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A Comprehensive Study on the Current Status of Library Automation and Networking among the Engineering College Libraries in the Sri Venkateswara University area

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ABSTRACT

This study aims to analyse the use of Automation and Networking among engineering college library faculty members and students in the Sri Venkateswara University Area. A well-structured questionnaire was distributed among the 1314 faculty members and students under study. The study's findings reveal the various aspects of Automation status, Categories of software used, Areas of Computerization, Source finance for their library automation work, automated services, the topology of computer networking used, types of networks used, and satisfaction with digital library services. The study concludes that automation and networking have become vital instruments for these respondents' teaching, research, and learning processes. The study also provides suggestions for enhancing the services for the engineering colleges' academic community.

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1. Introduction

Library networking and automation have been carried out on a large scale across countries. It provides a platform for automating library network systems, allowing library professionals to manage their networks more reliably and efficiently. It provides the tools to monitor and manage network performance, identify and troubleshoot problems, and automate the deployment of new services and applications. It is crucial that any networking in the library should allow us scalability to meet future needs, regardless of size or complexity. When designing library networking, we can remember that the system can quickly and accurately identify problems, increase network uptime, and reduce time spent on manual tasks. A well-prepared library automation design provides the ability to adjust configurations rapidly and respond to changes in the network environment. It can help reduce costs and improve the efficiency of network operations.

Library automation is the computerisation or mechanisation of all library activities. It deals with designing and developing processes and systems that minimise the necessity of human intervention in their operations. Library automation is defined as 'Integrated Systems' that use integrated library software to computerise traditional library functions such as acquisition, cataloguing, circulation and serials control. A computerised library and information system is a set of functional systems encompassing:

- In-house operations of the library; and
- Other applications of information technologies in libraries include information storage and retrieval.

Computerisation is a significant digital transformation activity based on technological innovation, and the academic library can use it to provide library users with alternative educational services. Automation accelerates intelligent processing for retrieving and sharing information for learning and research. However, the studies reported varying degrees of automation and adoption rates by academic libraries using modern data science and other new technologies to provide innovative alternative services. We need to study the development of library services and the framework to provide new insight into how computer technology can deliver value-added new library services to achieve digital transformation. It will also encourage library and information professionals to adopt new computerised technology to complement effective service delivery.

Networking: A network is a system that uses computers, computer terminals, printers, etc. to receive and transmit information, according to the English Language Encyclopedic Unabridged Dictionary of Webster. (Singh, 2007). According to the Oxford Advanced Learner's Current English Dictionary, various computers and other devices link to share tools and information through a network. (Hornby, 1968). In other words, a network comprises two or more connected computers that can share resources like printers and CDs, for example, or exchange data or carry out electronic communications. A network of computers may be connected by cables, phone lines, radio waves, satellites, or infrared light beams. Networks typically come in three flavours: LAN (Local Area Network), MAN (Metropolitan Area Network), and WAN (Wide Area Network). Global awareness of the networked infrastructure phenomenon is expanding. Many academic institutions deploy networked infrastructure to access and utilise local and remote library resources. (Rao & Choudhury, 2010). A new platform for offering users improved information services and resources has been made possible by the swift development of IT, particularly the Internet and related technologies. A new platform for providing users with improved information services and resources has been made possible by the speedy development of IT, particularly the Internet and associated technologies. The World Wide Web (WWW) was developed as a new medium for storing and distributing information, and the Internet was formed simultaneously. This was the true blessing of electronic technologies. Individual e-journal subscriptions and institutional membership in any consortium, such as the INDESTAICTE Consortia

2. Earlier Studies

Library automation and networking have been focal points in information processing and handling centres of all types. In this context, the research by Ahammad and his colleagues stands out, offering a fresh and comprehensive analysis of various aspects of sustainability in library automation. Their study covers community support, user adoption, technical expertise, funding, software customisation, integration with other systems, documentation and training, governance, and decision-making, making it a valuable resource for our current review.

The Library Automation System is receiving more importance as the number of its users is increasing. It is evident that Library automation reduces work duplication, saves time, and brings accuracy and speed. It also increases efficiency in library services and boosts the quality of work. One such effective system is the Smart Library Automation System, which uses facial recognition. The proposed system uses face recognition to enter and get the details of an end user. Through this application, the book gets issued to the end-user by identifying the user with the help of face recognition and identifying the book using barcode

capture. In an automation system, Yalagi and his colleagues used *dlib* face recognition, which resulted in 99.38% accuracy. They provided the validations on the user registration form so that we get the right information. The registration process captures the face of the user and the book issue, and the book return process checks the user's details. End-users of the application will be librarians, students, and teachers. This project aimed to simplify the library tasks and make the book issuing and returning process more interactive and effortless for the user. Also, this system is responsible for preserving the details of book issues and returns and paperless report generation.

Asid studied the outcome of the library automation system's implementation in a group of libraries. Based on the findings, such as the library automation system's full implementation, the author recommended upgrading library technology tools and e-resources, creating a functional and interactive library web page, and designing innovative library programs using social media tools to support the educational system with a diverse clientele.

A major literature review examined the factors contributing to the sustainability of open-source library automation and digitisation software. The review analyses various aspects of sustainability, including community support, user adoption, technical expertise, funding, software customisation, integration with other systems, documentation and training, and governance and decision-making. The findings suggest that sustainability is influenced by multiple factors, and libraries must invest in resources such as funding, staff training, and community support to ensure the continued use and relevance of OSS.(Abduljabbar)

Rajput and Gautam[1] conducted a study to determine the status of library automation and the problems in its implementation in special libraries in Indore City, India. Nagalakshmi's[2] study deals with the deployment of RFID technology and its issues in academic libraries. Mulla and others carried out a survey of engineering college libraries in Karnataka, India. Bansode and Periera[4]studied library automation in college libraries in Goa, India. Husain and Alam[5] discussed the salient features of cataloguing modules of three software packages: Alice for Windows, Libsys and Virtua, and their acceptability in a developing nation. Saibaba 7 studied cooperation and networking among engineering and technological libraries in India. Vasishta8 conducted a study to determine the status of library automation and networked services at six technologically deemed university libraries in North India. Gulati's10 study highlights the consortia efforts in India, such as the JCCC Consortium, INDEST Consortium, SIR E-Journal Consortia, and UGC INFONET.

3. Need and background of the Study

Academic institutions have developed their library information system. In this work, we outline the system's structure and design, which was created to organise the library operations such as ordering, selecting, cataloguing, electronic catalogue management, searching for books, reserving small-format books, tracking inventory of books/electronic materials, scheduling and viewing digital publications), and offering users access to the electronic catalogues. Further, it includes the digital versions of the library's printed and other materials, including videos, audio files, and additional data linked to bibliographic entries. The resources are accessible via the web and crucial to the University. The primary beneficiaries of this Library System are the Library staff, students, and faculty members.

4. Purpose of the Study

The paper explores the concepts and methods of effective library network systems. Library Network administrators are more critical as digital information technologies evolve quickly to maintain an objective library network connection. This article aims to give network administrators the information and abilities they need to successfully traverse library automation's intricacies. It starts by going through the proposed tasks and explaining the roles and relationships between each layer. We have fixed the aims of the current work below.

1. How do users perceive the impact of automation and its applications in the library on their engagement and learning experiences?

2. Are there significant variations among different classes of users who perceive the utility and effectiveness of automation in the library for enhancing their learning experiences?

3. Are there differences in how users with different academic qualifications utilise automation i the library for educational purposes, and what implications do these variations have for optimising the use of computerisation in library services?

5. Methodology

This study's research design combines qualitative and quantitative approaches. It involves an in-depth literature review to gather existing knowledge on library network automation and automation practices. Moreover, empirical data was collected through surveys and interviews with library network administrators to understand their experiences, challenges, and perspectives on library automation.

There are 116 engineering colleges in the Sri Venkateswara University area. The investigator selected 53 engineering college libraries out of 116 by using a simple random method to examine the status of automation and networking of these libraries. The users of engineering college libraries are undergraduate students, postgraduate students and faculty members. There are 14,706 undergraduate students, 2,722 postgraduate students and 3,433 faculty members who use these selected 53 engineering college libraries. The total number of users in these libraries is 20, 231. As the population is significant in terms of the cost, time and labour involved, the investigator selected a sample of 1,314 users using stratified random sampling as shown below:

Undergraduates	1010
Post-graduates	143
Faculty Members	161
Total	1314

The study is limited to engineering college libraries in Sri Venkateswara University. Its users include undergraduate students, postgraduate students, research scholars, and faculty members. The research scholars are excluded from the study's purview.

6. Data Analysis and Discussion of Results

6.1. Library Automation

Library automation refers to the computerisation or mechanisation of all library activities. It deals with designing and developing processes and systems that minimise the necessity of human intervention in their operations. Library automation is defined as integrated systems' using integrated library software to computerise traditional library functions such as acquisition, cataloguing, circulation serials control, etc.

The librarians were asked whether their libraries are automated. Their responses are shown in Table 1.

Note: Figures in parentheses indicate percentages.
Table 1 shows that most engineering college libraries (83.01%) are automated, and the remaining 16.98% are not.

A study by Mulla and others[11] reveals that 17.73 per cent of libraries are not automated. Hence, the present finding almost confirms Mulla's and others' findings.

The librarians were asked to identify the category of software used in their libraries. Their responses are shown in Table 2.

Response	Type of Institution			Total
	UE	OPE	NPE	
Yes	5 (83.33)	22 (81.48)	17 (85.00)	44 (83.01)
No	1 (16.67)	5 (18.52)	3 (15.00)	9 (16.99)
Total	**6 (100.00)**	**27 (100.00)**	**20 (100.00)**	**53 (100.00)**

Note: Figures in parentheses indicate percentages.

Table 1. Distribution of librarians according to their responses about the automation of their libraries

Table 2 shows that half of the libraries (50.00%) use commercial software, 31.81% use their own developed software, and 18.18% use open-source software.

The librarians were asked to identify the areas automated in their respective libraries. Their responses are shown in Table 3.

Software used	Type of Institution			Total
	U E (n=5)	O P E (n=22)	N P E (n=17)	(N=44)
Open source	0	4 (18.18)	4 (23.52)	8 (18.18)
Commercial	3 (60.00)	10 (45.45)	9 (52.94)	22 (50.00)
Own developed	2 (40.00)	8 (36.36)	4 (23.52)	14 (31.81)

Note: Figures in parentheses indicate percentages.

Table 2. Distribution of librarians according to their responses about the category of software used

Areas	Type of Institution			Total (N=44)
	UE (n=5)	OPE (n=22)	NPE (n=17)	
Acquisition	4 (80.00)	22 (100.00)	14 (82.35)	40 (90.90)
Cataloguing	5 (100.00)	22 (100.00)	16 (94.11)	43 (97.72)
Circulation section	5 (100.00)	22 (100.00)	17 (100.00)	44 (100.00)
Serial control	2 (40.00)	15 (68.18)	11 (64.70)	28 (63.63)
Administration	2 (40.00)	15 (68.18)	14 (82.35)	31 (70.45)
Budget	2 (40.00)	9 (40.90)	7 (41.17)	18 (40.90)
Interlibrary loans	1 (20.00)	8 (36.36)	5 (29.41)	14 (31.81)
Stock verification	1 (20.00)	14 (63.63)	10 (58.82)	25 (56.81)
CAS	0	7 (31.81)	7 (41.17)	14 (31.81)
SDI	0	9 (40.90)	7 (41.17)	16 (36.36)
Others	0	3 (13.63)	3 (17.64)	6 (13.63)

Note: Figures in parentheses indicate percentages. Respondents are permitted to tick more than one answer.

Table 3. Distribution of librarians according to their responses concerning the areas of computerisation

It is evident from Table 3 that almost all libraries (100.00%) automated their circulation section; 97.72% of them informed that their cataloguing sections are automated, and 90.90% of them informed that their acquisition activities are automated. The table also reveals that 70.4 per cent of the libraries have automated their administrative activities; 63.63 per cent of them have automated their serial sections, 56.81 per cent of them have automated their stock verification activities; 36.36 per cent of them have automated their SDI services, and the remaining 31.81 per cent of them have automated their CAS.

The librarians were asked to provide the source of finance for their library automation work. Their replies are shown in 4.

Source	Type of Institution			Total
	U E	O P E	N P E	
Donor funding	0	2 (9.09)	0	2 (4.54)
Government funding	5 (100.00)	0	0	5 (11.36)
Management	0	20 (90.90)	15 (88.23)	35 (79.54)
Others	0	0	2 (11.76)	2 (4.54)
Total	**5 (100.00)**	**22 (100.00)**	**17 (100.00)**	**44 (100.00)**

Note: Figures in parentheses indicate percentages.

Table 4. Distribution of librarians according to their responses about the source of Finance for their library automation work

It is evident from Table 4 that the majority of the librarians (79.54%) replied that their automation work is funded by their management. It is also evident from the table that 11.36 per cent of librarians replied that their library automation work is funded by the Government; 4.54 per cent of them replied their library automation work is funded by donors; and the remaining 4.54 per cent of them replied their libraries obtained funds from other sources for their automation work. It is also evident from the table that all university engineering college libraries are getting funds from the Government for their automation work. In contrast, old and new private engineering college libraries get funds from their respective managements.

The users were asked whether their respective libraries had been computerized. Their responses are shown in Table 5.

Response	Type of Library			Gender		Category			Total
	U E	O P E	N P E	M	F	U G	PG	F M	
Yes	134 (89.33)	537 (77.94)	324 (68.22)	561 (75.61)	434 (75.87)	735 (72.77)	119 (83.22)	141 (87.58)	995 (75.72)
No	16 (10.67)	152 (22.06)	151 (31.78)	181 (24.39)	138 (24.13)	275 (27.23)	24 (16.78)	20 (12.42)	319 (24.28)
Total	**150 (100.00)**	**689 (100.00)**	**475 (100.00)**	**742 (100.00)**	**572 (100.00)**	**1010 (100.00)**	**143 (100.00)**	**161 (100.00)**	**1314 (100.00)**

Note: UE: University engineering colleges, OPE: Old private engineering colleges, NPE: New private engineering colleges. Figures in parentheses indicate percentages.

Table 5. Distribution of users according to the type of library, gender, category, and Responses about the library computerisation

x^2 (UG - PG):117.001	df:1	TV:3.841	Sig at 0.05 level
x^2 (UG - FM): 85.714	df:1	TV:3.841	Sig at 0.05 level
x^2 (PG - FM) : 28.266	df:1	TV:3.841	Sig at 0.05 level
x^2 (UE - OPE): 2.383	df:1	TV:3.841	N Sig at 0.05 level
x^2 (UE - NPE): 6.143	df:1	TV:3.841	Sig at 0.05 level
x^2 (OPE - NPE) : 16.432	df:1	TV:3.841	Sig at 0.05 level
x^2 (M - F): 9.543	df:1	TV:3.841	Sig at 0.05 level

Table 5 shows that most users (75.72%) informed that their libraries were computerised, and the remaining 24.28% replied negatively.

Table 5 shows a significant difference in the replies of undergraduate and postgraduate users on the one hand and undergraduate and faculty members on the other hand about the computerisation of their libraries. This is indicated by the Chi-square values, which are significant at the 0.05 level with one degree of freedom. This means that fewer undergraduates replied that their libraries had been computerised compared to postgraduates and faculty members.

It is also apparent from the table that there is a significant difference in their replies about the library computerisation among the users of postgraduates and faculty members, as evidenced by the Chi-square value, which is significant at 0.05 level with one degree of freedom; it means more number of faculty members replied that their libraries have been computerised compared to postgraduates.

The table shows no significant difference in replies regarding library computerisation between the users of the University engineering and old Private engineering. This is indicated by the Chi-square value, which is not significant at the 0.05 level with one degree of freedom.

It can also be seen from the table that there is a significant difference in their replies concerning the library computerisation between the users of the University engineering college libraries and new private engineering college libraries on the one hand, and old private engineering college libraries and new private engineering college libraries on the other hand. It is indicated by the Chi-square values, which are significant at 0.05 level with one degree of freedom, which means more users of the University engineering college libraries replied that their libraries have been computerised compared to users of new private engineering college libraries. More old private engineering college libraries replied that their libraries had been computerized compared to the users of new private engineering college libraries.

It has also been noticed that there is a significant difference between male and female users concerning library computerisation. The Chi-square values, which are significant at the 0.05 level with one degree of freedom, show that more women users replied that their libraries have been computerised compared to the male users.

The users were asked to identify the various automated services they used in their respective libraries. Their responses are shown in Table 6 and diagrammatically in Figure 1.

It is evident from Table 6 that among various automated library services, nearly half of users (48.71%) replied that they are using computerised renewal of books, 21.92 per cent of them are using online database service, 20.78% of them are using computerized circulation service, 18.95 per cent of them are using printout service, 12.10 per cent of them are using

Services	Type of Library			Gender		Category			Total
	U E n=150	O P E n=689	N P E n=475	M n=742	F n=572	U G n=1010	P G n=143	F M n=161	N=1314
Circulation control service	33 (22)	168 (24.38)	72 (15.15)	189 (25.47)	84 (14.68)	148 (14.65)	44 (30.76)	81 (50.3)	273 (20.78)
OPAC	9 (6)	106 (15.88)	12 (2.52)	86 (11.59)	41 (7.16)	49 (4.85)	11 (7.69)	67 (41.6)	127 (9.67)
CAS	6 (4)	79 (11.41)	15 (3.15)	59 (7.95)	41 (7.16)	25 (2.45)	15 (10.48)	60 (37.2)	100 (7.61)
SDI	5 (3.33)	77 (11.17)	13 (2.73)	55 (7.41)	40 (6.96)	30 (2.97)	12 (10.48)	53 (32.91)	95 (7.23)
Serial holdings	19 (12.66)	96 (13.93)	44 (9.26)	105 (14.15)	54 (9.44)	95 (9.40)	20 (13.98)	44 (27.32)	159 (12.10)
Renewal of books	74 (49.33)	332 (48.18)	234 (49.26)	353 (47.57)	287 (50.17)	487 (48.21)	81 (56.64)	72 (44.72)	640 (48.71)
Printout service	29 (19.33)	131 (19.01)	89 (18.73)	147 (19.81)	102 (17.83)	182 (18.01)	25 (17.48)	42 (26.08)	249 (18.95)
Online database service	34 (22.66)	175 (25.39)	79 (16.63)	178 (23.98)	110 (19.23)	183 (18.11)	30 (20.97)	75 (46.58)	288 (21.92)
CD-ROM database service	11 (7.33)	59 (8.56)	34 (7.15)	65 (8.76)	39 (6.18)	60 (5.94)	13 (9.09)	31 (19.25)	104 (7.91)
Others	3 (2)	31 (4.49)	15 (3.15)	33 (4.44)	16 (2.79)	30 (2.97)	9 (6.29)	10 (6.21)	49 (3.73)

Note: Figures in parenthesis indicate percentages. Users are permitted to tick more than one answer.

Table 6. Distribution of users according to the type of library, gender, category, and Computerised library services used in their libraries

Serial holdings, 9.67 cent of them are using OPAC, 7.91 percent of them are using CD-ROM database service, 7.61 91 percent of them are using computerized CAS service, 7.23 percent of them are using computerised SDI service and the remaining 3.73 per cent of them are using other services.

Note: Figures in parentheses indicate percentages.

Table 7 shows that most of the colleges (88.67%) have digital libraries, and the remaining 11.33% do not.

Hypothesis number one states that "Most of the engineering college libraries have digital library facilities". This was verified from the data collected, and it is found to be true (vide Table 7).

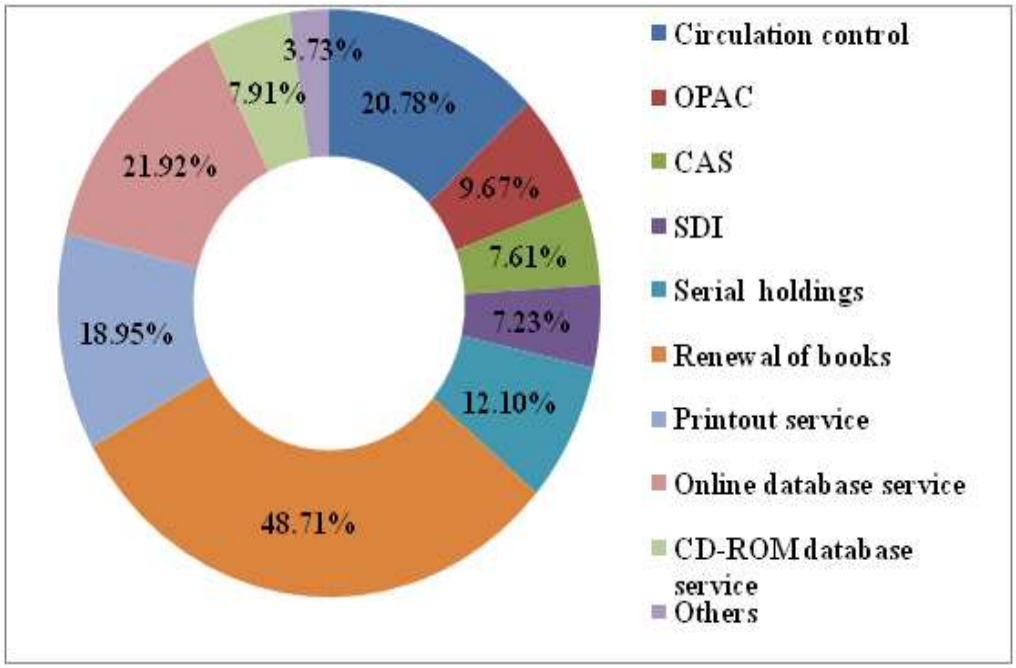

Figure 1. Distributions of users according to their responses about the use of computerised library services in their libraries

Response	Type of Institution			Total
	U E	O P E	N P E	
Yes	6 (100.00)	23 (85.18)	18 (90.00)	47 (88.67)
No	0	4 (14.82)	2 (10.00)	6 (11.33)
Total	**6 (100.00)**	**27 (100.00)**	**20 (100.00)**	**53 (100.00)**

Table 7. Distribution of librarians according to their responses about the availability Digitallibraries in their libraries

Type of digital library software used

Again, a question has been put to those librarians, who replied that their libraries have digitised libraries, to know the type of digital library software they use. Their responses are shown in Table 9 and diagrammatically in Figure 2.

Software	Type of Institution			Total	Rank
	U E (n=6)	O P E (n=23)	N P E (n=18)	(N= 47)	
Greenstone	4 (66.66)	11 (47.82)	12 (66.66)	27 (57.44)	1
D Space	2 (33.34)	8 (34.78)	4 (22.22)	14 (29.78)	2
Fedora	0	3 (13.04)	1 (5.55)	4 (8.51)	3
Others	0	1 (4.34)	1 (5.55)	2 (4.25)	4

Note: Figures in parentheses indicate percentages.

Table 8. Distribution of librarians according to their responses about the types of digital library software used

Table 8 shows that most libraries are using Green Stone digital library software (57.44%), D Space software (29.78%), Fedora software (8.51%), and other software (4.25%).

Hypothesis number four states that "Most of the engineering college libraries are using the software of Green Stone for their digital libraries." This was verified from the data collected, and it is found to be true (vide Table 7)

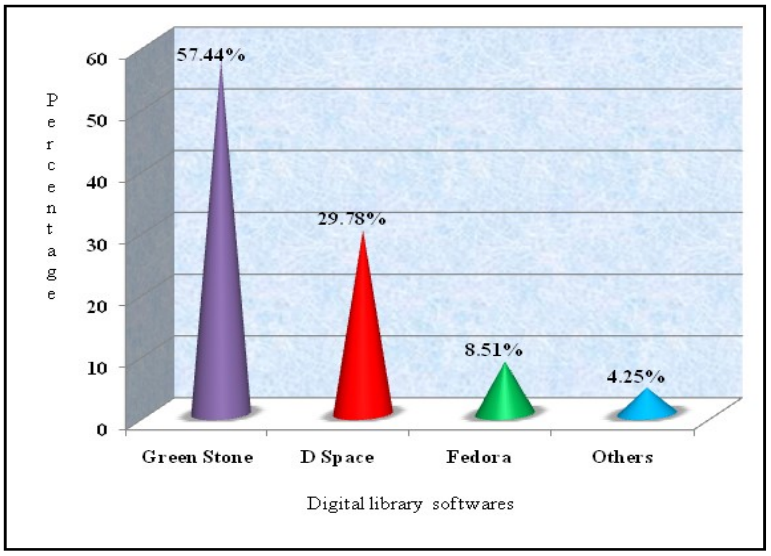

Figure 2. Distribution of librarians according to their responses about the type of digital library software used

Topology of Networking in Digital Library

Network topology refers to the layout of a network and how different nodes in a network are connected and communicate. Librarians were asked to describe the topology of computer networking used in their digital Libraries. Their responses are shown in table 9.

Network topology	Type of Institution			Total
	U E (n=6)	O P E (n=23)	N P E (n=18)	(N=47)
Bus	1 (16.66)	15 (65.21)	13 (72.22)	29 (61.70)
Ring	0	0	2 (11.22)	2 (4.25)
Star	3 (50.00)	1 (4.34)	2 (11.22)	6 (12.76)
Tree	2 (33.33)	6 (26.08)	0	8 (17.02)
Others	0	1 (4.34)	1 (5.5)	2 (4.25)

Note: Figures in parentheses indicate percentages.

Table 9. Distribution of digital libraries according to the type of topology of the network used

Table 9 shows that most digital libraries (61.70%) have a Bus network topology, 17.02% have a Tree network topology, 12.76% have a Star network topology, and 4.25% have a Ring network topology. The same percentage (4.25%) have other network topologies.

Hypothesis number three states that Most engineering college libraries use bus topology to network computers in their digital libraries. This was verified from the data collected, and it is found to be true (vide Table 9)

Type of Network

A network is a system of computers interconnected by telephone wires or other means to share information. Two or more computers are connected to route, manage, and store rapidly changing data. Networks allow for resource sharing (e.g., multiple computers sharing one printer), data sharing, and communication or data exchange (e.g., electronic mail). Computer networks can be grouped into three categories based on the geographical locations of their computer terminals: LAN, WAN, and MAN.

A question was asked of the librarians to determine the type of network used. The responses given by them are shown in Table 10 and diagrammatically in Figure 3.

Table 10 shows that most engineering colleges (96.23) have a local area network, 13.20 percent have a wide area network, and 3.77 percent have a metropolitan area network.

A study by Wadeyar and others12 reveals that 70.00 per cent of libraries have a local area network. The present study has increased this percentage.

Hypothesis number two 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)

Types of network	Type of Institution			Total
	U E (n=6)	O P E (n=27)	N P E (n=20)	(N=53)
LAN	5 (83.33)	27 (100.00)	19 (95.00)	51 (96.22)
WAN	2 (33.33)	2 (7.40)	3 (15.00)	7 (13.20)
MAN	1 (16.66)	0	1 (5.00)	2 (3.77)

Table 10. Distribution of librarians according to their responses about the type of Computer network used

Note: Figures in parentheses indicate percentages. Respondents are permitted to tick more than one answer.

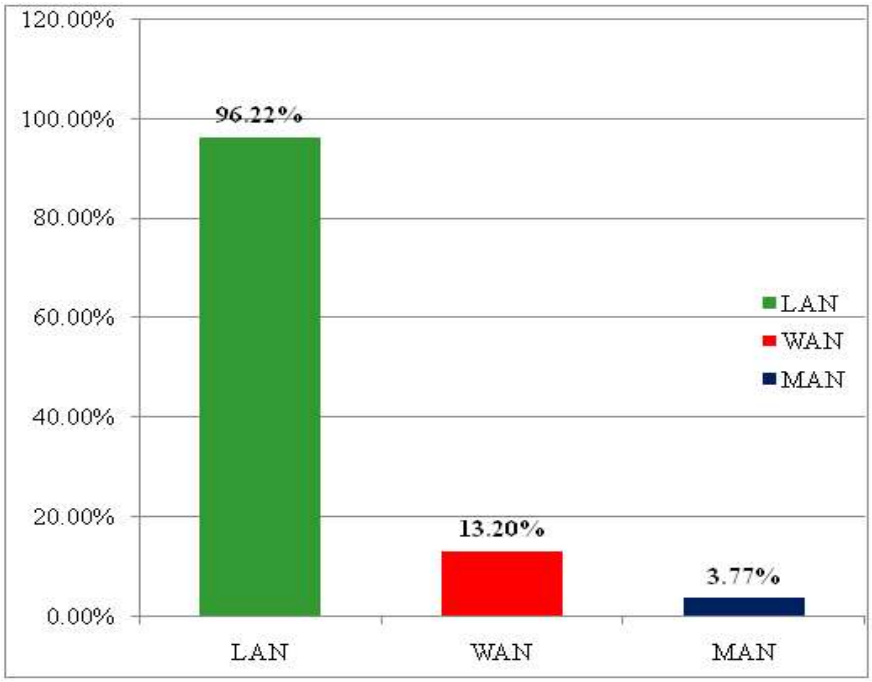

Figure 3. Distribution of librarians according to their responses about the types of networks used

Membership in information networks

A question has been asked of the librarians to indicate the information networks in which their libraries are members. The responses given by them are shown in Table 11

Table 11 shows that the majority of librarians (79.24%) informed that their libraries have membership in the DELNET network, 15.09% in the INFLIBNET network, 3.77% in INDONET,

Information networks	Type of Institution			Total
	U E (n=6)	O P E (n=27)	N P E (n=20)	(N=53)
INDONET	0	1 (3.70)	1 (5.00)	2 (3.77)
DELNET	5 (83.33)	22 (81.48)	15 (75.00)	42 (79.24)
INFLIBNET	2 (33.33)	2 (7.40)	4 (20.00)	8 (15.09)
Others	0	0	1 (5.00)	1 (1.88)

Note: Figures in parentheses indicate percentages. Respondents are permitted to tick more than one answer.

Table 11. Distribution of librarians according to their responses about their membership in various information networks

and 1.88% in other information networks.

A study by Dhanavandan and others 13 reveals that DELNET occupies the first position concerning the type of network accessed, and INFLIBNET occupies the second position. Hence, the present finding confirms the findings of Dhanavandan and others.

Hypothesis number five states that "Majority of the engineering college libraries are members of DELNET." This was verified from the data collected, and it is found to be true (vide Table 11)

Satisfaction with Digital Library Services

The users were asked a question to determine their satisfaction with their libraries' digital library services. Their responses are shown in Table 12.

Table 12 shows that a high percentage of users (46.88%) are satisfied with their libraries' digital library services, 36.91% are neither satisfied nor dissatisfied, and 16.21% are dissatisfied.

Table 12 shows that there is no significant difference in the replies of the users, undergraduates, and postgraduates regarding satisfaction with their libraries' digital library services. This is indicated by the Chi-square value, which is insignificant at the 0.05 level with two degrees of freedom.

It is also obvious from the table that there is a significant difference in their replies about satisfaction with the digital library services of their respective libraries between the users of undergraduates and faculty members on one hand and postgraduates and faculty members on the other. This is proved by the Chi-square values, which are significant at 0.05 level with two degrees of freedom, which means undergraduates are more satisfied with digital library services than postgraduates and faculty members.

It is evident from the table that there is a significant difference in their replies about satisfaction with the digital library services of their respective libraries between the users of University

Level of satisfaction	Type of Library			Gender		Category			Total
	U E	O P E	N P E	M	F	U G	P G	F M	
Satisfied	70 (46.66)	344 (49.93)	202 (42.53)	364 (49.57)	252 (44.05)	459 (45.44)	73 (51.05)	84 (52.17)	616 (46.88)
Neither satisfied nor dissatisfied	55 (36.67)	241 (34.98)	189 (39.75)	247 (33.28)	238 (41.60)	379 (37.53)	56 (39.16)	50 (51.05)	485 (36.91)
Dissatisfied	25 (16.67)	104 (15.09)	84 (17.68)	131 (17.65)	82 (14.35)	172 (17.03)	14 (9.79)	27 (16.78)	213 (16.21)
Total	**150 (100.00)**	**689 (100.00)**	**475 (100.00)**	**742 (100.00)**	**572 (100.00)**	**1010 (100.00)**	**143 (100.00)**	**161 (100.00)**	**1314 (100.00)**

Table 12. Distributions of users according to their satisfaction with the digital library services

Note: Figures in parenthesis indicate percentages.

The Levels of Significance are produced below.

x^2 (UG - PG):4.139	df:2	TV:5.991	N Sig at 0.05 level
x^2 (UG - FM):7.654	df:2	TV:5.991	Sig at 0.05 level
x^2 (PG - FM) :6.965	df:2	TV:5.991	Sig at 0.05 level
x^2 (UE - OPE) :5.999	df:2	TV:5.991	Sig at 0.05 level
x^2 (UE - NPE) :8.974	df:2	TV:5.991	Sig at 0.05 level
x^2 (OPE - NPE) :7.186	df:2	TV:5.991	Sig at 0.05 level
x^2 (M - F) : 5.642	df:2	TV:5.991	N Sig at 0.05 level

engineering college libraries and old Private engineering college libraries on the one hand and University engineering college libraries and new Private engineering college libraries on the other hand. This is proved by the Chi-square values, which are significant at 0.05 level and have two degrees of freedom. This means that old private engineering college libraries are more satisfied with digital library services than university engineering college libraries. University engineering college library users are more confident than the new Private engineering college libraries.

It can also be seen from the table that there is a significant difference in their replies concerning the satisfaction with the digital library services of their respective libraries between the users of old Private engineering college libraries and new Private engineering college libraries. It is proved by the Chi-square value, which is significant at 0.05 level with two degrees of freedom. This means old private engineering college libraries are more satisfied with the digital library service than new ones.

It is also noticed that there is no significant difference in their replies about satisfaction with the digital library services of their respective libraries between the users of men and women. It is indicated by the Chi-square value, which is insignificant at 0.05 level with two degrees of freedom.

7. Findings of the Study

Through this work, we have arrived at some significant findings. Most of the studied institutions already resorted to automation. Even though many open-source options are available, more than half of the studied institutions resorted to commercial platforms. Circulation and many processes are completely automated. Automation has not received any support from third parties but from the institutions themselves. The digital libraries established preferred the Bus type of network topology. Besides, they have local area network operations. The end-user's satisfaction was recorded in the study. The computerisation task was performed well in many institutions. Self-supportive institutions funded the digital task using their resources.

8. Suggestions

Based on the study's findings, the following suggestions are put forward to improve the use of automation and networking among the faculty and students in engineering colleges in the S V University area. The study reveals that (36.91)users are not satisfied with digital library services.

Hence, based on this study, several recommendations applicable to engineering college libraries can be made:

1. A few engineering college libraries (16.98%) are not automated. According to AICTE norms, computerised indexing with bar code / RF-tagged book handling is essential. Hence, the college authorities concerned should take the initiative to computerise the various operations of the library. AICTE and affiliating universities also should insist the college authorities on the computerisation of their libraries.

2. The study reveals that a few engineering college libraries (11.33%) do not have digital libraries. A few users (16.21%) also replied that they were dissatisfied with digital library services in their respective libraries. More than half of the librarians (51.55%) suggested that digital libraries in engineering colleges should be developed. A few users (10.21%) suggested establishing digital libraries in their college libraries. As per AICTE norms, a digital library with a multimedia facility is essential. Hence, the library authorities should take necessary measures to develop digital library facilities in their libraries for the benefit of students and research scholars. AICTE and affiliating universities should insist the authorities of engineering colleges on the provision of digital libraries at the time of permission, affiliation and inspection.

9. Conclusions

Library automation and networking are now the most effective and user-friendly technology for accessing library resources in all fields. In engineering colleges, users like students and faculty members are highly dependent on automation and networking to access information and exchange ideas in their respective disciplines. The electronic journals and e-databases available in the library are widely used by the user community of engineering education. Hence, a free automation and networking service with an increasing number of subscribed e-journals and e-database facilities is of great importance to meet the emerging needs of the users of the engineering education system.

The educational background and experience of students significantly shape their perceptions of AR. As seen in this study, those with higher educational levels tend to appreciate the advantages of technology in learning, emphasising the role of familiarity and exposure in establishing a solid technological foundation (Adewusi et al., 2021). Additionally, the research aligns with the findings of Saleem et al. (2021), emphasising that perceived utility, ease of use, and enjoyment of AR directly impact an individual's attitude and intention to use. This observation is particularly relevant in an era where technology's integration into education is rising. The study highlights the importance of considering gender-specific preferences and

usage patterns when implementing AR in educational strategies. Regarding AR's impact on learning and knowledge acquisition, this study reveals its potential to enhance engagement and content creation, offering an exciting pathway for improved learning experiences. As a transformative tool, AR empowers users to access dynamic, interactive learning environments in libraries, fostering more engaging learning cultures. To summarise, this study underscores the promising potential of Augmented Reality in educational settings, particularly within libraries. It engages students, enriches content delivery, and caters to individual preferences, marking a significant advancement in modern education. As technology evolves, the synergy between AR and learning is poised to reshape education, offering immersive, personalised learning experiences.

Educational institutions must seize this potential, adapting to the evolving dynamics of twenty-first-century education.

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