

ADOPTING FREE AND OPEN SOURCE SOFTWARE (FOSS) IN EDUCATION

By

DEEPTY GUPTA *

SURBHI **

*-** Assistant Professor, Central Institute of Educational Technology, New Delhi, India.

Date Received: 30/10/2017

Date Revised: 28/02/2017

Date Accepted: 07/03/2018

ABSTRACT

Information and Communication Technology (ICT) has provided the better learning opportunities to the present teachers and learners across the world. In the era of internet, many educational resources are free and lot of free softwares are also available. In our country the basic operating system used in educational institutions are proprietary in nature and we all are dependent to that. But in past few years the Free and Open Source Software (FOSS) movement has broken the outlook of using the paid softwares. In the generation of online learning, where Massive Open Online Courses (MOOCs) are being used by educators for transacting the curriculum based material, we need to use the available FOSS also. The Indian Government is also encouraging the usage of GNU/Linux in all the institutions. Still there are lots of barriers which are making teachers and students reluctant towards the usage of FOSS in education. So in this research paper, the authors have attempted to conduct a small scale research to find out the awareness of FOSS among school teachers along with their usage and barriers. An attempt has also been done to suggest some FOSS, which could be useful for teachers while transacting the curriculum.

Keywords: Free and Open Source Software (FOSS), Education, ICT.

INTRODUCTION

The development, advancement, and innovations in Information Technology have given rise to new opportunities for learning, understanding, new ways of learning, and easy accessibility with reduction in cost. Unfortunately, majority of learning tools, software, and materials were cost effective, specifically for developing countries within proprietary systems. The Free and Open Source Software (FOSS) aims to break these barriers. According to Free Software Foundation (2009), Free software means that the software's users have freedom (The issue is not about price) to use them. It encourages and enables free sharing of softwares and their distribution to serve the community. FOSS has become popular due to its affordability and the freedom it provides and hence it has begun to get noticed by many governments around the world, and many initiatives have been launched to reap its benefits.

The benefits of FOSS is not only utilizing the software for

free, but also sharing of resources, fast repair of the code, high code quality, utilizing the shared resources for the development and maintenance, and empowering the end users to gain all the benefits of using the shared software.

The adopters of FOSS also have the opportunity to localise the software to suit local people. For example, in India Open Office has been localised, that is translated to support twenty-six Indian languages, while Microsoft Office can support only twelve (E-governance India blog, 2007). This phenomenon is especially useful and can be adopted in other countries too to increase its citizen's access to ICT.

The use of FOSS (i.e. Ubuntu, LibreOffice) will help the students to share, participate, modify, and assist in the development of software for the local market and community (Makhathe and Mabanza, 2013). Since the code is accessible, it assists the students not to re-invent the wheel, but to modify and improve the software

through the help of the FOSS community which is the Open Source Initiative.

In 1983, Richard Stallman launched the GNU Project (GNU is the recursive acronym for "GNU's Not Unix") to write a complete operating system which was free from the constraints to use its source code (Ghosh et al., 2002). The GNU design is like Unix, which is another operating system, but it differs from it by being free software and containing no Unix code. Out of many reasons that motivated, this includes a case where a printer could not be fixed because its source code was withheld from the end-users. Later, in 1985, Stallman published the GNU Manifesto to outline the purpose of GNU project and to explain the importance of free software. Soon after the launch of the Manifest, he coined the term "free software". He also founded the Free Software Foundation so that the concept of free software could be promoted and in February 1986, a free software definition was published. The first version of the GNU General Public License was published in the year 1989. An updated version two was published in the year 1991.

According to Saini (2013), Richard Stallman and the Free Software Foundation characterize Free Software by the following four freedoms that its receiver is entitled to. The four freedoms are:

- Freedom to run the program in any place, for any purpose and till any time.
- Freedom to study how it works and to adapt it to our needs. This requires access to the source code.
- Freedom to redistribute copies.
- Freedom to improve the program and to release improvements to the public. This also requires the source code (source: <https://www.gnu.org/philosophy/free-sw.en.html>).

The "open source" term was created on February 3rd, 1998 at a strategy session held in Palo Alto, California, shortly after the announcement of the release of the Netscape (a type of internet browser) source code. This strategy session grew from the realization that attention around the Netscape announcement had created an opportunity to educate and advocate for the superiority of an open

development process (source: <https://opensource.org/history>, 2012).

The Free (as in freedom) software and the Open Source Software (OSS) are many a times treated as the same thing. The differences between the two are in regards to the license mode used, their beliefs, and how the software should be used for sharing, modification, and redistribution after being developed. Free software is generally licensed with the GNU General Public License (GPL) (Scacchi, 2011), which means the software is free, copyleft license software, free to share and change the works (source: <https://www.gnu.org/licenses/gpl-3.0.en.html>). The OSS on the other hand may use either the GPL or some other license that allows for the integration of software which may not be a free software. However, free software is always available as OSS, but OSS is not always free software.

1. FOSS Around the World

Many countries around the world and their education system have been adopting FOSS. Some of the countries with their status of FOSS usage are given below:

- Europe has been the hub of a large number of FOSS developers and projects (FLOSS Report, 2002). European Union Public License (EUPL) paved way to the foundation of many community platforms which support FOSS development, for example, Open Source Observatory and Repository (OSOR.eu) is an award winning initiative which offers a recommended set of Web 2.0 FOSS tools which are used for social collaboration.
- With 12.4% of FOSS developers being from Germany, it is second in the world behind France in terms of the nationality of FOSS developers/contributors. Bundestag is the legislative body in Germany, which uses Linux on its 150 servers.
- With 16.5%, the largest numbers of FOSS developers are French and residence wise too France houses have 15.4% of the FOSS developers of the world.
- Spain is one of the fastest adopters of open source software in Europe as its government has pro FOSS policies and has many key FOSS projects to support these policies. Since 2002 in Spain, the State of Extremadura has

deployed over 80,000 copies of LinEx (a locally developed version of Debian) into the schools (Saini, 2013).

- On 27 December 2010, Vladimir Putin, the President of Russia issued an order for Russia's government to switch to open source.
- Many universities around the world have started promoting FOSS in their education and the Open University of Catalonia started the first International Master's in Free Software.
- In Latin America, Brazil is leading the way in FOSS usage, adoption and contribution. According to Paiva (2009), University enrollment is done via the Internet. E-Prinfo is an e-learning project that has already trained 50,000 students. It is public software which was developed for the Secretariat of Distance Education and released under the GPL.
- The Chinese distribution of GNU/Linux called Red Flag Linux is a government initiative, which aims at developing China's open source industry (Saini, 2013).
- FOSS has been present in South Africa's government policy since 2007. Some of the initiatives and projects that use FOSS are FOSSFA, ict@innovation, OSISA, AVIOR, ANLoc, OER Africa, and AITI-KACE.
- In some countries like China, Japan, and South Korea, collaborations are done with their FOSS communities to challenge Microsoft products used in schools (Shaame, 2014).

2. FOSS in India

Dr. A P J Abdul Kalam in 2003 said that, "In India, open-source code software will have to come and stay in a big way for the benefit of our billion people". The National Policy on Information Technology, 2012 has mentioned to "Adopt open standards and promote open source and open technologies" as one of its objectives (Policy on Adoption of Open Source Software for Government of India, 2014). In India, the Department of Information Technology under the Ministry of Communication and Information Technology has been encouraging GNU/Linux and FOSS as standards in academic institutions (Shaame, 2014). The following are some of the initiatives

taken regarding FOSS:

- In 2005, the National Resource Centre for Free and Open Source Software (NRCFOSS) Project was set by the Department of Electronics and Information Technology (DEITY), Government of India (source: <http://www.nrcfoss.org.in/>).
- An indigenised GNU/Linux Operating System Distribution named "Bharat Operating System Solutions (BOSS)" is being developed and promoted by C-DAC.
- The Open Technology Centre (OTC) was set in 2007 within the National Informatics Centre (NIC) by DEITY, Government of India, including a mandate to promote usage of FOSS within the government.
- Anna University Chennai has developed 2-year fully Online MSc (CS-FOSS) program.
- Open Standards for e-Governance has been approved and implemented by the Government of India in 2011, enacting of FOSS policy regimes by state governments such as Kerala, etc.
- The Aadhaar project by the Unique Identification Authority of India has used FOSS solutions like RabbitMQ, Hadoop, Hive, Pentaho, Apache Tomcat, MongoDB, Apache Solr, and MySQL with the Spring Framework (Saini, 2013).
- State level initiatives have been launched like the "IT@Schools" in Kerala and the Institute for Open Technologies and Applications (IOTA) in West Bengal, bundling Linux into the millions of laptops being distributed by states, such as Tamil Nadu and Assam, and migration of the public libraries to FOSS in Tamil Nadu, etc (Saini, 2013).
- According to Implementations in Government Schools in India (2014), In Kerala state the Education department adopted FOSS in the year 2001, for all government schools in Kerala. The entire platform for IT@School was developed on FOSS. This transition into hundred percent usage of FOSS was made in 2007. The state has also developed their own version of OS, using Linux, for deployment in Secondary and Higher Secondary schools (Implementations in Government Schools in India, 2014). The project is considered as:

“Single largest simultaneous deployment of FOSS based ICT education in the world”.

The following Tables 1 and 2 shows the list of commonly used proprietary softwares with their FOSS replacement.

3. Benefits of FOSS

The various benefits of FOSS are given below.

3.1 Ability to Customize

Since the source code of open source software is accessible, the institutions can modify the software to meet their needs. The programming skills if available within the educational institution may be used to customize an existing functionality to provide totally advance features or system.

3.2 Availability/Reliability

Availability is the amount of time a system is up and running. According to a survey, conducted by Blood Research company it was found that after running both

S. No	Proprietary Softwares	FOSS Replacement	Purpose
1.	Windows	Ubuntu/Linux	Operating System for desktops/laptops
2.	MS Office	Libre	Complete suites for creating and editing documents, spreadsheets, presentations, database, etc.
3.	Notepad	Gedit, writer	Word processing/text editors
4.	Powerpoint	Impress	Presentations
5.	Excel	Calc	Spreadsheets
6.	Photoshop	Gimp, Inkscape	Image editors
7.	Final cut pro	OpenShot	Video editors
8.	Maya	Blender	Animation

Table 1. List of Proprietary vs. FOSS Softwares

S. No.	Name of the Software	Purpose	Subjects for which can be used
1	Tupi and timeline JS	Animation, timeline	All (specially history)
2	Geogebra	Creating Interactives	Maths, Geometry
3	Shutter	Screenshots	General purpose
4	Scratch, turtle block	Programming	Computer Science
5	Audacity	Audio editing	Multimedia
6	Freemind	Mind maps	All
7	Planets	Exploration of planets/universe	Science, Geography
8	Kalziium, Avogadro, Gaussian, Jmol, Gk periodic	Creating molecular structure, details of periodic table elements	Chemistry
9	Education G-comprise	Games	All
10	Inkscape	Graphics editor	All (specially maths)

Table 2. Some suggested FOSS Software in Education

Linux and Window Operating System for a year, Linux crashed once due to hardware fault (disk problems), and it took 4 hours to fix it. Window NT crashed 68 times due to reasons like hardware problems, memory (26 times), file management (8 times), and various other odd problems (33 times), which took 65 hours to fix. These showed that Linux is more reliable than Window system (Shaame et al., 2013).

3.3 Performance

Performance is the ability to use computer resources, such as the Processors, memory, and disk efficiently. A good performance of the software is useful in educational activities, such as studies, research, development, digital library, etc., to be performed efficiently.

3.4 Security

While comparing security issues, Linux is more secure than Windows systems. Windows machines are more prone to virus, Trojan, worms, and other malware. Apparently, many viruses, Trojan, worms, and other malware that infect windows machines are able to do so because of vulnerability in Microsoft Outlook and Internet Explorer. Contrary to Windows, Linux has been developed from the ground-up to isolate the users from applications, files and directories that affect the entire Operating System. Every user is given a user specific directory where all of its data files and configuration files are stored (Petreley, 2004). So it is nearly impossible to send an email to a Linux user that can infect the entire machine with a virus, because even if they did, the most damage or deletion would be in the user's own files (Petreley, 2004).

3.5 Low Cost

FOSS is affordable due to its low cost or no cost and it can be used in any organisation.

3.6 Design and Code are Free/open

It also provides the innovativeness due to its coding which can be customised by any individual according to his/her needs.

3.7 Open Standards

It promotes open coding for large scale adoption of the

softwares.

3.8 Eliminate of Unlicensed Software

FOSS can help in eliminating the use of unlicensed software. It is widely known that very large scale use of unlicensed or pirated software does exist in India, which is the type of embarrassment that we cannot afford no longer. FOSS helps to remove cost as a factor from encouraging the use of unlicensed software (Saini, 2013).

4. Drawbacks of FOSS

The various drawbacks of FOSS are given below.

4.1 Trained Staff

Due to the fact that the current curriculum is based on the proprietary approach, only few teachers and staff members have FOSS skills in the educational institutions.

4.2 Lack of Support

The risk of using FOSS in educational institutions are lack of support; how to review software licensing models that is to choose model that aligns with the intention, the ability of the programmer to check the code which is causing problem, and modifying it to fix the problem.

4.3 Perception

The Linux is perceived to have a less Graphical User Interface (GUI) compared to Microsoft Windows and various other proprietary softwares. However, the improved features of new Linux versions came closer with similar user-friendly features as Microsoft Windows. Similarly, Open Office has nearly the same usability features and highly comparable functionality to Office 2003 and Office 2007 (Shaame, 2014).

In India, lack of awareness is a hurdle for the adoption of FOSS, though many persons associated with Open Educational Resources (OER) movement are trying to motivate the usage.

5. Need of the Study

Every research has to be done on the basis of some need and for this, the literature review done by researchers are analyzed. Johnston et al. (2013) found that the key factors that hinder in the adoption of FOSS for schools, include compatibility with proprietary software, lack of slack resources, insufficient human resources, and lack of time,

IT staff resistance, lack of top management buy-in, lack of clear policy, and negative individual attitudes. They also found that all the respondents were using Microsoft products on daily basis though they were aware about OSS. Blessing (2012) also found in his study that most librarians in Nigeria have limited awareness on the availability of the varying OSS and hence do not significantly utilize them in their library management and services provision (Ukachi, 2015). Another factor established by this study was Inadequate ICT skill required for the adoption and utilization of the software. Similar results were found by Mengesha (2010), which are limited awareness and financial resource limitations. According to Morgan and Finnegan, fear, uncertainty, and doubt are factors that negatively impact on OSS adoption.

In our school education system it was predicted that syllabus lacks FOSS component, teachers have lack of awareness about it, non-availability is also one of major factors, and the attitude towards free software. Fernando (2011) of Sri Lanka also showed through survey that 93% of schools use Microsoft Windows as the operating system while 4% of schools use both open source and Microsoft Operating Systems. According to him if the schools use FOSS in this present situation, the government of Sri Lanka can save a minimum of ₹1304.00 million a year and ₹3855.45 million in the future.

According to a report of Rahul De (2015), among five states, i.e. Kerala, Karnataka, Goa, Maharashtra, and Assam, Kerala stands out amongst the other states for its adoption of FOSS for schools and the various tangible and intangible benefits it has realized. Tangible benefits include massive cost savings, and intangible benefits include inculcation of a do-it-yourself attitude amongst the teachers and students and massive participation in the ICT education process. The education department of the other states did not adopt FOSS and incurred tangible and intangible costs. Mittal and Singh (2013) found in their study that the lack of awareness about the uses and benefits of open source software is a large factor towards less use of open source software. Woodall and Marius (2013) have found that most countries and institutions did not have official policies on FOSS and only some level of

FOSS use was evident in each country. Saini (2013) conducted a research on FOSS and found that the educational institutions and research organisations have very low level of FOSS usage and its adoptions. He also found that very few departments that is only 25% maintain a repository of FOSS tools and majority of the departments did not inculcate the culture of having, developing, and maintaining their respective FOSS repository, which is expected of an educational department. A measure of the trained FOSS people, especially in the educational class shows that 98% of the departments have staff with some exposure to FOSS. 35% of the departments are using some FOSS tools for teaching purpose and only 25% departments use FOSS tools for the research work.

This review has indicated that there is still lack of awareness regarding FOSS exists across the world and in India, only Kerala seems to be using FOSS most prominently. So the authors study the awareness of FOSS among the school teachers of the capital city Delhi. The survey also proposes to study the present usage of FOSS if there is any benefits and barriers of FOSS according to them.

6. Objectives of the Study

- To find out the level of awareness and familiarity of Free and Open Source Software among school teachers of Delhi.
- To study the perception of school teachers for FOSS.

7. Methodology

Descriptive survey method has been used for collection of data. The survey was administered in online form to the participants. The survey contained items regarding the awareness, familiarity of terms related to software, proprietary and free, FOSS, and policy of FOSS. The survey also included items about the usage of FOSS in their teaching; any training provided to them, studied about FOSS, their perception was studied by asking benefits of FOSS, purposes, future, barriers, and preferences of softwares.

A questionnaire containing 20 questions was prepared in order to collect teachers' views. The sample of the study comprised of 50 school teachers teaching in Delhi.

Various private and government school teachers through convenient sampling method provided data for the research.

8. Analysis and Findings

On the basis of data collected, findings can be presented as follows.

- Almost 80% of teachers use Windows Operating System in their school and 12% teachers do not have the facilities of computers in school.
- 92% of teachers use Windows in their personal computers or laptops and the rest do not have the facility of personal computers.
- 50% of teachers said that the softwares they use are proprietary and 50% responded that the softwares they use are free.
- Only 20% teachers were familiar with different type of software licenses and the rest are unaware.
- Among the entire sample, only 37.5% of teachers were familiar with the term FOSS and those teachers will prefer to procure the software for their organisation.
- Only 1 teacher answered that she had been taught about FOSS; used it in her student life and also training was provided by the organisation through workshop, rest of the teachers were not trained and not taught about FOSS.
- Only 2 teachers are aware about Government is policy regarding the FOSS usage.
- Only 2 teachers had taught about FOSS to her students.
- None of the teachers were aware of the universities using FOSS.
- Very few teachers use FOSS for security, teaching, creating documents, and the rest does not use them.
- Only 2 teachers use Ubuntu as FOSS.
- 45% teachers think that FOSS can be beneficial to our school education. Some teachers responded that this can include decreasing software costs, increasing security, and stability. Rest of the teachers either do not know or said 'No'.

- Teachers said that future of FOSS in India can be: people are welcoming such softwares, Slow pace, not fully effective, accessible to all, can become a common software to use but need to aware people about it. Rest of the teachers have no idea about this.
- About the adaptation of FOSS over Windows, teachers had responded that if the people are not aware about it then how it would it be preferred.
- Some of the benefits discussed by teachers are: does not require licence, easily available, user friendly and free of cost, People can use them according to their needs, and Piracy will be removed.
- Some of the barriers discussed were: lack of knowledge, lack of training, lack of availability of technology, and awareness of such softwares. It should be used either in in-service course or in B.Ed. course, poverty, infrastructure, quality, resources, etc.

9. Suggestions

- Provide funding for FOSS support and promotion.
- Syllabus of all teacher education courses should include FOSS so that the future teachers can use them.
- In-service and pre-service training on FOSS tools should be given.
- Administrative and technical support should be provided to all teachers for motivating its usage.
- Teachers should be orientated for various FOSS softwares, which can be used in transaction processes. Positive attitude should be developed for its usage.
- Appropriate measures should be taken for policy implementation of FOSS.
- Government officials to be educated on FOSS.
- A comparison of proprietary and FOSS applications, e.g. MS Office and Open Office, should be given to teachers.

Conclusion

This research paper has highlighted that the opportunities of adoption of FOSS not only saves cost to educational institutions, but freedom to use source code, make copy,

and distribute the software to others. Various FOSS softwares can also be used in education successfully. Through the research it was indicated that the awareness about the FOSS among school teachers is very less and they are still using proprietary software for their teaching and learning processes. Some of the key barriers for adoption of FOSS mentioned by the teachers were lack of FOSS general awareness; FOSS not been taught at schools and universities; no training provided to them and lack of technical support. They were having a positive perception towards usage of FOSS, but the barriers should be removed for its adoption.

References

- [1]. **Blessing, U. N. (2012).** Awareness, availability and utilization of open source software in Nigerian libraries: the way forward, *International Research Journal of Library, Information and Archival Studies*, 1(1), 1-9.
- [2]. **De', R. (2015).** *Economic Impact of Free and Open Source Software Usage in Government: Final Report.*
- [3]. **E governance in India blog (2007).** *Free as in Freedom and Free Software.* Retrieved from <https://egovindia.wordpress.com/category/foss/>
- [4]. **Fernando, M. (2011).** Enhancement of ICT Education via FOSS Solutions in Developing Countries through Sri Lankan Observations. *5th International Conference of Education, Research and Innovation* (pp. 169-179). IATED.
- [5]. **Free Software Foundation. (2009).** *GNU Operating System.* Retrieved from <http://www.gnu.org/gnu/gnu-history.html>
- [6]. **Ghosh, R. A., Glott, R., Krieger, B., & Robles, G. (2002).** *Free/Libre and Open Source Software: Survey and Study.* International Institute of Infonomics, University of Maastricht. Retrieved from http://flossproject.merit.unu.edu/report/FLOSSFinal_2b.pdf
- [7]. **History of the OSI. (2012).** Retrieved from <https://opensource.org/history>
- [8]. **Implementations in Government Schools in India. (2014).** *Department of School Education & Literacy, MHRD, GoI NISG.* Retrieved from http://mhrd.gov.in/sites/upload_files/mhrd/files/upload_document/Annexure%20IV.pdf

- [9]. Johnston, K., Begg, S., & Tanner, M. (2013). Exploring the factors influencing the adoption of Open Source Software in Western Cape schools. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 9(2), 64-84.
- [10]. Makhathe, M., & Mabanza, N. (2013, January). ICT students' perception concerning free and open source software: A case study of Central University of Technology. In *Advanced Communication Technology (ICACT), 2013 15th International Conference on* (pp. 2-7). IEEE.
- [11]. Mengesha, N. T. (2010). The role of technological frames of key groups in open source software implementation in a developing country context. *The Electronic Journal of Information Systems in Developing Countries*, 43(1), 1-19.
- [12]. Mittal, P. & Singh, J. (2013). A Survey on Open Source Software using Questionnaire. *International Journal of Computer Trends and Technology (IJCTT)*, 4(4), 833-838.
- [13]. Paiva, E. (2009). Use of Open Source Software by the Brazilian Government. *The Technology Innovation Management Review*. Retrieved from <https://timreview.ca/article/250>
- [14]. Petreley, N. (2004). *Security Report: Windows vs. Linux*. Retrieved from https://www.revpol.com/files/www-theregister-co-uk-2004-10-22security_report_windows_vs_linux-print.html
- [15]. Policy on Adoption of Open Source Software for Government of India. (2014). Ministry of Communication & Information Technology, Department of Electronics & Information Technology.
- [16]. Saini, S.K. (2013). *Use of Free/Open Source Software By Indian Organisations - A Preliminary Study and its findings* (Ph.D. Thesis, Faculty of Science And Humanities Anna University Chennai). Retrieved from <http://nrcfoss.au-kbc.org.in/smedia/images/downloads/FAIthesis.pdf>
- [17]. Scacchi, W. (2002). Understanding the requirements for developing open source software systems. *IEE Proceedings-Software*, 149(1), 24-39.
- [18]. Shaame, A. (2014). The Adoption of Free and Open Source Software in Teaching and Learning: Case Study Zanzibar Education Institutions. *International Journal of Managerial Studies and Research (IJMSR)*, 2(5), 53-59.
- [19]. Shaame, A., Shanmugam, K., and Dehghantanha, A. (2013). An Educational Framework for Free and Open Source Software. *International Journal of Innovation, Management and Technology*, 4(1), 16-20.
- [20]. Ukachi, N. (2015). Awareness, availability and utilization of open source software in Nigerian libraries: the way forward. *International Research Journal of Library, Information and Archival Studies*. 1(1), 1-9.
- [21]. What is free software? (n.d.). Retrieved from <https://www.gnu.org/philosophy/free-sw.en.html>
- [22]. Woodall, L. & Marius, M. (2013). *Free and Open Source Software, Open Data, and Open Standards in the Caribbean: Situation Review and Recommendations*, UNESCO.

ABOUT THE AUTHORS

Dr. Deeply Gupta is working as an Assistant Professor in Central Institute of Educational Technology (CIET), NCERT. She has received her Ph.D. (Education) from IGNOU, M.Sc. (Chemistry) from Delhi University, B.Ed. & M.Ed. from Maharshi Dayanand University, Rohtak, M.Phil (Edu) from VMU. She has completed various online courses like Action Research in ET from NCERT, Online workshops from Wikieducator, COL, WizIQ, IGNOU, and IT4ALL. She had worked as an Assistant Professor under Guru Gobind Singh Indraprastha University for almost 6 years. She had presented several papers in various National and International Seminars and Conferences. Her 17 research papers/ articles/ chapters in edited books have published so far in various Journals of National and International repute.



Surbhi is working as an Assistant Professor in Central Institute of Educational Technology (CIET), NCERT. She is Co-coordinator, Trainer, and Online Mentor for ICT in Education curriculum for Teachers, developed by CIET, Part of core development team of ICT in Education curriculum for Teachers and Students and Co-Coordinator of Political Science subject for Massive Open Online Courses (MOOCs) for school education for SWAYAM. She has completed her B.Sc. (Hons) Computer Science from Delhi University and MCA from University School of Information and Communication Technology (USICT), GGSIPU. Her areas of specialization are ICT in Education, Computer Applications, Cloud Computing, Artificial Intelligence, FOSS, Cyber Security, Software Engineering, etc.

