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Creating Institutional Repository in Libraries: The DSpace Experience in Pakistan

Muhammad Safdar

National University of Sciences and Technology (NUST) Pakistan, safdargr8@gmail.com

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Creating Institutional Repository in Libraries: The DSpace Experience in Pakistan

Abstract

The purpose of this study was to know the experience of Library and Information Science (LIS) professionals of Pakistan about creation of the institutional repositories (IRs) using DSpace at their institutions. This study also explored the success factors, problems in the implementation of the DSpace and solutions. To meet the purpose, study was conducted in the multiple phases. In the first phase, the relevant literature was reviewed. On the basis of reviewed literature, an interview guide was developed for data collection. Data was collected from LIS professionals of renowned Lahore based universities such as Lahore University of Management Sciences (LUMS), University of Management & Technology (UMT) and COMSATS Institute of Information Technology. Results of the study revealed that lack of trained staff was one of the major problems in creating the institutional repositories. This study being first of its kind is unique in terms of topic and nature. It involved professionals of LUMS, COMSATS and UMT for their experience in creation of IRs using DSpace. This study is of value for organizations and professionals to understand the problems involved and their possible solutions for successful implementation of DSpace for creation of IRs.

Keywords: Institutional Repository (IR); Digital Library; DSpace; Open Access; LUMS; UMT; COMSATS.

Introduction

Libraries around the globe are working on the creation of IRs to facilitate their faculty and researchers in meeting their educational as well as research needs. IRs also serve the purpose of preservation of the material. Libraries use different applications i.e. Greenstone, DSpace, E- Prints etc. for developing their IRs. Concerned professionals and researchers have shown interest in studying the IR and DSpace software (Tramboo, Shafi, & Gul, 2012).

DSpace is one of the world's popular open source software developed by Massachusetts Institute of Technology (MIT) Libraries and Hewlett-Packard for managing the

digital collections of institutions (Dulek, 2019). It is being used worldwide. Many institutions in Pakistan are trying to develop their IRs using Dspace.

Anuradha (2005) defined the IR as “digital collections that capture, collect, manage, disseminate, and preserve scholarly work created by the constituent members in individual institutions” (p.169). Palmer et al. (2008) narrated that organizations are preparing policies regarding the creation of IRs.

DSpace has been a subject of interest for the researchers (Barov, 2020; Formonek, 2021; Hamill, 2019; Kumar, 2017; Satish, 2019). However, in Pakistan there is a dearth of literature as well as awareness on the subject.

Lahore University of Management Sciences (LUMS), University of Management & Technology (UMT) and COMSATS Institute of Information Technology are renowned Lahore based institutions of Pakistan. These universities offer various educational programs in the field of Management and Engineering. These are trying to meet the modern academic and research needs of their faculty, researchers and pupils. To cater the educational and scholarly needs of their communities, library professionals of LUMS, UMT and COMSATS have recently worked on the creation of institutional repositories using DSpace at their institutions. This paper dilates upon the advantages of Dspace, problems involved and the remedial measures for creating IRs. It also focuses on the need and importance of IRs in the current era. Efforts have been made to explore the experience of library professionals regarding creation of IRs at universities of COMSATS, UMT and LUMS.

Research Objectives

- To determine the significance of IRs.
- To ascertain the reasons for preference of DSpace.

- To identify problems faced by professionals in the process of DSpace' implementation.
- To find out the solutions for the above problems.

Research Questions

- What were the reasons for creation of IR?
- What were the reasons for preference of DSpace?
- What were the major problems faced in implementing DSpace?
- What solutions emerged for the problems faced in implementing DSpace?

Literature Review

Lynch (2003) defined IR as “a set of services that institutions offer to the members of its community for the management and dissemination of digital materials created by the institution and its community members” (p.2). Palmer et al. (2008) conducted a study on “strategies for institutional repository development: A case study of three evolving initiatives” and revealed that organizations are developing the repository to preserve the research output produced by their researchers.

DSpace is free open source software (Dulek, 2019) and being used for institutional repositories' development (Satish, 2019). Foster & Gibbons (2005) narrated that open access to the research contents is popular among the educational institutions and research scholars. Authors highlighted that DSpace is a tool also popular among the institutions for the creation of IRs. Researcher mentioned that DSpace has been downloaded by vast number of institutions and members of organizations. Authors further revealed that there were a less contents in the IRs. Biswas & Paul (2010) argued that open source software is meeting the needs of developing nations for making their research output accessible to their scholars.

Authors considered DSpace as one of the best application for creating the IRs. IRs

are helpful in improving the services of the libraries. Authors considered the option of content's submission by the users themselves as key advantage of Dspace. Thakuria (2008) pointed out that various free and commercial tools are available in the market for the development of IRs. However DSpace is a freely available tool which helps in creating IR in an economical manner. Author further highlighted the significance of IRs quoting that IRs facilitate the organizations in managing and preserving their electronic data. These also plays a significant role in facilitating mutual collaboration and coordination. Open source applications also prove economical.

Bainbridge et al. (2006) revealed that DSpace is used for development of IRs and institutes prefer it to preserve their research contents. Author further stated that professionals can customize this application as per their needs. However the extent is limited. Another prerequisite is the services of information technology professionals for installation purposes. Chen (2012) narrated that DSpace is helpful in storing and accessing the electronic information contents. However, there is a need to customize the DSpace functions to meet the requirements of the users. Smith et al. (2003) narrated that DSpace is an effective tool available for institutions. Institutions can customize it as per their local needs. Authors highlighted that it is time consuming to handle and segregate the information produced by the various researchers. Therefore it is helpful to develop the IRs for collection, storage and dissemination of information.

Biradar & Banateppanavar (2013) concluded in their study on the topic "Steps for Developing Digital Repository using DSpace: An Experience of Kuvempu University" that IRs have the edge for their capacity to store huge research material and other literature in a little space. Authors further argued that cost of managing the IRs is lower than maintaining the traditional libraries. Doctor & Ramachandran (2008) narrated that researchers and faculty produce research work and get it published in many journals, books reviews, conference

proceedings etc. Authors suggested that this research is of significant value and IRs are best means for its long term preservation. Researchers further narrated that IRs will also facilitate the sharing of the research output and knowledge.

Chimah et al. (2015) concluded in their study that library professionals and academic institutions create the IRs to store the research material for future dissemination. Authors also concluded that digital libraries are the applications which give the surety of materials' preservation and its usage for future research projects. Covey (2011) narrated that it is the top priority of many academic institutions to develop IR to store and share the digital material.

Chan (2004) concluded that IRs are still in development phase. Author further highlighted that these repositories do help in timely access to research materials. Shen (2012) narrated that many researchers used the IRs on the suggestion of their teachers and colleagues. Author found that users accessed the repositories to stay abreast with the latest research output of their institutions.

Shewale (2012) concluded in his study that there is valuable and rare print material which needs to be digitized for future use. Author further narrated that there is a demand from researchers for the rare materials. Therefore it is pertinent that professionals should make such materials available in digitized format online. Jain et al. (n. d.) pointed out that academic institutions have realized the importance of IRs for the storage and dissemination of scholarly information. Authors further mentioned that IRs play an important role in archiving and sharing the information. Researchers mentioned that ever increasing volume of the electronic material has made it difficult to archive, preserve, and disseminate the entire digitized material.

Nagatsuka & Koremura (2004) conducted a study on "Trends of the Institutional Repositories on Agricultural Universities in Japan" and concluded that IRs are very good sources for sharing the electronic material. IRs can meet multifaceted needs of the institutions.

Authors narrated that IRs can effectively store multidimensional data or information.

Tansley et al. (2003) narrated that institutions are opting for the IRs due to the growth in research output in the digitized format. Institutes want a constant application, which can manage their research contents for future access. Authors pointed out that there are many institutes, who have successfully installed and implemented the DSpace for creation of their IRs.

Bankier & Perciali (2008) narrated that academic institutions are now publishing their research work in digitized format. They also encourage their scholars to share their research materials. Authors that universities ask the authors to store their materials in IRs to facilitate its use or publishing with the open access journals.

Tramboo et al. (2012) pointed out that there are different applications, which help in developing the digital libraries. Authors revealed that growth in the volume of information has altered the ways for its timely retrieval. Authors stated that every tool has its own scope. Hence, commensurating with their respective requirements, organizations select or rely on variety of tools for storage and dissemination of their respective contents.

Ren (n. d) highlighted that users of an IR include academicians, library staff, students, administrators, internal research staff, and external researchers. Rieh et al. (n. d) found out that participants of the study endorsed the merits of IRs. Respondents considered that the collection of research output of their organizations' scholars was the significant advantage of repository. Baba et al. (2011) stated that highlighting the advantages of the IRs to research community can play a vital role in contributing towards the growth of IRs. Authors opined that, in this way, collections of the IRs can also be improved.

Although, concept of IRs in the developing countries is not yet implemented to desired level, however professionals and researchers are well aware of the significance of IRs. Making the print material available in digitized format will enhance the use of resources. It

will also play a vital role in satisfying the academic and research needs of the students, faculty and researchers.

Elliott et al. (2008) created an add-on facility for repository. It helps the users in book marking their liked items and also facilitates them in finding the resultant recommendations, generated on the basis of book marked items. It will attract the users, who engage in the scholarly communications.

Cullen & Chawner (n. d) stated that library centers have been experiencing the reception, storage, access and dissemination of information from centuries. They have experienced the various modes of accessing, managing and sharing the information. In the current era, libraries are forced to adopt new technology i.e. IRs for storing and sharing the information.

Alexia & Zervas (n. d) revealed that creation of the IR can be a demanding process as it involves academic community as well as the research output. Barwick (2007) highlighted that copyright is also an important challenge for IRs. Author further narrated that most of the publishers of the journals ask the authors for copyright agreement at the time of article submission. Author is of the view that sustainability of the IRs is also an important factor. Author revealed that librarians have to play a role to market and advocate the IRs. Sharif (2013) narrated that IRs are used to store, maintain and share the digital materials. Author also counted the copyright as a challenge. Author narrated that to get the permission from the owner of the research material was also a problem. Fatima and Tahira (2009) concluded in their study that less technological skills of LIS professionals is a prominent hindrance in developing the digital libraries. Authors further highlighted that it is necessary to equip the library staff with the technological skills to meet the challenges in developing the digital libraries.

Russel & Day (2010) concluded that less deposit in the IRs is a challenge for the

institutions. It shows that there is dire need to do more in this context. Organizations need to convince the researchers for usefulness of the repositories. Jean et al. (2008) highlighted that some respondents described Wikipedia as an IR. Researchers came to know about the application through their teachers, Google, library workshop, institutions etc. Alemayehu (2010) stated that the users were not well aware about the existence of IR. However, they had interest in depositing the material in IR. Users were willing regarding the free use of their research output by others. Author further narrated that users are the central factor in making these repositories successful.

Chapman et al. (2009) concluded that metadata is an issue faced by the organizations using IRs. However, institutions have adopted different procedures to tackle with this very metadata problem to cater for their contents' needs. Institutions customize the open source technology as per their needs, which help them in managing their data. Authors further stated that LIS professionals upload the research contents on the part of teachers.

Da Rosa & Lamas (2012) highlighted that poor nations have many issues in the development of IRs. They ascertained limited access to technology and poor quality of internet as primary reasons, which deprive the residents of developing countries from in using the IRs.

Mohammed (2013) concluded that IRs help the research scholars in sharing their research contents with their colleagues. It also helps in opening discussions and bringing improvements in the contents. Researcher highlighted internet speed, funding, less technological skills of staff, lack of awareness etc. as the challenges in implementing the concept of IRs in Nigeria.

Davis & Connolly (2007) highlighted that there are many factors responsible for the less usage of the IR. Authors identified less awareness, limited contents or non-existence of suitable collections in the IRs as key factors. Authors further counted the fear of plagiarism as

one of the barrier in the depositing of research output in repositories by the users. Research scholars feel reluctant to deposit their research contents due to lack of familiarity with the purpose and scope of repositories.

Sterman (2014) narrated that less technical skills, limited funds, institutional policies, licensing of documents, less manpower, collection of contents from researchers etc. are the hindrances in implementing the concept of IRs. Author further stated that open source as well as purchased software for the IRs will have their own merits and demerits in implementing the concept of IRs.

Lagzian et al. (2013) presented a model related with success factors for creation of the digital libraries. Authors counted the factors such as motivation, resource, people, process, location, and time, which ensure the successful implementation of digital libraries' concept.

Method

Qualitative research design was utilized to conduct this study. Interview guide was used to collect the data from LIS professionals of Lahore University of Management Sciences (LUMS), University of Management & Technology (UMT) and COMSATS who remained involved in the process of DSpace's implementation and creation of IRs at their respective institutions. A questionnaire was developed on the basis of reviewed literature, experts' opinion and consultation with the peers. Prior to visiting the concerned professionals, appointments were taken for the interview. These in-depth, semi-structured interviews were conducted in the libraries of the interviewees. Before the interview, a brief introduction and purpose of the study was shared with the participants. Interviews were recorded using smart phone, after obtaining their consents. To avoid any inconvenience to other staff of the institution, 50% of the interviews were conducted in a separate room outside the offices of the interviewees and remaining 50% of the interviews were conducted in the offices of interviewees. Appropriate measures were taken to ensure conducive environment for the

smooth conduct of interviews. Thematic approach was used to categorize and analyze the text of the recorded interviews.

Results

Findings Related to DSpace Selection

Following are the main reasons extracted from the participants' responses related to DSpace selection:

- Availability of Dspace as open source software was primary reason for its selection.
- It is very flexible and can be customized as per user needs.
- It is user friendly.
- Getting help regarding the application is very easy.
- Features of DSpace are very good.
- It is a new application so one should learn the new technology and harvest its benefits.
- DSpace is already adopted by world's best universities and organizations.
- Participants explored Greenstone, Eprints but DSpace attracted them due to its features and openness.

Prior to selection of Dspace, respondents consulted other DSpace users, who also encouraged and advised its use. Interviewees visited different websites, read literature, documentation, tutorials etc. prior to selection of DSpace and found it economical and effective tool for creation of IR.

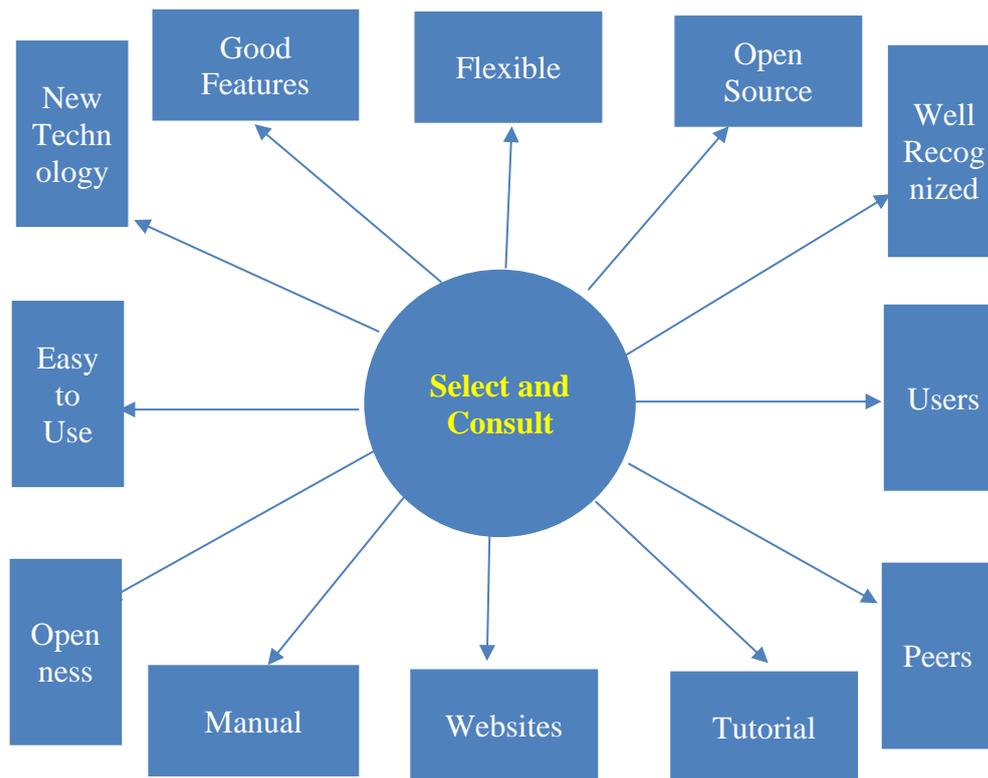


Figure 1. Factors Contributed towards DSpace Selection

Interpretation and Discussion

Findings of study indicate that interviewees preferred DSpace because it is an open source application. One interviewee highlighted “we definitely wanted to go for open source software”. Studies by Biswas & Paul (2010) and Thakuria (2008) found the same results regarding the use of open source applications by developing countries. Majority (83%) of the interviewees mentioned that user friendly features of Dspace attracted them. Professionals prefer the applications which are already adopted by well renowned institutions and organizations. Results of this study also confirmed that respondents preferred DSpace because it is the product, which is already adopted by world’s renowned institutions. Respondent further narrated that it is a product of MIT, a well renowned institution, so it is easy to justify it with administration or higher authorities for seeking their approval. Most (67%) of the interviewees revealed that reading of available literature, DSpace manual and taking online tutorials prior to the selection of DSpace added their confidence in the product. One

respondent highlighted “No, we did not consult other DSpace users but we had consulted different sources of information available on internet”. Another interviewee mentioned “we did not actually contact the users or any library which was using the DSpace. However we did visit their repositories and evaluated them and read literature on those repositories”.

Findings Related to Need Assessment for Creation of IR

Following is the summary of points extracted from the interviewees’ responses related to need assessment for creation of IRs:

- IRs provided a common collection point for multi-source data and information.
- IRs facilitated sharing the research output with other researchers and students of the institution.
- All the participants mentioned that they consulted their faculty, who supported the concept.
- Staff requirement and other allied imperatives emerged as under:
 - There is a need to hire more staff to implement the concept of IR.
 - Few participants suggested that merely the role of existing staff can be changed.
 - Actual requirement of staff will be dependent upon peculiar needs of respective institutions.
 - IRs can be efficiently managed with existing staff after suitable training.
 - An appropriate arrangement for training of staff remains a key prerequisite for smooth implementation of DSpace.
- Availability of adequate funds is also vital for successful development of IRs.
- Hiring of additional staff will also entail extra recurring expenditure.

- Staff training and purchase of project related hardware such as servers, scanners, hard drives etc. have financial implications, which merit due consideration.

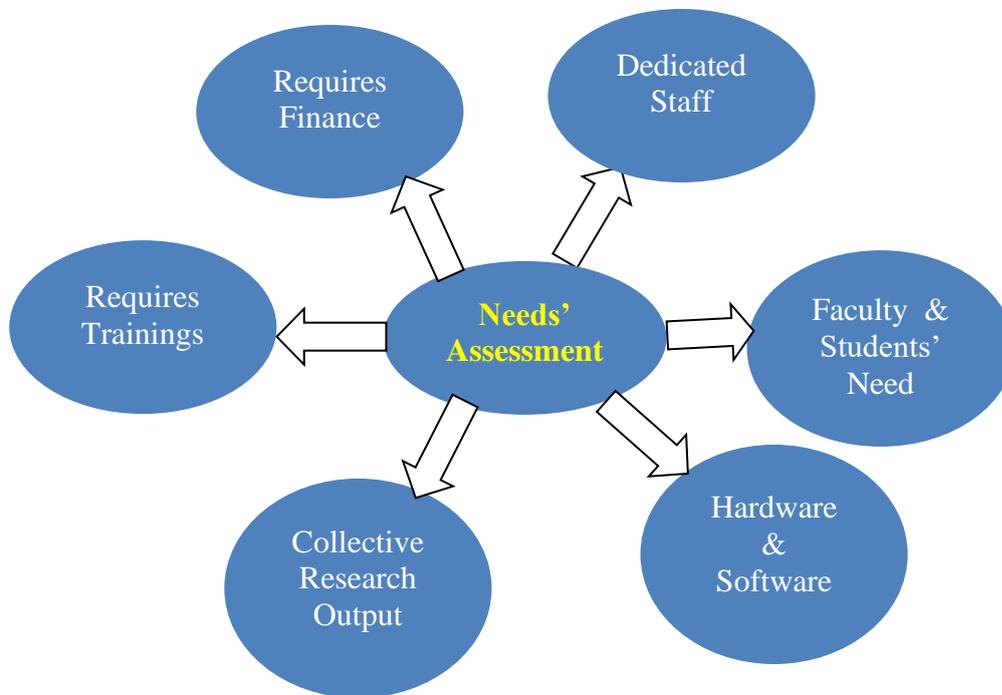


Figure 2. Needs' Assessment

Interpretation and Discussion

Primary objective of repositories is to get the research output of the institutions at one central point. Results show that all the interviewees mentioned that they created the IR to get the university research and related collection at one place for sharing it with other researchers and students of the university. As one interviewee mentioned “there was no central hub, even any hub”. Many previous studies already produced similar results (Chimah et al., 2015; Covey, 2011; Doctor & Ramachandran, 2008). Faculty is always considered as the most important stakeholder of any educational institute. This study found that 100% of the interviewees mentioned that they consulted the faculty prior to repository’s creation. One respondent mentioned “yes, we did this, we have a library committee which deals with all the issues related to the library information services”. He further revealed “we initiated this idea through that committee. It took all the stake holders except students on board, who fully

supported the development of such kind of repository”. All the interviewees also highlighted that preservation was another reason for creation of the IR. One interviewee remarked “so, to preserve the student intellectual assets, to facilitate the users, particular new intake users, we have decided to create the IR”. Many studies produced the same results (Bainbridge et al., 2006; Jain et al., n. d.; Palmer et al., 2008). Majority (83%) of the interviewees considered availability of adequate staff, suitable training arrangements and provision of required funds as the essential prerequisites for successful implementation of the concept.

Findings Related to Problems in Implementing DSpace and Solutions

- Below are the main findings extracted from input of the study’s participants:
- Lack of infrastructure in institutions is a major problem in creation of IRs.
- Less trained staff and their limited IT skills are also real problem in implementing DSpace.
- Lack of support from IT department is also an impediment.
- Conversion of data remains a big issue while creating the repository.
- Copyright issue hampers the efforts for acquisition of research documents.
- Availability of an independent or dedicated server can facilitate issues of installation and storage.
- Help from IT professionals proves vital to solve the technological problems faced during the creation of the repository.
- DSpace community can also significantly contribute in resolving the faced problems.
- Training of the existing staff remains important for sustainable development of IRs.

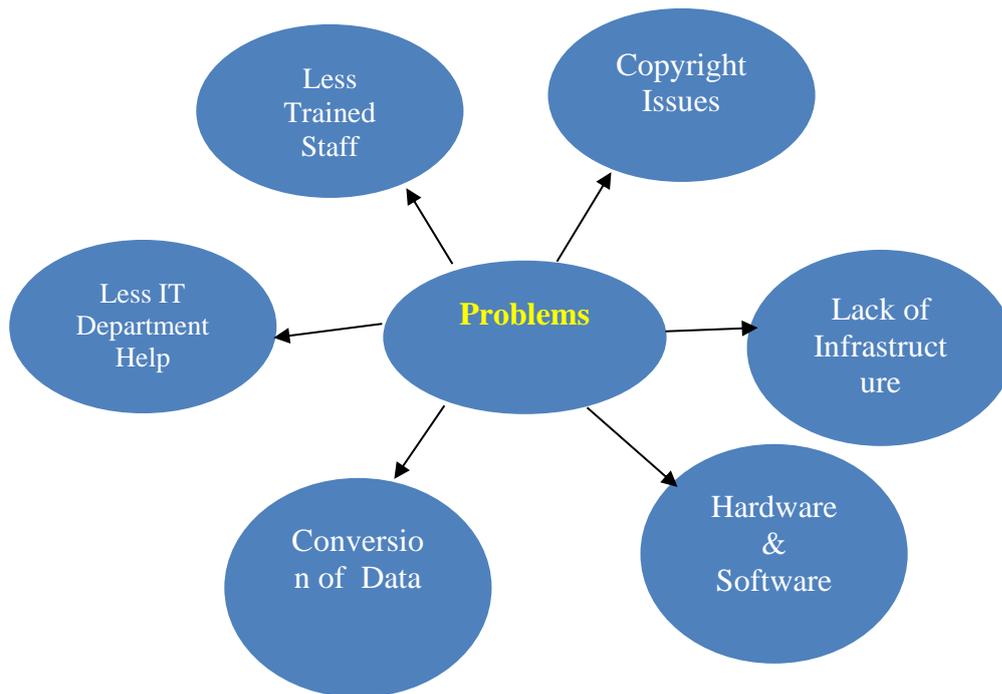


Figure 3. Problems in Implementing IR



Figure 4. Solutions to Implement IR

Interpretation and Discussion

Lack of trained staff and copyright are the major issues faced by the professionals in creation of repositories. Results of the study indicate that problems in creating IRs include

less trained staff, copyright issues, data conversion, lack of infrastructure etc. Majority (83%) of the interviewees considered lack of trained staff as a major problem and 50 % of the interviewees' highlighted copyright as a main issue in creating IR. Studies by Sharif (2013) and Barwick (2007) already identified copyright as key challenge in developing IRs. Mohammed (2013) highlighted less trained staff as a hindrance in creating IRs. One interviewee counted lack of infrastructure and suitably trained staff as key factors responsible for the delay in the project. Interviewees solved these problems by conducting trainings and getting help from the IT department of the institution. Majority (83%) of the interviewees sought help from IT department and 67% of the respondents mentioned that they consulted DSpace community for solutions. 50 % of the respondents arranged training sessions for solving the problems.

Results Related to Suggestions Regarding DSpace Implementation / IRs

Following are the major suggestions, which emerged from the responses of the study's respondents regarding for DSpace implementation:

- Participant suggested that there should be a dedicated staff for such kind of project.
- Participants highlighted that training should be conducted for successful implementation of DSpace.
- DSpace being economical as well as user friendly should be preferred for the purpose of institutional repository.
- Help from IT professionals, cooperation between library professionals and software engineers are also necessary for creation of repository.
- Selection of content for repository is very important. It should not be a collection of irrelevant data.
- Librarians suggested that subject of IR and related applications should be made part of curriculum should be taught in library and information science department.
- Higher Education Commission of Pakistan (HEC) should ask its member

institutions to promote creation of IRs in their institutions.

Interpretation and Discussion

Interviewees suggestions include availability of dedicated staff, staff training, preference of DSpace for developing IR, cooperation between IT department and library staff, teaching of these tools in LIS schools, HEC role in promoting IRs etc. for the successful development and sustainability of IRs. Fatima and Tahira (2009) highlighted the need of staff training in developing IRs. One of the interviewees added “if you are going to implement this kind of repository it is better to have separate staff, which is suitably equipped and sufficiently trained”. Another respondent highlighted that selection of the contents for IR should be done carefully. It should be useful and relevant to the needs of its users. One of the respondents highlighted “HEC should encourage all the librarians to develop institutional repositories to preserve the valuable research work being produced.

Conclusion

Findings of the study indicate that professionals preferred DSpace because it is open source application. DSpace being the product of well reputed organization and its adoption by renowned institutions in the world became first choice of most professionals. Interviewees also appreciated the features of DSpace. They were of the view that DSpace is very easy to use and it was also very easy to get the help about the tools from the community. Problems such as less trained staff, copyright, lack of proper infrastructure, absence of trainings opportunities are the major hindrances in creating IRs. However, these problems can be tackled by conducting proper training by experts and promoting good working relationships between library staff, IT experts, faculty and other users. Vigilance of LIS professionals regarding the selection of contents, considering quality and legal issues, is also an integral part of successful implementation of the concept.

Recommendations

- Staff trainings should be conducted for smooth and sustainable development of IRs.
- Cooperation and good working relationship between library staff and IT department professionals is necessary for successful implementation of IRs.
- Appropriate funds should be allocated especially for the purchase of server and other hardware tools to meet the requirements of IR.
- All the stake holders particularly faculty should be consulted prior to repositories' implementation as it is the faculty which can be helpful in getting maximum research output deposited in the repository.
- Selection of contents should be done carefully for building a valuable and trustworthy repository.
- To avoid copyright issues, material should be deposited after getting the consent of the document owner as well as considering other legal issues.
- Online tutorials and other community discussions and feedback mechanism should be promoted to facilitate implementation of the concept of IRs.

Implications of the Study

This study has diverse implications for library professionals, LIS students and organizations. Results of the study might help professionals understand the importance of IRs, DSpace, problems in its implementation as well as possible solutions. Such understanding will be a milestone towards a wise selection of the software for IR as well as its successful implementation. Likewise, study's findings could be useful for LIS students in understanding the concept of IRs, its application and problems related to its implementation. Emerged solutions after this study could also be useful for them during their practical journey in the field. Organizations might also gain benefits from the study's results by understanding the benefits of using DSpace, while planning its implementation for their researchers.

Future Research Directions

Research on pros and cons related to DSpace's implementation is so far quite limited in Pakistan. Therefore, there is an dire need of encouraging and promoting research in this area. Researchers should conduct research by collecting data from the both i.e. library professionals as well as users, to develop a clearer scenario for DSpace in terms of its merits and demerits, problems in its implementation and possible solutions. Such research should also be conducted in other major cities of Pakistan.

References

- Alemayehu, Muluken Wubayehu. (2010). researchers' attitude to using institutional repositories: a case study of the Oslo University Institutional Repository (Duo). Retrieved from <https://oda.hio.no/jspui/handle/10642/426>
- Anuradha, K. T. (2005). Design and development of institutional repositories: a case study. *The international information & library review*, 37(3), 169-178.
- Baba, K., Mori, M., Ito, E., & Hirokawa, S. (2005). A feedback system on institutional repository. *Analysis*, 2010, 11-02.
- Bainbridge, D., Osborn, W., Witten, I. H., & Nichols, D. M. (2006). *Extending Greenstone for institutional repositories*. Berlin Heidelberg: Springer.
- Bankier, J. G., & Perciali, I. (2008). The institutional repository rediscovered: what can a university do for open access publishing?. *Serials Review*, 34(1), 21-26.
- Barov, T. (2020). Implementation of Dspace-CRIS extension in the institutional repository IRMS-Nicolae Testemitanu SUMPh. Retrieved from <http://repository.usmf.md/handle/20.500.12710/14934>
- Barwick, J. (2007). Building an institutional repository at Loughborough University: some experiences. *Program*, 41(2), 113-123.
- Biradar, B. S., & Banateppanavar, K. (2013). Steps for developing digital repository using DSpace: An experience of Kuvempu University, India. *DESIDOC Journal of Library & Information Technology*, 33(6), 74-79.
- 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(1), 1-10.
- Chan, L. (2004). Supporting and enhancing scholarship in the digital age: the role of open access institutional repository. *Canadian Journal of Communication*, 29(3), 277-300.

- Chapman, J. W., Reynolds, D., & Shreeves, S. A. (2009). Repository metadata: approaches and challenges. *Cataloging & Classification Quarterly*, 47(3-4), 309-325.
- Chen, C-M., Chen, Y-T., Chin-Ming Hong, Chin-Wen Liao, Chia-Meng Huang, (2012), "Developing a Taiwan library history digital library with reader knowledge archiving and sharing mechanisms based on the DSpace platform", *The Electronic Library*, 30 (3), 426 – 442
- Chimah, J. N., Ugwuoke, N. J., & Ogwo, U. (2015). Implementing institutional repository in Nigerian Universities: Status, Challenges, prospects, and the role of librarians & libraries. Retrieved from <http://www.jatlim.org/Volumes/Vol.1%20No.1/Jonathan.pdf>
- Covey, D. T. (2011). Recruiting content for the institutional repository: the barriers exceed the benefits. *Journal of Digital Information*, 12(3), 1-18.
- Cullen, R., & Chawner, B. R. E. N. D. A. (2009). *Institutional repositories and the role of academic libraries in scholarly communication*. In Asia-Pacific Conference on Library & Information Education & Practice, Retrieved from <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.475.6004&rep=rep1&type=pdf>
- da Rosa, I. B., & Lamas, D. R. (2012). *Designing mobile access to DSpace-based digital libraries*. In Proceedings of the International Working Conference on Advanced Visual Interfaces (pp. 745-748). ACM. Retrieved from <https://dl.acm.org/doi/abs/10.1145/2254556.2254699>
- Davis, P. M., & Connolly, M. J. (2007). Institutional repositories: evaluating the reasons for non-use of Cornell University's installation of DSpace. *D-lib Magazine*, 13(3), 1-19.
- Doctor, G., & Ramachandran, S. (2008). DSpace@ IBSA: knowledge sharing in a management institute. *VINE*, 38(1), 42-52.
- Dulek, D. (2019). DSpace. Retrieved from <https://uh->

ir.tdl.org/bitstream/handle/10657/4960/DSpace.pdf?sequence=1

Elliott, D., Rutherford, J., & Erickson, J. (2008). *A recommender system for the DSpace open repository platform*. Tech. Rep., HP Laboratories, Bristol.

Formanek, M. (2021). Solving SEO issues in DSpace-based digital repositories. *Information Technology for Libraries*, 40(1). <https://doi.org/10.6017/ital.v40i1.12529>

Foster, N. F., & Gibbons, S. (2005). Understanding faculty to improve content recruitment for institutional repositories. *Online Submission*, 1-11 Retrieved from <https://files.eric.ed.gov/fulltext/ED490029.pdf>

Hamill, L. (2019). DSpace as an Institutional Repository. Retrieved from <https://corescholar.libraries.wright.edu/cgi/viewcontent.cgi?article=1073&context=ird>
ay

Jain, P., Bentley, G., & Oladiran, M. T. (2009). The role of institutional repository in digital scholarly communications. *Proceedings of African Digital Scholarship & Curation*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.517.8448&rep=rep1&type=pdf>

Kumar, V. (2017). Developing institutional repository using DSpace Software: An experience at Guru Jambheshwar University of Science & Technology, Hisar. *International Journal of Science, Engineering and Computer Technology*, 7(3/4), 208-212.

Lagzian, F., Abrizah, A., & Chin Wee, M. (2013). An identification of a model for digital library critical success factors. *The Electronic Library*, 31(1), 5-23.

Lynch, C. A. (2003). Institutional repositories: essential infrastructure for scholarship in the digital age. *portal: Libraries and the Academy*, 3(2), 327-336.

Mohammed, A. (2013). Institutional digital repository: An option for scholarly

- communication in Nigeria. *International Journal of Education and Research*, 1(6), 1-10.
- Nagatsuka, T., & Koremura, N. (2011). Trends of the Institutional Repositories on Agricultural Universities in Japan [Article and Abstract]. *Agricultural Information Worldwide*, 4(1), 21-26.
- Palmer, Carole L, Lauren C Teffeau, and Mark P Newton. (2008). "Strategies for Institutional Repository Development: A Case Study of Three Evolving Initiatives." *Library Trends*, 57, 142-67.
- Rieh, S. Y., Markey, K., Yakel, E., St Jean, B., & Kim, J. (2007). *Perceived values and benefits of institutional repositories: a perspective of digital curation*. In An International Symposium on Digital Curation (DigCCurr 2007), Chapel Hill, NC, April 18-20, Retrieved from https://ils.unc.edu/digccurr2007/papers/rieh_paper_6-2.pdf
- Russell, R., & Day, M. (2010). Institutional repository interaction with research users: a review of current practice. *New review of academic librarianship*, 16(S1), 116-131.
- Satish, S. (2019). Development of institutional repository using DSpace at ICMR-National Institute of Epidemiology, Chennai, Tamil Nadu: An overview. *Asian Journal of Information Science & Technology (AJIST)*, 9(2), 96-102.
- Sharif, A. (2013). Implementing Institutional Repository (IR) system in a multi-campus international university: Nuts and bolts. Retrieved from <http://ecommons.aku.edu/libraries/8/>
- Shen, L. (2012). Perception and information behaviour of institutional repository end-users provides valuable insight for future development. *Evidence Based Library and Information Practice*, 7(2), 81-83.
- Shewale, N. (2012). Building Digital Library using DSpace: Case Study of GIPE's

- Dhananjayarao Gadgil Digital Library. *DESIDOC Journal of Library & Information Technology*, 32(5), 417-420.
- Smith, M., Barton, M., Bass, M., Branschofsky, M., McClellan, G., Stuve, D. & Walker, J. H. (2003). DSpace: An open source dynamic digital repository. Retrieved from <http://www.dlib.org/dlib/january03/smith/01smith.html>
- St Jean, B., Rieh, S. Y., Yakel, E., Markey, K., & Samet, R. (2009). Institutional repositories: What's the use?. *Proceedings of the American Society for Information Science and Technology*, 46(1), 1-5.
- Sterman, L. (2014). Institutional Repositories: An Analysis of Trends and a Proposed Collaborative Future. *College & Undergraduate Libraries*, 21(3-4), 360-376.
- Subirats, I., Prasad, A. R. D., Keizer, J., & Bagdanov, A. (2008). *Implementation of rich metadata formats and semantic tools using DSpace*. In *International Conference on Dublin Core and Metadata Applications* (p. 199). Retrieved from <https://library.oapen.org/bitstream/handle/20.500.12657/32535/610315.pdf?sequence=1#page=215>
- Tansley, R., Bass, M., Stuve, D., Branschofsky, M., Chudnov, D., McClellan, G., & Smith, M. (2003). *The DSpace institutional digital repository system: current functionality*. In *Proceedings of the 3rd ACM/IEEE-CS joint conference on Digital libraries* (pp. 87-97). IEEE Computer Society. Retrieved from <https://ieeexplore.ieee.org/abstract/document/1204846/>
- Thakuria, J. (2012). Building an institutional repository with DSpace. Retrieved from <https://atmire.com/DSpace-labs3/bitstream/handle/123456789/22917/DSpace%20paper.pdf?sequence=1>
- Tramboo, S., Shafi, S. M., & 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.

Warraich, Nosheen Fatima, and Muzammil Tahira. (2009) *HEC national digital library:*

Challenges and opportunities for LIS professionals in Pakistan. Retrieved from

<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1252&context=libphilprac>