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General Article

Use of Free and Open Source Software (FOSS) in content creation

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Abstract

Information and communication Technology (ICT) has become a powerful tool and medium for anyone to use, explore and get benefitted from. It provides immense opportunities for teachers, students and the field of education to use the available digital resources for teaching and learning. It also opens up a window for using the ICT to create and contribute the educational resources for the masses. Browsing through Google for searching any content is familiar to everyone today but awareness towards creating educational content/ resource is limited. Free and Open Source Software (FOSS) gives a platform to explore the software/ tools and use them for various purposes. It allows for active engagement of teaching learning fraternity. FOSS provides the freedom to use and make changes to the software itself by making required changes in the source code. This paper deals with the understanding of the FOSS, uses of FOSS for education and understanding of some of the tools available for content creation.

Keywords: ICT, FOSS, education, technology in education

Introduction

ICT is the acronym for Information and Communication Technology, and it is considered as an extension of IT but it is broader than that. ICT as explained by Technopedia is the convergence of various technologies like audio-visual, telephone and computer networks. The meaning of ICT gets complete when this convergence is used to create, store, manage and disseminate or communicate information. If any of the step is not possible in the medium then it may not be considered as ICT. It has been observed that the technologies are being used for communication and information sharing and individuals are more towards being the consumers of information or educational content available through different mediums. Very few have initiated themselves towards the content creation exploiting the available ICT.

The ultimate aim is to bring quality in education and ICT can play a vital role in achieving so. According to National Policy on ICT in School Education:

'*ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process'*

This gives an idea about the need of ICT in education, which makes it important to understand the way ICT can be utilised to fufill the given need. Teachers and students have already started using ICT in personal lives through their phones and laptops but ICT in education has still not taken front seat in India. Use of various resources available on Internet

has increased but initiative towards creating resources by teachers and teacher educators is still not visible.

It is observed that lack of awareness amongst teachers and students about the ways of creating resources is the main concern. Further the options available for creating resources seem to be complex as well as costly i.e. audio video production is a very complex, costly and tedious job. This needs professional expertise and equipment and it is difficult for a teacher to enter in the world of production. On the contrary practical situations show the ability of a teacher to handle a smart phone and create a video or capture an image, store it on the device and share it further. There seems a gap between the availability of the tools for creating educational resources and knowledge about those tools to the teachers. Free and Open Source Software (FOSS) is one such movement to give varied range of software in the hands of teachers to use.

What is FOSS

Initially during the evolution of computers, software was taken only as an add- on to the hardware and software was shared frequently by the developer. Later certain restrictions were imposed by the developers or the vendors using software licences on the use of software or on sharing the software. Richard Stallman saw this imposition of restrictions on the use of software and established Free Software Foundation (FSF) in 1985 and introduced the term Free Software (GNU Operating System). The Open source Initiative and Free Software Movement are two different movements. Each of them has a specific philosophy (Rao, S.C). Free and Open Source Software (FOSS) is an umbrella term which covers both Free Software as well as Open Source Software.

FOSS Culture

FOSS culture is all about sharing, whatever backend is used for creating is shared, and not just the outcome; the whole process or the recipe is shared. Free Software Foundation (FSF) explains the basic philosophical difference between the Free Software and Open Source software.

Free Software is a social movement and focuses on the freedom of the user without the constraints of copyright and not on being without any cost (Wong & Sayo 2004). "What is Free Software, 2019" says that "the users have the freedom to run, copy, distribute, study, change and improve the software." Free softwares are seen licensed with GNU General Public License (GPL) (Scacchi 2007).

On the otherhand, Open Source Software is a practical developmental methodology in terms of making the software better (Wong & Sayo 2004). OSS may or may not use GPL and adopt some other license allowing for the integration of other software which may not be free software (Scacchi 2007).

FOSS refers to software that is both free and as defined by FSF and Open Source as per the advocacy of OSI (Khan & Rehman 2012). FOSS allows the users and programmers to access, edit/modify or reuse the source code of the programme for improving it further.

In contrast, the proprietary software available in the market for use do not give any liberty to see the source code of the same (Technopedia) and thus, prevent any useful change in the software.

According to FSF a program is free software, when its users have these four freedoms:

- *The freedom to run the program as you wish, for any purpose (freedom 0).*
- *The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.*
- *The freedom to redistribute copies so you can help others (freedom 2).*
- *The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.*

(According to GNU Operating System, 2019)

It might be difficult for a subject teacher to make changes in the source code but a simple step a teacher can take is to start using those softwares and distributing copies of it to students and co-teachers for its maximum use and gather user's feedback which can later help developers to improve upon the software. FSF provides a list of software which can be used in place of the proprietary software. In this paper some software/ tools which are Free and Open Source have been discussed which are helpful to teachers in creation of educational resources.

FOSS Tools

According to GNU Operating System, 2018" A teacher has multiple tasks at his/her disposal and teaching -learning is one major result-oriented task. A teacher uses variety of available resources for teaching-learning, some of those resources are created by others and sometime created by the teacher herself in hard forms and cannot be used during the coming years. FOSS opens a new window for teachers to create resources using easily available technology and with least infrastructure required.

Today Windows is the most known Operating System (OS) to work upon with other added applications and software like Microsoft Office Suite and many more. FOSS gives a possibility to shift to a Linux based operating system which is simple to use and it has its own software store from where one can just install the required software. As a user, only a machine is required and then one can directly install any one Linux based OS like Ubuntu, Debian, Fedora, Mint etc (Opensource.com). Further, there are many tools to communicate with each other which are either Proprietary or FOSS. It is important to be familiar with the open source tools also. Starting from the browser, Mozilla Firefox which is an open source browser for accessing the internet.

Similarly, FOSS has many tools available for variety of resource creation (opensource.com, 2016). Whether one wants to create a simple text document, edit an image, create an audio,

video resource or animate stories, there is a tool. But it is important to get familiarise with these tools and their usages.

Working on Office Suites: Everyone has the need of an office suite having possibility of creating text document, spreadsheet or a presentation. Libre office is one such suite offered as FOSS. Libre Office has six programs that provide everything needed from an office suite:

- Writer for creating word files
- Calc for creating spreadsheets
- Impress for presentations
- Draw for vector graphics
- Math for mathematical formulae
- Base for databases

Libre office can save and open many different formats, including Microsoft file types like DOC, DOCX, PPT, PPTX, xls etc. It is ideal while working with users of various other Office suites, or if one has recently shifted to LibreOffice.

Note taking: Notepad is considered an effective medium for taking notes but there is a possibility that notepad is either lost or not located at the time of need, here software can be of great help. Anything once typed into the soft copy is easy to locate even if the file has not been saved properly. Note taking apps automatically generates a date and time stamp and one can easily locate it and use it further. Some of the tools available under FOSS are Tomboy notes, Red notebook. These note taking tools allows to take notes, close them without saving, retrieve it easily later and also to compile the similar notes together as a notebook and share it as an html file with others.

Mind Map: A mind map can also be utilised for planning and creating the resources. It is a visual tool and gives a platform to link ideas in multiple ways. It allows to think in a divergent way rather just linearly. There are many FOSS tools available to create a variety of mind map having different features. Some of the very simple tools are Free mind, Free plane, Xmind for creating branches and having explanation. An advanced software is VUE for creating mind maps with relation names.

Image and Graphics: The mobile phone or smartphone is a technology which is easily available to masses in comparison to any other such technology which have evolved in recent times. The mobile phone allows to click images, record audio, record video and store it in device. If a teacher needs to create an image resource, it can be done using mobile phone and the same can further be modified using variety of tools. My Paint is a tool which is simple and allows for creating expressive drawing and illustrations.

For image manipulation, GIMP is a useful program; it allows for basic graphic creation, and illustration. Anyone can start using GIMP by doing simple tasks like cropping and resizing images. After the basic familiarity, other functionalities of the tool can be explored. The output image/ graphic can be exported into different file formats. Similarly, there is one tool

which is vector-based graphic design with many features. It can be used for creating simple graphics, diagrams, layouts, or icon art. Pencil and Krita are some more tools which can be used for creating and editing images or graphics.

There are variety of other resources like newsletter, books magazines or any other print material which can be created using Scribus. Scribus is a powerful tool for page layout and publishing.

Music and Audio Editing: For creating audio resources first script need to be written then it can be recorded using mobile phone or Audacity software. Audacity is a simple sound recording and editing software which is available under FOSS. It allows for adding music file, sound effect file parallel to the audio file and apply variety of effects available in the software.

Video Editing: Video resources can be created using Openshot Video Editor. It is a basic video editing tool and allows for chopping of the video, adding simple visual effects and also adding audio layer and finally preparing an MP4 for using and sharing at any and every place. There are other FOSS tools also for video editing like Pitivi and Shotcut.

2D and 3D Animations: Synfig Studio, Krita, Scratch are tools for 2D animations. Synfig Studio is a 2D animation suite which is vector-based. It supports bitmap artwork and is tablet-friendly. For creating 3D models and resources Blender is a powerful open source suite. It includes tools for modelling, sculpting, rigging, animation, rendering, realistic materials, game creation, and simulation compositing, and video editing.

Interactives: H5P (HTML 5 Package) is an online platform for creating, sharing and reusing variety of interactive resources. It allows to create interactive videos, presentations, quizzes, hotspots many more and a mix of all. The resources can be used while teaching-learning and assessment and evaluation. It works through a web-based content editor and allows to add and replace multimedia files and textual content in all kinds of H5P content types.

Apart from this many more varieties of resources like Simulation, animation, Web Blogs, Websites can be created using various tools lika Easy java simulation, Easel.ly, Blogspot, Wordpress and many more.

Subject Specific Tools

FOSS provides an array of software for dealing with different subjects. Mathematics is considered a drysubjects by students but some tools for mathematics can make it very interesting and interactive. Geogebra, Tuxmath, Matlab, Matita which can make mathematics interesting and engaging for the students. These tools are easily available online for download or working online and creating new resources. These can be explored just by searching their names.

Language teachers and students can use Audacity for pronunciation, praat, openculture etc for other language related learnings.

Stellarium, Kalzium, Phet Simulations, Avogadro all these tools can be explored for sciences, Phet Simulations can be used for mathematics social sciences and languages also.

Marble, School Bhuvan, Mapbender are tools for helping students to understand and engross in Social sciences. Apart from these, timelines can also be used in history for understanding the subject in more engaging way.

The approach should be to start exploring the newly available technologies. FOSS tools specifically come with help tutorials which are available online as well as offline through help buttons. Only need is to explore and learn and go beyond the traditional way of working, teaching and learning.

Management and Pooling of Resources: Once resources are created they need to be managed well and shared with public for use. Managing of the resources include giving proper information about the resources which is termed as metadata. Metadata includes title, description, keywords/tags, file name, and mapping the resource with the concept it covers. Then it can be uploaded or pooled on common platform like NROER or on other such online platforms for further access and sharing.

Conclusion

A teacher or a learner has to start using the tools then only the potential of these tools can be judged. These tools are available with a lot of freedom for using as well as sharing. According to UNESCO "The Free and Open Source Software (FOSS) model provides interesting tools and processes with which women and men can create, exchange, share and exploit software and knowledge efficiently and effectively. FOSS can play an important role as a practical instrument for development as its free and open aspirations make it a natural component of development efforts in the context of the Millennium Development Goals (MDGs)." Time is the most required thing to be spend for engaging in new tools, or ideas. A teacher feels overwhelmed when a child learns and achieve something. FOSS provides a complete panorama for exploration and learning and it is high time now to engage with and create contents using FOSS.

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