

Digital Information and Provision of E-Resources and its Services in Engineering Colleges



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ABSTRACT: *This study presents the survey results obtained from 150 professionals employed at various engineering colleges in Karnataka, India, with an aim to understand the efforts of information users in traveling extra miles to accomplish the information needs of the generation Z. It describes the initiatives, efforts, arrangements, and work carried out by information users in the provision of access to e-Resources and also examines barriers in extending e-Resource services. Findings reveal that majority of the information users are providing digital services in spite of lack of support from their management and subsequently lack of demand from the user.*

Keywords: Online Database, E-Resources, Electronic Resources, Academic Institutions, Engineering Colleges

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1. Introduction

The generation Z engineering students expect more from the institutions to fulfill their educational needs. The students are in need of learning resources to enhance their knowledge which can be accessed easily using access tools and technology. The

rapid growth of digital information in the form of digital books, online journals in open source as well as paid version, institutional repositories, gadgets like an e-book reader, federated search engines, have boosted and created abundant opportunities to meet their needs beyond their expectations. It is obvious to note that, the technological trend with the rapid succession and subsequent wide spectrum use of computing systems such as desktop, laptop, palmtop, iPad, mobile devices, including network-based systems viz. LAN, Optical, Wi-Fi, Cloud, etc., are playing a key role in providing information to the generation Z users. Really, it is a challenge for engineering college information users in the present context to facilitate e-resources, since for many years most of the institutions have been providing printed materials to its end users. The transition from print to electronic or digital resources is a high priority now for many information users with an effort to convince their administrators and top-level management for necessary budgetary apprehensions to change their library scenario.

In recent years, the information users at the global level have transformed their institutions by the way of collecting, organizing, storing and disseminating information in creating a conducive atmosphere to suit their needs of generation z users. In an Indian scenario, particularly Engineering institutions are concerned, periodical guidelines issued by All India Council for Technical Education (AICTE) has also drawn the attention of administrators to understand the need of such facility in Library due to technological advancement that has invaded the Library arena. As a result of this, a provision for a subscription to several e-Resource packages has come into force with fewer efforts from information users of Engineering Institutions. Several institutions have implemented have compiled the directives issued by Ministry of Human Resource Development (MHRD), Government of India in providing NPTEL Video lecture content, Web courses through their intranet for the benefit of users. Also, policy-making agencies have mandated for the digital infrastructure facilities in their institutions. This has forced the engineering institution institutions to adapt to new technological changes to providing the e-Resources to its users. Thus, this study is aimed to report the efforts of information users in the provision of e-Resources and services in engineering colleges of Karnataka.

1.1 Objectives of the Study

The following objectives envisage executing the study smoothly and effectively.

- To know the e-Resources provided by the engineering colleges under the study.
- To understand the perception of information users in subscribing to e-Resources packages that are relevant on the line with AICTE norms or through their affiliated University norms.
- To know the barrier to providing e-Resources.

1.2 Methodology

The study has adopted the quantitative research method and employed the Questionnaires as a tool for data collection. The sample for the study was comprised of one hundred and ninety-one (191) colleges. The colleges established before the year 2012 are included in the survey. Among the sample, the authors are able to collect only 150 duly-filled-in questionnaires with a percentage of 78.53%.

2. Review of Literature

Literature was collected pertaining to the study carried out by different authors to evaluate the status and availability of e-Resource in engineering institutions. Several studies have revealed the importance of e-Resources for engineering institutions, thus they are considered for our study to understand the subject better. A study by Mulla & Chandrashekara (2006) on the availability of e-Resources and services reveals that the e-resources collection management and digital services in the surveyed regions were not promising as information users were facing a lot of challenges in building e-Resources collection Viz. lack of digital infrastructure, trained human resources, budgetary concerns, etc. A case study by Sasireka et.al. (2011) reveals that the Engineering colleges in Tamil Nadu provide an evidence of the status of e-Resources, selection, and access to various e-Resources. Survey of engineering colleges in Kerala by Archana & Kabir (2014) revealed that 86% colleges provide access to electronic databases to its users. It was also observed that among them 94% of the colleges subscribed to the databases proposed by the AICTE. Further, it was found that financial constraints and perpetual access are the major problems in subscribing to e-Resources. In order to identify problems in subscribing to e-Resources in West Bengal Bhattacharya & Das (2015) highlighted and listed the only meager percentage of institutions had a separate budget for e-Resources. Many of electronic resources and were of the expressed that, e-Resources were being underutilized in their institutions and lack of comprehensive and up-to-date selection tools for digital documents is a barrier and suggested regulatory body like AICTE to

prescribe a more exhaustive list of electronic resources and consortium to provide a tailor-made option for choosing e-resources. Further, Jestin & Sornam (2016) investigated the awareness and availability of electronic resources in Kerala and found that most of the information users were aware of consortia and 42.42% was a member of the erstwhile INDEST-AICTE consortium. Their study also revealed that 100% institutions were subscribing to e-journals and 54.54% were subscribing to e-books.

3. Analysis and Interpretation

3.1 Digital Infrastructure

institutions are expected to have the basic amenities that, meet the needs of the library users. Majority of the colleges (82%) did not provide E-book readers whereas the majority (64%) of them provided audio facilities (Table 1). AICTE and VTU do not have any specific norms for an e-book reader. However, based on the number of users number of e-book reader required for the user can be provided. AICTE and VTU mandates for multimedia facility thus it is essential for all institutions to provide the audio facility.

Infrastructure Facility	E - book Reader		Audio Facility	
	Frequency	%	Frequency	%
Yes	27	18	96	64
No	123	82	54	36
Total	150	100	150	100

Table 1. Digital Infrastructure

The provision of computer facilities in colleges has become essential. The availability of an adequate number of PCs enhances the usage of services. AICTE and VTU norm mandates 10 PCs for digital institutions. 18.00% of the institutions have <10 PCs, which represents that, they have flouted the norms and overlooked the provision of infrastructure for accessing e-resources at the library.

PCs	No. of Systems	Percentage
Below 10	25	18.00
10-29	79	52.67
30+	44	29.33
Total	150	100

Table 2. Number of Computer Systems Available

3.2 Subscription to Online Journal Databases

Responses were collected to understand how many engineering colleges had subscribed to online journal databases as per AICTE and VTU norms. It was found that the majority (78.00%) of the colleges has subscribed to online journal database/s through consortia and the 3.33% reported that they did not subscribe to online journal database/s (Table 3). It is evident from the results that, almost all the engineering colleges are in support of online journal database/s and are compliant with the VTU and AICTE norms of subscribing to online journal database/s.

Depending on the type of courses being offered, one or more online databases are subscribed by the colleges, therefore an attempt has been made to understand the type of database/s being provided by these colleges. Figure 1 shows that the majority (64.18%) of the information users, who subscribe to databases, reported that they subscribed to IEEE at their library. Only 6.90% subscribed to Gale Cengage Learning which is the lowest subscribed database. Hence, it can be inferred that IEEE, Springer, J-gate, and Elsevier are the most used database by the engineering community.

Subscription Mode	No. of Responses	Percentage
Through Direct Subscription	28	18.67
Through VTU/INDEST - AICTE Consortia	117	78.00
Not Subscribed	5	3.33
Total	150	100

Table 3. Subscription to Online Journal Database

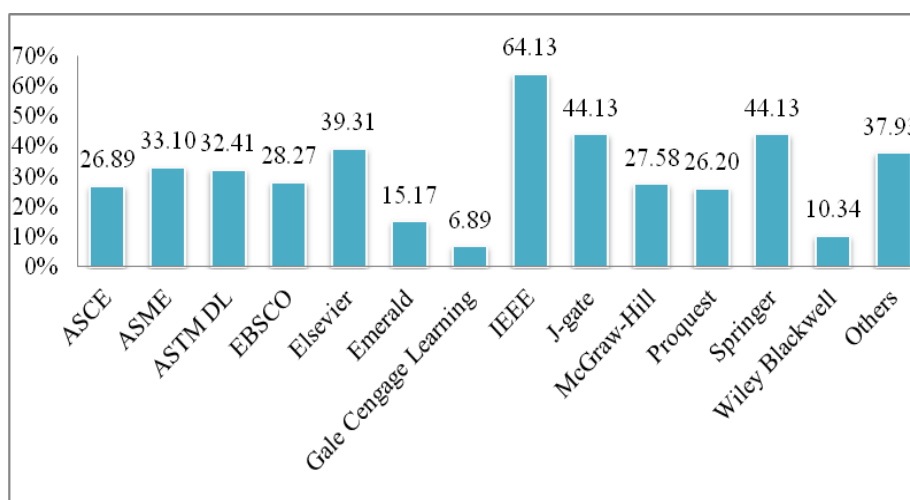


Figure 1. Subscribed Online Databases as per AICTE Norms

3.2.1 Opinion on Subscription to Databases

It is essential to know the opinion of information users with regard to the subscription to online journal database/s as per AICTE norms, as huge expenditure is incurred towards this. It was found that 36.67% reported that subscribing to databases as per AICTE norms is “essential to users” and 5.33% reported that subscribing to databases as per AICTE norms is “not at all required for users”(Table 4). This indicates that a significantly high number of information users are of the opinion that subscribing to e-resources is essential for users and also somewhat required for the user.

Opinion		Very Essential for Users	Essential for Users	Some What Required for Users	Not at all Required for Users	Required to satisfy AICTE Committee	Total
	F	31	55	39	08	17	150
	%	20.67	36.67	26.00	5.33	11.33	100

Table 4. Opinion on Subscription to E-resources as Per AICTE

3.2.2 Subscription to E-books

E-book technology has plenty of valuable features for learners. The unique features and capabilities of e-book technology like less text size, text-to-speech conversion, and interactions feature which is lacking in text-based materials encourage users to adopt the e-book. Previous studies show that e-book is a valuable resource, which is gaining more potential in terms of usage (Ajay, Shorunke & Aboyade, 2014), Zickuhr, et.al. (2013). In order to know how many information users are providing this

resource, responses were gathered and found that 34.00% of the information users reported, they provide access to e-books at their library. Studies have shown that e-books are popular in western countries; gradually the momentum is picking up in India too as evidence VTU e-resources consortia include Springer and Taylor & Francis e-book databases.

Subscription to E-Books	No. of Responses	Percentage
Subscribed	51	34.00
Not Subscribed	99	66.00
Total	150	100

Table 5. Subscription to E-book/s Databases

3.3 Information on Lecture Notes

Another important component in an academic library is the provision of lecture notes. These resources help users to learn, understand, and remember the ideas and facts presented easily. Table-6 shows the efforts of information users in educating users to utilize lecture notes. It was observed that 97.30% of the information users are of the opinion that they suggested the use of lecture notes to users (Table 6). This reveals that majority of the information users were aware of lecture notes and understand the responsibility for educating users to best utilize the lecture notes.

Suggestions	No. of Responses	Percentage
Yes	146	97.30
No	04	02.70
Total	150	100.00

Table 6. Information users Suggestion to Utilize Lecture Notes to Users

3.3.1 Different Lecture notes Suggested by Colleges

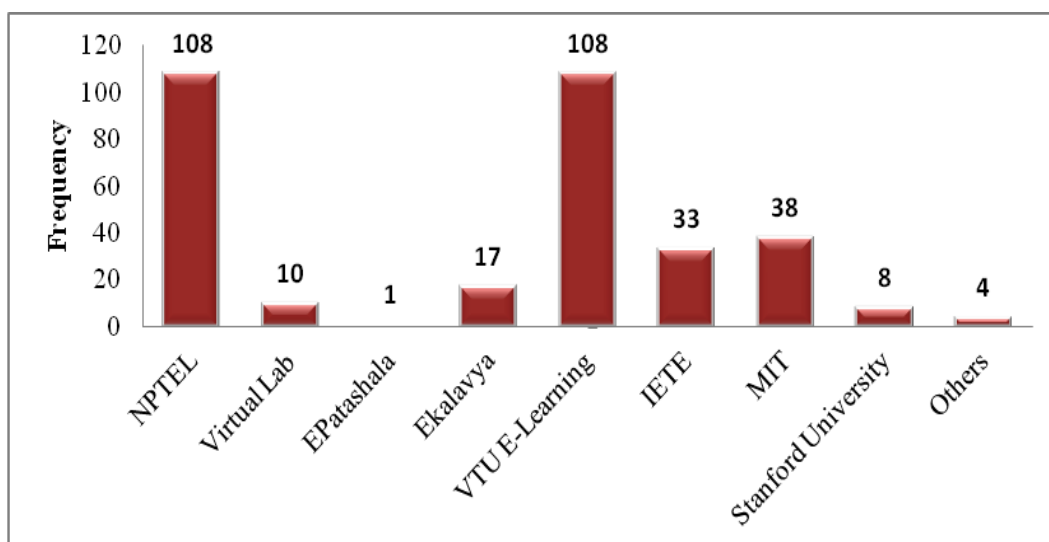


Figure 2. Suggestion on Lecture Notes

These days lecture notes and coursewares are available in most of the field, but it is predominant in the engineering field. They are expanding largely and provided by leading professors of the best universities in the world. In order to know the librarian's effort in guiding the users towards world's best lecture notes response was collected and found that out of the 146 information users who suggested the users use lecture notes, 73.97% reported that they suggested the use of NPTEL lecture notes and VTU lecture notes. A few information users suggested the use of Virtual Lab, E-pathashala, Ekalavya, and Stanford University lecture notes. Growth in the rate of video lectures and online courses (MOOC) are evidence that majority of students and faculty members have accepted lecture notes and utilizing them for their knowledge enhancement. It is clear from the study that NPTEL and VTU e-lecture notes are the most recommended lecture notes.

3.3.2 Access to NPTEL

NPTEL is an Indian portal dedicated to the provision of video lectures with the intent to solve the issue of deficiency of qualified faculty and to support teaching. Thus provision for access facility to NPTEL content is mandatory in accordance with AICTE. Only 58.70 % were found providing access, it clearly indicates that many engineering college information users have not shown interest in arranging for NPTEL access facility though, they are aware of the importance of the resource.

Access to NPTEL	No. of Responses	Percentage
Provided Access	88	58.70
Not Provided Access	62	41.30
Total	150	100.00

Table 7. Provision of Access Facility to NPTEL

As lecture notes are video files which require more storage space, users may have to spend more time in downloading to use it. It is therefore important for institutions to provide good access facility for lecture notes to save the time of users. In order to know the mode of access facility provided by the institutions data was collected and observed that majority of them(39.77%) reported that they provide access through NPTEL server and 10.26% reported that they provided access through the purchased disk. It is interesting to observe that information users preferred to utilize most methods except for the actual purchasing of the lecture notes (Figure-3).

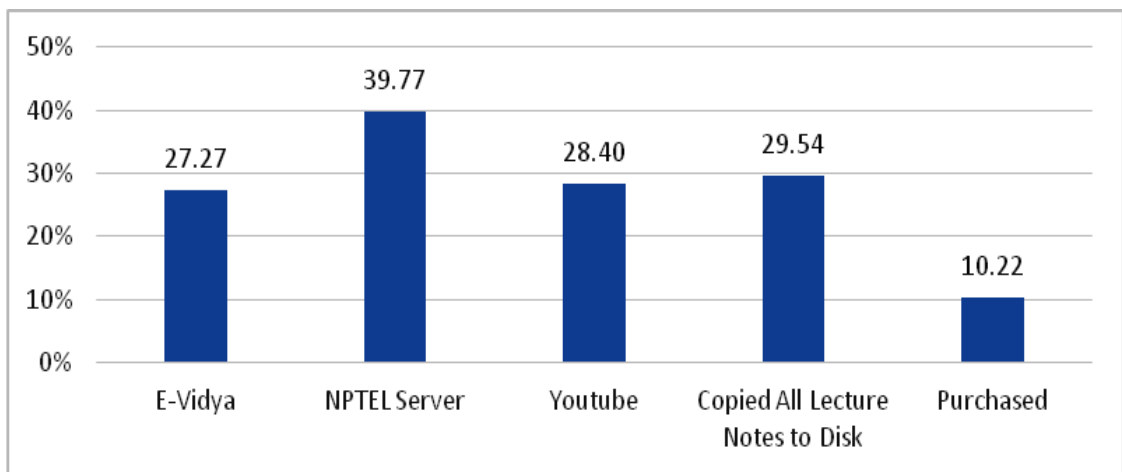


Figure 3. Mode of Provision to Access to NPTEL Lecture Notes

3.4 Information on Institutional Repository (IR)

The collection, management, conversion, in-house production, and showcasing of digital content has become the need of the day for information users. In order to fulfill user needs, it is very important to manage digital resources using digital management

software to support search systems such as advanced search, Boolean logic search, etc. for information retrieval. Hence, data was collected and represented in Table-8 to understand archiving facility provided for the current and future use of resources. The majority of the colleges (57.33%) were observed to have created an IR facility to allow the users to access archived research material, question bank, lecture notes, and so on.

IR Facility	No. of Responses	Percentage
Provided	86	57.33
Not Provided	64	42.67
Total	150	100

Table 8. Provision of IR Facility

3.4.1 Resources in IR

IR was initially designed to provide an institutional output or scholarly resources, but in the recent years their scope has enhanced and they are used to organize and archive most of the digital collection to provide customized services to users. Data were collected in order to know the resources collected and organized in IR. Out of 86 institutions with provision for IR, 94.19% to archive question papers of previous years. A few information users used IR to archive, audio files, images, and other resources. It is evident that most of the information users use IR to archive question papers of previous years and articles which are mostly used at undergraduate and post-graduate level (Figure-4).

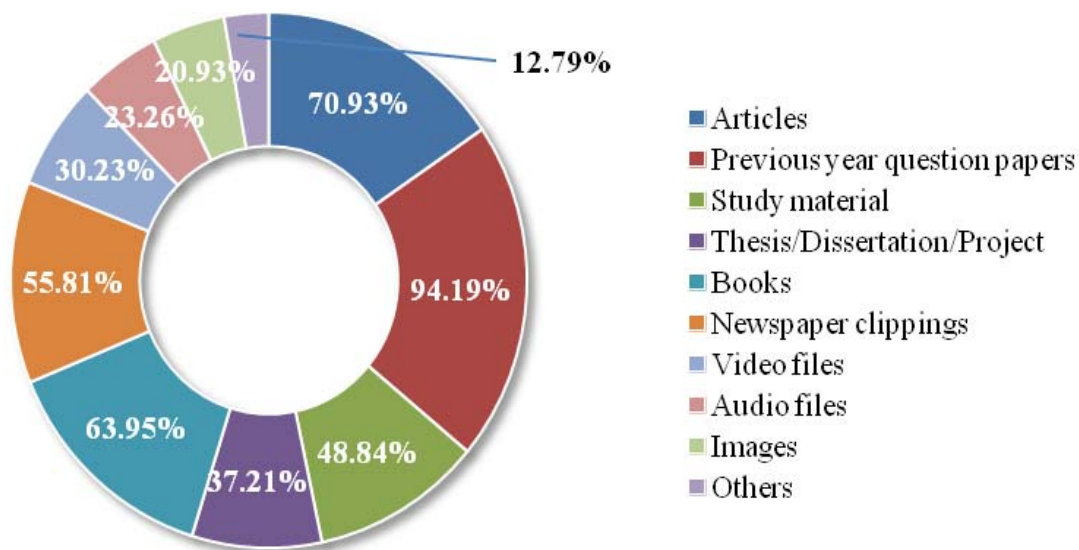


Figure 4. Resources Included in IR

3.5 Open Access Resources

The whole world is embraced by open access resources. They are the outcome of the open access movement for which even commercial publishers like Springer, Taylor, and Francis, Wiley etc. are supporting and providing free access to many articles and journals. Although open access resources are very important resources, many of the users do not know the existence of such resources. Information users play a key role in ensuring that the users benefit out of these resources. The information users, however, to a large extent (86.00%) motivated to use these open resources (Figure-5).

The open access resources considered for the study are open access journals, open access books, open access repository, and open access thesis repository. Many of these resources are unknown to many users. Therefore, an effort was made to identify

the role of the information users in creating awareness to increase the utility of open source resources were evaluated.



Figure 5. Recommendation of Open Access Resources to the Users

Based on the response received i.e. 129 out of 150 information users, it is to state that open access journals were recommended by all the information users to the users and open access books were recommended by 93.02% of the information users and only 30% of the information users recommended open access thesis repository (Table-9). It clearly indicates that open access journals and e-books are the most recommended resources in the engineering community.

Types of open access resources	Yes		No	
	Frequency	%	Frequency	%
Open Access Journals	129	100	00	00
Open Access Books	120	93.02	09	6.98
Open Access Repository	66	51.16	63	48.84
Open Access Thesis Repository	39	30.23	90	69.77

Table 9. Type of Open Access Resources

3.6 Hurdles in the Effective Implementation of E-resource Services, Lecture Notes (NPTEL) and IR

In order to understand the problems faced by modern-day information users in providing digital information services, especially IR, video lecture notes, e-resources, and digital library infrastructure - a hypothesis was framed. Problems such as lack of interest among the user, lack of interest from management, lack of support from staff, lack of trained staff, lack of staff, and lack of infrastructure were discussed.

In terms of providing IR services, lack of infrastructure (32%) and lack of interest among user community was found to be the main problems. The same was true for provision for video lecture notes too. In the case of providing e-resources and digital infrastructure, lack of interest from management (36%) was found to be the major problem (Table-10), which is justified as e-Resources involve huge investment and hence the management may not be willing to make provision for it in the library budget. Lack of interest among user community was found to be the next major problem in providing the digital information services.

4. Discussion and Interpretation

4.1 Infrastructural Facility

Service		Lack of interest among user	Lack of support from management	Lack of support from staff	Lack of trained staff	Lack of Staff	Lack of Infra-structure	Others
IR facility	F	48	44	14	35	15	34	13
	%	32.00	29.33	9.33	23.33	10.00	22.67	8.67
NPTEL Lecture Notes	F	44	28	12	20	18	48	15
	%	29.33	18.67	8.00	13.33	12	32.00	10.00
E-Resources	F	44	54	9	14	11	15	19
	%	29.33	36.00	6.00	09.33	7.33	10	12.67

Table 10. Problems in the Effective Implementation Digital Information Services

The majority of the engineering institutions in Karnataka provided audio facilities to help the students listen to the lecture notes in the library premises but E-book readers were lower in occurrence.

4.2 Online Journal Databases

It was observed from the study that most information users agreed that subscribing to online journal databases were essential to the library users and part of INDEST-AICTE or VTU consortia. This clearly shows that the information users are in favor of the AICTE and VTU norms. However, a small percentage felt, that the subscription to online journal database/s was done only to satisfy the AICTE/VTU committee. It could be because the online journal database/s costs around INR 27,00,000/- if underutilized will lead to loss to the college, especially at the time of low students strength in the colleges. This also brings to the force another argument on the efforts of information users in creating awareness among users. Many studies Mishra & Gohain (2010), Ali, (2005) & Natarajan et al., (2010) have reported the lack of awareness about databases leads to the low use of e-resources.

It is found that IEEE is the most subscribed database followed by Elsevier, Springer, and J-Gate. The remaining database as per AICTE mandatory subscription norms has been given less importance. The Study (by Archana & Kabir, 2014) reveals that most of the engineering colleges in Kerala have subscribed to IEEE followed by Elsevier and J-Gate. Another study (by Puttaswamy & Krishnamurthy, 2014) also highlighted that most of the engineering colleges in Bangalore have subscribed to IEEE, Elsevier, and Springer so it indicates that above-cited resources are the most popular resources to the engineering community.

In comparison with e-journal databases, e-book database was given less importance. On the other hand, in the Western countries, especially at the USA, studies have shown that reading habit can be enhanced by providing access to e-books, for example, 63% students in Adeleke University were reported to use e-books (Ajay et.al. 2014). Further, a study by Zickuhr, et.al. (2013) reported that rising popularity of e-books in facilitating the transformation of America's reading habits. A dire need is there felt to increase the provision of e-books in college institutions. The users, as well as the college administrators, should be sensitized to the importance of e-books and databases.

4.3 Lecture Notes

Lecture notes is another significant trend which has been enabled by the growth in information and communications technology. This has transformed the concept of ongoing education for people across age groups. Several initiatives are present globally to encourage this trend.

Most of the information users who participated in the study reported that they recommended NPTEL and VTU lecture notes to users in their colleges. The recommendation for VTU lecture notes are obvious since NPTEL is mandated by the AICTE and VTU but a smaller proportion of the respondents deviated from norms as they did not make arrangements to provide access to institutions. It could be because of the open access facility available to these resources. Agarwal et.al. (2015) found that NPTEL is the largest open access repository of education content and Indians are the second highest visitors of EdX and Course era.

This clearly indicates that students and learners are looking for lecture notes, so information users have to work on providing access to lecture notes. The Governing bodies should play a key role in paying more attention towards implementation of the rules so as to support online learning and teaching.

4.4 Institutional Repository (IR)

The study revealed that most of the engineering colleges have adopted institutional repositories (IR). Less than two-thirds of the information users who participated in this survey reported that DSpace was the preferred software. The major resources included in IR were questioned bank, research articles, and e-books. The study on engineering college institutions by Sahu & Mahapatra (2012) also have shown that book, study materials, and question banks were the major resources of IR suggesting a clear link between the demand for the above-cited resources in the engineering community.

4.5 Use of Open Access Resources

The majority of the information users reported that they motivated the users to use the open access resources available at the library. Open access journals and open access books were the most common resources recommended for use by the information users. As general impression could be that, the other open access repository and open access thesis repository resources may not be required for graduates who are in the entry level of their profession compared to researcher or information users may not know the availability as they are recently gaining potential in Indian education.

5. Conclusion

Many studies are evident that electronic resources have certainly been accepted and used by users for various reasons. In this situation, providing them with academic institutions especially in engineering institutions is important to facilitate the research and enrich user's knowledge base. A sincere attempt has been made by the authors to analyze the status and availability of e-Resources. The majority of the engineering institutions in Karnataka are well-equipped with the adequate infrastructure for the provision of e-Resources to the users. Furthermore, the colleges are found to adhere to VTU and AICTE guidelines in regard to e-Resources as a specified subscription model. However, in spite of regulatory body guidelines, few institutions have not subscribed to online databases, which demonstrate that the adoption of online databases is still being evaluated by information users for their value in the academic process nor have some negative opinion towards subscribing to e-resources against to the print resources.

It is observed that few eminent faculty lecture notes are made available by few institutions that benefit the users. Another commanding note that, most of the institutions have created an Institutional Repository (IR) to allow the users to access archived e-Resources such as question banks, in-house faculty publications, etc. This study also reveals that information users are educating users to utilize open access resources like open access journals, open access e-books, open access repository and few are guiding to use open access thesis too.

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