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SPOKEN TUTORIAL PROJECT: AN INITIATIVE FOR SPREADING AWARENESS ABOUT OPEN SOURCE SOFTWARE

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Abstract-In present world of technology and globalization, the IT literacy can contribute significantly in building an economically strong nation by providing computer-related skills for numerous employment opportunities. Free and Open Source Software (FOSS) are licensed free, free to download and use with the openly shared source code in contrast to expensive proprietary software which are under restrictive copyright and the source code is hidden. Open source software such as Linux, LibreOffice, Java, C, C++, etc. are widely utilized today powering millions of servers, desktops, and other devices, and in other technical applications. Spoken Tutorial project is an initiative of IIT Bombay with the government support that holds the potential to build an IT literate nation using FOSS. The project uses simple and user friendly pedagogic principles in the form of Information and Communication Technology (ICT) based audio-video tutorials for teaching different Open Source Software. At present the software training programs are provided in Colleges and School campuses, NGOs, Government Organizations, and Armed Forces through the distance learning mode. The project has been implemented successfully in India and has proved to be one of the best initiatives for spreading awareness about the free and open source software.
Key words: ICT in Education, FOSS, audio-video tutorial, free software training.

I. INTRODUCTION

The current status of most of the developing nations is that they are constantly struggling with issues of poor economic performance, poor productivity, and inefficient management of resources. The limited Information and Communication Technology (ICT) literacy amongst the majority of the population is one of the most responsible factors for such situation. The ICT knowledge can contribute significantly in building an economically strong nation by providing computer-related skills for numerous employment opportunities. ICT based learning is right of all the students of a nation as it will provide quality based education which is essential and key component in the development process of a nation [2][7].

In a developing yet fast growing economy like India, the premier institutes like Indian Institute of Technology (IIT), National Institute of Technology (NIT), and few government organisations such as C-DAC, NIC, etc. are constantly exploring and developing new ICT enabled tools for value addition to the existing traditional way of teaching and learning. One of the leading initiatives taken by IIT Bombay under NMEICT scheme of MHRD is Spoken Tutorial Project which is a part of Talk to A Teacher Project (TTAP)[1][5][6]. This Project was started by Prof. Kannan Moudgalya of Chemical Engineering Department in 2009 and is funded by MHRD, Government of India and NMEICT. There are several factors that contribute to the success of ICT education in any nation, and one of the most essential infrastructures for ICT education is software. Spoken Tutorial Project provide free software training on various Open Source Software like Linux, LaTeX, Scilab, PHPMySQL, LibreOffice, Python, C and C++, Java, Kturtle, Tux-typing, Firefox, OpenFOAM, and OSCAD [5][6].

Software being an integral part of ICT based learning and teaching, licensing cost consumes the huge portion of the fund allocated for implementation of ICT in education. Therefore it is highly

recommended to use Free and Open Source Software (FOSS) in ICT based learning and teaching as Open Source Software [2][7]. Open Source software are called Free and Open Source Software as they are free to download, and free to use, as no licensing fees involve in buying them. These are the programs whose source code is made available for use and modification without the expensive license fees imposed by COTS software editors. The developed countries like United Kingdom, Germany, France, and China, and more than 20 other countries have adopted using FOSS because of three main reasons:

1. It is efficient, reliable, and saves lot of money
2. It prevents the import of commercial software that causes national level economic losses. 3. It helps in developing IT Literate Nation [4].

This encouraged a developing country like India to use and promote FOSS in ICT Based education. As per 2001 census, the overall literacy rate in the India was 64.8 % and there are no formal means to the talent of the remaining 35.2% of the total population, one can say that there is very high level of under-utilization of human resources. Between 2000-01 and 2003-04, there was 3.87% of growth in Primary Schools, 9% in Upper Primary Schools, 5.29% in Plus 2 level institutions, and about 6.33% in colleges [3]. With above results it is difficult to make a dent in existing education status in India, however, a value addition and support in conventional way of teaching can make a difference, using ICT, which will be able to provide knowledge resources to every learner at their doorstep and as per their convenience. Recognizing this goal, Government of India started Flagship education program for school students at primary level called Sarva Sikhsha Abhiyaan whose complete focus is on providing Quality education. Similarly for college students many ICT enabled project were started Under National Mission on education through ICT [1].

ICT renders an opportunity to teachers to reconstruct their practices by helping them in enhancing teaching methodology, course content and learning approach. It enhances the students' involvement in learning as students are generally more 'on task' and express more positive feelings when they use computers. The use of computer during lessons motivates the students to continue learning outside college hours. ICT helps in development of higher level learning styles by using more interactive educational materials and improves learners' interest in understanding of basic skills. Students usually find learning in a technology-enhanced setting more stimulating than in a traditional classroom. Even after spending enormous amount of money on improving the education system through various programs and Schemes, the nation has not become fully literate. Hence most of the governments have decided to use cost effective way using ICT enabled learning to address the same problem. Use of FOSS in ICT based teaching and learning has taken the challenges to come out with various ICT based educational tools to potentially promote better education on large scale. The objective of the present paper is to highlight and explain the role of the Spoken Tutorial Project in promoting the FOSS and hence ICT enabled learning. The subsequent sections of the paper talks about the project, methodology, and major aspects of the project and challenges considered to promote FOSS.

II. SPOKEN TUTORIAL PROJECT

Spoken Tutorial Project is an endeavor developed at IIT Bombay towards spreading ICT based Education and Usage of Free and Open Source Software (FOSS). Prof. Kannan Moudgalya from Chemical Engineering Department of IIT Bombay is the founder of this Project. The project provides software training to college students from all background, school students, faculty and staff members, and staff of government organizations and NGOs through distance learning mode. This training is provided completely Free of Cost through a highly conducive self-study Instruction Methodology, namely, 'Spoken Tutorials'. Spoken Tutorials comes in Audio-Video CD or could be downloaded from website-http://spoken-tutorial.org. The Software Training Workshops on various

software like Linux, LaTeX, Scilab, PHPMySQL, LibreOffice, Python, C and C++, Java, Kturtle, Tux-typing, Firefox, OpenFOAM, and OSCAD, known as SELF Workshops, has been conducted all over India from cities to remote suburbs [5]. SELF is an acronym for Spoken Tutorial based Education and Learning through Free FOSS. Any educational institute having a computer lab could avail the training facility free of cost. The training workshops were commenced from July 2011 onwards. The simple and user friendly pedagogic principles have been used to create instructional material to teach ICT out of Spoken Tutorials [5]. These workshops are organized by students and teachers by sitting in their own college campuses via distance learning mode. Those students and teachers receive organizer certificates from IIT Bombay as a token of appreciation and gain experience in Event Management. Participants take an online exam and receive certificates from IIT Bombay, which are turning out to be of immense value during their placements.

The tutorials that are provided are self-explanatory as they are audio-video based. Students can learn tutorials themselves, they can rewind, pause and in this way they can learn at their own pace. The project is promoting the information and usage of Free and Open Source Software (FOSS). Taking into account the growth and employability effect of the computer and IT sector, Spoken Tutorial Project has aimed at enhancing IT-skills particularly in students at a massive scale. Through this project till date approximately 1,17,000 students and teachers have been trained through more than 5000 workshops covering 2000 colleges at PAN India Level [6]. It can be attributed to the success of this project that many colleges/universities in India are converting their offices from proprietary to Open Source software- staff using Linux Ubuntu Operating system and Libre Office Suit; students prefer using Python, PHP & MySQL and Scilab to solve their exercises and LaTeX to submit their thesis and presenting their work.

III. Methodology

A spoken tutorial is an audio-video tutorial which is normally a 10 minute screencast that explains working of software in a simplistic manner. The project is currently restricted to promotion of open source software. In these tutorials, a video is shown on screen with background narration. The screen software is used to merge the video part with the audio part. The movie is called Spoken Tutorial. The software are provided in the form of CDs/DVD costing around Rs. 10-15 each [1][5][6]. There are certain norms that are set to create spoken tutorials:

(i) The duration of every video is of 10 minutes, and the memory of video is 1 MB for 800 × 600 screen size in normal resolution.

(ii) There are assignments after every tutorial for the students to practice the concept learnt in the tutorial.

(iii) From basic to intermediate level the tutorials are created for software such as Linux, Scilab, LaTeX, Python, PHPMySQL, C,C++, Java, Blender, GIMP, OpenFOAM, Oscad, K-turtle, Tux-typing, LibreOffice, Firefox. It also allows transmission through low bandwidth networks.

(iv) Suitability of Spoken Tutorials for Self Learning Spoken tutorial is a recording of an actual session. As a result, it can capture every step that is required to explain an activity. The instruction sheet is given for each software, which provides all the instruction to learner starting from how to install the software and how to navigate all the tutorials.

(v) Before acceptance of any tutorials it goes few rounds of novice check and review by experts and beginners.

(vi) Each tutorial is created in a way that 75% of Tutorials can be reproduced and demonstrated by learner in practice. After every tutorial learners can practise via assignments.

(vii) The tutorials are dubbed in many Indian languages, so that weaker section of students who are not well-versed in English adapt IT Skills and get jobs. The approach of creating script before creating videos is used for dubbing, as it is possible to translate the script into another language and

use them to change the audio part only- it means screenshots will be written in English and only audio part will be changed. It is made sure that each sentence in the script should not be longer than 80 characters, and the dubbed tutorials should be of same time duration [1][5].

3.1. How to use Spoken Tutorial for learning

The basic steps of how to use a spoken tutorial for learning are explained as follows:
(i) Open the tutorial, and software window simultaneously, use tutorial screen to learn about software and practice it in software screen side by side, learner should listen the commands he can pause rewind and once again listen the command if he missed any point otherwise he can go to next tutorial.
(ii) One computer and ear-phone is required to learn the software using Spoken Tutorials. Each participant in the training should be given individual computer to learn software.
(iii) A workshop flow document is provided to organizer to make system ready before workshop.
(iv) Workshop will be of two hours only so that multiple workshops can be completed in single day [1][5].

3.2. How to conduct workshops

The following are the steps to be considered for conducting the workshop:
(i) Register on Spoken Tutorial website and become authorized member of Spoken Tutorial Family using link:http://www.spoken-tutorial.org/user/login
(ii) Training and test are both within the college campus and the dates etc. are fixed as per the college's wish
(iii) There is no need for any expert or specialist of the software needed in the college. This is because the course is designed for self-learning (Skype support from IIT Bombay available)
(iv) Teachers/Staff and Students all can take the training, in batches, of any size. No upper limit
(v) Process Description: http://process.spoken-tutorial.org/index.php/Software-Training# Organising_Workshops [6].

IV. IMPORTANT ASPECTS OF SPOKEN TUTORIAL PROJECT

The workshops conducted under the Spoken Tutorial Project are also called as SELF workshops. The term SELF stands for Spoken Tutorial based Education and Learning through FOSS. This also explains the major aspects of the project that make it special as an initiative to spread awareness about FOSS. These aspects are:

- Spoken tutorial
- Education
- Learning
- FOSS

Each of these aspects is interlinked and hence is equally important to increase the IT literacy of a nation. However, “Spoken Tutorial” can be defined as the process; “Education and Learning” as the vision and objective; and “FOSS” as the medium [6]. The detailed explanation of each of these aspects is given sequentially as follows:

4.1. Spoken Tutorial

Spoken: Audio-Video Methodology of Teaching software via online (Online content present on Website) and offline mode (CDs). It is a tutorial with details instruction and independent learning. Spoken tutorial contents are freely available on website link:http://files.spoken-tutorial.org/disc-source/ [6]. At some places in India where internet connectivity is poor, CDs are sent to schools and colleges by Speed post. All the software is provided with detailed instruction sheet, this instruction sheet are used to learn complete software independently without help.

4.2. Education

Quality Education from premier Institutes like IITs and awarding Certificate. Spoken Tutorials are part of course curriculum of many Universities and Education based Government Bodies in India. Spoken Tutorials are created by an expert who are having specialized knowledge in particular topic which The project is assisting Universities/ educational institutes and Government bodies like Directorate of Technical education to design course curriculum. Educational Institutes are incorporating 2 hour workshop followed by 6-7 hours of practice session and one hour of online test in the curriculum. Himachal Pradesh University, Anna University in Tamil Nadu has incorporated it in course curriculum. Commissionerate of Technical Education Gujarat, Directorate of Technical Education Tamil Nadu has already taken it in course curriculum. Students qualifying the assessment test and scoring more than 40% are awarded with certificates. These certificates are important for students while getting jobs or applying for higher studies.

4.3. Learning

Self-Learning via an easy way called Spoken Tutorial. Spoken Tutorial based E-learning empowers students with IT-Skills. These tutorials are also available in vernacular languages. The improvement in the IT skills could increase the employment opportunities for many and especially those from the lower strata of the society and from rural areas. Though spoken tutorial project deals mainly with computers and Information Technology (IT) when it comes to development of skills, it is not restricted only to IT skills. The considerable importance is given to the skills in other areas, which would help to improve the employability of a large number of our children, a requirement for economic prosperity [1]. However, an efficient method is needed to impart skills in a massive way in an effective manner. The approach taken by the Spoken Tutorials and the SELF Workshops to improve the IT skills has been discussed in this section It is recommended to propose the same approach to provide training in several other skills as well. IT skill is a subject area that can effectively be taught through Spoken Tutorials. For example, C, C++, Java, PHP, Python and Bash are programming languages. For general computer awareness and use, one can use LATEX, GNU/Linux, LibreOffice, Firefox and Thunderbird. Similarly there are several other software specifically for different purposes [1]. There are many other skills along with IT skills that this project gives emphasis on. The Spoken Tutorial approach seems to be applicable to all topics that can be explained mostly through demonstrations. Etiquette skills are extremely important in present world of competition to become a more civilized society. Delivering a talk to group of people, working as a team, standing in a queue without touching the person ahead, etc. are some examples of these. Explaining the career options seems to be an extremely useful topic for children from rural areas and from the lower strata of the society. For these sections of the society, how to use computer and internet will also be extremely useful. Lack of these skills could deprive these children from gainful employment in jobs where they could function extremely well. The world has experienced the role of Internet to help locate job advertisements. Writing an email, booking train and flight tickets online, online money transfer between bank accounts, etc. are some examples where internet skills would prove helpful. Health related skills are another extremely important area where we can use Spoken Tutorials effectively [1]. If the important health related instructions are provided through small chunks of Spoken Tutorials, lot of people can be provided with the knowledge of common illness and the necessary precautions. The idea is to teach software in a language that is comfortable to learner. Goal of Spoken tutorial based learning is to teach any software in different languages and to different difficulty level learner - Beginner, Intermediate or Advanced [1].

4.4. FOSS

FOSS Training is free of cost provided to colleges, schools, Government organizations and corporates. The National Mission on Education through ICT, MHRD, which enforces the use of FOSS in all their funded projects [1]. Free and Open Source Software (FOSS) holds the potential to play a vital role in the present technological world, especially in the IT sector. Though the legitimacy of this software is philosophically appealing, the use of FOSS makes a lot of economic sense too [5]. The students who need to learn the software need not worry about the legality of the software that they use for learning. The students, researchers and engineers who can use such systems effectively, add a lot of value to the respective institution and hence the society. This can help even small and medium scale enterprises that cannot afford expensive software compete effectively with big corporations having huge turnovers. If a country like India start using ICT enabled education system provided with open source, then it will save the money spent on buying licensing software, provide critical and deep knowledge to the students, avoid the use of pirated software. The government can easily introduce ethical aspects to the school community, to eliminate problems in ICT practical sessions due to pirated software, provide a wide range of ICT skills in the use of open source products rather than using limited facilities available in closed source software products. Open source products are customizable and can involve third parties. New features and tools can be imported from the open source community, to provide continuous involvement: extensive collaboration ensures that software products keep improving. Programmers from different institutions and organizations, schools, along with volunteers, contribute freely to the products [2].

V. KEY ISSUES AND CHALLENGES

1. Lack of computers: In India there are many institutes and schools where there is only one computer or no computer, especially in rural parts of India.
2. Lack of electricity: Several districts in India are facing electricity problem in terms of availability of electricity during day and night time. Many colleges and schools are still not connected to electricity. India being a developing country with large population and huge area, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools and colleges that fall under such areas are left handicapped and may not be able to offer computer studies.
3. Lack of internet or slow connectivity: The number of colleges and schools are having bandwidth problem and unavailability of internet.
4. Lack of awareness among students and colleges about availability of ICT based Education.

Fear by the teacher: The teacher may fear being rendered irrelevant by the introduction of computers in his/her class. The ‘feel’ that the teacher still remains an authority and a ‘know it all’ in class is something that most teachers cherish, and anything that makes them otherwise is deemed an enemy of the classroom.

VI. CONCLUSION

Spoken Tutorial Project indeed plays a significant role in promoting the use of FOSS through ICT enabled learning in order to help provide good quality education in a scalable manner to large sections of the society. The project has the potential to improve the IT literacy of the nation thus adding to the economy of the country. It is strongly believed that all the children can be made employable through this methodology, an important pre-requisite to become a developed nation. The software training programs are provided to a wide variety of recipients in Colleges and School campuses, NGOs, Government Organizations, and Armed Forces through the distance learning mode. The project has been implemented successfully in India and has proved to be one of the best initiatives for spreading awareness about the free and open source software. Spoken Tutorial project

is a team effort with the government support that truly holds the potential to build an IT literate nation with the strong and legitimate base of Open Source Software.

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