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Provision of E-resources in Engineering College Libraries in India: A pilot study

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Libraries and information systems have been witnessing continuous transformation since the last two decades, particularly with regard to the collection of information resources and services. A spectrum of E-resources that have emerged during this time are chiefly responsible to this transformation and changed landscape of libraries in terms of collection development, storage and provisioning their access. It has created tremendous opportunities for librarians to be innovative in order to provide information services relevant to new situations and conditions like the discovery services. A study in this context was taken up to understand the efforts of librarians in travelling extra miles to accomplish the information needs of the generation z, also denoted as new millennial. The study presents the survey results obtained from 150 professionals from engineering college libraries in Karnataka, India. It describes the initiatives, taken by the librarians in e-resources collection building and efforts and work undertaken in providing access to e-Resources. It also examines barriers coming in the way of promoting the use of e-Resource services. Findings reveal that, majority of the librarians are providing digital library services in spite of lack of support from the management and also the diminishing demand of library users. The study concludes that the librarians of engineering colleges in Karnataka have been moderately successful in meeting the information needs of users efficiently and contextually observing the AICTE norms and guidelines in this regard.

Key words: E-resources, digital resources, digital library services, engineering colleges.

INTRODUCTION

The generation-z often called as millennial are the new band of engineering college students whose expectations from the libraries are varying to fulfill their educational and informational needs. The students are in need of learning resources to support their academic demands and enhance their knowledge which can be addressed easily using access tools provided by the technology. The rapid growth of digital information resources comprising varieties; e-books, Open Access journals, subscription resources, institutional repositories, gadgets like e-book readers, federated search engines, that have furthered and created abundant opportunities to meet their needs, fulfill their expectations. It is obvious to note that, the technological trends with the rapid succession and

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subsequent wide spectrum of use of computing systems such as desktop, laptop, palmtop, iPad, mobile devices, via Intranet and Internet based network systems, Optical devices, Wi-Fi, Cloud, etc., are playing key roles in providing access to remotely placed information to the generation-z users. In reality it is challenging for engineering college librarians in this context to facilitate e-resources, since for many years most of the libraries have been in familiarity with printed resources and services provisions to their end users. The transition from print to electronic or digital resources is a high priority now for many librarians with an effort to convince their administrators and top level managements for necessary budgetary increments to change their library scenario and meet the user demands too.

In the Indian professional education scenario in particular, the Engineering institutions are subjected to periodical assessment and abide to the guidelines issued by All India Council for Technical Education (AICTE) (2015-2016) which has drawn the attention of administrators to understand the need of such facility in Library, due to technological developments that has invaded the Library arena. As a result of this, provision for subscription to several e-Resources digital library systems has come into force with consortia based e-resources digital library services to Engineering institutions. Several institutions have subscribed to this and implemented them and have complied with the directives issued by Ministry of Human Resource Development (MHRD), India. In recent years, the librarians at global level have transformed their libraries by way of collecting, organizing, storing and disseminating information to create conducive atmosphere to suit the needs of generation Z users. The utilization of NPTEL-based Video lecture content and Web-based courses are deployed through their intranet for the benefit of users. Also policy making agencies have mandated for the digital infrastructure facilities in their libraries. This has, forced the engineering college libraries to adapt to contemporary technological developments providing for and facilitating the use of the e-Resources to its users. Thus, this study has aimed to essay the efforts of librarians in the provision of e-Resources and access services in engineering college libraries in Karnataka.

OBJECTIVES OF THE STUDY

The study's objectives are as follow:

(i) To know the e-Resources provided by the engineering college libraries under study.
(ii) To understand the perception of librarians in subscribing to e-Resources packages that are relevant on the line with AICTE norms or through their affiliated University norms
(iii) To know the barrier in providing e-Resources.

Review of literature

A number of studies have been reviewed in this study to reveal the importance of e-Resources for engineering institutions, and are y to understand the subject of investigation better. Mulla and Chandrashekara (2006) researching on the availability of e-Resources and services revealed that, the e-resources collection management and digital services in the geographic surveyed are not promising as librarians were facing lots of challenges in building e-Resources collection such as lack of digital infrastructure, trained manpower, budgetary provisions etc. A case study by Sasireka et.al. (2011) revealed that the Engineering colleges in Tamil Nadu state provide an evidence of the status of various e-Resources selection and access. Also, a survey of engineering colleges in Kerala by Archana and Kabir (2014) revealed that 86% of the 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. Furthermore, 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 and Das (2015) highlighted and stated only meager percentage of libraries had separate budget for e-Resources. Many librarians expressed that e-Resources were being under-utilized in their libraries; and lack of comprehensive and up-to-date selection tools for digital documents is a barrier and regulatory body like AICTE was suggested to prescribe more exhaustive list of e-resources and consortium to provide tailor made option for the purpose of choosing e-resources. Jestin and Sornam (2016) investigated the awareness and availability of e-resources in Kerala and found that most of the librarians were aware of consortia and 42.42% were INDEST-AICTE consortium members. Their study also revealed that 100% of the libraries were subscribing to e-journals and 54.54% were subscribing to e-books.

METHODOLOGY

The study collected data from the engineering college libraries from Karnataka, adopting the Simple random sampling method. As a quantitative research method, the study employed a survey method using a questionnaire as a tool for data collection. The study considered engineering colleges affiliated with Visvesvaraya Technological University (VTU), Belagavi, Karnataka. The Sample comprised of 191 engineering colleges out of 204, excluding 13 colleges that were established after the year 2012. A questionnaire consisting of 17 questions covering both quantitative and qualitative aspects of the research problem were framed to obtain the required information. From the 191 sample, the authors received 150 responses, which is 78.53% of the total sample population response and determined that collected data can be summarized for whole population. The data collected was analyzed, using descriptive analysis through Statistical Package for the Social Sciences (SPSS) 20.

Table 1. Digital infrastructure.

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 2. Number of computer systems available.

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

Table 3. Subscription to online journal database.

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**

RESULTS

Digital infrastructure

The data on digital infrastructure like the e-Book readers and Audio-visual facilities was collected and presented in Table 1. Libraries are expected to have the basic amenities that meet the needs of the users. The table reveals that 82% of the colleges have not provided e-Book for readers; whereas 64% of them provided audio facilities. AICTE and VTU do not have any specific norms for the provision of e-Book for readers to facilitate their reference. Based on the number of users, the number of e-Book for readers can be prescribed. AICTE and VTU have a mandate for multimedia facility and it is essential for all libraries to provide audio facility.

Computer facility

The provision of computer facilities in colleges to use the e-Resources is an essential requirement. The availability of adequate number of PCs enhances the usage of services. AICTE and VTU norms mandated 10 PCs for digital libraries.

Table 2 shows that 18.00% of the libraries have less than 10 PCs, which means that they have not been adhering to the norms and have overlooked the provision of infrastructure for accessing e-resources in the library.

Subscription to online databases (Journals)

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 78.00% of the colleges have subscribed to online journal database/s through consortia and the 3.33% reported that they did not subscribe to online journal database/s as presented in Table 3. It is evident from the results that, almost all the engineering colleges are subscribing to the online journal database/s and are in compliance with VTU and AICTE norms of subscribing to online journal database/s.

Subscription to online database portals

Depending on the type of courses being offered, colleges have subscribed to one or more online database portals, therefore an attempt has been made to understand the names of the database/s being provided by these colleges. Figure 1 shows that 64.18% of the librarians, who subscribe to databases, reported that they
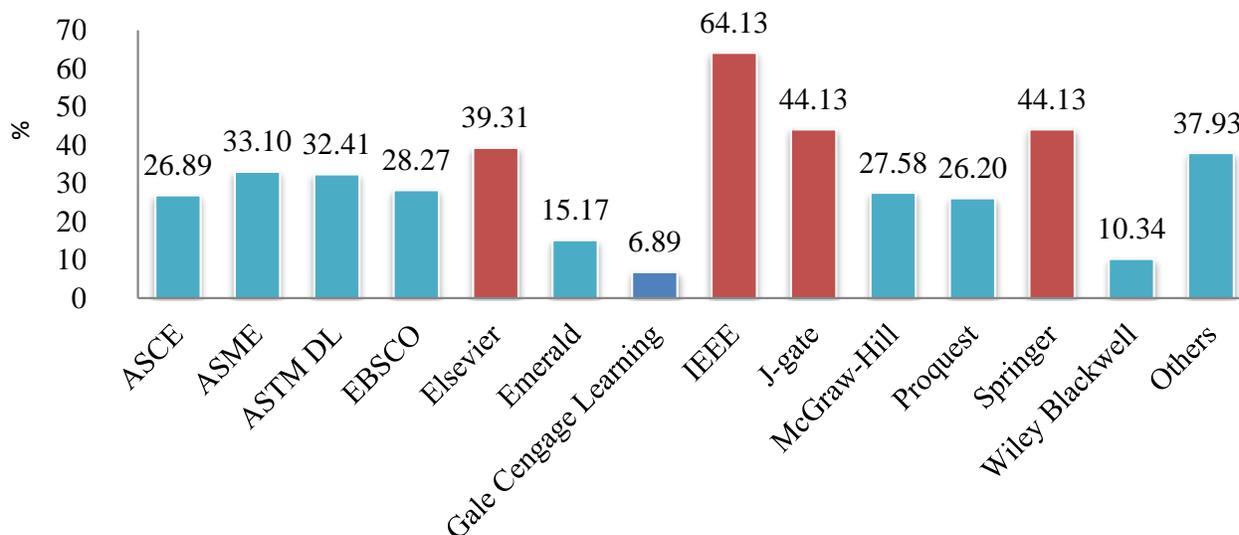
Figure 1. Subscribed online databases as per AICTE Norms.

subscribed to the Institute of Electrical and Electronics Engineers (IEEE) at their library. Only 6.90% subscribed to Gale Cengage Learning which is the subscribed by least number of colleges understudy. It can be inferred that IEEE, Springer Verlag, J-gate, and Elsevier are the most subscribed databases by the engineering college academic community under study.

Opinion on subscription to databases

It is essential to know the opinion of librarians with regard to the subscription to online database/s of e-Journals as per AICTE norms, as immense expenditure is incurred towards their subscription. The responses are presented in Table 4. It was found that   57.34% reported that subscribing to databases as per AICTE norms is "very crucial and 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 librarians are of the opinion that subscribing to e-resources is essential for users and also 26% opined that it was somewhat required for user.

Subscription to e-Books

It is known that E-books possess good deal of valuable features for learners. The unique features and capabilities of e-Books are such as minimal text size, text-to-speech conversion, and interaction features which is lacking in the print-based materials; thus the e-Books encourage users to adopt. In some previous studies it was shown that e-Book is a valuable resource, which is gaining

potential response in usage (Ajayi et al., 2014; Zickuhr et al., 2013).
In order to know how many librarians are providing this resource, responses were gathered and presented in Table 5 and it was found that 34.00% of the librarians reported that they provide access to e-books in their library. The VTU e-resources consortia includes Springer Verlag and Taylor and Francis e-book databases.

Information on lecture notes

Another important source of learning material 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. Results show that 97.30% of the librarians are of the opinion that they suggested the use of lecture notes to users. This reveals that majority of the librarians were aware of lecture notes and understand responsibility of educating users to best utilize the lecture notes.

### Different lecture notes suggested by colleges

These days, lecture notes and course wares are available in most of the field, but it is predominant in the engineering field. They are expanding largely and provided leading professors of the best universities in the world. In order to know the librarians effort in guiding the users towards world's best lecture notes, response was collected and displayed in Figure 2. It was found that out of the 146 librarians who suggested to use lecture notes, 73.97% reported that they suggested the use of NPTEL and VTU lecture notes. Few librarians suggested the use

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

	Opinions					
	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 5. Subscription to E-book/s databases.

Subscription to E-Books	No. of responses	Percentage
Subscribed	51	34.00
Not Subscribed	99	66.00
Total	**150**	**100**
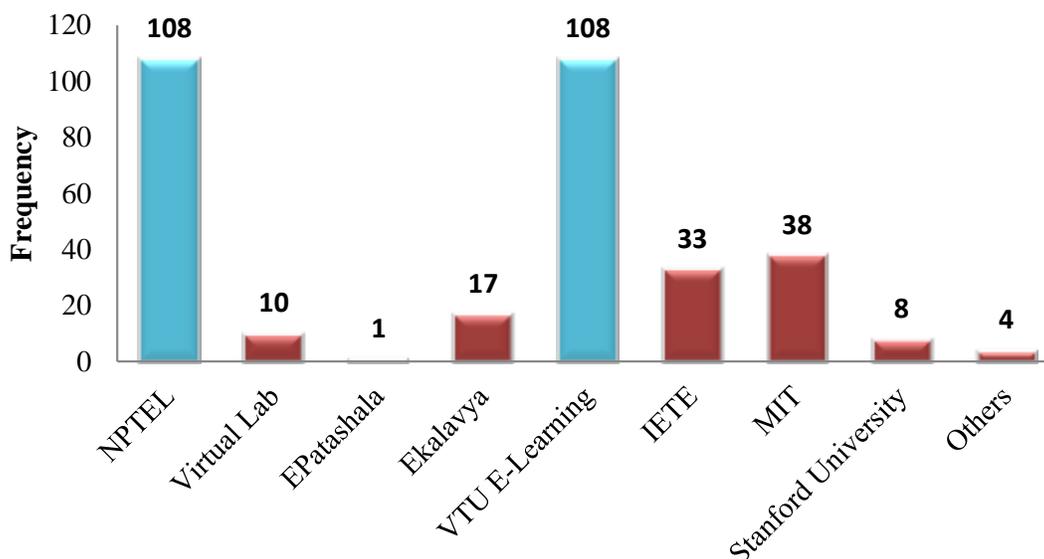
Figure 2. Suggestion on lecture notes.

of Virtual Lab, e-PG Pathshala, 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 VTUe-lecture notes are the most recommended lecture notes.

Access to NPTEL

NPTEL is an Indian portal dedicated to the provision of video lectures with the intent to augment class room teaching and learning, and these are created by experienced faculty to support teaching. The provision for access to the facility of NPTEL content is mandatory in accordance with AICTE. Only 58.70 % provide access. This clearly indicates that many engineering college librarians still have to initiate promoting and show interest in arranging for NPTEL access facility, though they are aware of the importance of the resource. 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 libraries 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 libraries, data was collected and observed that 39.77%
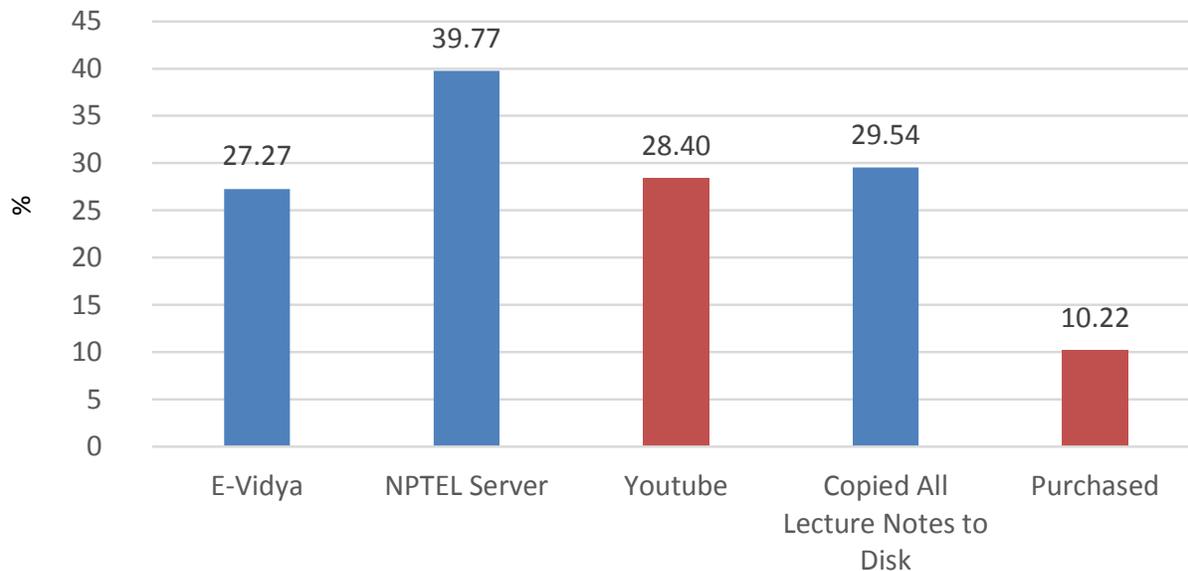
Figure 3. Mode of provision to access to NPTEL lecture notes.

reported they provide access through NPTEL server and 10.26% reported that they provided access through purchased disk. It is interesting to observe that librarians preferred to utilize most methods except for the actual purchasing of the lecture notes (Figure 3).

Information on Institutional Repository (IR)

The collection, management, conversion, in-house production, and showcase of digital content has become the need of the day for librarians. In order to fulfill this user need, 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 to understand archiving facility provided for the current and future use of resources. It was observed that 57.33% of the colleges have created an IR facility to allow the users access archived research material, question bank, lecture notes, and so on.

Resources in IR

IR was initially designed to provide 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 was collected in order to know the resources collected and organized in IR. Out of 86 libraries with provision for IR, 94.19% to archive question papers of previous years. A few librarians used IR to archive, audio files, images, and other resources. It is

evident from Figure 4 that most of the librarians use IR to archive question papers of previous years and articles which are mostly used at under-graduate and post-graduate level.

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. Librarians play a key role in ensuring that the users benefit from these resources. The librarians, however, to a large extent (86.00%) motivated to use these open resources.

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 librarians in creating awareness to increase utility of open source resources and data were evaluated and presented in Table 6. Based on the response received, 129 out of 150 librarians, state that open access journals were recommended by all of them to the users and open access books were recommended by 93.02% of librarians and only 30% of them recommended open access thesis repository. It indicates that open access journals and e-Books are the most recommended resources in engineering subjects.
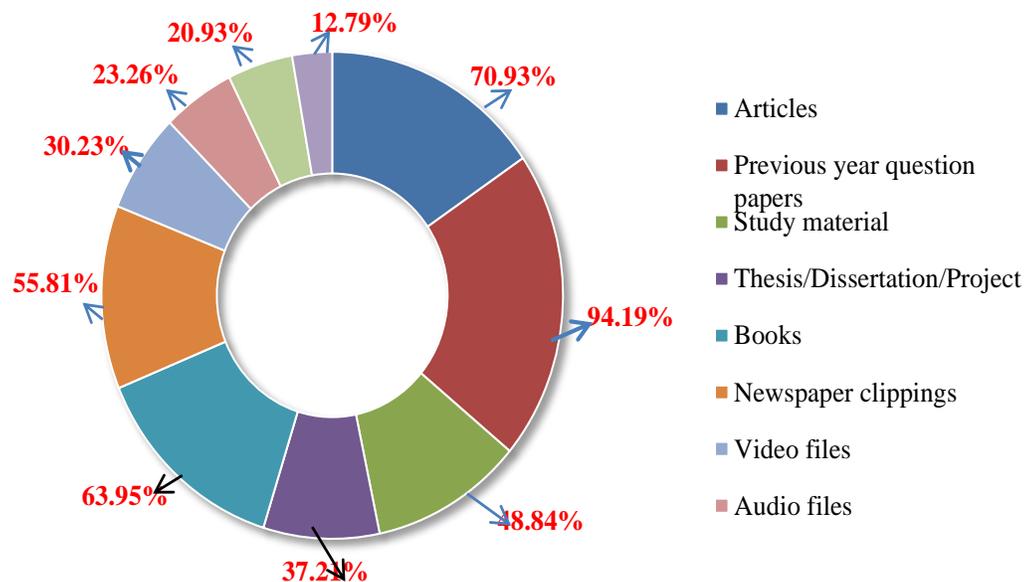
Figure 4. Resources Included in IR.

Table 6. Type of open access resources.

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

Hurdles in the effective use of e-resources, lecture notes and IR

In order to understand the problems faced by present day librarians in providing digital information services, especially with regard to IR, video lecture notes, e-resources, and digital library infrastructure - a hypothesis was framed. Problems such as lack of interest among users, lack of interest from management, lack of support from staff, lack of trained manpower, inadequate strength 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 were found to be the main problems. The same was true for provision for video lecture notes too. In case of providing e-resources and digital infrastructure, lack of interest from management (36%) was found to be the major problem (Table 7), which is justified as e-Resources involve huge investment; 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 digital information services.

DISCUSSION

Infrastructural facility

Majority of the engineering institutions in Karnataka provided audio facilities to help the students listen to the lecture notes in the library premises but sufficient number of e-Book readers were lower in occurrence.

Online journal databases

It was observed from the study that most librarians agreed that subscribing to online journal databases through INDEST-AICTE or VTU consortia was essential to the library users. This clearly shows that the librarians are in favour 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 27,000,000/- if underutilized it would lead to loss for the college;

Table 7. Problems in the effective use of digital information services.

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 Infrastructure	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

especially at the time of small student strength in the colleges. This also brings into light another argument on the efforts of librarians in creating awareness among users. The studies Mishra and Gohain (2010), Ali (2005) and Natarajan et al. (2010) have found the lack of awareness about databases leads to low use of e-resources.

It is found that IEEE is the most subscribed database followed by Elsevier, Springer Verlag and J-Gate. The remaining database as per AICTE mandatory subscription norms has been given less importance. The study by Archana and 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 and 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 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 USA, studies have shown that reading habit can be enhanced by providing access to e-Books, for example, 63% students in Adeleke University have reported to use e-Books (Ajayi et al., 2014). Further study by Zickuhr et al. (2013) reported that rising popularity of e-Books in facilitating the transformation of America's reading habits. Therefore, there is a dire need to increase the provision of e-Books in college libraries. The users as well as the college administrators should be sensitized for the importance of e-Books and online journal databases as they will be used more.

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 librarians 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 smaller proportion of the respondents deviated from norms as they did not make arrangements to provide access to libraries. It could be because of the open access facility available to these resources. Agrawal 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 librarians 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.

Institutional repository (IR)

The study revealed that most of the engineering colleges have adopted institutional repositories (IR). Less than two-thirds of the librarians who participated in this survey reported that DSpace was the preferred software. The major resources included in IR were question bank, research articles and e-books. The study on engineering

college libraries by Sahu and 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 engineering user community.

Use of open access resources

Majority of the librarians reported that they motivated the users to use the open access resources available in the library. Open access journals and open access books were the most common resources recommended for use by the librarians. 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 at entry level of study and profession compared to researchers. The open access trend is gaining popularity gradually in Indian academics, although it may take some time for libraries and librarians to make users accept it in large numbers.

Conclusion

The studies have evidences that e-Resources have certainly been accepted and used by users for various reasons. In this situation, providing them in academic libraries especially in engineering institutions is important to facilitate the teaching, learning and in research activity and enrich user's knowledge base. An attempt is 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 need to adhere to VTU and AICTE norms and guidelines as regard to e-Resources as specified subscription model. However, in spite of regulatory body guidelines, few libraries have not subscribed to online databases, which demonstrate that the adoption of online databases is still being evaluated by librarians for their value in the academic process or have to get convinced in subscribing to e-resources in lieu of print resources, due to various reasons.

It is observed that few libraries are aware of the benefits of lecture notes produced by the eminent teaching faculty and extend the facilities to the users. Another commanding note that, most of the libraries 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, librarians 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. Thus it is assessed that, librarians are largely supporting the teaching and learning activities and catering to the needs of generation engineering college library users. The libraries and librarians are helping the users to update their knowledge of technological developments, influencing information content and access to suit the environment of current job market.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Agrawal P, Kumar A, Agrawal A (2015). Massive Open Online Courses: EdX.org, Coursera.com and NPTEL, A Comparative Study Based on Usage Statistics and Features with Special Reference to India. http://ir.inflibnet.ac.in/handle/1944/1879

Ajayi SA, Shorunke OA, Modupe A (2014). The influence of electronic resources use on students' reading culture in Nigerian Universities: A case study of Adeleke University. http://digitalcommons.unl.edu/libphilprac/1182/

Ali N (2005). The use of electronic resources at IIT Delhi Library: A study of search behaviors. The Electronic Library 23(6):691-700.

All India Council for Technical Education (2015-2016). Approval Process Handbook. http://www.aicte-india.org/downloads/Approval_Process_Handbo ok_2015_16.pdf

Archana SN, Humayoon KS (2014). Resource Sharing among Engineering College Libraries Affiliated to Mahatma Gandhi University, Kerala: A Proposed Model (Ph.D. Thesis, Cochin University of Science and Technology). http://dyuthi.cusat.ac.in/xmlui/handle/purl/4958

Bhattacharya N, Das SK (2015). Present status of e-resources available in the engineering college libraries of West Bengal: problems towards sustainable collection development. Knowledge Librarian 2(3):232-251.

Jestin KJ, Sornam SA (2016). E-resources in engineering college libraries in Kerala: awareness and availability – A study. International Journal of Digital Library Services 6(2):85-90.

Mishra RN, Gohain RR (2010). Use and Usage Statistics of Electronic Resources at Central Library, Tezpur University: A Case Study. In: Re-engineering of Library and Information Services at Digital Era: Proceedings of 7th Convention PLANNER-2010, 18-20 February 2010, (Eds: JagdishArora et al.,) INFLIBNET Centre, Ahmadabad pp. 183-205.

Mulla KR, Chandrashekara M (2006). E-Resources and Services in Engineering College Libraries - A Case Study. Electronic Journal of Academic and Special Librarianship 7(1). http://southernlibrarianship.icaap.org/cont ent/v07n01/mulla_k01.htm

Natarajan K, Suresh B, Sivaraman P, Sevukan R (2010). Use and user perception of electronic resources in Annamalai University: A case study. Annals of Library and Information Studies 57(1):59-64.

Puttaswamy RM, Krishnamurthy M (2014). Information seeking behavior in an electronic environment in libraries among teachers and research scholars of engineering colleges under Visvesvaraya Technological University, Karnataka: a study. http://shodhganga.inflibnet.ac.in/handle/10603/51425

Sahu MK, Mahapatra RK (2012). Digital repository: A study of revolutionary endowment of Engineering Institution Libraries of Odisha. International Journal of Information Dissemination and Technology 2(4):237-244.

Sasireka G, Balamurugan S, Gnanasekaran D, Gopalakrishnan S (2011). Use of E-resources in digital environment among engineering institutions in Tamil Nadu (India): an empirical study. European Journal of Scientific Research 60(3):326-333.

Zickuhr K, Rainie L, Purcell K (2013). Library Services in the Digital Age. Pew Internet and American Life Project. http://libraries.pewinternet.org/2013/01/22/library-services/