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A survey on information and communication technology infrastructure in engineering College libraries in Sri Venkateswara university area

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Abstract

The present study aims at analysing the use and availability of Information Communication Technology infrastructure facilities in engineering college libraries in S V University area. This study traces out the Hardware specification, Software specification, Library automation, accessibility of digital library, Internet connectivity, Library website, Tele communication facilities, audio visual equipments, Specialized ICT staff, ICT strategy and policy and Barriers to usage of ICT has been analyzed and interpreted.

Keywords: ICT, Network topology, Infrastructure, Hardware, Operating System.

1. Introduction

Information and Communication Technology (ICT) comprises a diverse set of technology tools to identify, collect, organize, create and disseminate data and information. The ICT encompasses a wide range of technologies including telecommunication technologies, such as telephony, cable, satellite, TV and radio, computer-mediated conferencing and videoconferencing, as well as digital technologies, such as computers, information networks (internet, world wide web and intranet) and software applications. In other words, ICT has emerged as a result of the technologies, telecommunication technologies and other media communication technologies.

ICT has altered the ways in which the academic activities-teaching, learning, research and extension activities-are carried out at higher education level. ICT has helped to overcome the barriers of time and space and reduced the time-lag between the generation of information and its consumption by the end user. Engineering College library, as a sub-system of Technical education should act as a trend-setter in adopting ICT in its activities. Ever dynamic ICT has challenged the traditional process of library activities and this situation stresses the necessity for the Engineering college libraries to be part of the ICT based information world. ICT offers ample opportunities for libraries to automate the traditional activities, implement efficient and effective library cooperation and resource sharing networks, develop institutional repositories, provide value-added information services and initiate capacity building programmes for library staff and library users. The present study is an attempt to assess and report the ways in which the Engineering college libraries in S.V. University area have responded to changing information environment and developed ICT infrastructure.

1.1. Definition

Defines ICT's as the "scientific technological and engineering disciplines and management techniques used in information handling and processing".

1.2. UNESCO

ICT (Information and Communication Technology-or Technologies) is an umbrella term that includes any communication devices or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as

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the various services and applications associated with them, such as video conferencing and distance learning. ICTs are often spoken of in a particular context, such as ICT's in education, health care, or Libraries.

2. Review of Literature

A few significant studies that were conducted on ICT infrastructure in libraries were discussed.

Archana singh and others (2014) ^[1] conducted a study on use of Information and Communication Technology (ICT) based resources and services and its impact on users. The study was performed via a questionnaire survey of the library users. The papers also determine the satisfaction level of users regarding online services, favorite search engine and problems faced by the users in using the ICT in libraries. Users proposed a variety of measures of formal orientation and training in ICT based resources and services to become more effective users.

Jerry and Ramasesh's (2013) ^[2] conducted a survey to assess the existing ICT skills and competencies of the LIS professionals working in the Engineering colleges of Karnataka. And thus comes out with suggestions in bridging the gap by stating the required knowledge, skills and competencies that has not only brought in change in the working style of LIS professionals but which are also essential for them to survive and flourish in this digital era.

Praveen kumar (2013) ^[3] discussed in his study about the application of ICT in the Central State Libraries in Haryana and Chandigarh. The study provides to infer that the library automation is one of the effective and efficient applications of ICT. The questionnaire comprises various aspects of the selected libraries under study to assess the applications of ICT. The data has been presented in tables along with their interpretation. The findings and a conclusion has been drawn in the light of objectives of the study.

Tiwari and Sahoo's (2011) ^[4] conducted a survey to assess the present ICT infrastructure in University libraries of M.P and use of ICT in terms of communication facilities, collection, hardware, software, networking infrastructure, housekeeping operations, user's service and training. The paper concludes that University libraries of MP are in a developing stage in its infrastructure and use of ICT. Lack of proper planning and supervision and frequent change ICT are the basic hurdles in successful development of ICT in University libraries in MP.

Dhanavadan and others (2011) ^[5] conducted a study on infrastructure facilities of Information communication technology (ICT) in self- financing engineering college libraries in Tamil Nadu. The study discusses about the nature of electronic resources, library automation level, computerized library services, electronic access points, type of digital libraries, Network and topology of network, Internet and Intranet services with reference to 140 selected libraries.

Wodeyar and others (2011) ^[6] conducted a survey of Information and communication technology (ICT) infrastructure of 10 engineering college libraries in Hyderabad in Andhra Pradesh and Karnataka region. Some measures have also been suggested for the improvement of existing ICT based resources and services.

Latha and others (2010) ^[7] discussed in their study the factors that necessitated the special libraries to get digitized. Advantages and disadvantages of electronic libraries, the requirements for building an e- library, the role of librarian in

the new ICT environment were also discussed.

The study conducted by **Dhanavadan and others (2011)** ^[8] on the awareness of ICT tools among library professionals in Tamil Nadu reveals that all respondents use some kinds of ICT tools, particularly the Internet and mobile phones. The use of ICT by the female respondents is somewhat higher than that of male respondents. There is no significant relationship between the use of e-mail and Internet. Respondents strongly believe that ICT tools play a significant role in supporting and enhancing their professional and research activities.

Haneefa (2007) ^[9] made a survey on the uses of special Libraries in Kerala with referred to their use of Information and communication technology (ICT) based resources and services. Assistance of Library professionals in the use of ICT based resources and services; the change in the speed of academic/research work by using ICT; satisfaction of users with the application of ICT; reasons for their dissatisfaction ; their suggestions for user education and training in ICT.

Haneefa (2006) ^[10] discussed in his study about the state-of-the-art of ICT infrastructure in special libraries in Kerala. Though the special libraries in Kerala have hardware, software and communication facilities to some extent, ICT based resources and services are not reaching the users to the expected extent. This has severely affected the provision of ICT based resources and services. Hence special libraries in India should develop strategies and policies that could make better use of ICT based resources and services.

It is evident from the above review of literature that no comprehensive study has been undertaken on ICT Infrastructure of engineering college libraries in Andhra Pradesh. Hence the present study has been undertaken.

3. Need for the Study

Today, Information and Communication Technology (ICT) has become an integral part of day-to-day activities of human life. It has not left any area untouched and library and information centres are not exception to this. The Library and Information centres play a vital role in providing right information to the right users at the right time in the right manner. Here, ICT assists library professionals to provide qualitative information services to the users of libraries. Introduction and adoption of ICT is inevitable in libraries for the benefit their users to get the required information not only from print sources but also from electronic sources. Today, the name and fame of any Institution / Library and Information centres depend upon the sound ICT infrastructure it has. Looking into the need of the hour, the researcher has undertaken this study.

The main purpose of this study is to understand the possible areas where the application of ICT is made as a part of overall improvement in the engineering college library services. It is relevant and essential to know about the status/position of ICT infrastructure in the engineering college libraries under the study. This study provides current state-of-the-art of ICT infrastructure in engineering college libraries in Sri Venkateswara University Area.

4. Objectives of the Study

The following are the specific objectives of the study.

1. To assess the present status of library automation in engineering college libraries;
2. To examine the ICT infrastructure with regard to hardware in engineering college libraries;

3. To examine the systems software and application software used in engineering college libraries;
4. To assess the digital library and Internet facility in engineering college libraries;
5. To examine the Telecommunication facilities and Audio-visual equipments used in engineering college libraries;
6. To examine the training needed for the librarians to develop their ICT skills to collect, organize and disseminate information;
7. To examine the websites of engineering college libraries;
8. To analyse the factors that hindered the use of ICT services and facilities in engineering college libraries in S.V. University Area; and
9. To suggest measures for improvement of the use of ICT based resources and services in engineering college libraries in S.V. University Area.

5. Hypotheses

The following hypotheses have been set up for the present investigation:

1. Most of the engineering colleges Libraries use local area network (LAN).
2. Most of the engineering college libraries are providing Internet facilities.
3. Most of the engineering college libraries do not have their own websites.
4. Majority of the engineering colleges have staff with adequate ICT skills.

6. Methodology and Limitations of the Study

There are 116 engineering colleges in Sri Venkateswara university area at the time of investigation. Sri Venkateswara University area covers the districts of Anantapur, Kadapa, Kurnool, Chittoor, and Nellore. Each college has its own library. The investigator selected 53 engineering college libraries out of 116 by simple random sampling to examine the present conditions of these libraries. Copies of questionnaire were distributed to the librarians of these 53 engineering college libraries and the filled in copies were collected personally from them during the period from June 2012 to April 2013. The study is limited to engineering college libraries located in Sri Venkateswara University area which are established up to July 2007 due to constraints of time, money and efforts involved. Questionnaire method is used for collecting the required data for the present study. The questionnaire consists of questions on general Institutional information, hardware specification, software specification, library automation, accessibility of digital library, Internet connectivity, library website, telecommunication facilities, audio visual equipments, Specialized ICT staff, ICT strategy and policy, and Barriers to usage of ICT has been analyzed and interpreted.

7. Data Analysis and Discussion of Results

The data collected from the librarians are analysed and the results are discussed in the following paragraphs.

7.1 Hardware

A question has been put to the librarians to know the Hardware facilities. The responses given by them are shown in Table 1

Table 1: Distribution of libraries according to their response with regard to availability of hardware

Hardware	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Servers	6 (11.32)	23 (43.39)	18 (33.96)	47 (88.67)
Clients/Computer work Stations	6 (11.32)	19 (35.84)	18 (33.96)	43 (81.13)
Dot Matrix Printers	0	5 (9.43)	3 (5.66)	8 (15.09)
Inkjet Printers	1 (1.88)	4 (7.54)	3 (5.66)	8 (15.09)
Laser Printers	5 (9.43)	21 (39.62)	14 (26.41)	40 (75.47)
Identity card printers	0	2 (3.77)	2 (3.77)	4 (7.54)
Bar code Printers	2 (3.77)	9 (16.98)	12 (22.64)	23 (43.39)
Scanners	3 (5.66)	12 (22.64)	9 (16.98)	24 (45.28)
CD-Net Server	1 (1.88)	10 (18.86)	7 (13.20)	18 (33.96)
CD-Rom tower	0	8 (15.09)	4 (7.54)	12 (22.64)
Systems with DVDS	2 (3.77)	14 (26.41)	14 (26.41)	30 (56.60)
Back Up Devices	2 (3.77)	15 (28.30)	12 (22.64)	29 (54.71)
Web camera	1 (1.88)	9 (16.98)	6 (11.32)	16 (30.18)
CD writer	6 (11.32)	22 (41.50)	19 (35.84)	47 (88.67)
CD drive	6 (11.32)	20 (37.73)	19 (35.84)	45 (84.90)
UPS	6 (11.32)	21 (39.62)	17 (32.07)	44 (83.01)
V SAT Proxy Server	0	5 (9.43)	3 (5.66)	8 (15.09)
Lap Tops	1 (1.88)	3 (5.66)	4 (7.54)	8 (15.09)
Xerox Machines	5 (9.43)	17 (32.07)	16 (30.18)	38 (71.69)
CC. Cameras	3 (5.66)	9 (16.98)	4 (7.54)	16 (30.18)
Multimedia kit	1 (1.88)	10 (18.86)	10 (18.86)	21 (39.62)
Voice input devices	0	7 (13.20)	5 (9.42)	12 (22.64)
Teleconferencing devices	0	6 (11.32)	4 (7.54)	10 (18.86)
Barcode Scanner	3 (5.66)	14 (26.41)	12 (22.64)	29 (54.71)
Modems	4 (7.54)	16 (30.18)	13 (24.52)	33 (62.26)
Facsimile transmission	0	7 (13.20)	5 (9.43)	12 (22.64)
Electronic bulletin boards	0	5 (9.43)	3 (5.66)	8 (15.09)
Video conferencing devices	0	6 (11.32)	4 (7.54)	10 (18.86)
Theft detecting Alarms	0	1 (1.88)	1 (1.88)	2 (3.77)

(Figures in parentheses indicate percentage) N=53

Table 1 shows that maximum of the (43.39%) per cent libraries of Private old engineering Institution, 33.96 per cent of Private New engineering Institutions and 11.32 per cent University engineering Institutions have separate computer servers in their libraries. All the libraries of different categories of Institutions have clients/computer workstations. A few of 15.09 per cent of libraries except University engineering Institutions have Dot Matrix and Inkjet Printers. Majority of libraries 75.47 per cent have Laser Printers. A few of 7.54 per cent of libraries except University engineering Institutions have Identity card Printers. All most all categories of libraries have Barcode Printers and Scanners. 1.88 per cent of University engineering Institutions, 18.86 per cent Private old engineering Institutions and 13.20 per cent of Private New engineering Institutions have CD-Net Servers. A few libraries except University engineering Institutions have CD-ROM towers (22.64%) in their libraries. Majority 83.01 per cent of all the libraries in all the categories of institutions have U P S. Most of the libraries 71.69 per cent in all the categories have Xerox Machines. A few (30.18%) libraries of have C C Cameras. A few libraries have Multimedia Kit (39.62%), Voice input Devices (22.64%) and Teleconference Devices (18.86%). A few libraries except University engineering Institutions have Facsimile Transmission, Electronic Bulletin boards, video conferencing Devices and Theft detecting Alarms. It is found that majority of the engineering Institutions libraries in S V University Area have basic hardware facilities like Servers, Computer workstations /nodes, Printers etc.

7.2 Operating Systems used

A question has been put to the librarians to know the Software facilities. The responses given by them are shown in Table 2

Table 2: Distribution of librarians according to their response with regard to availability of operating systems

Operating System	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Windows Vista	0	5 (9.43)	5 (9.43)	10 (18.86)
Unix	0	4 (7.54)	2 (3.77)	6 (11.32)
Windows 95/98	0	5 (9.43)	5 (9.43)	10 (18.86)
Linux/ Ubuntu	0	2 (3.77)	4 (7.54)	6 (11.32)
Windows 2000	1 (1.88)	4 (7.54)	6 (11.32)	11 (20.75)
Windows 2003	1 (1.88)	15 (28.30)	10 (18.86)	26 (49.05)
Windows X P	4 (7.54)	16 (30.18)	12 (22.64)	32 (60.37)
Windows 7	2 (3.77)	8 (15.09)	6 (11.32)	16 (30.18)

(Figures in parentheses indicate percentage) N=53

Table 2 shows, the majority of the librarians (60.37%) informed that their libraries have Windows XP operating system, 49.05 per cent of them replied their libraries have Windows 2003, 30.18 per cent of them replied their libraries have Windows 7 operating system. It is evident from the table that a few 20.75 per cent of them replied their libraries

have Windows 2000 operating system. It is evident from the table that a few (18.86%) libraries have Windows Vista and Windows 95/98 operating systems. A very few (11.32%) of them have both UNIX and Linux/ Ubuntu operating systems.

7.3 Accessibility of Digital Library

A question has been put to the librarians to know the availability of Digital Library. The responses given by them are shown in Table 3

Table 3: Distribution of librarians according to their response with regard to the availability of digital Library in their libraries

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Yes	6 (11.32)	23 (43.39)	18 (33.96)	47 (88.67)
No	0	4 (7.54)	2 (3.77)	6 (11.33)
Total	6 (11.32)	27 (50.94)	20 (37.73)	53 (100.00)

(Figures in parentheses indicate percentage)

Table 3 shows that out of 53 colleges, (88.67%) colleges have Digital libraries in their libraries and the remaining (11.33%) colleges do not have for establishment of Digital libraries.

7.4 Status of Library Automation

A question has been put to the librarians to know the status of Library Automation. The responses given by them are shown in Table 4.

Table 4: Distribution of librarians according to their response with regard to the automation of their libraries

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Computerized	5 (9.43)	22 (41.50)	17 (32.07)	44 (83.01)
Manual	1 (1.88)	5 (9.43)	3 (5.66)	9 (16.99)
Total	6 (11.32)	27 (50.94)	20 (35.84)	53 (100.00)

(Figures in parentheses indicate percentage)

Table 4 shows that out of 53 colleges, (83.01%) colleges are automated and the remaining (16.98%) colleges are had not taken initiatives for automating their housekeeping activities.

7.5 Internet Connectivity

A question has been put to the librarians to know whether their libraries have Internet connectivity. The replies given by them are shown in Table 5.

Table 5: Distribution of librarians according to their response with regard to the status of Internet connectivity

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Yes	6 (11.32)	21 (39.62)	18 (33.96)	45 (84.90)
No	0	6 (11.32)	2 (3.77)	8 (15.10)
Total	6 (11.32)	27 (50.94)	20 (35.84)	53 (100.00)

(Figures in Parentheses indicate percentage)

It is evident from Table 5 that the majority of the librarians (84.90%) informed that their libraries are providing Internet connectivity, and the remaining 15.10 per cent of them replied negatively.

Hypothesis number two states that "Most of the engineering college's libraries are providing Internet facilities".

This was verified from the data collected and it is found to be true (vide Table 5).

7.6 Web Browsers

A question has been put to the librarians to know the availability of Web browsers. The replies given by them are shown in Table 6 and diagrammatically in Fig.1

Table 6: Distribution of libraries according to the availability of Web browsers

Browsers	Type of Institution			Total	Rank
	University-Eng	Private-Old-Eng	Private-New-Eng		
Mozilla Firefox	4 (8.16)	23 (43.39)	15 (30.61)	40 (81.63)	1
Internet Explorer	5 (10.20)	18 (33.96)	14 (28.57)	36 (73.47)	2
Google Chrome	3 (6.12)	17 (32.07)	10 (20.41)	29 (59.18)	3
Opera Mini	2 (4.08)	4 (7.54)	2 (4.08)	7 (14.29)	4

(Figures in parentheses indicate percentage) N=53

Table 6 shows that majority (81.63%) of the libraries are using Mozilla Firefox as their Web Browser in on first rank, 73.47 per cent of the libraries are using Internet Explorer as their Web Browser in on second choice, 59.18 per cent of the libraries are using Google Chrome as their Web Browser in on third rank and 14.29 per cent of the libraries are using Opera Mini in on fourth rank.

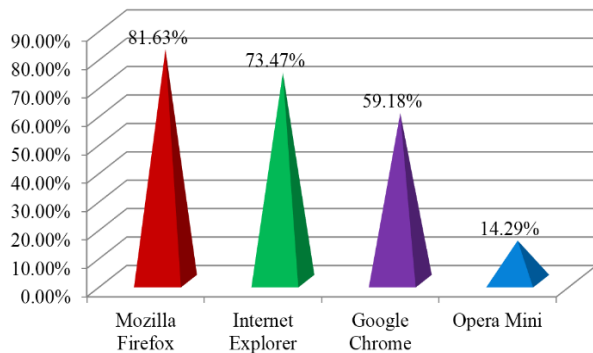


Fig 2: Distribution of libraries according to the availability of Web browsers

7.7 Search Engines

A question has been put to the librarians to know the preferred search engines. The response given by them are shown in Table 7.

Table 7: Distribution of librarians according to their response with regard to the preferred search engines

Search Engine	Type of Institution			Total	Rank
	University-Eng	Private-Old-Eng	Private-New-Eng		
Alta Vista	1 (1.88)	1 (1.88)	1 (1.88)	3 (5.66)	4
Google	6 (11.32)	23 (43.39)	16 (30.18)	45 (84.90)	1
MSN	0	3 (5.66)	1 (1.88)	4 (5.74)	3
Yahoo	2 (3.77)	9 (16.98)	8 (15.09)	19 (35.84)	2
Others	0	1 (1.88)	1 (1.88)	2 (3.77)	5

(Figures in parentheses indicate percentage) N=53

Table 7 indicates that most of the librarians (84.90%) use Google for searching information from Internet. It is also evident from the table that 35.84 per cent of them are using Yahoo, 5.74 per cent of them are using MSN, 5.66 per cent of them are using Alta Vista and the remaining 3.77 per cent of them are using others search engines.

7.8 Library Website

A question has been put to the librarians to know the availability of Library Website. The responses given by them are shown in Table 8.

Table 8: Distribution of librarians according to their responses with regard to the separate library website

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Yes	1 (1.88)	1 (1.88)	0	2 (3.77)
No	5 (9.43)	26 (49.05)	20 (37.73)	51 (96.22)
Total	6 (11.32)	27 (50.94)	20 (37.73)	53 (100.00)

(Figures in parentheses indicate percentage)

Table 8 shows that out of 53 engineering college libraries only (3.77%) of libraries have their own websites and the remaining (96.23%) college libraries do not have separate websites. But the information pertaining to the library is provided in the college website.

Hypothesis number Three states that "The majority of engineering college libraries does not have their own websites".

This was verified from the data collected and it is found to be true (vide Table 8).

7.9 Telecommunication Facilities

A question has been put to the librarians to know the availability of telecommunication facilities. The response given by them are shown in Table 9.

Table 9: Distribution of librarians according to their response with regard to the Tele communication facilities

Telecommunication facilities	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Telephone	6 (11.32)	23 (43.39)	14 (26.41)	43 (81.13)
Telex	0	1 (1.88)	1 (1.88)	2 (3.77)
Fax	0	7 (13.20)	3 (5.66)	10 (18.86)

(Figures in parentheses indicate percentage) N=53

Table 9 shows that majority of the libraries (81.13%) have Telephone facility, but very few 3.77 per cent of them have Telex facilities. A good number of 18.86 per cent of them have Fax facilities. All the libraries of University engineering Institutions, most of 44.39 per cent of the Private Old engineering Institutions and Half of the Private New engineering Institutions have Telephone facility. Telex and Fax facilities are not available in University engineering Institutions.

7.10 Type of Network

A question has been put to the librarians to know the type of Network used. The response given by them are shown in Table 10 and diagrammatically in Fig.2

Table 10: Distribution of librarians according to their response with regard to the types of network used

Types of Network	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
LAN	5 (9.43)	27 (50.94)	19 (35.84)	51 (96.22)
WAN	2 (3.77)	2 (3.77)	3 (5.66)	7 (13.20)
MAN	1 (1.88)	0	1 (1.88)	2 (3.77)

(Figures in parentheses indicate percentage) N=53

Table 10 shows that Most (96.23) of engineering colleges have local area network, 13.20 per cent of them have posses wide area network and remaining 3.77 per cent have metropolitan area network. The group wise analysis reveals the following facts. All the Institutions have the maximum in local area network facilities and also a Private old engineering Institution does not have metropolitan area network

Hypothesis number one states that” Most of the engineering colleges Libraries use local area network (LAN)” This was verified from the data collected and it is found to be true (vide Table 10).

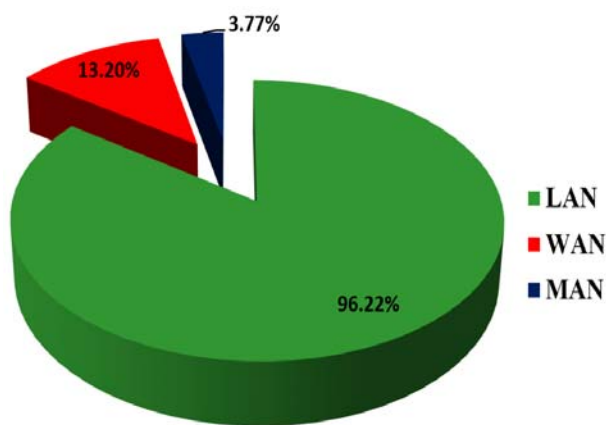


Fig 2: Distribution of librarians according to their response with regard to the types of network used

7.11 Audio Visual Equipments

A question has been put to the librarians to know the availability of audiovisual equipments. The response given by them are shown in Table 11.

Table 11: Distribution of librarians according to their response with regard to the availability of audio visual equipments

Audio visual equipments	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Audio Tapes	2 (3.77)	14 (26.41)	10 (18.86)	26 (49.05)
Audio Tape Player	2 (3.77)	5 (9.43)	7 (13.20)	14 (26.41)
LCD Projector	4 (7.54)	15 (28.30)	8 (15.09)	27 (50.94)
Video Tape	1 (1.88)	7 (13.20)	6 (11.32)	14 (26.41)
Video Tape Player	2 (3.77)	5 (9.43)	4 (7.54)	11 (20.75)
Slides	3 (5.66)	4 (7.54)	3 (5.66)	10 (18.86)
Satellite Dish	2 (3.77)	6 (11.32)	4 (7.54)	12 (22.64)
Antenna Mast	0	4 (7.54)	3 (5.66)	7 (13.20)
Slide Projector	1 (1.88)	4 (7.54)	3 (5.66)	8 (15.09)
Film Projector	0	1 (1.88)	2 (3.77)	3 (5.66)
Overhead Projector	0	3 (5.66)	3 (5.66)	6 (11.32)
Microfilm Reader	0	3 (5.66)	5 (9.43)	8 (15.09)
Television	4 (7.54)	10 (18.86)	7 (13.20)	21 (39.62)

(Figures in parentheses indicate percentage) N=53

Table 11 shows, the nearly half of the librarians (50.94) informed that their libraries have LCD Projector, 49.05 per cent of them replied their libraries have audio tapes, 39.62 per cent of them replied their libraries have television sets. It is also evident from the table that 26.41 per cent of them have audio tape players and video tapes, 22.64 per cent of them have satellite dish, 20.75 per cent of them have video tape Player. It is evident from the table that a few 18.86 per cent of them have Slides, 15.09 per cent of them have both slide Projectors and microfilm readers and 13.20 per cent of them have antenna mast. A very few 11.32 per cent of them have overhead projectors and remaining 5.66 per cent of them have film projectors.

7.12 Specialised ICT Staff

A question has been put to the librarians to know the availability of specialized ICT staff. The response given by them are shown in Table 12.

Table 12: Distribution of librarians according to their response with regard to the specialised ICT staff

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Yes	4 (7.54)	18 (33.96)	13 (24.52)	35 (66.03)
No	2 (3.77)	9 (16.98)	7 (13.20)	18 (33.97)
Total	6 (11.32)	27 (50.94)	20 (37.73)	53 (100.00)

(Figures in parentheses indicate percentage)

It is evident from the Table 4.48 that majority of the librarians (66.03%) informed that there is the specialized ICT staff, and the remaining 33.97 per cent of them replied negatively.

Hypothesis number four states that "The majority of engineering colleges have staff with adequate ICT skills". This was verified from the data collected and it is found to be

true (vide Table 12).

7.13 Preferred ICT Training Methods

A question has been put to the librarians to know the preferred training methods. The response given by them are shown in Table 13

Table 13: Distribution of librarians according to their response with regard to the preferred training methods

Training Methods	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
In house Training	2 (3.77)	18 (33.96)	14 (26.41)	34 (64.15)
Professional Associations	0	10 (18.86)	9 (16.98)	19 (35.84)
Courses/Workshops	4 (7.54)	16 (30.18)	14 (26.41)	34 (64.15)
Tours of other Institutions	4 (7.54)	9 (16.98)	6 (11.32)	19 (35.84)
Conference/Seminars	0	11 (20.75)	7 (13.20)	18 (33.96)
Web-based Tutorials	0	9 (16.98)	9 (16.98)	18 (33.96)
Tele Video Conferencing	0	4 (7.54)	2 (3.77)	6 (11.32)
Self-Study Training	0	7 (13.20)	5 (9.43)	12 (22.64)

(Figures in parentheses indicate percentage) N=53

Table 13 reveals that the majority of the respondents (64.15%) preferred both in house training methods and courses/workshops. It is followed by 35.84 per cent of respondents which is also preferred by both Professional Associations and tours of other Institutions; followed by 33.96 per cent of respondents preferred both conference/seminars and web-based tutorials. It also evident from the table that 22.64 per cent of respondents preferred self-study training and the remaining 11.32 per cent of respondents preferred Tele video conferencing.

7.14 ICT Strategy and Policy

A question has been put to the librarians to know the ICT Strategy and Policy. The response given by them are shown in Table 14.

Table 14: Distribution of librarians according to their response with regard to the ICT Strategy and Policy

Response	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Yes	2 (3.77)	17 (32.07)	10 (18.86)	29 (54.72)
No	4 (7.54)	10 (18.86)	10 (18.86)	24 (45.28)
Total	6 (11.32)	27 (50.94)	20 (37.73)	53 (100.00)

(Figures in parentheses indicate percentage)

It is evident from the Table 14 that the majority of librarians (54.72%) informed that their libraries having an official, written Plan containing uses of ICT by the library objectives and guidelines for acquisition or usage of ICT by the library and remaining 45.28 per cent of them replied negatively.

7.15 Barriers to Usage of ICT

A question has been put to the librarians to know the barriers to usage of ICT. The response given by them are shown in Table 15.

Table 15: Distribution of librarians according to their response with regard to the barriers to usage of ICT

Barriers	Type of Institution			Total
	University-Eng	Private-Old-Eng	Private-New-Eng	
Inadequate facilities	6 (11.32)	25 (47.16)	15 (28.30)	46 (86.79)
Lack of Budget for ICT	6 (11.32)	18 (33.96)	17 (32.07)	41 (77.35)
Lack of ICT usage skills among the library users	4 (7.54)	14 (26.41)	14 (26.41)	32 (60.37)
Lack of ICT qualified Staff in the Library	5 (9.43)	19 (35.84)	17 (32.07)	41 (77.35)
Difficulties to recruit or retain ICT Qualified Staff (lack of applicants/ Prohibitive Salary demands)	4 (7.54)	19 (35.84)	17 (32.07)	40 (75.47)
Reluctance among Staff to use ICT	5 (9.43)	20 (37.73)	17 (32.07)	42 (79.24)
Library lacks updated ICT Strategy	4 (7.54)	20 (37.73)	17 (32.07)	41 (77.35)
Lack of Commitment by institutional management	4 (7.54)	27 (50.94)	19 (35.84)	50 (94.33)
Difficulties in training Library Staff in appropriate ICT Skills	5 (9.43)	15 (28.30)	16 (30.18)	36 (67.92)
High cost of ICT facilities/components	5 (9.43)	23 (43.39)	18 (33.96)	46 (86.79)
Lack of professional recognition for library staff	1 (1.88)	16 (30.18)	20 (37.73)	37 (69.81)
Overload of working hours	5 (9.43)	26 (49.05)	17 (32.07)	48 (90.56)

(Figures in parentheses indicate percentage) N=53

It is noted that in the Table 15 reveals that most of the (94.33%) respondents stated that Lack of Commitment by institutional management is the main barrier to usage of ICT, 90.56 per cent of them opined that Overload of working hours hindered to usage of ICT, 86.79 per cent of them stated that High cost of ICT facilities/components. Other major issues indicated by library professionals are that 86.79 per cent of them stated that inadequate facilities, 79.24 per cent of respondents stated that Reluctance among Staff to use ICT, 77.35 per cent of them stated that both Lack of ICT qualified Staff in the Lack of Budget for ICT, 75.47 per cent of them stated that Difficulties to recruit or retain ICT Qualified Staff (lack of applicants/Prohibitive Salary demands). Some other issues which was indicated by lesser number of professionals include 67.92 per cent of them stated that Difficulties in training Library Staff in appropriate ICT Skills. Only few 69.81 per cent of professional had opinion that Lack of professional recognition for library staff.

8. Findings of the Study

1. A high percentage of colleges (43.39%) libraries of Private old engineering Institutions, 33.96 percent of Private New engineering Institutions and 11.32 percent of University engineering Institutions have separate computer servers in their libraries.
2. Majority of the librarians (60.37%) informed that their libraries have windows XP operating system.
3. Most of the librarians (88.67%) informed that their libraries have digital library section.
4. Majority of the librarians (83.01%) informed that their libraries are automated.
5. Majority of the librarians (84.90%) informed that their libraries are providing Internet connectivity.
6. Majority of the librarians (81.63%) informed that their libraries are using Mozilla Firefox as their web browser.
7. Majority of the librarians (84.90%) informed that they are using Google as the main tool for searching information from Internet.
8. A very few of the librarians (3.77%) replied that their libraries have own websites and the remaining 96.23 per cent of them have website facilities as part of their institution.
9. Majority of the librarians (81.13%) informed that their libraries have Telephone facility.
10. Most of the librarians (96.23%) informed that their libraries have local area network facility.
11. Majority of the librarians (50.94%) informed that their libraries have LCD projectors.
12. Majority of the librarians (66.03%) informed that there libraries having Specialized ICT staff.
13. Majority of the librarians (64.15%) preferred in house training methods.
14. Majority of the librarians (54.72%) informed that there libraries having an official, written plan containing use of ICT by the library objectives and guidelines for acquisition or usage of ICT by the library
15. Most of the librarians (94.33%) informed that lack of commitment by institutional management is the main barrier to usage of ICT.

9. Suggestions

The following are some of the suggestions given for the improvement of ICT infrastructure in engineering college libraries of S V university area.

- A peculiar situation was observed that S V university area does not have sufficient Government engineering colleges. It is very difficult for the economically backward people to get admitted to private and private unaided colleges. Hence, in the interest of the economically backward people, it is recommended to the higher authorities that at least 2 Govt. Engineering colleges should established in each district of S V university area.
- The study reveals that a few librarians (16.98%) replied that their libraries had not taken initiatives for automating their housekeeping activities. Hence, the college authorities concerned should take initiatives to provide automating their housekeeping activities. AICTE also should insist the college authorities on the computerization of their libraries fully as a basic requirement for recognition.
- The study reveals that a few librarians (11.33%) replied that their libraries had not taken initiatives for establishment of Digital library section. Hence the authorities should take necessary steps to provide digital library sections in their libraries.
- A few engineering college libraries are not providing Internet facility (15.10%). Hence the authorities of these engineering colleges should take necessary steps to provide Internet facility as demanded by the librarians.
- The study reveals that a few librarians (3.77%) libraries have their own websites and remaining (96.23%) colleges have website facilities as part of the Institution. Hence the authorities of these engineering colleges should take necessary steps to provide libraries have their own websites.
- The study reveals that (33.97%) colleges have not providing specialized ICT staff. Hence the authorities of these engineering colleges should take necessary steps to providing specialized ICT staff.
- The study reveals that (45.28%) colleges have not an official, written Plan containing uses of ICT by the library objectives and guidelines for acquisition or usage of ICT by the library. Hence the authorities of these engineering colleges should take necessary steps to implement the ICT Strategy and Policy.

10. Conclusions

ICT infrastructure in engineering college libraries has become inevitable in the present era of information explosion and widespread use of digital information resources. Effective ICT infrastructure in engineering college libraries helps in performing their operations and services most efficiently. In S V University area many engineering college libraries have been applying ICT for providing efficient services and resources. This investigation has a summary of the current state-of-the art information and communication technology infrastructure in engineering college libraries in S V University area. Majority of the engineering college libraries in S V University area have basic hardware facilities like servers, computers, printers, etc. However in the majority of the cases it was underutilized. The libraries of autonomous institutions have better hardware facilities including scanner, barcode printer, Net Server, CD-ROM Tower, CD-Writer, etc. The study concludes that most of the engineering college libraries in S V University area need proper ICT infrastructure including hardware, software and library staff have to be trained properly to make use of the resources optimally.

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