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RESEARCH ARTICLE

EduPad- "A Tablet Based Educational System for Improving Adult Literacy in Rural India"

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Abstract— Literacy is one of the great challenges in the developing world. But universal education is an unattainable dream for those children who lack access to quality educational resources such as well-prepared teachers and schools. Worse, many of them do not attend school regularly due to their need to work for the family in the agricultural fields or households. However, the rural areas of India are often at a disadvantage within the Indian Education System. An educational system called EduPad, to reduce the rural adult illiteracy using advanced technology. The device proposed here is an interactive Tablet, which is capable of teaching multiple languages. The software helps the user to learn to write as well as spell the alphabets.

Keywords: tablet; android; literacy; rural; educational

I. Introduction

The first census of independent India was held in 1952.The census data showed that of the 356 million people, 298.3 million were illiterates. Thus illiteracy was one of the major obstacles in the development of the nation at that time. Due to the lack of significant improvement in the state of literacy in India, during the late 1980s, the then Prime Minister of India, Mr. Rajiv Gandhi laid the foundation for the National Literacy Mission. Because of this, during the decade 1990-2000 rate of literacy was increased by 13.17%. According to the 2011 census of India, the rate of literacy is 74.64%. However, this literacy rate of India is far short of international standards, which can be seen from Table I.

Most of India's population is concentrated in the rural parts of the country. According to the 2001 Census of India, 72.22% of the total population of India is in the rural parts of the country. The literacy rate of urban India is 79.9%, while that of rural India is only 58.7%[1] . Thus rural India, where the majority of the population is concentrated has a much lower literacy rate than urban India. We believe that technology can help in achieving the goal of improving this literacy situation. Bangladesh, another South Asian country, has a similar literacy scenario as that of India. Technology was used to implement a distance education program to improve the literacy situation in rural Bangladesh [3] . In India too, many projects have been implemented which makes use of technology, in which television sets were used to teach languages with the help of subtitles and also school children were taught English with the help of interactive cell phone games. Still the problem of literacy prevails, especially among the adults of the country. So, the proposed tablet based educational system, called EduPad, can considerably reduce the literacy problem in an interactive way than the conventional class room system.

II. PROBLEM DEFINITION

India has a total literacy rate of 74.64%[2] , male literacy rate of 82.14% and female literacy rate of 65.46% according to the 2011 census. The provisional population totals of Census of India 2011 puts the illiterates (aged 7 and above) at 272,950,015.According to the UNESCO's Education For All (EFA) Global Monitoring Report 2011, India was home to 283,105,000 illiterates (aged 15 and over) in the year 2008, out of the 795,805,000 adult illiterates around the world. Thus India accounts for 35.57 % of the global adult illiterate population (aged 15 and over), making it home to the largest population of illiterates[4] . Thus India should be a major region of focus for any project aiming to improve the global literacy scenario.

Illiteracy is caused by several factors. Lack of primary education is one of the major causes of illiteracy. Research has shown that the access to primary education depends on the wealth of the family. All else being equal, a child from a household from the highest quintile is 31 percentage points more likely to be in school than a child from a poor quintile. Another factor influencing the access to primary education in rural areas of India is the land owning pattern. Children of families with small/marginal holdings are often forced to do manual labor, which lead these children to illiterates.

Range of Literacy (Percent)	Persons		Males		Females	
	No.of Villages	No. of UAs/Towns	No. of Villages	No. of UAs/Towns	No. of Villages	No. of UAs/Towns
Nil	3,077	0	3,546	0	9,899	0
Less than 10	8,664	0	4,516	0	28,412	0
10-25	31,494	0	14,410	0	90,198	17

25-50	162,727	122	72,057	33	244,760	475
50-75	294,596	1,740	237,381	624	186,245	2,638
75 or above	93,055	2,516	261,630	3,721	33,029	1,248
Total*	593,613	4,378	593,540	4,378	592,543	4,378

TABLE: NUMBER OF VILLAGES/TOWNS BY RANGE OF LITERACY RATE & SEX, INDIA.

III. MOTIVATION

To know development in a society, Literacy is another proper indicator of economic development. As per Population Census of India 2011, the Literacy rate of India has shown as improvement of almost 9 percent. It has gone up to 74.04% in 2011 from 65.38% in 2001, thus showing an increase of 9 percent in the last 10 years. It consists of male literacy rate 82.14% and female literacy rate is 65.46%. Kerala with 93.9% literacy rate is the top state in India. Lakshadweep and Mizoram are at second and third position with 92.3% and 91.06% literacy rate respectively. Bihar with 63.08% literacy rate is the last in terms of literacy rate in India.

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Literacy opens doors to opportunities and improved standards of living. It empowers individuals to be active members of the local, national and global community. On the other hand illiteracy traps people in poverty and reduced Opportunities. Around the world, technology based projects for improving literacy has been implemented. In Egypt, ICT 4 IE (Information and Communication Technologies for Illiteracy Eradication) for Illiteracy Eradication has been met with considerable success. In a similar way *EduPad* is designed to reduce the problem of adult literacy.

There is the top bracket earning a few million rupees each month, who aspire for top notch international education for their children. They are prepared to pay, and they get it. Their children attend branded schools, often franchises of an international educational brand. Students get to sit in air-conditioned classroom and get personalized education from teachers, because their classes are optimally populated. Primary children in these schools learn the use of tablets to access maps or any other learning aid. The children are techno-savvy, and if guided well, can go on to make important innovations and discoveries.

But every school in India does not enjoy the same advantages. Several free, primary education schemes have been implemented to close the gap in educational facilities. Getting technology at the students'

fingertips is a related endeavor. The Indian government has been actively promoting the use of the Aakash tablet, especially in the schools that it runs. These include the Kendriya Vidyalayas and the Navodaya Vidyalayas that are run by the central government; in addition, there are the municipal or state run schools in most cities. Efforts are made, through grants and donations, to provide each student with a tablet, so lessons may be more interactive and better learning may ensue. In many schools, parents are encouraged to buy tablets for their children as part of the school-going kit.

Another advantage is that in the absence of adequate teaching resources, a dedicated teacher might help the students with accessing information via the internet. The internet is a mine of teaching resources; films and video clips can become valuable learning tools. A video tutorial of, say, the mechanics of lifting an object, is clearer than what a text can explain. Besides, if the LAN is set up in schools, and the students have tablets, a number of school administrative processes can be conducted online. However, caution has to be exercised, lest we substitute technology for the interactive schooling experience. For example, over-emphasis on computer based education will not give our young minds the inputs that they need for holistic development. We have to teach them to use their minds; thinking, creating, going wrong and then getting it right - these are natural processes and they must be allowed the freedom to explore their own minds and environment. Tablets and computers are to be introduced as tools to learning.

IV. SYSTEM DESCRIPTIONS

The heart of EduPad is the Android based tablet. A tablet is basically a portable computer which has a touch screen as its primary input and is easy to handle and transport. The traditional Tablet was the Microsoft Tablet PC, which was designed to work for the Microsoft XP tablet PC edition Operating system. An Android base tablet on the other hand is one which is designed to work on the Android operating system, developed by Google Inc. Android Tablet is chosen because Android is an open source operating system that supports a wide range of application Many Tablet PCs have already been designed to work on the Android platform and are available in the market at reasonable prices. EduPad requires an Android Tablet which has an 8" resistive multi Touch screen, a 700MHz processor, 150 MB random access memory and 3GB storage memory. The tablet should have a battery which can give back up of up to 7-8 hours. Apart from the tablet, there has to be additional loud speakers, which will be connected to it. The user will be able to hear the audio through this loud speaker. Such a system has the required specifications for running the software which we have to design for the implementation.

We have to develop a software application that can run on the Android Tablet, which will help the user of the tablet to learn. The application will be developed using the Android SDK. SDK is a software development kit that will enable us to create applications for the android platform. The SDK will require Eclipse (a software development environment), JDK (Java Development Kit) and Android Development tools (ADT) plug-in.

V. ILLUSTRATION

EduPad has to be used in an interactive way so that learning alphabets would be interesting and enjoyable. For this purpose, we propose a software application that can teach the alphabets in an interactive way.

This software will contain all the alphabets and also words with examples. It will initially teach the user how alphabets are written also it will first shows a demonstration of how the alphabet is written. Along with this demonstration, the sound of alphabet will be pronounced by the software. After finishing one alphabet, the user can move onto the next one.

The user can come back to the previous alphabet as well and see the demonstration over again. In the first phase of the software, alphabets will be taught. In the later phases the user will be able to learn words with examples. In the third phase the user can learn how to write the alphabets along with the sound of alphabet will be pronounced by the software. The interface of the EduPad should be the local language. For the analysis the user can play the quiz for each language. The result is stored in the database. The user can also able to see the previous score when finished the current quiz.

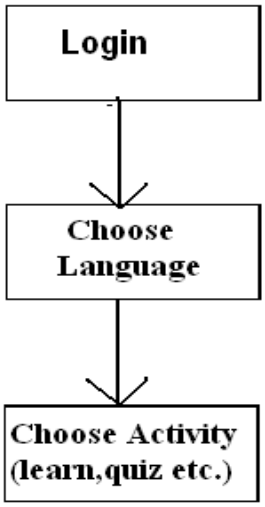

Fig 1: Different Phases of Application

VI. Related Work

ICT for Illiteracy Eradication (ICT4IE) program of Egypt is one of the 30 programs under the UNDP (United Nations Development Program) ICT program. It employs technology to create simple and interactive digital content. The program focuses on the women of Egypt who form 70% of the nation's illiterates. The project transforms learning content from illiteracy classes into simpler, more interactive computer based tutorials. Lessons are designed in such a way that learning activities are embedded into familiar contexts of everyday life and are dramatized using sound and music effects. A method that was employed in India is the Same Language subtitling on Television[6]. Here, subtitle in the same language as that of the program displayed on the television is simultaneously displayed on the television. This way, while the audio is being played, the listener can read the subtitle along with the audio, which proved to be an effective method for improvement of literacy.

In another method, interactive games for learning are designed, which is mainly focused on children[7]. The main aim of this program is to improve English as a second language for children. Another project named,

"Hole in the Wall" [8] was employed in a slum in New Delhi, where a PC was embedded in a wall. The children of the slum were given unconditional access to the computer. The main focus of this project was on E-literacy.

Technology training appears to focus mainly on technology knowledge and skills while overlooking the relationships between technology, pedagogy, and content. As a result, teachers learn about "cool" stuff, but they still have difficulty applying it for their students' learning. Teacher candidates need opportunities to practice effective technology integration strategies in supportive contexts during technology courses, technology-integrated methods courses, and field experiences. Experienced teachers also need opportunities to learn about new technologies and ways to integrate them effectively in their classroom. Teacher education programs can facilitate improvements not only in students' technology skills but also in their beliefs and intentions regarding integrating technology into instruction. Technology training directly affects pre-service teachers' self-efficacy and value beliefs, which in turn influence their student-centered technology use.

VII. CONCLUSION

India is a country where the problem of adult literacy still prevails. We believe that the EduPad based educational system will help the illiterate people of rural India to become literate through an interactive and enjoyable method without affecting their day to day life. Most of the illiterate people of rural India rely on manual labor for their living and are unable to attend regular study classes. So, the EduPad can be a convenient method for the study of rural India to become literate.

VIII. ACKNOWLEDGMENT

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