

DEVELOPMENT OF AN INTELLIGENT EDUCATIONAL MOBILE APPLICATION FOR CHILDREN

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ABSTRACT

Transition from preschool to primary schooling is a major milestone in the lives of young children. Although most children successfully navigate this transition, it can be problematic for children who have not mastered the basic educational competence needed to do well in school. This study is focused on reviewing the conceptual method of teaching kindergarteners (kindergarten student) and designing an intelligent mobile educational application (software) that would aid both teachers and parents alike in giving these young minds educational training they require at this stage of life. The intelligent mobile educational application contains detailed interfaces and has an Object-oriented database required for data storage. The object-oriented analysis and design methodology (OOADM) was used to analyze and design the app. Its key stages include Object-Oriented analysis (where items that interact with one another are grouped together by class, data or behavior) and the Object-Oriented design (where these classes and their relationships that are needed to build the system). The application was developed using PHP (hypertext processor) and HTML (Hypertext Markup Language) and is deployed in an android mobile device for use. Learning has evolved significantly and in a dynamic pattern. The booming development of intelligent mobile devices and wireless communication technology has created well foundation conditions for mobile learning (M-Learning). The result shows that children will learn a lot comfortably, with ease and at their pace with this new system.

Keywords: learning, e-learning, m-learning, mobile, education

1. INTRODUCTION

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. It frequently takes place under the guidance of educators, but learners can also educate themselves. Any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational. Education can occur in formal or informal settings. Educational methods include storytelling, discussion, teaching, training, and directed research. In a Formal setting, education is commonly divided into such stages as preschool (kindergarten), primary school, secondary school and then college, university, or apprenticeship.

The kindergarten education curriculum covers three interconnected components, namely “Values and Attitudes”, “Skills” and “Knowledge”, which form a coherent curriculum system. This curriculum emphasizes on nurturing children’s learning interest, building positive values and attitudes and enhancing self-confidence as well as self-care abilities. Based on these components, an Intelligent Educational App for children, especially the Kindergarten, is developed.

An intelligent educational system (IES) also known as an intelligent tutoring system (ITS) is a computer-based system that aims to provide immediate and customized instruction/feedback to learners, usually without requiring intervention from a human teacher. It’s typically aimed at replicating the demonstrated benefits of one-to-one, personalized tutoring, in contexts where students would otherwise have access to one-to-many instruction from a single teacher

(like classroom teachings/lectures).ITSs are often designed with the goal of providing access to high quality education to each and every student.

Today's kindergarten education, especially with the public schools, lack interest/motivation and without enough of it, a young learner can get into big trouble. This lack of interest which has brought about loss of focus in kindergarteners is as a result of these underlying issues which are: Substandard and irregular education, Unqualified and/or unprofessional teachers, Teacher-Pupil Ratio, Understanding and learning rate, Poor learning environment and Lack of appropriate media and technologies. This study aims to develop a mobile app for teaching kindergarten pupils and to provide a simple interactive system for aiding teaching in kindergarten classes. It is an attractive and motivational system that would build self-confidence in kindergarteners.

2. LITERATURE REVIEW

In every modern society it is believed that education is the key to national development and there is a need to maintain every level of education especially the pre-primary/preschool/early childhood education/kindergarten stage, because it is the bedrock upon which all other educational levels build. (Gormley, Gayer, Phillips and Dawson, 2005)

Despite the different views on early childhood education by scholars, the National Policy on Education (FRN, 2012) stipulates that it should be included in mainstream education. The operational objectives of kindergarten education as stated in the National Policy of Education (FRN, 2012) include:

- i. Effecting a smooth transmission from the home to the school;
- ii. Preparing the child for the primary level of education
- iii. Providing adequate care and supervision for the children while their parents are at work;
- iv. Inculcating in the child the spirit of enquiry and creativity through the exploration of nature and environment, art, music and playing with toys, etc.;
- v. Develop a sense of co-operation and team spirit;
- vi. Inculcating social norms;
- vii. Learn good habits, especially good health habits; and
- viii. Teaching rudiments of numbers, letters, colors, shapes, forms etc. through play.

2.1 Nigeria's Educational System/Types of Education

Education in Nigeria is overseen by the Ministry of Education. Local authorities take responsibility for implementing state-controlled policy regarding public education and state schools.

The 6-3-3-4 system of education, which was introduced in 1982 to replace the 6-5-4 system, according to experts, was designed to inject functionality into the Nigerian school system, by producing graduates who would be able to make use of their hands, head and the heart (the 3Hs of education). The idea was to have six years of primary education, three years of junior secondary education, three years of either technical education for those who were more interested in learning a trade or three years of senior secondary school for those who were more academically inclined and four years for tertiary education. This policy was changed about 24 years later when the then Minister for Education, Dr. Obi Ezekwesili heralded the 9-3-4 system coupled with the privatization of unity schools, hitherto known as Federal Government Colleges. However, taking a second look at the system, the Minister of Education, Professor Ruqayyatu Ahmed Rufa'i proposed to the National Assembly (NASS), the need to revert to the old system of 6-3-3-4, but with a modification that would include Early Childhood Education (ECE). In the manner of her predecessors, she also christened the system hence the name 1-6-3-3-4. (Vanguard, 2012). In a

nutshell, the education system of Nigeria is divided into Kindergarten, Primary education, Secondary education and Tertiary education (Abdullahi, 2014)

2.2 Teaching Methods/Aids Used In Classrooms

Kindergarten is the first time most children are exposed to a classroom environment that's less about playing and more about sitting still, listening to the teacher and completing classwork. Teachers in kindergarten classrooms use several teaching methods to ensure that each student is learning as expected. These consist of: Whole Group Instruction (Direct Instruction), Small Group Instruction, Individualized Instruction and Differentiated Instruction.

Teachers use learning aids to teach/instruct these children. A learning aid is something intended to enhance learning and retention by the learner. They may include, but are not limited to: written materials, visualizations, charts, diagrams, processes, strategies, or any other appropriate item. (Kwantlen Polytechnic University, 2018)

Learning/teaching aids can be generally classified into three. These are: Visual aids, Audio aids and Audio-Visual aids. Visual Aids use the actual vision and can be grouped into four namely: Visual (Verbal) Print or Duplicated, Visual (Pictorial) Non-projected Two-dimensional, Visual Non-projected Three-dimensional and Visual Projected (Still).

The many benefits of teaching aids include: Helping learners improve reading comprehension skills, Illustrating or reinforcing a skill or concept, Differentiating instructions, Help to make the learning environment interesting/engaging as well as Saves a lot of explanation time. (Ministry of Education Guyana, 2016).

2.3 Mobile Educational Learning System across the Globe

Mobile learning (m-learning) is the ability to obtain or provide educational content on personal pocket devices such as Personal Digital Assistants (PDAs), smart-phones and mobile phones. Educational content refers to digital learning assets which includes any form of content or media made available on a personal device.

In 2013, a large and growing body of literature – Ako-Nai, Tan, Mogire and Oboko (Ako-Nai, 2013) – has investigated the integration of mobile learning systems. In 2004, a major study by Attewell, J. and Savill-Smith, involving three countries namely, Italy, Sweden and UK, examined the use of mobile phones by young adults to predict the future usage of mobile devices and to determine the willingness of these young adults in using mobile devices for learning purposes. Their results revealed that 49% of the sample showed interest in using phone-based games to improve spellings and reading and 44% indicated same for mathematics. Similarly, Kumar, Tewari, Shroff, Chittamuru, Kam and Canny in 2010 investigated the extent to which children were willing to use mobile phones to access learning content. Likewise, their results showed a positive level of learning and motivation.

Donner (2009) reviewed the impact of mobile devices on education in developing countries, specifically Tanzania and Thailand. His study revealed that attitudes towards the use of mobile devices for learning were positive. In another but related study, Warschauer (2011) investigated the use of iPads in K-12 schools in the United States, revealing among other findings that iPads were preferred to laptops in view of their light weight, portability, touch screen, and user friendly applications. Similarly, Valk, Rashid and Elder in 2010, examined the extent to which the use of mobile phones can assist to improve access to educational resources and promote acquisition of new knowledge. Having reviewed the results of some pilot projects from Asia, Philippines, Mongolia, Thailand, India, and Bangladesh, it was concluded that while mobile phones had a huge impact in the facilitation of increasing access to education, there was little evidence in promoting new learning.

2.4 Mobile Learning System in Nigeria

In its bid to contribute to deepening the penetration of Information and Communications Technology (ICT) in Nigeria's education system, promote teacher-education as well as improve students' performance in examinations, a leading ICT solutions company, Coscharis Technologies, has launched Edu-Mobile. It is Nigeria's first mobile school. It is primarily targeted at primary and secondary school students and teachers.

Embedded in ASUS mini-pads with Brain Friend software, Edu-Mobile is a mobile learning programme that integrates a typical school environment into an App so students and teachers have round-the-clock, real-time access to learning. Brain Friend is proprietary software developed by Cinfores, an ICT education development company. (Guardian, 2016)

While speaking at the launch, Managing Director, Coscharis Technologies, Emomine Mukoro, stated that Edu-Mobile comes with a curriculum library, which covers the totality of syllabi used in primary and secondary schools in Nigeria, and tailored to provide teachers with quick learning needs, including the flexibility to modify the classroom environment. He said the device could also provide career guidelines to help students make suitable career choices as well as prepare them towards achieving such goals. (Guardian, 2016). Media Learning aids include step-by-step tutorials, videos, animations, PowerPoint presentations, etc.

There are, also, learning aids designed for children with learning difficulties – such children with autism, Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD), dyslexia and other learning difficulties. These learning aids include: DT Trainer, Speech Software, Voice-Recognition Software, and Mindmap Software.

2.5 Mobile Applications (Mobile Apps)

Mobile applications (also known as mobile apps) are software programs developed for mobile devices such as Smartphone and tablets. They turn mobile devices into miniature powerhouses of function and fun. Some devices come preloaded with some mobile apps courtesy of their manufacturers or the mobile service providers with which they're associated (for example, Verizon, AT&T, T-Mobile, etc.), but many more apps are available through device-specific app stores. (Priya, 2017)

Various app categories include: Gaming apps, Business apps, Educational apps, Lifestyle apps, Entertainment apps, Utility apps, and Travel apps

Types of Educational Apps are: Playful Learning, eBooks, Workbooks/Worksheet, Puzzles and Traditional Games, Theme Experiences, Interactive Encyclopedias and BYOC (Build Your Own Content) for Kids.

3. PROPOSED SYSTEM AND IMPLEMENTATION

A common way to organize tasks in an *app* is to arrange them in *menus*; an *Application (App) Menu* is the primary list of options available to the user at the start point of an application. The software (proposed app) is a standalone app hence needs to be installed on the mobile device of the user. The entry point into this Intelligent Mobile Educational *App* is a distinctive button that appears on the first page of the app once it is installed and launched. It is the button labeled 'Welcome, Let's learn something'. It is a clickable button that allows the user access to other pages of the.

Another main menu is the "select a subject" button. There are five (5) subjects each handled in this app – letter work, number work, rhymes, current affairs and general studies. The contents of these subjects are based on the curriculum of kg1 and kg2 classes. When a subject is selected, the user is asked to select a particular lesson.

3.1 Methodology

In this work, the object-oriented analysis and design methodology was employed in carrying out the research. Object oriented systems development is a way to develop software by building self – contained modules or objects that can be easily replaced, modified and reused. In an object-oriented environment, software is a collection of discrete objects that encapsulate their data as well as the functionality of model real–world events ‘objects’ and emphasizes its cooperative philosophy by allocating tasks among the objects of the applications. A class is an object oriented system carefully delineates between its interface (specifications of what the class can do) and the implementation of that interface (how the class does what it does).

The new system is an audio-visual learning aid with four (4) components>

- a. **Select Class Interface:** The class interface tells the categories (class) of students for which this mobile app is built. It is built for kindergartens 1 & 2 (kg 1 & kg 2) pupils.
- b. **Select Subject Interface:** The subject interface displays all the available subjects in the mobile app (these include Number Work, Letter Work, Rhymes, etc.).
- c. **Select Lesson Interface:** This interface has a list of lessons for each subject been selected.
- d. **Start Training interface:** once a lesson is selected, the training for that lesson begins with lots of pictures, audio and/or music accompanying each topic of discussion.

The architecture diagram provides an overview of the entire system, identifying the main components that would be developed for the software and their interfaces

3.2 Implementation

The development environment used for this work is Adobe Dreamweaver CS5. Adobe Dreamweaver is a web design and development application that combines a visual design surface known as Live View and a code editor with standard features such as syntax



highlighting, code completion, and code collapsing as well as more sophisticated features like real-time syntax checking and code introspection for generating code hints to assist

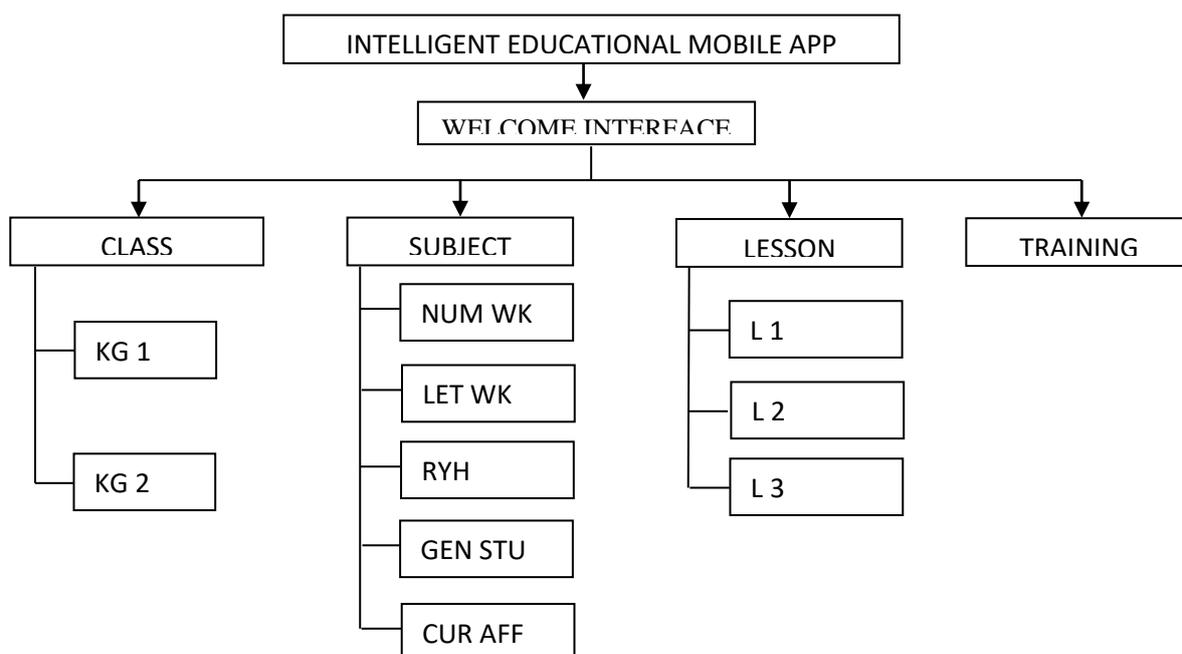
the user in writing code. Dreamweaver, like other HTML editors, edits files locally then uploads them to the remote web server using FTP, SFTP, or WebDAV. The PHP code is embedded into HTML code and is processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which include images, with the generated web page. PHP (an acronym for *Hypertext Preprocessor*) is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. PHP is mainly focused on server-side scripting. Its codes are executed on the server, generating HTML which is then sent to the client. The client would receive the results of running that script, but would not know what the underlying code was.

**Intelligent Educational Mobile App
Welcome page**

**Intelligent Educational Mobile App
Subject page**

4. CONCLUSION

Apps are making our lives lot more fun and easy. These days we have learning apps for children, which assist them in the process of learning new and interesting things. Children should not be left alone to ‘so much play’ with friends/peer-group because parents are busy with other assignments or for the fact that teachers are wearied of them. Educational apps are of great importance among kids especially those between two (2) to ten (10) years of age. In fact, not just the parents but also the teachers should see this enormous need for their children to use mobile learning apps for this will enhance their skills as well as overall competence level. Needless to say, the use of mobile learning applications has grown immensely over the last few years in most advanced countries because of its immense benefits and so it will be splendid if this idea is bought into the academic/educational sector especially the kindergarten level where the academic foundation of the child is formed.



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