

## **Experiences of Library Professionals on DSpace Installation**

**Lila Nyaichyai**

Central Department of Library and Information Science, TU

**Goma Luitel**

Library Officer

Kathmandu Model College

**Ram Krishna Maharjan**

Department of Electronics and Computer, IOE, TU

### **Corresponding Author**

**Lila Nyaichyai**

[lila.nyaichyai@cdlis.tu.edu.np](mailto:lila.nyaichyai@cdlis.tu.edu.np)

Received: June 07, 2021; Revised & Accepted: July 23, 2021; Published: July 31, 2021

© Copyright: Nyaichyai (2021).



This work is licensed under a [Creative Commons Attribution-Non Commercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

### **Abstract**

*DSpace, a free and open-source software (FOSS) provides the digital platform for building collections of an institution. Due to the lack of the skills to install and configure DSpace, librarians are incapable to conduct it even after the awareness about it. Identifying challenges about DSpace installation is vital to increase its use by librarians. Hence, it aims to explore the understanding of DSpace installation among librarians and to identify aspects of their experiences and feelings while installing DSpace. Librarians' experiences and feelings are important for accepting the software. Librarians were interviewed during the training program conducted on digital library technology from December 2020 to January 2021. Two groups were distinguishing from each other: one is with a library science background and another is with computer science and engineering background. The second group aswas self-sustained to install DSpace, once they got the guidelines for installation. Their views were reflected with the code terms status, exploration, feeling, activities, preferences, and inadequacy. Through their experiences, the aspects of challenges are the less experience of using the command line in computer use, the unavailability of teaching courses on Linux operating system in Library and Information Science (LIS) education, and the lack of self-exploration habits. Practice to*

*Linux commands, incorporate the Linux in the Library Science course, self-exploration, and consistent effort will help librarians in installing DSpace by themselves. Finally, librarians should internalize their goal to act as the administrator for the DSpace, not only as of the operator.*

**Keywords:** *DSpace installation, DSpace configuration, Experiences, Challenges, Inadequacies*

## **Introduction**

### **Background**

DSpace, an open-source software, was set open by the MIT team after it was successfully launched in MIT 2002 March. It is designed to operate in the UNIX platform, multi-tasking operating system together with other open-source middleware and tools. Other open-source software is PostgreSQL for the relational database management system, Apache and Tomcat, a web server and Java Servlet engine, etc. (Smith et al., 2003). A free and open-source software, DSpace builds a digital library, basically is employed for the institutional repositories. DSpace supports all sorts of file formats for submission. It permits changes in metadata fields as the local needs (Bollini, Cortese, Groppo, & Mornati, 2017; Navirathan & Jeyakanathan, 2018). There are flexibilities such as adding google analytics, email alerts, and so on. The provision of communities, sub-communities, and collection make users clear about the hierarchy of the knowledge management for the digital resources. Due to such useful features librarians are operating DSpace in libraries, however exceeding application operation, librarians are facing difficulties in administering the system as a whole. There are many studies on detail operational functionalities of DSpace. Studies on installation process are too technical for librarians. So, what technical information are difficult to grab for librarians and why is it tough for them? This study sought answer for these questions.

### **Current knowledge**

Information technology outsourcing is mostly applied in libraries for Nepal to install library software (Nyaichyai, 2017). Small libraries with few resources and a lack of human resources have applied IT outsourcing as the quick solution for the IT problems (Wang, 2011). Yet the question arises, is it the sustainable solution for libraries? Wang (2011) experienced the first challenge on installation while planning for the institutional repository. It is very common for every library. There are studies on the usability test of the DSpace installation process that suggested the use of system tools for the higher usability of DSpace installation (Korber & Suleman, 2008). However, it did not cover the problems encountered by librarians while installing DSpace.

### **Research Gap**

There is a plethora of research on DSpace software, many studies dealing with the functionalities of the software. Studies are dealing with the technical description. Some studies are on the experience of applying DSpace in their institution, and also use evaluation of DSpace

(Baudoin & Branschovsky, 2003; Smith et al., 2003; Tansley, Bass, & Smith, 2003). Some studies are related to the comparative study between DSpace, Fedora, Greenstone, Eprint software (Khan, 2019; Trambo, Shafi, & Gul, 2012). So, no studies have dealt with the installation process and experiences of librarians. Though DSpace is more and more popular in the library field, it is still lesser in number to be used in Nepal. In addition, most of the libraries in Nepal are depended upon outsourcing for the installation and maintenance of the DSpace software because there was a huge lacking of capable manpower within libraries. It is also identified as one of the major reasons for the lesser use of open-source software in Nepalese libraries (Neupane, 2017; Nyaichyai, 2017). So, this study revealed the real experiences of the librarians who are professional librarians and they are working in DSpace too. It described what they faced while installing DSpace in real-time and what their experiences are.

### **Research Objectives**

The first objective of this study is set as to explore the major aspects of the DSpace installation. Since this exploration helped to undertake necessary requirements for the librarians to be learned for installing DSpace, the explorative method was attempted for the study. Likewise, the second objective is to identify the challenges of DSpace installation. Once the challenges are identified, the librarians could be made prepared to cope with those challenges. Hence, in short, this study aimed to explore the understanding of DSpace installation among librarians and to identify aspects of challenges while installing DSpace.

### **Materials and Methods**

This study explored the understanding of DSpace installation among librarians, systems' librarians, and the fresher. The installation process comes at the first whenever the work on DSpace is planned.

The exploration was conducted while the DSpace software was installed by the participants. Three out of 7 participants were librarians, during the installation of DSpace, the mentor helped them in every step.

While on the other hand, the participants whose background is with computer science and computer engineering were self-sustained to install DSpace, once they got the guidelines for installation. They were found self-motivated to explore more about the software.

This study applied the qualitative research method that assisted to retrieve non-quantitative issues of information professionals and helped to dig out the human and social nature of information work (Gorman and Clyton, 1997, p. 31). This study revealed the participants' views and experiences regarding DSpace installation.

A training program, where DSpace installation was one of the courses, was held for the 3 months from November 2020 to January 2021. The trainees were given a document for the

installation of DSpace and side by side the instructor had observed the installation process. The trainees' background was varied; some belong to the library science field, some were computer science fields and some were very beginners for the DSpace software. The whole 7 trainees were interviewed regarding their experiences and understanding while installing DSpace. The interview was open-ended questions so that it could explore the common views from the interviewees. The interviews were conducted on the Zoom video conferencing software. Only one participant gave the face-to-face interview.

### **Population of the study**

The librarians in Nepal are found using DSpace repositories as the digital library platform for their libraries. Some of the names are Nepal National Library, Civil Aviation Authorities of Nepal, Nepal Health Research Council, Nepal Army Library, Tribhuvan University Central Library, and Central Department of Library and Information Science are some of them. Even so, the librarians are more engaged in working on the operational phase. As DSpace is open source software, it required particular knowledge and skill to install and apply it. Studies suggested the reasons behind using open source software are free distribution, the possibility of customization, and free from regular payment for the software license. Yet, the huge setback for applying open-source software is the lack of own experts available in the libraries (Choi & Pruett, 2019). It is rare to find in-house experts available in the case of Nepalese libraries. One has to use outsourcing for the expert service and the service providers are also countable. For this reason, the population for this study was also limited in numbers.

*Table 1: List of respondent*

Number of participants	Status of the respondents	Methods of data collection
4	Librarians with Library and Information Science Masters' degree, trainees	Interview on ZOOM application
1	The Library system's librarian graduated in Computer Engineering, a trainee	Interview on ZOOM application
1	A fresh graduate of Bachelor in Information Technology, a trainee	Interview on ZOOM application
1	An expert on DSpace, Masters' in Computer Science	Face-to-face interview

Source: Author compiled

### **Results and Discussions**

Data are based on the interviews. After recording those data, they were transcribed and extracted the meaningful expressions that reflected the main theme listed in the following table. The code terms were formulated as per the likeliness of the meaning and the context of their

views. The meaning of their sentences was particularly analyzed and defined the major 5 code terms accordingly. Their views were categorized into these 5 code terms and interpreted then.

The code terms and their definitions were as followed:

Table 2: interview coding

Code term	Code definition	Supporting quotes	Respondent
status	The respondent's professional and academic background that is supportive or less supportive for DSpace installation	Though it was the first time that I am installing DSpace, I studied Bachelor in Information Technology for 4 years and worked a year in a Linux operating system, where I eventually installed different software, and hence learned assigning, and changing passwords and different package installation, etc., as it is done during DSpace installation.	(R1)
		2. I am familiar with DSpace for the last 2 years. Moreover, I participated in DSpace training programs. In addition, I had learned MS-DOS commands, which helped me a lot to understand Linux commands and helped to build my confidence for working in a Linux environment, which is the basis for DSpace installation.	(R2)
		3. Before 6 years, I knew about DSpace software that is very useful for the full-text database, but I did not know the installation process. However, the 6 months course I did on Red Hat Linux helped me to understand the DSpace installation.	(R3)
		4. I participated in DSpace installation training, so I can install DSpace following each step of the installation document.	(R4)
		5. Being a masters' graduate in computer science, I worked in Madam Purashkar Library as a systems'	(R5)
			(R6)

	librarian, where I worked in DSpace for a long time.
	6. I knew about DSpace when I participated in the training in 2011, but (R7) could not install it by myself before. Now I learned it in another training.
	7. I am graduated in computer science and a masters' graduate in computer systems and I am working as a system analyst at the Eastern University, Sri Lanka for 9 years. I did self-studies to learn about DSpace
exploration	The respondents "Everything is possible to find in search for the Google and I know which site may solution in Google provide for the particular problem. So if any unknown it helps proper troubleshooting" (R1) problems occur during DSpace installation "The error code could be searched in Google that will bring us to right solution"
feeling	One's intuitional understanding about the installation of DSpace "In the training, I can install DSpace by following all the steps one by one. (R4) "I think there is the need of basic IT knowledge at least, hardworking, continuity, and dedication is important" (R7).
activities	The action followed by the participants when installing DSpace. "Note down the steps while installing DSpace. It will help to identify the problem if some occur" (R1) "I do an internet search for finding a solution of problems occurred or asked mentor's guidance, my mentor" (R2) one requires answers to tiny problems too. "I tried to solve with the backup configuration files, if not solved, I will reinstall DSpace" (R3) " I did Google search to find the solution of the problems, I have gone through during the installation" (R6)

---

Preference	<p>The reason for liking and preferring DSpace software is that “The sample of configuration files are kept in various packages of DSpace. If any mistakes took place during configuration, it could be retrieved easily.” (R1)</p> <p>“Real-time installation is better than Live-DVD installation” (R1)</p> <p>“I prefer DSpace due to the easy interference of it” (R5)</p> <p>“I have installed DSpace in many libraries, they are performing well in various libraries. So, I would prefer it to use” (R3)</p> <p>The “small sized library can install from live DVD but large-sized library should follow real-time installation.” (R6)</p>
Inadequacy	<p>The experience that the respondent felt about DSpace. I will know it only after lack of knowledge my mentor told about it. I am and skill to solve dependent upon my mentor. The less problems, during habitual to use Linux is major lacking the installation of part” (R2)</p> <p>DSpace.</p> <p>“Even after successful installation of DSpace, some problems arise during hosting. I could not get proper troubleshooting.” (R3)</p> <p>“I don’t have proper knowledge on solving problems it occurs while installing DSpace. I can just follow the steps given in the document of DSpace installation” (R4)</p> <p>“As a student of library science, I know what a DSpace can do, but I don’t know that there are so many technical things to know to be able to install DSpace.” (R6)</p> <p>“I have still more to learn about document object identifier, handle</p>

---

server and mailing list provisions in DSpace” (R5)

“ it is difficult for a librarian to learn all technical things” (R5)

---

Source: Data collections

### **The status of respondents**

The respondents with computer science or engineering background are more confident in the DSpace installation process than other respondents with different academic fields. A respondent told “though it was the first time I am installing DSpace... I felt comfortable in downloading different packages, changing the password, and so on because these sort of tasks were experienced during my job.” The respondent studied Bachelor in Information Technology. In the same way, another respondent claimed that just after being post-graduate in computer science, he worked in a library and started to work for DSpace that continued for a long time which was true for the Sri Lankan respondent too who learned DSpace only through self-studies and he is also a post-graduate from Computer Science field. While on the contrary, the respondent from the library science field had gone through the training programs on DSpace and learned to install DSpace through the mentors. The common point with both categories of the respondent that they are confident that the installation process is much possible in their working environment and implementing it too.

The Computer science, computer engineering graduates and Information Technology graduates are confident because they have a technical foundation, so they have many capabilities to learn by self too. Open-source software installation requires basic knowledge of Unix Operating System because that software is built on Unix operating system. In contrary to the daily computer work, the general works in the computer is conducted in Graphic User Interface (GUI) in Windows Operating System and librarians, as common people are habitual to use it. The problem lies over here. As Choi and Pruett (2019) surveyed over 179 information officers, and chief of technology officers of academic libraries of United States came with the findings that the lack of technical expertise in applying open sources software and the lack of customization capacity are major reasons for not implementing them in libraries. So, enabling library personnel to understand and use the DSpace is the primarily important thing.

### **Reason for preferring DSpace**

Nevertheless, the digital library software DSpace is mostly liked by the respondent. All 7 respondents preferred using DSpace software for making a digital library. The reasons were varied. A respondent (R1) found “The sample of configuration files are kept in various packages of DSpace. If any mistakes took place during configuration, it could be retrieved easily.” These configuration files help to customize the DSpace as the local requirement. For

customization purposes, installing DSpace in real-time installation is suggested by all respondents rather than Live-DVD installation. Live-DVD installation is an easier installation tool, where all the configurations are already completed, while the real-time installation required all the needed configurations. Studies showed that the use of high-level system installation tools would increase the usability of installation. The installation process should compress lower-level tasks (Körber & Suleman, 2008). In regards to the installation of open-source software Koha, Kumar V and Jasimudeen (2012) found that the complexity of installation process of the open-source system made librarians hesitate to implement it, while the availability of Live DVD for the Koha installation made it popular in India. However, this study resulted in the respondents' preferences for the real-time installation because it gives the facility to install the latest version while Live-DVD always is the previous version and has limited room for customization too.

Other studies have also indicated the growth of popularity for the use of DSpace. Biswas and Paul (2010) had explored the larger use of DSpace as the list of the world's libraries record showed, and Parabhoi, Pareek, and Priya (2019) also claimed for the more popular of DSpace based on the Youtube videos posted and viewed by the audience. The study claimed that the videos on installation and configuration of DSpace are more. So, installation and configuration are mostly sought aspects for those who are interested in DSpace because these steps are the initially needed one.

### **Feeling erupted during DSpace installation**

Once the respondents had learned how to install DSpace with the help of a mentor, they desire to install it independently. In the case of library science students, they felt that they can install by themselves after the training that they had participated in. A respondent expressed "I can install DSpace by following all the steps one by one...but if any problem arises, it will be challenging to me". The problem solution is an unexplored part for the respondent while it was also viewed by another respondent (R1) that "the error code could be searched in google that will bring us to right solution". The respondent was quite familiar with the solution finding my own. But on the other hand, a respondent who is newly introduced to Linux operating system had difficulties faced. Because DSpace is originally built on Linux, so it is more likely to operate on Linux rather than in Windows operating system, though it is possible to install in a Windows environment. In this regard, a respondent (R2) explained her views "in addition, I had learned MS-DOS commands, which helped a lot to understand Linux command." She further suggested including a Linux commands course in the Masters' Degree of Library and Information Science so that librarians could work a lot in Free and open-source software like DSpace that is particularly useful for libraries.

### **Exploration for the solution and knowledge on DSpace**

Information on DSpace installation is possible to find on [www.wiki.lyrasis.org](http://www.wiki.lyrasis.org) and it is possible to search for the solution to various problems. There is the number of discussion groups where

problems and solutions are given. But if there is a lack of computer knowledge, the given solutions will be unable to understand. All of the respondents expressed that they do google searches for finding solutions to problems that occurred with during installation. The (R7) respondent told that he spent 3 years exploring the DSpace installation process and finding solutions for problems that he had gone through. He started to study on DSpace in 2009 and succeed to install it fully in 2012. He has used documents provided in different conferences too. So he is much confirmed, “I think there is the need of basic IT knowledge at least, and the hardworking, continuity, and dedication are another important thing to be successful in the installation of DSpace.” It is true for all sort of task, however, it is more true for learning new things particularly of those that is technical.

### **Activities followed during DSpace installation**

Activities are the action followed by the respondent during DSpace installation. In addition to the mentor’s guidance, the respondent required varieties of things to be careful about. So, a respondent (R1) suggested “Note down the steps while installing DSpace. It will help to identify the problems if some occur.” While another respondent (R3) said “I tried to solve with the backup configuration files, if it does not work out, I will reinstall DSpace.” The most followed solution are searching the internet whenever problems occurred. Hence, online platforms for discussing the particular DSpace are very important. If the user does not know how to sign in to those platforms is another inability that could prevent accessing solutions when a problem occurs. It is for sure that once the learning and working in DSpace triggers, a learner can access many platforms for which continuous efforts is the must.

### **Inadequacies felt during the DSpace installation**

Even though there are many means to find the solutions for problems that occurred during DSpace installation, respondents have expressed their inadequacies encountered during DSpace installation. A respondent (R2) worried about not being timely updates on the DSpace unless she was made aware by her mentor. She said “I don’t know the updates available about DSpace. I will know it only after my mentor told about it. I am heavily dependent upon my mentor. The less habitual to use Linux is a major lacking part.” Her views arouse the urgent need for continuous effort even after once installed DSpace. The new updates give new services and it is important to be updated so that it could be used along with other software too. While another respondent (R3) further encountered another kind of inadequacies. He explained “Even after successful installation of DSpace, some problems arise during hosting. I do not get proper troubleshooting.” The knowledge of installation is not sufficient but need to learn the proper hosting process for it. It requires IT professional help. While the newly learning respondent (R4) had accepted that “I don’t have proper knowledge on solving problems. I can just follow the steps given in the document of DSpace installation.” The learning phase always starts from copying through proper documents. It encourages to keep going because the prepared documents provide few mistakes and guide a way to follow. But of course, the prepared document may not be sufficient while working on real-life situations. So another respondent

(R6) described “as a student of library science, I know what a DSpace can do, but I don’t know exclusively that there are so many technical things to know to be able to install DSpace independently.” The Library science course is more focused on managing physical books rather than managing digital resources, so it made the library science graduate are challenged with inadequate capability for working on DSpace software. Hence, a master's graduate computer scientist emphasized: “it is difficult for a librarian to learn all technical things.” For himself, the respondent (R5) planned to learn more about various aspects of DSpace. He said “I have still more to learn about document object identifier, handle server and mailing list provisions in DSpace”

### **Conclusions and Recommendation**

Inadequate knowledge and experience are the major hurdle in DSpace installation that has contributed to the fewer adoption of the software in Nepalese libraries. Even professional librarians (who graduate a Masters’ of Library and Information Science) in Nepal has lack installation and configuration knowledge about DSpace, even though, they have been using the software in their libraries. They had used outsourcing for the installation and configuration. The study found the first lacking is about the habit of using a computer through the command line. It was also correctly discussed by Tomer (2017) in his article “Cloud computing and virtual machines in LIS education: options and resources” that many librarians are expected to work in Graphical User Interface rather than in the command line. It made librarians strange toward the use of Linux Command lines. The absence of a Linux Operating System course in Library and Information Science (LIS) education is a major reason for being ignorant about the command line that is the basics for the DSpace installation process. Likewise, the concept of the command line is important if any task like a copy, paste, deleting, creating fidders are to be performed during the installation process.

Secondly, the habit of searching error code on the internet is a commonly used solution by the respondents, which is a useful tool for self-studies too. Nevertheless, the capacity to understand the given solution is another vital thing, in absence of which is useless for the user. So, in such conditions, the availability of a mentor for the DSpace installation is inevitable, who can make understand the user. Similarly, the installation document had contributed to assist installing DSpace.

Whatsoever the hurdles came across if a user is consistent and laborious for learning about the software, it turns understandable and applicable as the respondent (R7) had gone through his experience who started to learn DSpace in 2009 and succeeded to install by self in 2012. He, as one of the authors of the article ‘Digitizing the Ceylon Collections: a case study of the library, Eastern University, Sri Lanka’ urged the need of the combined effort of IT experts and librarians, which they did in their university (Navirathan & Jeyakanathan, 2018). They digitized the Ceylon collection even without proper training on the functioning and technicalities of DSpace, but they succeed. They have a computer science background. The major thing to be noted is

that the respondent has a computer science background not a library science background. It suggested the importance of computer knowledge behind for achieving the success in learning about library software including DSpace. Unless librarians learnt about how the software work and how they could be installed, configured and customized, they could not be the manager for those software (Tomer, 2017). It is not sufficient to learn only the operational system of software for the librarians. Librarians require exclusive knowledge about library software, however, the respondent (R5) explained the impossibility for librarians to learn all technical things.

The possible solution is the adopting the required portion of ICT course in Library and Information Science education too because library services are depended more on information communication technologies in a speedy way. Unless the graduates of LIS education learned ICT-related knowledge, they could act in implementing new avenues of library services. DSpace is one such tool that can be used to build a digital library. Once Nepalese librarians are capable to be system administrators in DSpace, it is much possible to use in many libraries and Nepal be rich in having digital content. It helps for the knowledge management of each institution.

### **Acknowledgments**

I am grateful to the University Grant Commission (UGC) Nepal for providing scholarship to conduct my Ph.D. research entitled 'Usability Test of DSpace Software and its Application for Plagiarism Checking.' The UGC scholarship identification number is PhD-74/75-H&S-07. we acknowledge the international digital library technology training organized by VuFind Software and the the trainees who agreed to be interviewees for this research. At last but not least, we thank the Central Department of Library and Information Science, TU and the Dean Office of Humanities and Social Science, TU for the continuous support.

### **References**

- Baudoin, P., & Branschofsky, M. (2003). Implementing an institutional repository: the DSpace experience at MIT. *Science & Technology Libraries*, 24(1-2), 31-45. doi:[https://doi.org/10.1300/J122v24n01\\_04](https://doi.org/10.1300/J122v24n01_04)
- Biswas, G., & Paul, D. (2010). An evaluative study on the open source digital library softwares for institutional repository: special reference to Dspace and Greenstone digital library. *International Journal of Library and Information Science*, 2(2), 1-10. doi:<https://doi.org/10.5897/IJLIS.9000011>

- Bollini, A., Cortese, C., Groppo, E., & Mornati, S. (2017). *Extending DSpace to fulfil the requirements of digital libraries for cultural heritage management*. Paper presented at the IRCDL 2017 Conference. Modena: IRCDL.
- Choi, N., & Pruett, J. A. (2019). The context and state of open source software adoption in US academic libraries. *Library Hi Tech*, 37(4), 641-659. doi:<http://dx.doi.org/10.1108/LHT-02-2019-0042>
- Khan, S. (2019). DSpace or Fedora: which is a better solution? *SRELS Journal of information management*, 56(1), 45-50. doi:<https://doi.org/10.17821/srels/2019/v56i1/139265>
- Korber, N., & Suleman, H. (2008). *Usability of Digital Repository Software: A Study of DSpace Installation and Configuration*. Paper presented at the International Conference on Digital Libraries: Universal & Ubiquitous Access to Information.
- Körber, N., & Suleman, H. (2008). *Usability of digital repository software: a study of DSpace installation and configuration*. Paper presented at the International Conference on Asian Digital Libraries.
- Kumar V, V., & Jasimudeen, S. (2012). Adoption and user perceptions of Koha library management system in India.
- Navirathan, G., & Jeyakanathan, M. (2018). Digitizing the Ceylon collections: a case study of the library, Eastern University, Sri Lanka. *Journal of the University Librarians Association of Sri Lanka*, 21(2). doi:<https://doi.org/10.4038/jula.v21i2.7921>
- Neupane, R. (2017). Hurdles of open source integrated library system implementation in Nepal. *Library Day Souvenir*, 10, 137-141.
- Nyaichyai, L. (2017). Glimpses on digital library in Nepal. *Library Sovenir*, 10, 101-105.
- Parabhoi, L., Pareek, N., & Priya. (2019). Examination of YouTube videos related to DSpace *Library Philosophy and Practice (e-journal)*, 3(31), 1-15.
- Smith, M., Barton, M., Bass, M., Branschofsky, M., McClellan, G., Stuve, D., . . . Walker, J. H. (2003). DSpace: an open source dynamic digital repository. *D-Lib Magazine*, 9(1).
- Tansley, R., Bass, M., & Smith, M. (2003). *DSpace as an open archival information system: current status and future directions*. Paper presented at the International Conference on Theory and Practice of Digital Libraries.
- Tomer, C. (2017). Cloud computing and virtual machines in LIS education: options and resources. *Digital library perspectives*, 33(1), 14-139. doi:<https://doi.org/10.1108/DLP-02-2016-0008>
- Tramboo, S., Shafi, S., & Gul, S. (2012). A study on the open source digital library software's: special reference to DSpace, EPrints and Greenstone. *International Journal of Computer Applications*, 59(16), 1-9. doi:<http://10.5120/9629-4272>
- Wang, F. (2011). Building an open source institutional repository at a small law school library: is it realistic or unattainable? *Information Technology and Libraries*, 81-85.