DEVELOPING AN MATHEMATICS APP FOR DEAF CHILDREN FOR ACHIEVING THEIR LEARNING OUTCOMES

ABSTRACT

Hearing impaired children encounters a great problems in communicating in classroom where teaching and learning take place using oralismatinclusive school system. This challenge demands for the need to address the problem of communication through the practice of mobile technology. Developing a mobileapplication may enhance learning and communication through which they can their develop self-confidence and self-esteem level among themselves without any hindrances. In this paper the researchers have proposed assistive technology which integrates text, audio and video along with sign language in a single android application for hearing impairment students in teaching mathematics. Although the proposed application is in the contents of mathematics, this application is useful enough to be adapted for education in learning algebra. Seem like mobile learning will go beyond theworld of education in the present and the future. It is expected that the design and development of the proposedapplication will serve as a reference for other researchers and developer regarding future developments in mobile learningapplication for hearing impairment.

Keywords: *Hearing impairment, Mobile application development, Teaching,Assistive technology,sign language.*

Introduction

As per the (Census 2011), there are 2.68 crore persons were estimated as disabledfrom the overall population of 121 crore in India which was 2.21% of the total population. Among the disabled population 19 % are with hearing disability and it is shown in Fig1. WHO (2012) defined that hearing loss can be denoted as deficient or ample loss of listening ability and itcan be producedin numerous factors they may be genetical problem, impediment at delivery, blasting sound can harm cells, adulthoodor also due to habit of medicines.
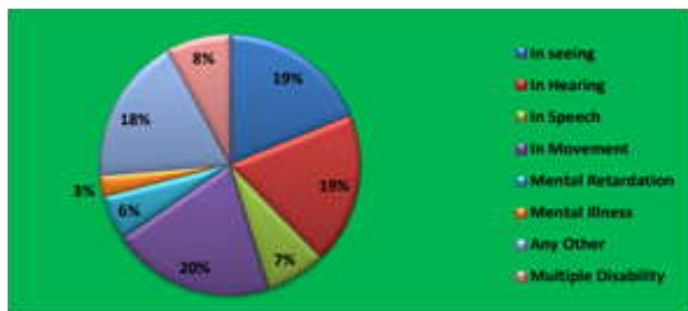
The prominence of the deaf individuals is as equal as normal students and their basic needs are the same,but they only differ in hearing and speaking compared to the normal students. Technology could engage and provide them a better assistancein the classroom and as well in society. They should not be quarantined due to their impairment. People who are suffering from Hearing impairment commonly use sign language for communication purpose which are the gestures using hands and fingers [2]. With the

Fig 1. Total People Registered under Deaf people Disability for Year 2011 (Retrieved from http://www.nhfdc.nic.in/upload/ nhfdc/Persons_Disabilities_31mar21.pdf)

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intention of educating students and to be life time learners in the society, primarily it is essential to substitute the traditional teaching learning methods with the help of an assistive technology. Which can generate their interest,curiosity, creative thinking among youth and must removepreviouspractice which led to mere memorization and mugging up only [4]. unless and until there is two way communication, effectiveness of teaching cannot be possible therefore one way communication must be changed to two way communication which could be only replaced by ICT. ICT has empoweredproduction of concepts in more understandable and relevant manner. It is an effective tool for gaining, remembering and retrieving information from multiple sources which helps the students in developing their ideas and to be innovative in all aspects. Recently, students are interested in learning Mathematics if teaching is done by using collaborativetechniques and ICT tools. These techniques helps in better understanding of concepts because it helps them to visualize mathematical problems. Thus the main goal of this paper is to develop an android mobile app for hearing impairment students in learning and teaching mathematics are discussed.

Objectives of the Study

To design and develop an assistive android application to support the mobile learning technologies with sign language to cater their educational needs.Furthermore, this assistive tool is intended for hearing impaired students for learning more interactiveand user-friendly environment.

Brief Overview of an Andriod System

Android is a mobile operating system which was designed primarily for touchscreen mobile devices such as smartphones and tablets. It is sponsored by Google, Inc., and its first release was presented in 2008 [Wikipedia]. Android apps can be downloaded through play store which replaced the old android marketplace (Bishop, T. (2012)). According to the officialwebsite (2012) of android it describes that this platform, is a software heap that includes an operating system, middleware and key applications for mobile devices and also it provides thecore set of featureswhich includeselectronic mail client, SMS package, logbook, maps and so on.

Design and Development

Md. SadadMahamud (2017) discussed that Speaking and listening are the foremostmodes of communication for all. But, those who have hearing impairment it is very difficult for them to communicate with everyone. On the other hand, normalperson may not know sign language in day-to-day life. Many sound amplifier devices are available in marketplace but, it may not beuseful for them those who have totally lost the hearing capability. Many researcher are still finding a solution for the problem of hearing impairment children.In this paper an assistive device or technology is being developed to improve the quality of understanding capacity of hearing impairment children in mathematics. The conclusion of the research is to have an efficient app for children with hearing impairment for learning and teaching in mathematics using sign language.

The researcher have developed and design an android mobile app which is named as MIME BOT nothing but MIMEis Deaf and Dumb and BOT is Robot. Features of the app involves series of step. First it involves Register process for the new user with OTP which is shown in

Fig 2 after OTP Verification,Login starts is shown in Fig 3. After completed verification it proceeds to the course page where the subjects are listed and it is shown in Fig 4. Next, by selecting mathematics it proceeds with the set of videos uploaded with the help of mathematics teacher, sign language interpreter and the researcher which is pre-defined and it is shown in Fig 5. And also there is a chat box included in this app where the students can question or ask their queries, later the queries will be sent the email of the maths teacher, sign language interpreter and admin. In a day the queries will be cleared and uploaded as a video for the users. At present there are only two language options; English and Tamil. Later it may extend upon the expectation of the users. Language selection can help to choose different language sections. The learning sections include algebra for the standard 9th. All the exercise is been solved from algebra using sign language interpreter.

Learning Objectives of This Application:

1. To find the variables and constants in the given terms of an algebraic expression using sign language interpreter.

2. This app is used in ISL.

3. To understand the concepts clearly and easily.

4. One can learn at their own pace without any hesitation n-number of times.

5. It may be used anytime anywhere.

6. Captioning is included for the better understanding of the hearing impaired children.

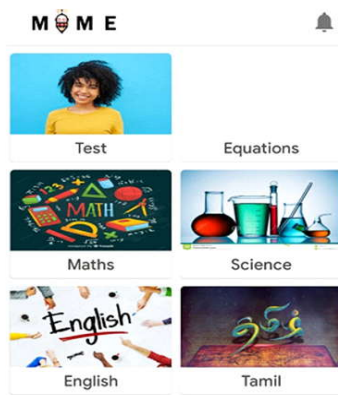7. Mobile phone applications that run on mobile phones which is android operating system.
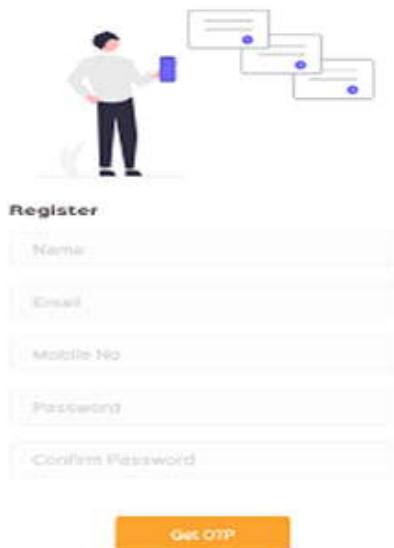

Fig 1 : screenshot of the Register page

Note : Registration page is a sign up page for the new user where the personal details can be submitted for the OTP verification.

Fig 2 : screenshot of the login page

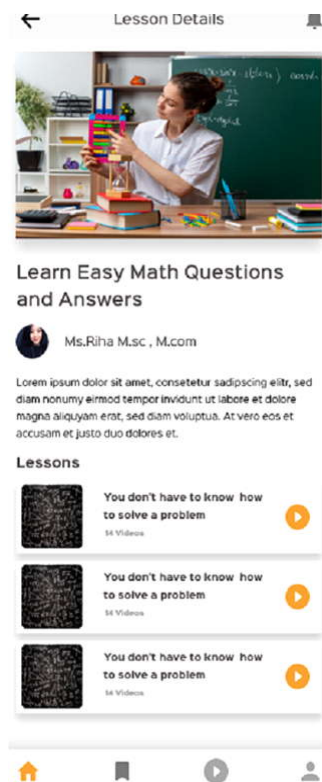Note : Login page is a sign in page for the registered user where they have their own username and password.

Fig3 : screenshot of the course page

Fig 4 : screenshot of the preloaded video page

Note : In a Video page number of videos is uploaded related to the content of algebra.
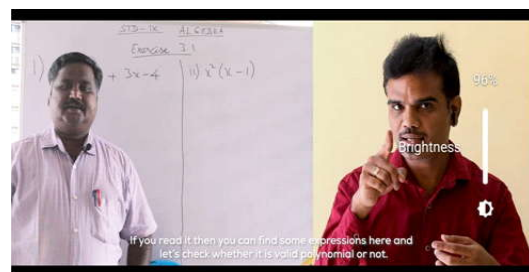

Fig 5 : screenshot of the course content using sign language, text and video page

Conclusion

In this paper, the researcher presented a mobile application to help hearing impaired children to learn mathematics using sign language. The key feature of this application is engaging the Tamil language as a medium of communication to learn mathematics terms in algebra. The proposed assistive application allow normal childrenalso to communicate with the targeted people without having any previous knowledge on signs language. The new application will be tested on hearing impairment and normal children for their understanding level on algebra concepts. All hearing impairment found the application valuable and most of them wanted to use on regular basis.This also provides an interactive learning experience for learners. Teachers are also benefited. This helps them encourage their pupils to actively participate in class and as well as at their own pace. This study introduced new and innovative learning and teaching method. This is beneficial in providing importance on the education of special children especially the hearing-impaired learners.

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Conclusion

It's a matter of grave concern that at present females constitute only nine percent of all Vice Chancellors positions across universities in the country. The leadership roles of females appear to be best epitomized as college principals of undergraduate colleges followed by directors of research institutes (17 percent) The present structuralmodifications in the universities across the country have exponentially increased the count of ad-hocappointments and temporary faculty members, females are present in a larger ratio in these positions, To conclude the non-presence of female leadership in Institutes of higher education is just not a repetitionof the old styled bias and supremacy from orthodoxy. It is a more accepted and accustomed description of inequality that manifests itself to the basic detriment of females in society as a whole, in this context, it is evidenced through a public institution like the university.

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