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USER PERCEPTION OF DSPACE IN PDPU LIBRARY: A CASE STUDY

by

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Abstract

This paper examines the extent use of DSpace open source software and its adoption and users perceptions among PDPU libraries as an intuitional repository. Two separate questionnaires were used to gather data. 118 users are selected from stratified random sampling technique from total population of 400; questionnaires were shared to 118 users. The findings revealed that 94 responses were obtained. It is a clear sign coming out from this study is that DSpace software is becoming adoptable option to managing digital collections and building digital repository in Pandit Deendayal Petroleum University Libraries, Gandhinagar, and Gujarat. The current research is a descriptive study to evaluate DSpace digital repository open source system among PDPU Library users (Students, faculties, and staff). Through the experimental study analysis the similarities and differences between cases, identifying areas that have direct implementations for DSpace for Digital Repository to be collected from multiple sources, printed and electronic questionnaires. Web based tools for evaluation and analysis have been accepted for the study. This study it is observed that digital repositories (DR) are become formative in PDPU. Now the things have changed and DSpace has become mature and popular than another open source software for managing Institutional repository, in terms of features, DSpace is rich according to users' perceptions, availability of community supports, and active participation of DSpace development leads make a very strong software.

Keywords: Digital Library, Digital Repository, Open Source software, DSpace, user perception

1.0 Introduction:

Information is oil today and a million rupees question that information must be well-organized quickly retrieved and comprehensively disseminated. Today Information and data can be managed with various software and tools vis. commercial and open source software but today open source has changed the paradigm in library realm and became popular choice in library and information professions. According to Tennant (2009), "Open Source is better option than commercial software" he asserted that Since last few years open source digital repository systems has significantly recognised a solution platform in today's' digital age. The current study tries to

identify the extent of adoption and perceptions of open source digital repository system-DSpace, among Indian library and information professionals. An extensive evaluation of the DSpace digital document repository systems has been conducted. The evaluation aimed at selecting an open source software package that best satisfies the organization needs and the requirements for the storage, dissemination and preservation of documents and for their optimum information usage. The DSpace repository systems were evaluated against 12 basic features were chosen from core categories (Table-4) of requirements: community, security, functionality, integration, modularity, metadata, statistics and reports, preservation, and outputs. These criteria were selected with the expansive literature review and pilot project conducted at Pandit Deendayal Petroleum University Gandhinagar. This research emphasis on two aspects of study one is to know adoption situation of DSpace for managing institutional scholarly repository among PDU library professionals and second is to know user perceptions and level of satisfaction investigating the academic staff, researchers, and student's roles to successful management of digital repository (DL) using DSpace.

2.0 Review of Literature:

The research paper published by entitled adoption and user perception of Koha library management system in India published in *'Annals of Library and Information Studies'* vol. 59, December, 2012 gave me an idea and delving into my choice of software-DSpace. The idea of samples selection has obtained from DSpace and Duraspace foundation, US that gave me delivery of correct information to my research. A number of authors advocated the suitability of OSS (Open Source Software) to libraries, while a few articles describe empirical studies of open source digital library systems using DSpace. Sreekumar, M, G. (2007) asserted that open source is better than proprietary software because libraries may alter it to meet their needs, and such alterations may benefit other libraries as well. However, he noted that small libraries were unlikely to have technically sophisticated personnel who could install and maintain OSS, and large libraries exceeded the scalability limits of open source ILSs at the time. Bretthauer (2006) considered OSS an opportunity for libraries and with a "tendency to push innovations". OSS considered low-cost solutions for technological applications and offer cheap alternatives to expensive commercialized solutions for libraries. Forrester undertook an in-depth study of how open source software is being used in North America and Europe to understand its role in IT and examine the barriers and benefits that open source software represents to enterprise customers. Among the concerns, the biggest concern was to find 'technical support'. The survey revealed respondents' perceptions as: OS provide significant economic and technological benefits including cost savings, improving overall efficiency of IT, quality of products and processes, greater innovation, increased competition among service offerings, and more efficient use of resources across the industry. SreeKumar (2007) has compared the open source DSpace, E-Print, and Greenstone in a cross comparison ranking of their features, and found that DSpace was the most functionally mature of the three. Chalon et al. (2005) Researched several open source ILSs for small collections. Gail Hodge and Evelyn Frangakis (2004) studied the digital archive. One of the aim of the study was to identify the how to archive document in digital format in a digital environment. It was found about DSpace Institutional Digital Repository System began as a joint project of the MIT Libraries and Hewlett-Packard Company. This architecture use number of preceding projects including those at

Cornell, CERN, OCLC, LC and OAIS. It describe about DSpace released in November 2003 under an open source license.

As per the DSpace website (www.DSpace.org) Last data on January 1, 2015 more than 1000 organizations that are currently using DSpace software in a production or project environment. The most common use is by academic and research libraries as an institutional repository; however there are many organizations using the software to host and manage subject based repositories, dataset repositories or media based repositories. Visiting to a list of registered users. For a map of all registered user's visit. DSpace comes with the best web based interface *to library communities*. Goutam Biswas and Dibyendu (2009) has mentioned various advantages of DSpace software like unrestricted use; free of cost; community involvement in development and maintenance of software; competence compared to other commercial software; and the issues of copyright etc. The obvious recognized reason for the organizations like libraries to choose open source software for DR (Digital Repository) purposes is 'no cost'. There is no restriction but everyone can use, study, modify and distribute the open source software, regardless of a person's position, wealth, social conditions etc. The social aspect of the open source software is tremendous. The development and maintenance of this type of software can be done with community-based activities. Anybody can contribute library users engaged in its development. "Open source software projects encourage innovation and collaboration of community members." Here the perception measurement on DSpace software is done through user engagement and software's features evaluations.

3.0 Objectives of the Research:

The primary aim of the research is to investigate the role of DSpace in scholarly publishing, growth of digital repositories adopting DSpace as system by PDPU Libraries and information professionals. At a baseline, this research will examine the current level of accessibilities of DSpace, difficulties faced to manage by the library users, repository managers, Dspace administrator and usage by end users.

1. To know the information access on DSpace by deferent user categories
2. To know purpose of searching DSpace content by deferent user categories
3. To Measures level of satisfaction towards DSpace software
4. To measure technical performance evaluating DSpace

4.0 Scope and Coverage:

The current study is focused on Pandit Deendayal Petroleum University based in Gandhinagar. The Library professionals are selected as a DR adapters. Administrative Staff, Faculty Members, under-graduate students, post-graduate student, and research scholar are the users of DR.

5.0 DSpace at Pandit Deendayal Petroleum University (PDPU): A Case Study

Pandit Deendayal Petroleum University acronym with PDPU was enacted in 2007. The University offers programs to address the need for trained human resources in the domains of Science, Technology, Management and Humanities.

5.1 PDPU Libraries:

PDPU libraries have its branch institutional libraries entitled SPM (School of Petroleum Management) Library and Faculty of Engineering and Technology Library (FOET). SLS (School of Liberal Studies) Library. PDPU libraries started its computerization in 2007 with its inception. The library automation has been approached centrally among all libraries. PDPU libraries begun to use Information Technology services such as OPAC for checking online availability and online book reservation. It is ensured that the resources are easily accessible to the users, remote access to e-resources and online databases are also made available.

5.2 DSpace in PDPU Library:

SPM library implemented DSpace 4.1 version with a relatively low cost on 4th August 2008 with 521 records which now 1241 records are accessible online. Library adopt XMLUI module of DSpace. The DSpace project was initiated by librarian Mr. Suresh Kumar B.O. with the help of Assistant Librarian Mr. Bharat Kumar and hosted on window 2003 IBM server shared with Alice software. DSpace now occupied 2 GB of Data out of 2TB of server space with RAM of 16GB. Assistant Librarian is managing all digital repository and DSpace task. PDPU Libraries have been offering service with brand name 'DeepBlue' – Knowledge repository. For purpose of understanding DSpace Assistant Librarian was attended 6 training workshop DSpace workshops. Currently PDPU library using 6.0 version of DSpace. The most appropriate reason to adopt DSpace lack of alternative available in market and cost. DeepBlue is also registered with OpenDoar repository platform. Now DeepBlue repository is available online at <http://ir.pdpu.ac.in:8080/xmlui> (the repository is integrated with National Digital Library program also).

5.3 Why DSpace, because

- Has become a popular software among Indian libraries
- Is platform of choice
- Has features rich application to offer optimum (effectiveness + efficiency) service to users

How DSpace

- MIT Library was willing to have the best flexible software with no lock in base option so they developed DSpace an alternative option.

Who DSpace

- According to DSpace Foundation (www.DSpace.org), over 1000 organizations are using DSpace as a digital library platform. Academic, Public, Research Library are using DSpace.

Where DSpace:

According the DSpace foundation (www.DSpace.org) more than 90 countries have adopted DSpace for their digital repository

5.4 About DSpace Software

The DSpace is an open source service platform developed by the community and project of the MIT Libraries and HP Labs

DSpace is a digital asset management system. It helps create, index and retrieve various forms digital content. DSpace is adaptable to different community needs. Interoperability between systems is built-in and it adheres to international standards for metadata format.

5.5 Reasons to choose this software:

1. DSpace is an open source technology platform which can be customized or extend its capabilities.
2. DSpace is a service model for open access and/or digital archiving for perpetual access.
3. DSpace is a platform to build an Institutional Repository and the collections are searchable and retrievable by the Web.
4. To make available institution-based scholarly material in digital formats.
5. The collections will be open and interoperable. Institutional repository is a set of services that a research institution/ organization/ University offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members
6. Open Source Software –Dspace can save the cost
7. Dspace is the feature rich application

5.6 Major features of DSpace

The following sections describe the ten major features of DSpace:

1. Lucene search engine and query language
2. Handle system
3. OAI-PMH (Open Access Initiative- and Protocol for Metadata Harvesting)
4. Standard metadata format
5. Reach workflow management
6. Web and cloud –based
7. Mobility & Scalability
8. Statistics and Metrics
9. Language customization
10. Intolerabilities

6.0 Methodology and Data Collection

Quantitative data collections involves interviews, observations, documents and questionnaires, in this study investigators conducted pilot testing and developed the structured questionnaires was developed to test the data received from respondents in MS-Word, along with Word format it was hosted using Google form. In the current study a survey methods has been selected. Researchers asked a question on details of DSpace implementation in the library and received their feedback on key fictional features of DSpace were randomly chosen. 94 responded data analysed with statistical methods mean, and hypothesis testing were done through t-test on SPSS edition 23, 2018 (Window-OS) for testing the hypotheses and analysing the level of satisfaction.

6.1 Classification and Coding:

The sample data are coded for processing the data in SPSS (23rd ed.) software. In this study depended variable is student group as (sg-1) (*table-6*) these are coded as students and

independent variables are level of satisfaction which coded as (iv-1) and processed by SPSS for analysis and testing the hypotheses.

8.0 Analysis and Interpretations:

8.1 Distribution of questionnaire:

(Table-1)
Distribution of questionnaire

Sr. No.	Respondents	Questionnaires distributed	Response received
1	Librarian	08	08
2	Postgraduate Student	15	11
3	Under Graduate Student	40	37
4	Research Scholar-PhD	20	15
5	Research Associate	05	05
6	Non-Teaching Staff	10	3
7	Faculty (teaching)	20	15
	Total	118	94

Out of 118 questionnaires 94 received from users, considering for the complete analysis. There are number of tests available for analyzing and testing the collected data. For analyzing 94 responses from PDU users, researchers finalized to select t-test for testing the hypotheses (z-test was also the option but having the sample size smaller t-test was selected for testing the hypotheses)

8.2 Frequency of Time for information access on DSpace by deferent categories:

(Table- 2)

Frequency of Time for information access on DSpace by deferent categories

Sr. No.	Content type	UG	PG	RS	RA	NT	TF	LB
1	Daily	15 (40.54%)	12 (66.67%)	12 (80.00%)	4 (100.00%)	0 (0.00%)	11 (73.33%)	0 (0.00%)
2	2-3 times in week	9 (24.32%)	4 (22.22%)	2 (13.33%)	1 20.00%	0 (0.00%)	3 (20.00%)	1 (100.00%)
3	Once a week	8 (21.62%)	1 (5.56%)	1 (6.67%)	0 0.00%	2 (66.67%)	1 (6.67%)	0 (0.00%)
4	2-3 times in month	5 (13.51%)	1 (15.56%)	0 (0.00%)	0 (0.00%)	1 (33.33%)	0 (0.00%)	0 (0.00%)
	Total	37 (100.00%)	18 (100%)	15 (100%)	4 (100%)	3 (100%)	15 (100%)	1 (100%)

(1. UG-Under Graduate Students, 2. PG-Post Graduate, 3. RS-Research Scholar, 4. RA- Research Associate, 5. NT-Non-Teaching Staff, 6. TF Teaching Staff, and 7. LB-Librarian)

As per the above result derived the above table shows that the entire groups of research scholars are spending time on DSpace for their information needs, whereas non-teaching staff are rarely refer DSpace. Librarian uses DSpace 2-3 times in a week.

8.3 Purpose of searching DSpace content by deferent category

(Table-3)
Purpose of searching DSpace

Sr. No.	Content type	UG	PG	RS	RA	NT	TF	LB
1	Finding related research work	09 (81.81%)	11 (29.72%)	15 (100%)	05 (100%)	00 (00.00%)	08 (53.33%)	01 (10.00%)
2	Finding a solution for information	07 (63.63%)	12 (32.43%)	06 (40.00%)	04 (80.00%)	01 (33.33%)	10 (66.66%)	03 (30.00%)
3	Consult electronic journals	10 (90.90%)	30 (81.08%)	10 (66.66%)	01 (20.00%)	02 (66.66%)	10 (66.66%)	01 (10.00%)
4	To read course materials	10 (90.90%)	30 (81.08%)	11 (73.33%)	04 (80.00%)	01 (33.33%)	01 (06.66%)	00 (00.00%)
5	Download exam. Papers	10 (90.90%)	36 (97.29%)	14 (93.33%)	01 (20.00%)	00 (00.00%)	00 (00.00%)	00 (00.00%)
6	Write an assignment	11 (100%)	30 (81.08%)	10 (66.66%)	01 (20.00%)	01 (33.33%)	00 (00.00%)	00 (00.00%)
	Total	11 (100%)	37 (100%)	15 (100%)	05 (100%)	03 (100%)	15 (100%)	10 (100%)

Most of the Research Scholars, Research Associates are searching and downloading contents from DSpace for their information needs. As researcher calculated standard deviation for measuring the correct opinion for research materials in DSpace by using mean values. 100% UG students refer DSpace for writing the assignment for the study, and also 91% of the UG students visit DSpace for Exam. Papers, and NT refer DSpace in rare case with 00%

8.4 Criteria base evaluation of Dspace:

12 basic attributes (table-2) were defined to measure satisfaction level of DSpace in PDP, out of 94 responses from respondents those are Under Graduate Student, Post-graduate students, Research Scholar-PHD, Research Associate, Non-Teaching Staff, Teaching Faculty gave the responses are specified in table below with percentages.

(Table-4)
Criteria base evaluation of DSpace

Sr. No.	Response of users for DSpace	Excellence	very good	Good	Average	Poor
		5	4	3	2	1
1	Information access and management	14 (14.89%)	68 (72.34%)	5 (5.32%)	7 (7.45%)	0 (0.00%)
2	search retrieval service	18 (19.15%)	51 (54.26%)	13 (13.83%)	12 (12.77%)	0 (0.00%)
3	Search support	15 (13.64%)	49 (44.55%)	12 (10.91%)	17 (15.45%)	17 (15.45%)
4	Browse	17 (18.09%)	55 (58.51%)	11 (11.70%)	11 (11.70%)	0 (0.00%)
5	Preservation	14 (14.89%)	49 (52.13%)	19 (20.21%)	12 (12.77%)	0 (0.00%)
6	Interoperability	18 (19.15%)	67 (71.28%)	8 (8.51%)	1 (1.06%)	0 (0.00%)

7	Metadata	7 (7.45%)	81 (86.17%)	5 (5.32%)	1 (1.06%)	0 (0.00%)
8	User Interface	4 (4.26%)	88 (93.62%)	2 (2.13%)	0 (0.00%)	0 (0.00%)
9	User Management	19 (20.21%)	70 (74.47%)	4 (4.26%)	1 (1.06%)	0 (0.00%)
10	Users Documentation	8 (8.51%)	1 (1.06%)	78 (82.98%)	5 (5.32%)	2 (2.13%)
11	Dspace Visibility	29 (30.85%)	38 (40.43%)	27 (28.72%)	0 (0.00%)	0 (0.00%)
12	Dspace Content Workflow	16 (17.02%)	54 (57.45%)	21 (22.34%)	3 (3.19%)	0 (0.00%)

Looking at the mean (average) percentage 60.60% of the respondents retorted at GOOD level and 0.25% remained on POOR, so its shows users satisfied with DSpace features. The data received from respondents, the search and retrieval stand excellent level with **25.21%**, and user interface stands with **93.12%** at good level. User interface stands with **(88; 93.62%)** at very good level.

8.5 Over-All Satisfaction of Dspace:

(Table-5)
Over-all satisfaction of DSpace

SR. No.	Level of satisfaction with overall DSpace services and Information resources	N	Percentage %
1	Very satisfied	30	31.91
2	Satisfied	61	64.89
3	Not very satisfied	2	2.13
4	Never satisfied	1	1.06
		0	0.00
	Total	94	100.00

Overall satisfaction ratio indicates that 64.89% DSpace users are satisfied with DSpace service hosted as IR. And 00.00% respondent is never satisfied

8.6 Testing of Hypotheses:

A perfect decision making depends on careful examination of understanding the data. There are different experimental and quasi experimental researches where the observations of the same variables are compared under the different conditions. In such situations two sample test, in the most appropriate test. When we go ahead with two-sample test, researchers have to decide whether the two groups are independent or related. For testing the hypotheses, an inferential statistics are useful that a researcher can conclude the correct results.

As per the assuming the below hypothesis, e. t. the null is formulated.

$$H_0 A$$

There will be a no significant difference between **features (V1)** of DSpace and level of **satisfaction (V2)** among **students (V3)** users.

There are many situations in which investigators must decide whether an observed difference between two samples means is attributed to change or whether two samples have come from two populations with unequal means. In this all situations investigator have to sets of data from different populations, either hypothetical or existing. Here the null hypothesis is that there is no difference in the means of two samples.

13.1 t-TEST Applications testing null hypothesis.

The formula for manual calculations is below:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2 + s_2^2}{n_1}}}$$

(Table-6)

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
sg1	94	3.1818	.98165	.29598
dv1	94	2.8182	1.47093	.44350

(Table-7)

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
sg1	10.750	10	.000	3.18182	2.5223	3.8413
dv1	6.354	10	.000	2.81818	1.8300	3.8064

dv1= depended variable, sg1: Student

The above t-test output gives at (95%) significant level that the null hypotheses St. Deviation for user group (2.5%) lower mend more than (0.5), So, it is interpreted that feature play key role in level of satisfactions.

9.0 Results and Interpretation:

The consolidated score from (table 1-7) indicate that DSpace offers better services and a good option having best search and browsing support for administrative metadata and provides more power to administrator to put access restrictions at collection level to PDPU communities. The web browser based upload and better user interface attracts more users. With the option of deployment of themes adds to better look and feel. The lacking points like unavailability to upload compressed files and little tough installation process put it on backstage However, librarians, administrators as well as organizations who want to adopt DSpace. Firstly, the validated

measurement model suggested in this study can help librarian, and DR Manager to better determine the effectiveness of their enhancement processes. The current study identified 5-1 scale for measuring enhancement effectiveness and efficiencies of DSpace. A thorough examination of enhancement performance of DSpace includes incorporating both the sets of measurement of effectiveness and ratifications. End-users of DSpace are recommended that they are less interested in which software library is using but they prefer fast information retrieval with any hazel free.

10.0 Conclusion and Future Research:

In this current digital environment digital repositories (DR) in academic libraries are playing crucial role for providing best service to end users. DR increases access the visibilities of resource output of the organizations and ultimately to the nations. It also provides opportunity to access high quality research publications even to those who cannot afford to pay for it. The research publications hosted on PDU IR remain best optimum utilization content on IR.

Library and even our nations. The librarian needs more attentions towards IR development and deposit maximum contents that optimum use can be possible. There is also a need for active commitment from researches and faculty members by all those involved in the production of scientific knowledge.

According to UGC notification published on 23rd July 2018, Part-3, Section 4, para 6, HEI (higher Education Institutions) shall create Institutional Repository on institute website which shall include dissertation/thesis/paper/ publication and other in-house publications. So, the Government of India is now taking steps to host more repositories in the nations. According to finding the researchers suggest to DSpace programmer team and committers to develop handy mechanism to installations process of DSpace also suggest create cloud appliance that librarian can easily adopt.

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