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Multimedia Based e-Learning for Educating Children

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Abstract:

The education system is rapidly updating with the involvement of technology. The primary education is considering the backbone of the children's study. Normally, the children do not memories their lesson at home and they play games on mobile instead of reading. In this paper, a digital learning approach has introduced based on Sindhi primary education using the mobile application. The children/students can learn easy basics of primary level like; numbers, Sindhi and English alphabets, shapes, and colors along with lessons. A digital approach is consisting of a mobile application that manages the basic learning features with an attractive user-friendly environment together with the Mp3 audio voice and high resolution of images in HD quality. The main features will be appeared on the screen by launching the application in the form of icons as ABC, ابپ, 123, and click them for further process. When a single alphabetical reading task is complete, then it moves into the Arabic form of the Sindhi alphabet with the addition of Zer, Zabar, Pesh. These alphabetical characters connecting to each other for the creation of Sindhi words such as; آهي(Is) {Aahe}, آهن(Are) {Aahin}, هُو (Who) {Hoo}and so on. The next level for children to learning, the basic lessons of Sindhi with audio and the same tasks for basic English for primary education learning. At the initial level of digital learning approach, a Sindhi textbook named "سنڌي ٻاراڻو ڪتاب" (Sindhi Childs Book) {Sindhi Barano Kitab} has been covered through this application.

Keywords: *Multimedia Learning, e-Learning, Cognitive Learning*.

1. Introduction

In the modern century, the advancement of technology devices such as; smartphones, laptops, and computers is a very essential requirement for the educational learning environment. To utilize these devices in educational sectors, schools, colleges, universities, the teachers teach by multimedia with innovative manners, this is also a motivational way for students to capture the information quickly [7]. The innovative learning material design is a key feature of the learning environment [9]. The student's concentration is noticed to be relatively good, during learning using a mobile application [15][10]. Mobile-based learning (MBL) may be the cause of recalling the previous lecturer or discussion and there are chances to reduce the memorization issue for learning [11]. It is observed that students enjoyed learning academia using multimedia devices [8][16].

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However, the development of innovative, informative, logical, and interesting material design based on the mobile application or multimedia-based is one of the challenging tasks together with managing the graded assignments [12]. In the environment of multimedia-based learning, the students develop a critical mind and this factor enables them to become a rapid learner along with a problem-solving approach [13] [17].

2. Related Work

Savannah, a mobile gaming tool was developed for children learning purposes. As the experimental results, there were ten children (5 boys and 5 girls) aged between 11 to 12 years who played gaming and supporting learning using the mobile application. In the ending there were 80% positive findings declared [1]. By the three years of study in Singapore, a Self-Regulated Learning (SRL) model was introduced in the field of educational psychology. The challenges and characteristics were based on ubiquitous learning and mobile learning. There was also a conceptual framework for understanding the learning using mobile from everywhere, anytime [2]. An operational model is discussed with the aim to improve the quality of learning and reducing the time for learning. The introduction of this model in the higher education system, there were 12 universities specific courses had been covered based on multimedia ethics. There were 23 variables used as indicators for capturing the performance and that indicators were categorized into six elements; however, each element shows uniquely representation such as; Confidence, ease of learning, ease of understanding, and so on [3]. Another study, addressed the problem-based learning using multimedia technology. The purpose was that what the teachers have taught to students and what the students have learned from the teachers to analyze that whole scenario and resolve the problems have faced during the teaching [4]. An application of a computer learning based elementary education system was built to monitor the students and the positive results were obtained [5]. Another study was conducted to facilitate the children through a learning app named as Easy Lexia. This was a mobile-based application to face the challenges and solve the learning difficulties. This mobile application consists of some attractive features along with books. The book tasks consisting of storytelling which was developed to follow the research study of dyslexia. The targeted stories according to the age group of 7 to 12 years old age children [6].

3. Methodology

The learning paradigm consists of four basic subjects of primary education i.e. Sindhi, English, Mathematics, and Drawing. The Sindhi subject, covers the single alphabets with the sound of each sign, after that the Arabic script cursive form of Sindhi alphabet will be combined with Zer, Zabar, and Pesh. After finishing with the basic cursive script, the words joining technique will be taught to children. After completing the word learning technique, the Sindhi basic book will start to the next level for the student where they can learn how to use those words inappropriate sentences.

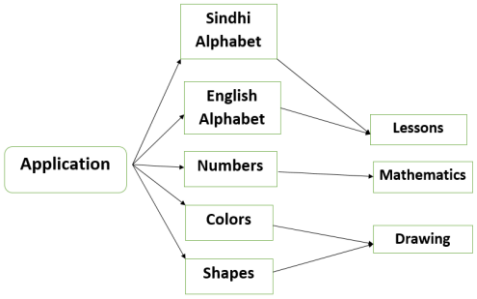

Fig 1: Learning Environment Model Based on Mobile Application

The English learning exercise initially involves basic alphabets then basic spellings

of words with audio voice. After completing the first lesson, the second lesson consists of basic sentences that are commonly used and spoken by children. The Mathematics subject starts with the numbers with a voice. After completing this task, a higher level for students is simple calculations learning which is consists of four operations plus, minus, division, multiplication (+, -, *, /). The fourth subject is Drawing, this starts with identifying colors like red, blue, black, white, pink, etc. Then simple line draw tasks are given, after that joining of that line to each other, then the learning environment draws the shapes like rectangle, oval, arrow, triangle, etc. Then filling the colors to shape.

Algorithm steps:

The algorithm typically involves the following steps:

1. Store the alphabets separately (Sindhi and English) with voice.
2. After completing the alphabet, the 1 digit will be count for learning level with subject and it moves into the table of Arabic form alphabet with Zer, Zabar, Pesh.
3. If the Arabic form table task has been completed, then send the message to the next level for its execution.
4. The complete word is predefined in the table form, so every single joining of alphabetical characters, the joining word matched to the predefined.
5. If the word joining is right or wrong, though the voice message as (good or join again) then the program will be executed.
6. Each word separately stored int the database with voice for lessons.
7. Stord the real numbers in the database with voice.
8. Four functions created for simple calculation (+, -, *, /).
   8.1 take input as the first number,
   8.2 take input for 2nd number,
   8.3 assign the operation task for the calculation by selecting the mathematical symbol.
   8.4 Executes the results.
9. Stored the images with names of its colors.
10. Store shapes with names.
11. If the shape is executed then activate the color mod for fill the color to shapes.

4. Results and Discussion

Each subject clarifies with different images and discussions that are given. Figure 2 shows the main icons of the application. The icon ABC represents for learning the English subject, and the icon اب پ represents the learning for Sindhi subject. However, the 123 icon indicates the learning for the mathematic subject while the green, red and yellow color icon shows the shapes for the representation of drawing subject and the other icon also illustrated as colors which are for the identification of colors.

Fig 2: GUI of Mobile-Based Learning Approach

There is a very attractive background image illustrated together with this and also shows the balloons that children take more interest in learning. The design has been focused to use Multimedia based Learning principles to ensure that the children are able to find the learning interesting and learn as expected [16].

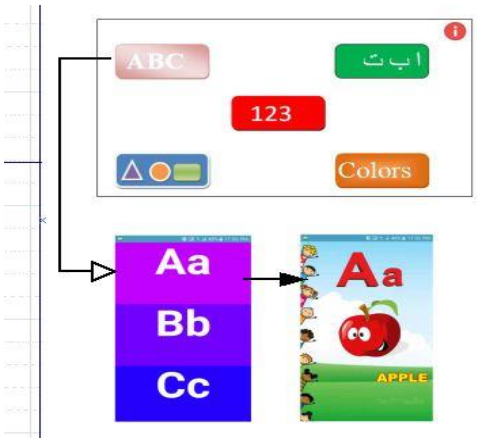

Fig 3: Main activity of learning environment model

Figure 3 represents the main activity of the learning environment where one icon has been selected to start reading and the other icons have been swiped.

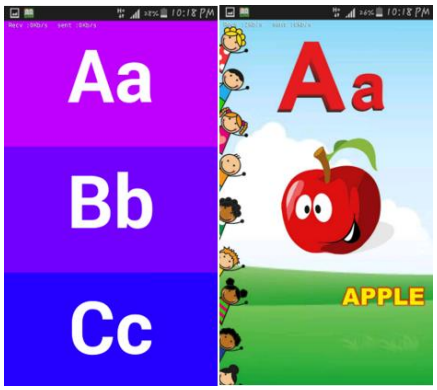

Fig 4: English alphabet with image

Figure 4 shows the English alphabets with dual form capital and small. The selected character indicates the shell of purple color and for the children to understand the image is illustrated with a complete spell as "Apple". However, each character has its own voice as their pronunciation.

Fig 5: English alphabet with image

In Figure 5, there as a sample of another alphabetical character. Where the character "H" is selected with the representation of images for a suitable word as H for Helicopter, while the others are swiped.

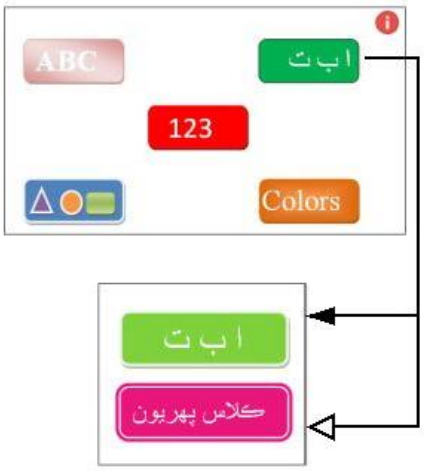

Fig 6: Selection of Sindhi Section

In Figure 6, the Sindhi section for learning has been illustrated. There are five icons mentioned there, but only one icon has been selected for learning and which represents the Sindhi subject. However, others are skipped.

Fig 7: Sindhi section for learning

In Figure 7 the learning environment has moved into Sindhi section which clearly shows the basic characters of Sindhi alphabet اب پ with the title as ڪلاس پهريون (Class One) {Class Pehryon}. There is a very attractive background image also here, which shows the shape of the house with different stylish colors.

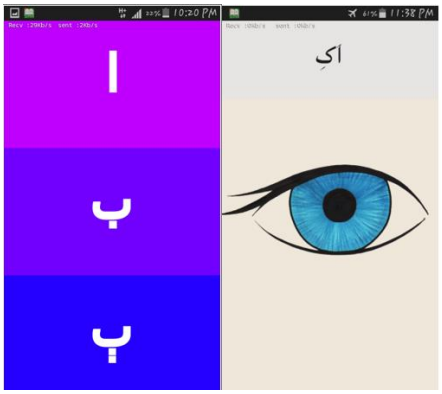

Fig 8: Sindhi alphabet with icons

Figure 8 represents the Sindhi alphabet with appropriate words belonging to that character and also with the shape of that word like اک (Eye){Akh} however, the other characters are not selected for reading, this reading task performed one by one single character.

Fig 9: Sindhi Lesson One

Figure 9 shows the lesson on of a Sindhi textbook named "سنڌي پاراٿو ڪتاب" (Sindhi Childs Book) {Sindhi Barano Kitab}. When the children click the single word, it produces the voice of that word as pronunciation when a user clicks the audio icon the application produces the reading voice of the whole sentence in Sindhi.

Fig 10: Sample of Sindhi Lesson

Figure 10 describes the sample lesson of the Sindhi section which already discussed above. There are three lines as sentences and twelve words are also there mentioned for the reading.

Fig 11: Numbers representation

Figure 11 describes the mathematics portion. There are three numbers in sequence that are illustrated and the number one 1 selected for reading and it also shows in the figure as shape and written the same as 1 and however the voice of every single number by clicked the number.

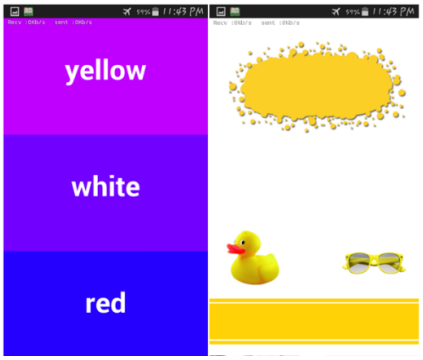

Fig 12: colors identification

Figure 12 shows the color identification for children with voice activities. There are three colors mentioned yellow, white, red. However, the yellow color has been selected and its shape also displayed for the children's color identification learning purpose.

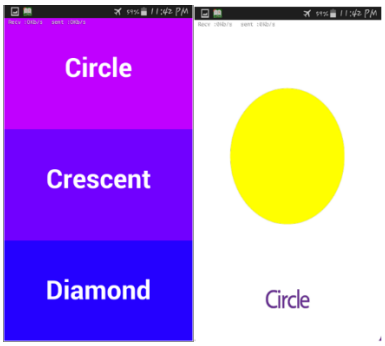

Fig 13: Shape understanding

Figure 13 shows the, shapes understanding for children. There are three shapes displayed as Circle, Crescent, Diamond. While only the circle has been selected and its shape also illustrated together with voice for the understating of shapes.

5. Conclusion

The aim of this work is to develop a child-friendly application with multimedia principles to ensure that children learn while

they are using mobile and reaming interested in using the application. For the digital learning paradigm, four main exercises were developed to facilitate multimedia-based learning for children. Each exercise developed contain vibrenet colors with legible text and voice narrations to ensure that children find the application interesting and keep learning from it.

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