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Utilization of the Digital Information Resources and Services Provided in the Engineering College Libraries in Karnataka, India: User's Perspective

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Abstract

Purpose - The current analytical survey investigates the utilization and effectiveness of digital libraries in 51 self-financed Engineering Colleges affiliated to the Visvesvaraya Technological University (VTU) in the State of Karnataka, India.

Design/methodology/approach - The research paper is based on survey of Final year (IV year) undergraduate students who use these digital information resources to a great extent for their project work, and faculty members have been chosen for the study. Questionnaire tool was used to gather data.

Findings - Utilization of Digital Information Resources for overall purposes is found to a large extent among respondents with mean value of 2.28±0.89. The Mann Whitney test shows that there is a significant difference in utilization between student and faculty members as $p=0.000<0.01$, which implies that digital information resources are used to a larger extent by faculty members and than by students. An impressive 88.9% of respondents are of the opinion that digital library services are superior to conventional library services. The digital library utilization and its purpose are correlated using Pearson correlation and its significant value $r=0.489$, $p=0.000<0.01$ proves that user dependency on digital information resources is positively increasing in the respondents' activities has an impact on their academic pursuits.

Keywords: Digital Library, Digital Information resources, E-databases, VTU Consortium, E-learning resources, NPTEL, Institutional repositories, Engineering Education, Users.

Introduction:

Digital information resources have become a vital part of an academic library. Engineering Educational Institutions are facing increasing competition from a global digital environment and ongoing change in user needs and expectations of information services. Today the quality is measured in terms of digital collections, e-resources, networking component, ICT tools etc.

The technology has changed expectations of researchers, their patience, and their willingness to accept services that are available on demand. The e-resources are the answer to expectations of the users. The pursuit of electronic information resources by libraries was driven by the core values of library science. It is possible to recognize in Ranganathan's five laws of library science the motivation that drove libraries to incorporate electronic resources into services and collections. These new library concepts have been adopted by many Engineering Colleges in Karnataka and are providing digital resources and service to their clients. Vishveswararaya Technological University (VTU) and governing body like All India Council for Technical Education (AICTE), understanding the technological changes; importance of digital resources and services, have made mandatory subscription to e-journal database/s to affiliated institutions. In this way they have enforced Engineering College libraries to acquire and manage digital collection time to time and cater to the needs of tech savvy users, who are always in need of information on their fingertips.

Need and Significance of the study

Electronic/digital information resources are a significant investment in many libraries and it must be ensured that patrons are capable of getting a good return on that investment. In the online world, libraries must understand that access to resources is more important than collection building as they continue to develop new capabilities and services on par with the changing demands of the users.

A majority of the institutes have initiated towards digital libraries. Additional research is needed to understand the direction and pace of transition from conventional libraries to digital libraries with a focus for providing better digital library services in accordance with the changing user expectations. Academic libraries are continuously working to support learning/teaching system by providing pinpointed information and services according to the needs of the users.

These days, users are craving for digital information resources and services to fulfill their information need, as it is easily accessible and searchable. So it was important to conduct the study to know the use of digital information resources by the faculty and students of Engineering College libraries.

Scope and Limitations of the study

Before making any progress in social research, it is highly essential to determine its scope and its limitations which will be helpful for timely completion of the investigation. If the boundary of research is not preordained, it becomes difficult on the part of the investigator to work in a scientific mind. The scope and limitations of the present study therefore has been restricted only to the study of the current status of digital libraries of the Engineering colleges of Karnataka State. However the present study has kept the following limitations in its scope.

1. This study covered only Engineering Colleges which are approved by the AICTE and affiliated to VTU.
2. Final year (IV year) undergraduate students are using the digital resources to the maximum extent for their project work and these students have been chosen for the study along with the faculty members.
3. The study mainly focused on the use of digital information resources, which mainly consists of electronic databases, under VTU consortium, e-learning resources and institutional repository collections.

Limitations of the Study:
1. The study was limited to the final year undergraduate students and faculty members of the self-financing Engineering Colleges.
2. The study was limited to the 51 self-financing Engineering Colleges affiliated to VTU established after the year 2005-2010.

Objectives

1. To analyze the utilization of various e-databases under VTU Consortium.
2. To aims to identify the use of e-learning resources and Institutional repository.

3. To understand the purpose of using the digital information resources by the faculty members and students

4. To evaluate the use of digital resources by the faculty and final year undergraduate student of these Engineering Colleges

Review of Literature

Literature Search is essential in order to be aware of the existing research and to know what has already come out to the surface. An exhaustive survey of the relevant literature related to the topic of research is the backbone of a successful research design. It will be needed to summarize the results of previous research to form a foundation of the present one and to collect ideas about what methodologies, techniques and tools were used by previous researchers in case of near topic that one is supposed to choose for and to assess the success of the previous research work based on the methodologies, techniques and tools undertaken.

Aravind (2017) attempted in his study the usage of electronic resources among the students of engineering colleges in Dindigul district. The primary data were collected from the student respondents from 5 selected engineering colleges in Dindigul district by using questionnaire. His study identified that majority of the respondents report the privacy problem is the prime problem in using electronic resources and they need workshop and classes for the effective use of e-resources. Majority of respondents are use the libraries for study propose and access the electronic resources regularly and once in a day. Most of respondent's purposes are visiting and use the electronic resource for developing knowledge and they preferred to use the Word & PPT format and PDF format to download information from the Internet. **Shivakumaraswmay and Khaiser (2016)** surveyed the use of e-collection in the Mysore Region Engineering College Library. The study indicated that the use of library e-collection which includes users profile; purpose of visiting; use of e-collection; use of e- database; of all the type of the use of e-collection "E-theses and dissertation" has the highest mean value with 3.25 and SD being 1.24; the Chi Square values reveal that ($2 = 72.434$, P>0.000) there was a significant difference among the respondents and the biggest choice of respondents was "sometimes" scoring, 215(28.3%); the variable e-database "IEEE (The institute of electrical and electronics engineers)" has the highest mean value with 3.88 and SD being 1.28; the results of Chi-Square test revealed that ($2 = 366.776$, P>.000) the differences among the respondents were

highly significant and the biggest choice of respondents in the use of "IEEE" was "strongly agree" scoring, 319(42.0%). **Kalbande and Chavan** (2015) found that 83% of faculty daily spend more than one hour on computers, 93.23% are familiar with digital resources, 60.48% were using digital resources at college library, 47.61% were using it for collecting subject information, most of the faculty members use ASTM digital library compared to other databases, and also expressed "limited access to internet" and "lack of training" were the main problems, majority of respondents i.e. 43.01% were partially satisfied. The suggestions were, in need of some improvement in the dealing with the digital resources, user orientation programs, more computer terminals should be installed, directory of websites should be prepared and updated, speed of internet, awareness and to join the consortium for maximum usage of digital resources. **Puttaswamy and Krishnamurthy (2014)** presented the use of e-resources by the faculty members and research scholars various Engineering Colleges of Visvesvaraya Technological University (VTU) Belgaum, Karnataka. Their study observed that majority of senior level teachers and research scholars access the e-resources for the research work rather than teaching. The study revealed that, 94% of the users were depending on e-resources which were more relevant for their study rather than print resources. The trend predicts that e-resources has over taken the print resources and predicts that the print resources would be phased out in near future. According to a study by **Nisa, Faizul and Ali, Naushad P M (2012),** examined the use of e-journals by the users of IIT Delhi, and Delhi University. Survey method was used to conduct the study to access e- journal use among IIT Delhi, and Delhi University users. Questionnaire tool was used to gather data and were administered personally among the users. The study found that most of the users are aware of e- journals and they are not only using them for building and updating their knowledge but also for collecting relevant material for their study and research purpose as information can be acquired expeditiously through e-journals.

Research Methodology

The survey method was used to collect the requisite data for the analysis. The study used questionnaire as main instrument to gather primary data from respondents. SPSS was used for descriptive and inferential statistical analysis and hypothesis testing. Graphs, charts and figures were generated on the basis of percentage analysis. The techniques and tests used for data

analysis include percentage analysis, Chi-square (χ^2) test, Fishers exact, Mann Whitney test; Mean, Standard Deviation and Correlation were used in the study for the analysis.

Analysis and Interpretation of the Data

Status-wise Respondents

The status of the respondents is taken as one of the variables for studying the use of digital information resources by the students and faculty members of Engineering Colleges under study. The status-wise breakup of responses is indicated in table 1

Table 1

Status-wise Respondents

Sl. No.	Status	Number of Respondents	Percentage (%)
1	Student	390	51.3
2	Faculty Member	370	48.7
Total		**760**	**100**

It is observed form the table 1 that out of the total 760 respondents, 390 (51.3%) are students and 370 (48.7%) are the faculty members

Gender-wise Respondents

Table 2

Gender-wise Respondents

Gender	Students	Faculty Members	Total	Test Statistics
Male	208(53.3)	244(65.9)	452(51.3)	X^2=12.531
Female	182(46.7)	126(34.1)	308(48.7)	df=1 p=.000
Total	**390(100.0)**	**370(100.0)**	**760(100.0)**	**HS**

Note: The percentage is given in the parentheses

Table 2 indicates the gender-wise segregation i.e. 452(51.3%) are male respondents and 308 (48.7%) are female respondents. Further among status-wise respondents out of 370 faculty members, 244(65.9%) are male and 126(34.1%) are female respondents. Whereas out of 390 students, 208(53.3%) are male and 182 (46.7%) are female respondents.

The majority of them were male respondents in both the categories (students and faculty members) as shown in the table 2. In addition to the above analysis, statistical testing has been conducted using the chi-square technique. The calculated chi-square values was employed to know the gender-wise response at 0.01 level of significance, chi-square value is 12.531 and p. value 0.000. This implies that there is a difference between students and faculty with respect to male female ratio as highly significant as $p=0.000<0.01$

Purpose of Visit to the Library

Engineering college libraries are information centers that provide maximum information related to the users. These centers maintain an extensive collection of information resources in the form of books, journals, etc., in print form or in digital form in relevant subject areas. The respondents generally visit the library for various purposes.

The various purpose of visit to the library by the respondents is presented in the table 3

Table 3

Purpose of Visit to the Library

Purpose	Respondents		
	Student (n=390)	**Faculty Members (n=370)**	**Total**
To Read Books/Journals	320(82.1)	321(86.8)	641(84.3)
To use Computer	148(37.9)	107(28.9)	255(33.6)
To request Inter Library Loans	55(14.1)	120(32.4)	175(23.0)
To Issue and Return Library Materials	360(92.3)	276(74.6)	636(83.6)
To read your own documents	101(25.9)	102(27.6)	203(26.7)
To use the Internet in the Library	125(32.1)	111(30.0)	236(31.1)
To read Newspapers	224(57.4)	241(65.1)	465(61.2)
To Photocopy materials	128(32.8)	128(34.6)	256(33.7)
To use Digital Resources	292(74.8)	302(81.6)	594(78.1)

Note: The percentage is given in the parentheses

The table 3 depicts that respondents visit the library for the purposes as mentioned. It was found that majority i.e. 641 (84.3%) visit the library to read Books/Journals and only 175 (23%) visit the library for requesting books and other materials under interlibrary loan services provided by the library. Further, 636 (83.6%) of them visit for Issue and Return of Library resources followed by, 594 (78.1%) visit to use Digital Resources, 465 (61.2%) visit to read newspapers, 256 (33.7%) for photocopying information resources, 255 (33.6%) to make use of

the computer and 236 (31.1%) visit for using internet facility in the library. The remaining 203 (26.7%) respondents visit the library to read their own information resources.

According to the status-wise responses, it was found that out of the total 390 students 360 (92.3%) students visit the library for Issue/Return Library information resources. Further, 320 (82.1%) students visit the library to read Books and Journals, followed by 292 (74.8%) to use the Digital information Resources in the Library and 224 (57.4%) students visit the library to read newspapers. The other purposes of the users visit to the library is 148 (37.9%) students come to use the Computer, 128 (32.8%) for photocopy materials of the Library information resources, 125 (32.1%) students visit the library to use the Internet facility and 101 (25.9%) of the respondents to read their own information resources and only 55 (14.1%) visit the library for requesting the materials on inter library loan service.

Among the total 370 faculty members, majority 321 (86.8%) visit the library to read books/journals. Further, 302 (81.6%) visit to use digital information resources, followed by 276 (74.6%) faculty members visit the library for issue/return the library information resources, 241 (65.1%) to read newspapers and 128 (34.6%) for photocopying materials of the library information resources, 120 (32.4%) faculty members visit the library for requesting the information resources under interlibrary loan services, 111 (30%) to use the Internet facility provided in the library and 107 (28.9%) faculty members visit the library to make use of the computers.

It could be seen from the above analysis that the faculty and student respondents generally visit the library for various purposes. Maximum number of respondents visits the library to issue/return the library information resources, to use digital information resources and to read books/journals for their academic pursuits.

Utilization of Library Facilities

The overall utilization of library facilities was presented in the table 4.

Table 4

Utilization of Library Facilities

Utilization	Respondents			Test Statistics
	Students	**Faculty Members**	**Total**	X^2= .170 df=2 P=.918 NS
Less Utilization	143(36.7)	138(37.3)	281(37.0)	
Moderate Utilization	19(4.9)	20(5.4)	39(5.1)	
High Utilization	228(58.5)	212(57.3)	440(57.9)	
Total	**390(100.0)**	**370(100.0)**	**760(100.0)**	

Note: The percentage is given in the parentheses

It was found that out of 760 respondents, 440(57.9%) respondents highly utilized the library facilities whereas 281(37%) respondents made low utilization of library facilities.

Among the students, 228 (58.5%) respondents utilized the library facilities to a higher extent, whereas, 143 (36.7%) students utilized the library facilities to a lesser extent and only 19 (4.9%) students used the library facility moderately. Again, among the faculty members, 212 (57.3%) respondents utilized the library facility to a higher extent, whereas 281 (37%) faculty members utilized library facilities to a lesser extent and only 39 (501%) respondents utilized the library facility to a moderate extent.

The Chi-square test was employed to know the utilization of library facilities at 0.05 level of significance, calculated chi-square value is 0.170, degree of freedom value 2 and p. value 0.918. This implies that there was a difference between students and faculties with respect to utilization of library facilities and it is not significant as p=0.918>0.05. In other words, it implies that dependency and importance of library facilities was high among the respondents and they used the library facilities for their academic and other purposes.

VTU Consortium

The VTU Consortium is an e-consortium of e-resources and databases established by VTU for the benefit of Engineering Colleges in Karnataka. It subscribes e-resources centrally and allows consortium members to use it at nominal charges.

Awareness of E-resource Databases under VTU Consortium

There are different E-resource databases available under VTU Consortium. Awareness of e-databases under the VTU Consortium was a very important aspect in the Engineering College Libraries. For the effective use of databases, the user should be aware of the e-databases. The respondents were asked whether they were aware of this consortium and if they are aware, are they using it. The results were presented in table 5.

Table 5

Awareness of E-resource Databases under VTU Consortium

Awareness	Respondents			Test Statistics
	Students	**Faculty Members**	**Total**	**Fisher's Exact Test P=.062 NS**
Yes	375 (98.7)	364(100)	739(99.3)	
No	5(1.3)	0(0.0)	5(0.7)	
Total	**380(100.0)**	**370(100.0)**	**744(100.0)**	

Note: The percentage is given in the parentheses

To gauge this awareness, the above table 5 shows that the huge majority, i.e. 739 (99.3%) of the respondents were aware of different databases under the VTU Consortium and the remaining, only 5 (0.7%) of the respondents remarked that they were unaware of the different databases under VTU Consortium. Further the data has been analyzed status-wise.

The status-wise responses indicated the awareness of e-databases under VTU Consortium that among students, large majority, i.e. 375 (98.7%) students were aware and only, i.e. 5 (1.3%) remarked that they were unaware of the different databases under the VTU consortium. Again, it was seen that all faculty members were aware of e-databases under VTU consortium.

In addition to the above analysis, statistical test has been conducted using Fisher's Exact Test. The Fisher's Exact Test reveals that there was a difference between student and faculty

with respect to awareness of different databases under VTU Consortium e-databases and it is not significant as p=0.062>0.05.

This implies that the awareness of e-resources databases under VTU Consortium was cent percent by all the faculty members and only few students were unaware of the consortium. A further insight into the findings clearly indicated that most of them were aware of the different e-databases and a negligible number of respondents were unaware of the VTU Consortium. The total awareness of the VTU consortium databases shows the popularization of the same in the Engineering Colleges in the state of Karnataka.

Frequency of Use of Different Electronic Databases

The frequency of use of e-databases had been obtained from the respondents and the same presented in table 6

Table 6

Frequency of Use of Different Databases

Databases	Respondents		
	Students	**Faculty Members**	**Total**
IEEE/IEL online	276(73.6)	259(71.2)	535(72.4)
ASCE	105(28.0)	95(26.1)	200(27.1)
J-Gate	42(11.2)	47(12.9)	89(12.0)
Elsevier	210(56.0)	216(59.3)	426(57.6)
Proquest	113(30.1)	120(33.0)	233(31.5)
Wiley Blackwell	5(1.3)	16(4.4)	21(2.8)
Gale Cengage Learning	5(1.3)	16(4.4)	21(2.8)
McGraw Hill	52(13.9)	54(14.8)	106(14.3)
EBSCO	25(6.7)	34(9.3)	59(8.0)
Emerald	18(4.8)	43(11.8)	61(8.3)
Springer	248(66.1)	261(71.7)	509(68.9)
K-Nimbus Digital Library	39(10.4)	36(9.9)	75(10.1)
Taylor and Francis	7(1.9)	24(6.6)	31(4.2)
Other	10(2.7)	4(1.1)	14(1.9)

Note: The percentage is given in the parentheses

The table 6 highlights the frequently used digital databases among the respondents. A maximum number, i.e. 435 (72.4%) respondents use IEEE/IEL online database and only 14

(1.9%) use other databases. Further, 509 (68.9%) respondents use Springer database, followed by 426 (57.6%) who use Elsevier databases, 233 (31.5%) respondents use Proquest database, 200 (27.1%) respondents use ASCE database, 106 (14.3%) respondents use McGraw Hill databases, 89 (12%) use J-Gate database and 75(10.1%) use K-Nimbus digital library. A fewer number, i.e. 61 (8.3%) use Emerald, followed by 59 (8%) who use EBSCO, 31 (4.2%) use Taylor and Francis and 21 (2.8%) each of the respondents use Wiley Blackwell and Gale Cengage Learning.

The status-wise responses further indicated that among the students, the majority, i.e. 276 (73.6%) students use IEEE/IEL online database, while only 5 (1.3%) each of the respondents use Wiley Blackwell and Gale Cengage Learning database. Another 248 (66.1%) students use Springer databases, followed by 210 (56%) students using Elsevier, 113 (30.1%) students use Proquest and 105(28%) they use ASCE. Again 52 (13.9%) students use McGraw Hill database, 42 (11.2%) students use J-Gate database and 39 (10.4%) use K-Nimbus digital library. A fewer number, i.e. 25 (6.7%) students use EBSCO, followed by 18 (4.8%) who use Emerald database, 10 (2.7%) use other database, and only 7 (1.9%) of the respondents use Taylor and Francis.

While among faculty members, majority, i.e. 259 (71.2%) use Springer database and only 4 (1.1%) members use other databases. While, 261 (71.7%) faculty members use the IEEE database, 216 (59.3%) use the Elsevier database, 120 (33%) faculty members use Proquest database and 95 (26.1%) faculty members use ASCE database. A lesser number, i.e. 54 (14.8%) faculty members use McGraw Hill database, 47 (129%) use J-Gate, 43 (11.8%) use Emerald database, 36 (9.9%) use K-Nimbus digital library, 24 (6.6%) use Taylor and Francis and only 16 (4.4%) respondents use Wiley Blackwell and Gale Cengage Learning databases.

It was evident from the above analysis that the frequently used and most popular e-databases were Springer, IEEE and Elsevier databases. This implies that the other databases such as Proquest, ASCE, McGraw Hill, J-gate, Emerald, Taylor & Francis and Wiley were less utilized among the respondents compared to the above three databases.

Location of Access of E-resources/Digital Information Resources

The location of access of Digital information resources by the respondents is presented in table 7.

Table 7

Preferred Location to Access E-Resources/Digital Information Resources

Preferred Location	Respondents		
	Students(n=375)	Faculty members (364)	Total(n=739)
College library	264(70.4)	258(70.9)	522(70.6)
At Home	63(16.8)	50(13.7)	113(15.3)
Internet Cafe	22(5.9)	16(4.4)	38(5.1)
Computer Lab/Computer Centre	110(29.3)	80(22.0)	190(25.7)
Department	54(14.4)	140(38.5)	194(26.3)
Mobile phone/PDA	71(18.9)	68(18.7)	139(18.8)
Others	6(1.6)	6(1.6)	12(1.6)

Note: The percentage is given in the parentheses

522 (70.6%) of the respondents indicated that they have access to the computer and use it for retrieval of digital information resources from the college library and 194 (26.3%) access it from their departments. About 190 (25.7%) access the digital information resources from the computer centre. Also 139 (18.8%) prefer to access the digital information resources using their Mobile phone. Whereas, 113(15.3%) access the digital information resources from their home. Hence it can be seen that the respondents access the digital information resources from different locations.

Regarding the faculty accessing digital information resources, a large majority 258 (70.9%) access the digital information resources from the college library and 140 (38.5%) access the digital information resources form their departments. About 80 (22%) of the faculty members access the digital information resources from the computer Lab/centre. While 68(18.7%) use their mobile phone to access the digital information resources. Only about 50 (13.7%) access the digital information resources at their home.

A large percentage of students i.e. 264 (70%) access the digital information resources from the College library. Also 110 (29.3%) of the students access from the computer lab, 71 (18.9%) through their mobile phones and 63 (16.8%) access the digital information resources at their home.

The above analysis shows that the respondents use the digital information resources at various places on the college campus. Their location of access of digital information resources is found to be mainly college library, departments and computer centre. This shows that majority of the respondents access the digital information resources at the college premises only.

E-Learning Resources

Awareness of E-learning Resource/Lecture Notes

E-learning Resources like lecture notes are becoming one of the major parts of the digital information resource and are gaining importance in Engineering education. Efforts from IITs, IETE, IISc and the Government of India are continuously made since 2000 to provide and popularize Lecture Notes in the Engineering field. The awareness of E-learning resource is very important task for the effective utilization. Hence, the details of awareness among the respondents are presented in the table 8.

Table 8

Awareness of E-learning Resources/Lecture Notes

Awareness	Respondents			Test Statistics
	Students	Faculty members	Total	
Yes	343(87.9)	341(92.2)	684(90.0)	X^2 =3.791
No	47(12.1)	29(7.8)	76(10.0)	df=1
Total	390(100.0)	370(100.0)	760(100.0)	P=.052 NS

Note: The percentage is given in the parentheses

Table 8 shows the awareness of e-learning resources/lecture notes among the respondents. A large majority i.e. 684 (90%) respondents were aware of e-learning resources and only 76 (10%) respondents were unaware of e-learning resources/lecture notes.

Status-wise responses regarding the awareness of e-learning resources are as presented in the table. Among the students, a majority i.e. 343 (87.9%) respondents were aware and the remaining 47 (12.1%) students were unaware of e-learning resources/ lecture notes. Again, among the faculty members awareness of e-learning resources shows that majority i.e. 341

(92.2%) faculty members were aware and the remaining 29 (7.8%) faculty members were unaware of e-learning resources/ lecture notes.

The Chi-square test was employed to find the awareness of e-learning resources/lecture notes among variables at 0.05 level of significance, chi-square value is 3.791 and p. value is 0.052 (>0.05). The test revealed that the difference between faculty and students with respect to awareness of e-learning resources/lecture notes was not significant as p=0.052>0.05. It implies that e-learning resources played a significant role in Engineering education.

Preferred E-learning Resource/Lecture Notes

In Engineering academia, the respondents prefer to use a variety of e-learning resources/lecture notes. To ascertain preferences in the use of various e-learning resources, the respondents were asked to indicate their preferences in the use of different e-learning resources. The collective responses are analyzed and presented in figure 1.
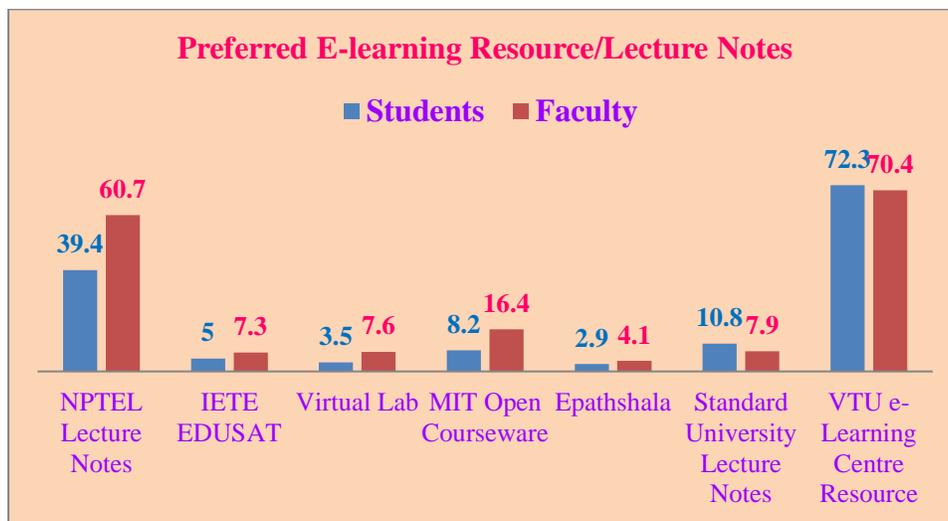

Figure 1

It is seen from the figure 1 that 488 (71.3%) of the respondents preferred VTU leaning resource and half of the total respondents i.e. 342(50%) respondents preferred NPTEL lecture notes. Only 84 (12.3%) respondents preferred MIT open Courseware. Whereas 64 (9.4%) respondents preferred Stanford University lecture notes.

Status-wise analysis indicated that 248 (72.3%) students first preference was VTU e-learning resources and next preferred e-learning resources was NPTEL lecture notes which was preferred by 135 (39.4%) students. The other e-learning resources are found to be Stanford

University lecture notes preferred by 37 (10.8%) students, followed by 28 (8.2%) students preferring to use MIT Open Courseware, again 17 (5%) students preferred IETE EDUSAT and a small number i.e. 12(3.5%) respondents preferred Virtual lab.

Again, the preference of use of e-learning resources among the faculty members indicated that VTU e-learning centre was the first preferred e-learning resources by 240 (70.4%) faculty members whereas 207 (60.7%) faculty members preferred to use NPTEL lecture notes. MIT Open Courseware was preferred by 56 (16.4%) respondents and Stanford University lecture notes, Virtual lab e-learning resources and IETE EDUSAT were preferred by only 27 (7.9%), 26 (7.6%) and 25 (7.3%) faculty members respectively.

There is no doubt that the internet has assumed the role of providing a e-learning resources and today's users can no longer depend only on conventional method of teaching/learning to cope with the latest e-learning/e-lectures developments in their respective field. For more effective use of available e-learning resources in the library, the users training and orientation on e-learning resources should be provided to the faculty and the students.

From the above analysis it can be seen that the most preferred e-learning resources were VTU e-learning resources and NPTEL lecture notes.

Institutional Repository

Awareness of Institutional Repository collection in the Digital Library

Archiving digital information resources is an important activity of a library for current and future use of information resources. Awareness of institutional repositories among the users is essential in use of Institutional Repository collections. The awareness of Institutional Repository among the respondents is displayed in the table 9.

Table 9

Awareness of Institutional Repository collection in the Digital Library

Awareness	Respondents			Test Statistics
	Students	**Faculty members**	**Total**	
Yes	312(80.0)	281(75.9)	593(78.0)	**X^2=1.820**
No	78(20.0)	89(24.1)	167(22.0)	**df=1**
Total	**390(100.0)**	**370(100.0)**	**760(100.0)**	**P=.177** **NS**

Note: The percentage is given in the parentheses

The table 9 indicated that among 760 total respondents a majority 593 (78%) respondents were aware of the institutional repository in their institution and the remaining, 167 (22%) respondents were not aware of institutional repository collection.

The status-wise results showed that 281 (75.9%) faculty members were aware of the institutional repository collection in their institutions and 89 (24.1%) were unaware of the same. Again 312 (80%) students were aware of institutional repository collection and 78 (20%) were not aware of it.

In addition to the above analysis, statistical testing has been conducted using the chi-square technique to know the awareness of e-learning resources, the calculated chi-square value is 3.791 and p. value is 0.177 (>0.05) table (5.2.16). The test revealed that there was difference between faculty members and students with respect to the awareness of the institutional repository collections provided in their college library but it is not significant as p=0.177>0.05.

Use of different Institutional Repository Collections in the Digital Library

In continuation of the question on the awareness of the Institutional Repository collections, the respondents were asked to indicate the frequently used institutional repository collections. A variety of collections are available in the Institutional Repository ranging from previous year question papers to college reports. The use of different types of Institutional Repository collections is presented in the figure 2.
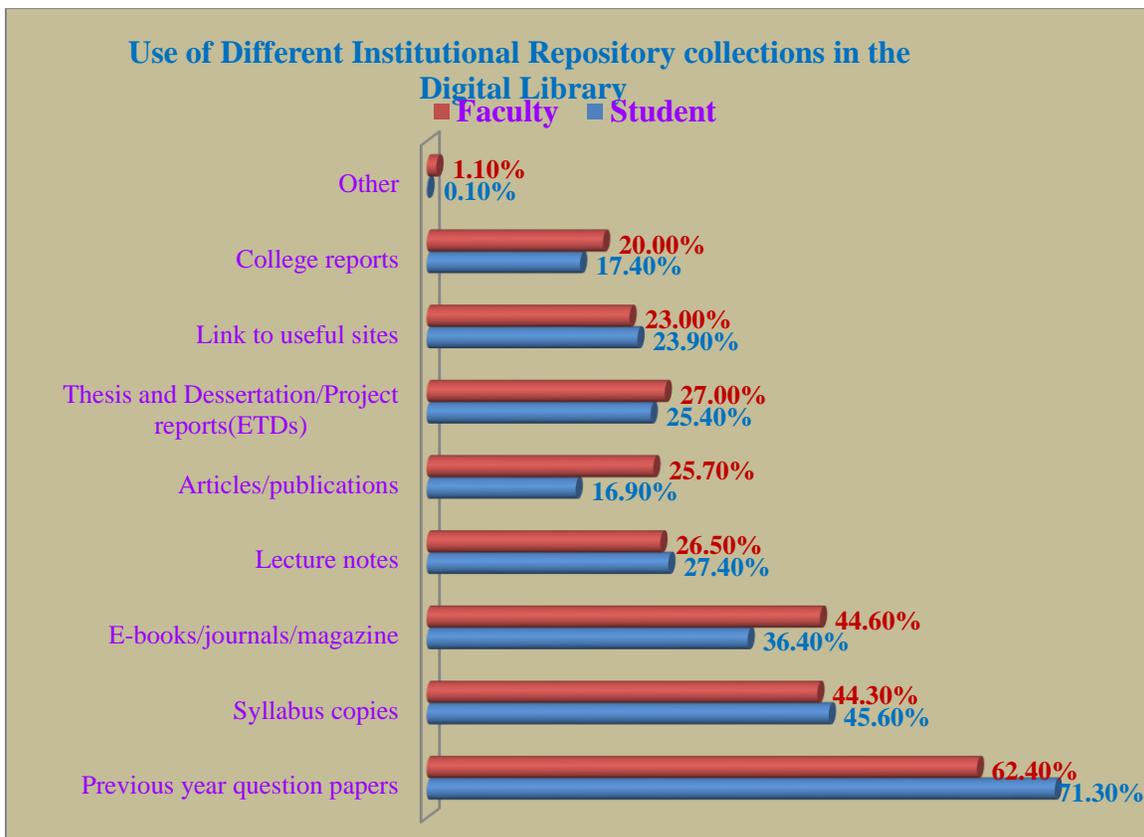
Figure 2

As expected the 'previous year question papers', which is the most popular and frequently used item in the Institutional repository is used by majority 509(85.8%) of the respondents.

Another most widely used IR collection is the 'Syllabus copies' which is used by 342(57.7%) of the respondents. The reason may be that a syllabus copy provides a total curriculum details.

Frequently used IR collection is 'e-books/e-journals by 307 (51.8%) of respondents. Similarly, 205 (34.6%) and 199 (33.6%) of the respondents have cited 'lecture notes' and 'Thesis/dissertation/project reports (ETDs)' respectively. 'Link to useful sites' used by 178 (30%) of the respondents. 'Articles/publications' and 'College reports' were not frequently used by majority of the respondents as shown in the table and figure i.e. 27.2% and 23.9% respectively.

According to the status-wise respondents use of different IR collections is indicated in the table 5.2.17. It is observed from the table that the most frequently used IR collection is 'previous

years' question papers' i.e. 278 (71.3%) students and 231(62.4%) faculty members use it, followed by the 'syllabus copies' as the second most frequently used collection by 176(45.6%) students and 164(44.3%) faculty members, 'E-books/e-journals' were used by 142(36.4%) students and 165 (44.6%) faculty members.

Another frequently used IR resource is 'lecture notes' which is used by 107(27.4%) students and 98 (26.5%) faculty members. Whereas 'Thesis/dissertation/project reports (ETDs)' is used by 99(25.4%) students and 100 (27%) faculty members.

The other institutional repository collections are not frequently used by the respondents and these collections are College reports, Articles/publications, Links to useful sites.

It is evident from the above analysis that, the most popular and highly used institutional repository collections were 'previous years question papers', followed by 'syllabus copies' and 'e-books/e-journals'

Purpose of Using Digital Information Resources

The respondents were asked to provide their reasons why they utilize digital information resources, based on fixed options by the investigator. The various purposes, for which the digital information resources used, were elicited from the respondents.

Respondents were asked to identify the various purposes of using the digital information resources on a 'five point scale' and to mark the purposes in the order of preference of use (4=very large extent).

Table 10

Purpose of Using Different Digital Information Resources

Purpose	Respondents	Not At All 0	Very Little Extent 1	Some Extent 2	Large Extent 3	Very Large Extent 4	Mean	S.D	Mann Whitney Test Z Value	P
For Updating Knowledge	Student	19 (4.9)	42 (10.8)	98 (25.1)	151 (38.7)	80 (20.5)	2.59	1.07		
	Faculty Members	12 (3.2)	41 (11.1)	98 (25.1)	114 (30.8)	105 (28.4)	2.70	1.09	1.33	.184 NS
	Total	31 (4.1)	83 (10.9)	196 (25.8)	265 (34.9)	185 (24.3)	**2.64**	**1.08**		
Preparation For Seminar/ Workshop	Student	34 (8.7)	43 (11.0)	116 (29.7)	128 (32.8)	69 (17.7)	2.40	1.15		
	Faculty Members	24 (6.5)	25 (6.8)	99 (26.8)	125 (33.8)	97 (26.2)	2.66	1.12	3.30	.001 HS
	Total	58 (7.6)	68 (8.9)	215 (28.3)	253 (33.3)	166 (21.8)	**2.53**	**1.15**		
Preparation For Examination	Student	37 (9.5)	39 (10.0)	94 (24.1)	115 (29.5)	105 (26.9)	2.54	1.24		
	Faculty Members	19 (5.1)	60 (16.2)	123 (33.2)	102 (27.6)	66 (17.8)	2.37	1.10	2.66	.008 HS
	Total	56 (7.4)	99 (13.0)	217 (28.6)	217 (28.6)	171 (22.5)	**2.46**	**1.18**		
Preparing For Research/Project/Articles	Student	39 (10.0)	54 (13.8)	120 (30.8)	129 (33.1)	48 (12.3)	2.24	1.14		
	Faculty Members	12 (3.2)	39 (10.5)	109 (29.5)	119 (32.2)	91 (24.6)	2.64	1.06	4.68	.000 HS
	Total	51 (6.7)	93 (12.2)	229 (30.1)	248 (32.6)	139 (18.3)	**2.44**	**1.12**		
Teaching	Student	115 (29.5)	146 (37.4)	62 (15.9)	37 (9.5)	30 (7.7)	1.28	1.20		.000 HS
	Faculty Members	14 (3.8)	55 (14.9)	61 (16.5)	108 (29.2)	132 (35.7)	2.78	1.18	14.60	
	Total	129 (17.0)	201 (26.4)	123 (16.2)	145 (19.1)	162 (21.31)	**2.01**	**1.41**		
Preparation For Ph.D Thesis	Student	150 (38.5)	123 (31.5)	45 (11.5)	43 (11.0)	29 (7.4)	1.17	1.25		
	Faculty Members	54 (14.6)	68 (18.4)	102 (27.6)	77 (20.8)	69 (18.6)	2.11	1.31	9.65	.000 HS
	Total	204 (26.8)	191 (25.1)	147 (19.3)	120 (15.8)	98 (12.9)	**1.63**	**1.36**		

Note: The percentage is given in the parentheses

The table 10 shows the various purposes of use of digital information resources. The highest score of 'For updating knowledge' given by the respondents is 2.64±1.087. The mean value of the student represents was 2.59±1.07 and faculty members 2.70±1.09. The Z value is 1.33 and significant value is 0.184 since it is p>0.05. The mean difference is not significant at 5% level of significance, which implies that the purpose of using digital information resources in terms of 'Updating knowledge' showed no significant difference between students and faculty members as p=0.184>0.05.

With regard to the use of digital information resources for the purpose of 'Preparation for seminar/workshop' with the mean value was 2.53±1.15. For the students the mean score was 2.40±1.15 and for faculty members the score was 2.66±1.12. The Z value being 3.30 and p. value 0.001 since p<0.01, the mean difference is highly significant, which implies that there exists highly significant difference between students and faculty members with regard to the purpose of using digital information resources in 'Preparation for seminar/workshop'.

Digital information resources are highly utilized in 'Preparation for examination' among the respondents with mean value of 2.46±1.18. The mean value given by status-wise respondents who are students is 2.54±1.24 and faculty members mean value is 2.37±1.10. The Z value is 2.66 and p. value is 0.008 since it is p<0.01 the mean difference is highly significant, which implies that the purpose of using digital information resources in terms of 'Preparation for examination' was found to be different between students and faculty members. It is encouraging to note that the student respondents are making maximum use of the digital information resources for their examination purpose.

The next purpose of using digital information resource 'Preparing for research/project/articles' had the mean value 2.44±1.12 for all the respondents, whereas the students mean value was 2.24±1.11 and for the faculty members scoring was 2.64±1.06. The Z value being 4.68, it implied that there was high significant difference between the students and faculty use of digital information resources for the purpose of 'Preparing for research/project/articles'.

The mean score of 'Teaching purpose' by the respondents is 2.01±1.41. The mean value of students is 1.28±1.20 and faculty members 2.78±1.18. The Z value is 14.60 and significant p.

value is 0.000. The mean difference is highly significant, which implies that teachers use digital resources to a larger extent for the purpose of teaching than the students, which is obvious.

The mean score of the respondents 'For preparation of Ph. D thesis' is 1.63 ± 1.36. The mean score of students is 1.17 ± 1.25 and faculty members is 2.11 ± 1.31. The Z value is 9.65 and significant value is 0.000 since it is $p<0.01$ the mean difference is highly significant, which shows there was highly significant difference between students and faculty members with regard to the purpose of use of digital information resources 'for preparation of Ph. D thesis'. This implies that the use of digital information resources of preparation for Ph.D thesis was used to a large extent by faculty members and less by students. It is noticed that the dependency of digital information resources among faculty members shows their interest in pursuing higher studies.

It is clear from the above analysis that the major purposes for using digital information resources were 'For updating knowledge', 'preparation for seminar/workshop', 'for research/project/writing articles' by the category of respondents.

The Mann Whitney test indicated that except for the purpose of using digital information resources 'for updating knowledge' for all the other purposes there was highly significant difference between the student and faculty members use of digital information resources.

Correlation between Utilization of Digital Library and Purpose

Table 11

Correlation between Utilization of Digital Library and Purpose

		Pearson Correlation	**p**	
Utilization of Digital library	Overall purpose	.489	.000	sig

The table 11 shows the purpose of utilization of digital library. The correlation coefficient value (R) is 0.489 which exhibits moderate correlation between the independent variable (utilization of digital library) and dependent variable (purpose), with its associated significance level being $p=0.000$ $(0.000<0.05)$. This shows there is a positive correlation between purpose and utilization of digital libraries, which implies that the utilization of digital information

resources and their purpose of use of digital information resources were accepted among the respondents. This shows the users dependency in digital information resources and also the users were positively accepting the digital information resources for their day-to-day activities as well as their academic pursuits.

The Overall Preference of Digital Library Services

User preference shows a greater liking towards digital libraries. Digital libraries can be considered as one of the important online information system, making it one of the main sources of reliable information for users. On the other hand, digital libraries can also act as 'an information resource banks with well organized and substantive data that can cater to the needs of large group of people in different locations via, the utilization of enhanced technologies'. Digital collections act as the abridgment of varied information sources outside the library but can be used by patrons via the WWW. Digital Library providing an organized content space and a series of services that can improve the co-relationship between information providers and users, thus maximizing the whole knowledge life cycle.

The study of the user preference towards digital information resources has a similar paradigm with the study of user acceptance towards utilizing digital library. The observation of the overall preferences of the digital library is presented in table 12.

Table 12

Overall Preference of Digital Library Services

Respondents	N	Mean	Std. Deviation	Mann Whitney test Z value	p
Students	338	2.74	.92		.004
Faculty	338	2.96	.75	2.88	
Total	676	2.85	.84		HS

Table 12 shows the overall preferences of digital libraries over conventional libraries high among the respondents with mean value 2.85±.84. Whereas student means value was (2.74±.92) and faculty members mean value was (2.96±.75). The Z value is 2.88 and p. value is 0.004 (0<0.01), hence difference is highly significant. The Mann Whitney Test revealed that there was highly significant deference between students and faculty members as p=0.004<0.01

with respect to overall preference of digital libraries over conventional libraries. It can be inferred that faculty members preferred more of digital library services in comparison to students.

Findings of the study

(i) **Respondent Categories**

a. Total number of Respondents: 760

b. Students: 390 (51.3%)

c. Faculty members: 370 (48.7%)

(ii) **Respondents by Gender**

a. Of the 760 respondents 452 (51.3%) are male and 308 (48.7%) are female.

b. Out of 390 student respondents 208 (53.3%) are male and 182(46.7%) are female.

c. Among the 370 faculty respondents 244 (65.9%) are male and 126 (34.1%) are female.

d. It can be seen that in both the categories the number of male respondents were higher than that of the female.

(iii) **Purpose of Visit to the Library**

a. The general purpose of visit to the library among both categories of respondents is to read books/journals or for 'Issue/return of Library resources' (84.3% and 83.6% respectively). 78.1% of respondents also 'Use digital resources' and 61.2% 'Read newspapers' for their academic pursuits.

b. Among the student respondents, it is seen that 92.3% visit the library for 'Issue/Return Library information resources'; followed by 82.1% to 'Read books and journals; and 74.8% to 'Use the digital information resources'.

c. 86.8% of the faculty respondents visit the library to 'Read books/journals'. 81.6% 'Use the digital information resources' at the library, followed by 74.6% whose visits are to 'Issue/return the library information resources' and 65.1% to 'Read newspapers'.

(iv) **Utilization of Library Facilities**

a. Utilisation of library facilities is found to be quite high among 57.9% (440) out of the 760 respondents. However, 281 (37%) of the subjects surveyed made very little use of the library facilities. High users include 228 (58.5%) students and 212 (57.3%) faculty members.

b. The chi-square test reveals that there is no significant difference between students and faculty members in terms of utilisation of library facilities p=0.918>0.05

(i) **Awareness about the E-resource Databases under the VTU Consortium**

a. 739 (99.3%) of the respondents – including 375 (98.7%) out of 390 student respondents and all faculty members are aware of the different e-databases available under the VTU Consortium.

b. The Fisher's Exact Test of the readings reveals that there is no significant difference between student and faculty respondents in connection with awareness of different databases under the VTU Consortium p=0.062>0.05. The widespread awareness about the VTU consortium databases among faculty as well as students shows the popularity of the same in the Engineering Colleges in the state of Karnataka.

(ii) **Frequency of Use of Different Electronic Databases**

a. From the response, it is clear that the IEEE/IEL online database is the most popular and frequently used digital database among the most number of respondents with maximum number, i.e. 535 (72.4%) users. A majority of the student respondents 276 (73.6%) students and 259 (71.2%) of faculty members in the survey use this database frequently.

b. The Springer database is another favourite used by 509 (68.9%) respondents i.e. 248 (66.1%) students and 261 (71.7%) faculty members.

c. 210 (56%) students and 216 (59.3%) faculty members, totalling to 426 (57.6%) respondents, use the Elsevier e-database frequently.

d. These findings reveal that the most frequently used and popular e-databases among respondents are Springer, IEEE and Elsevier databases (Table 5.2.11 and Figure 5.2.7).

1. **E-learning Resources**

(i) **Awareness of E-learning Resources/ Lecture Notes**

a. 90% (684) of the respondents are found to be aware of e-learning resources; including 343 (87.9%) students and 341 (92.2%) faculty members under the survey.

b. The test reveals that both students and faculty are equally aware of e-learning resources/lecture notes as p=0.052>0.05. This finding implies that e-learning resources are playing a significant role in engineering education. (Table 5.2.14).

(ii) **Preferred E-learning Resources/Lecture Notes**

a. Analysis of the survey shows a great preference for VTU learning resource with 488 (71.3%) respondents; and half of the total respondents 342 (50%) showing an inclination for NPTEL lecture notes.

b. The category-wise preference shows that the first choice of 240 (70.4%) faculty members and 248 (72.3%) students is the VTU e-learning resource; followed by NPTEL lecture notes preferred by 135 (39.4%) students and 207 (60.7%) faculty members. (Table 5.2.15 and Figure 5.2.9).

2.   Institutional Repository

(i) **Awareness about the Institutional Repository Collections in the Digital Library**

a. Of the total of 760 respondents, a majority 593 (78%) are seen to be aware of the Institutional Repository collections provided in their respective colleges.

b. This awareness of the Institutional Repository collections is evident in 312 (80%) students and 281(75.9%) faculty members.

c. At p=0.177>0.05, the test reveals that there is no significant difference in the level of awareness between students and faculty members. (Table 5.2.16).

(ii)   **The Use of different Institutional Repositories in the Digital Library**

a. It is clear from Table 5.2.17 and Figure 5.2.10 that 'Previous year question papers' are the most frequently used IR collection followed by Syllabus and e-books/e-journals. The frequency of use of Lecture notes, articles/publications, Theses/Dissertation/Project Reports (ETDs) are found to be comparatively less. Links to useful sites and college reports constitute the least frequently used Institutional Repository.

b. Therefore, it can be concluded that the most preferred IR collection are 'previous years' question papers" followed by Syllabus, E-books/e-journals and Theses/Dissertation/Project Reports (ETDs).

3.   The Purpose of Using Digital Information Resources

a. It is found that the use of digital information resources 'For updating knowledge' is a major purpose among respondents with highest mean value of 2.64 ± 1.08, followed by 'Preparation for seminar/workshop' with mean value of 2.53 ± 1.15 and 'In preparation for examination' with mean value of 2.46 ± 1.18. Close behind are the purposes 'Preparing for research/project/articles' and 'For teaching' with mean values of (2.44 ± 1.12) and (2.01 ± 1.41) respectively.

b. The purpose 'For preparation of Ph. D thesis' is found least utilised with lowest mean value of 1.63±1.36.

c. 'Updating knowledge' is found to be the most important purpose among both categories of respondents. The students mean value is 2.59±1.07 and faculty mean value is 2.70±1.09. The Z value is 1.33 and p. value is 0.18. Hence there is no significant difference between student and faculty in the purpose of utility of digital information resources 'For updating knowledge' (p=0.184>0.05).

d. From the Mann Whitney test it can be observed that there is highly significant difference between student and faculty members in the utilisation of digital information resources for various purposes. These include 'Preparation for examination,', 'Teaching', 'Preparation for Ph.D thesis', 'Preparation for Research/Project/Articles' and 'Preparation for Seminar/Workshop'.

(i)   **The Overall Purpose of Digital Information Resources**

a. Utilisation of digital information resources for overall purpose is found to a large extent among respondents with mean value of 2.28±0.89. The mean values for students (2.03±0.87) and faculty members (2.54±0.84) show that the overall utilization of digital information resources is to a large extent.

b. The Mann Whitney test shows that there is a highly significant difference between students and faculty with respect to their overall purpose of use of digital information resources at p=0.000<0.01. This implies that the overall purpose of use of digital information resources is shown to a large extent by faculty members and less by students.

(ii)   **Correlation between the Purpose and Utilization of Digital Library**

a. It is noted that there is a positive correlation between purpose and utilization of digital libraries. The correlation coefficient value (R) 0.489 exhibits positive correlation between the independent variable (Utilization of digital library) and dependent variable (Purpose), with its associated significance level being p=0.000 (0.000<0.05).

b. This analysis implies that the utilization of digital resources and the purpose of use of digital resources are accepted among the respondents.

The Overall Preference of Digital Library Services

The advantages of digital libraries over conventional libraries are concluded as overall preferences for digital libraries.

a. It is seen that the respondents' overall preference for digital libraries over conventional libraries is because of the many benefits with mean value of 2.85±0.84. Mean value of students' preference is 2.74±0.92; and that of faculty members is 2.96±0.75.

b. The Mann Whitney Test reveals that there is highly significant difference in the perception of students and faculty members (p=0.004<0.01) with respect to overall preference for digital libraries. It can be inferred that faculty members had slightly more benefits in comparison to students.

Suggestions for Effective Utilization of Digital Information Resources

The study reveals that the use of digital information resources is not a problem among majority of the respondents; but a few users do face some difficulty. To enable such users to overcome the problems, the following suggestions are made for the effective use of the digital library. This will help every user of the institute to feel comfortable and interested in using digital information resources and services:

a. Effective user orientation and information marketing programs may be conducted by each library to promote the use of digital information resources. It should be arranged according to the status of the users. A training program schedule should be publicized so that maximum users can benefit from it.

b. All the users should be fully notified of the various digital information resources and services available in the college library.

c. Regular policies should be framed at college level to collect and archive electronic versions of the final year B.E project reports, dissertations of post graduate courses; Ph.D theses; lecture notes and publications by faculty, etc.

d. The college/library website should be dynamic and regularly updated so that users can easily access academic news and other information.

e. The AICTE has made a stipulation regarding the annual subscription of e-databases. It is found that of the Consortium databases some are highly used and some are used very little. It is recommended that the colleges should seriously take up this matter and have discussions at various levels to acquire and access selected and useful databases.

Conclusion

The study has succeeded in attaining its objectives. The analysis shows that a wide gap exists in all the colleges in terms of their digital information resources and services. It is also evident that digital/electronic information resources have undoubtedly established a presence in today's academic libraries. Digital libraries present opportunities and challenges for libraries, information communities and all stakeholders. It is clear from the survey findings that users have started moving towards digital media from print media. The survey also reveals the fact that the college librarians should take an active role in providing modern IT facilities in the library by convincing the management and obtaining the necessary infrastructure for the best utilization of the digital information resources.

In this study a sincere attempt has been made by the researcher to analyze the utilization of digital information resources in the self-financed Engineering Colleges of Karnataka. In the Consortium, the provided e-resources are not utilized equally. Some of the resources are used to a great extent and some utilized very little. An evaluation of the usage of the e-resources is necessary for further implementation in the electronic databases under the VTU Consortium. And finally, the users are of the opinion that digital library services are better than conventional library services.

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