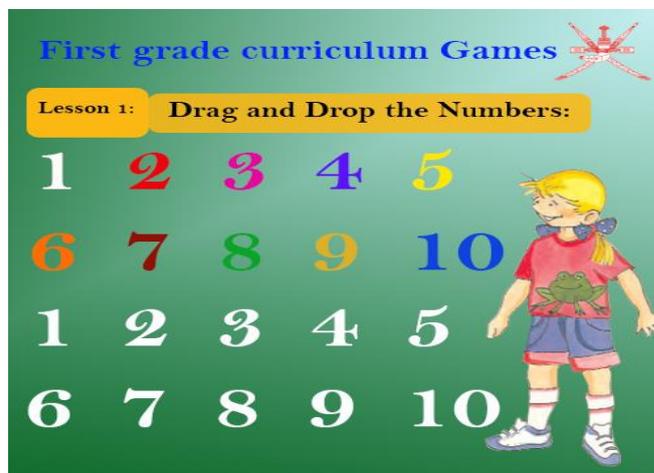
**Figure 6 – Lesson Screen**

Once the lesson screen completed, contents of the lessons have been mapped with the game logics and suitable games have been identified.

The development game was initiated for imparting educations for basic education systems, hence identifying of

game logic needs to be done as a rigorous exercises, because the interactivity or the approach needs to convey the information to the user must have simplicity in design.

All parameters of user interface design has to be taken into consideration because game based activity interface or the game design has to navigate towards solutions by solving the problems. Finally lesson contents created as a game activity as shown in below figure 7.



**Figure 7– Lesson Screen**

**VII. CONCLUSIONS**

Interactive application development for government school using FOSS is an innovative method for imparting primary education because, activity based learning using game [8,9] helps the student to understand the concepts and the contents in a most simple manner. It also creates interest among the student community towards learning by participating[10]. Using FOSS for design and development of interactive applications, games for education purpose helps to build cost effective solutions as a teaching and learning resources. Further wide availability of FOSS, supports from the FOSS user and developers community, progression of new updates, constant and continuous supports from the FOSS communities ensured FOSS as a best alternate for developing interactive educational applications.

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