ASSESSMENT OF AWARENESS, ACCESSIBILITY, AND UTILIZATION OF ICT-ENABLED INFORMATION RESOURCES AND LIBRARY SERVICES AMONG FACULTY MEMBERS OF ENGINEERING INSTITUTIONS IN PUDUCHERRY AND KARAIKAL."

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ABSTRACT

The services in academic engineering libraries are restructured around information and communication technology (ICT). This paper analyses the knowledge, availability, and utilisation of ICT-enabled information sources and library services by faculty members in engineering colleges (Puducherry & Karaikal). The surveyed digital resources are e-books, e-journals, online databases, OPAC, and institutional repository, and the knowledge of faculty about these resources is also studied, including their availability and usage with a descriptive approach using a questionnaire. The research identifies the hurdles teachers have to face and factors that influence effective use. The findings are meant to encourage improvements in ICT infrastructure, user training, and digital library services in order to increase academic and research productivity.

1. INTRODUCTION

Information and Communication Technology (ICT) discusses to the integration of computer-based applications and communication tools used for collecting, processing, storing, and sharing information. It can also be described as the convergence of computing, networking, and information processing technologies, along with their practical applications **Riyasat and Fatima, 2008[1].** In the digital age, ICT has revolutionized the way knowledge is generated, accessed, and disseminated. Academic institutions, particularly engineering colleges, are increasingly integrating ICT-based resources and services to enhance teaching, research, and professional development. Faculty members play a pivotal role in this transformation, as their awareness and effective utilization of ICT tools directly influence the quality of education and innovation within their institutions **(Thanuskodi, 2012)[2].** ICT refers to the integration of computing, telecommunications, and networking technologies that enable the collection, storage, processing, transmission, and diffusion of information in digital form. It encompasses both the hardware and software infrastructure that supports the creation, management, and sharing of knowledge. According to **UNESCO (2019)[3],** ICT can be defined as "a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information." This definition highlights the role of ICT as a vital enabler of communication and information flow in contemporary society.

The emergence of ICT has transformed the way individuals, organizations, and institutions access and utilize information. It integrates traditional computing systems with modern communication technologies, such as the Internet, mobile networks, cloud computing, artificial intelligence (AI), and digital media platforms. As noted by **Anderson and Rainie (2020)[4],** ICT serves as the backbone of the information society, connecting people and systems globally and supporting innovative modes of learning, research, and professional collaboration.

2. REVIEW OF LITERATURE

Guo et al. (2023) examined the application of metaverse-related technologies—such as 3D technology, RFID, virtual/augmented reality (VR/AR), and artificial intelligence (AI) in urban libraries across the United States. Their study revealed that these technologies are actively integrated into library services, with 3D technology emerging as the most widely adopted, followed by VR/AR and the Internet of Things (IoT). In contrast, the implementation of AI remains relatively limited within these libraries

Rajasekaran et al. (2022) explored RFID systems in library administration, highlighting their ability to automate transactions and enhance operational efficiency. The study emphasises the benefits of RFID implementation, such as improved book security and traceability, reduced loss, and streamlined, automated inventory verification. The integration of GSM technology with passive RFID tags and active readers presents an innovative solution to common library operational challenges.

Suman and Patel (2024) examined the awareness, usage, and satisfaction levels of ICT-based library and information services among users. The study revealed a higher preference for print resources over electronic formats, with RFID-based issue-and-return services being the most widely used. Findings showed that 49.12% of respondents were satisfied with the digital collection, while 38.60% were unsatisfied. Low internet connectivity, limited computer access, and a lack of awareness were identified as major challenges. The study suggested improving internet facilities, conducting user training, and enriching digital resources to enhance ICT-based library services.

Upadhyay et al. (2023) studied the transformation of traditional libraries into digital ones using information and communication technology (ICT). They found that ICT tools have revolutionized collection development practices, enabling better services and integrating digital resources. However, challenges like inadequate infrastructure and inconsistent power supply hinder their effective use. The study also revealed that ICT facilitates timely information delivery, strengthens connections with vendors and publishers, and saves time in collection management. The authors recommend prioritizing ICT infrastructure funding and providing staff training for effective implementation.

3. OBJECTIVES

- To examine the awareness of ICT-based library resources and services among faculty members.
- To analyse the frequency of library visits by faculty members.
- To investigate the purpose of ICT-based resource usage by faculty members.
- To assess the awareness of the types of electronic resources among faculty members.

3.1. METHODOLOGY

The study adopted a descriptive survey design to examine the awareness, accessibility, and utilization of ICT-enabled library resources among faculty members of engineering colleges in Puducherry and Karaikal.

Primary data were collected using a structured questionnaire based on a five-point Likert scale. The questionnaire covered demographic details, awareness of ICT services, frequency of library visits, purposes of ICT usage, and awareness of electronic resources.

A total of 1,186 valid responses were obtained from faculty members across 14 engineering institutions.

The collected data were analyzed using percentage analysis, mean and standard deviation, ranking method, and Pearson's Chi-Square test to examine associations between variables.

4.   DATA ANALYSIS AND INTERPRETATION

Table 4.1: Demographics of Respondents by Engineering Colleges and Designations

S. No	Name of College	Asst. Professor	Associate Professor	Professor	Total
1	Sri Manakula Vinayagar Engineering College	35 (3.0)	30 (2.5)	19 (1.6)	84 (7.1)
2	Sri Ganesh College of Engineering & Technology	31 (2.6)	33 (2.8)	20 (1.7)	84 (7.1)
3	Rajiv Gandhi College of Engineering and Technology	39 (3.3)	33 (2.8)	18 (1.5)	90 (7.6)
4	Alpha College of Engineering & Technology	38 (3.2)	32 (2.7)	16 (1.3)	86 (7.3)
5	Achariya College of Engineering & Technology	37 (3.1)	31 (2.6)	21 (1.8)	89 (7.5)
6	Christ College of Engineering & Technology	39 (3.3)	30 (2.5)	20 (1.7)	89 (7.5)
7	Christ Institute of Technology, Ramanathapuram	44 (3.7)	29 (2.4)	14 (1.2)	87 (7.3)
8	Sri Krishna College of Engineering & Technology	47 (4.0)	27 (2.3)	9 (0.8)	83 (7.0)
9	RAAK College of Engineering and Technology	45 (3.8)	31 (2.6)	7 (0.6)	83 (7.0)
10	Sri Venkateshwaraa College of Engineering and Technology	41 (3.5)	30 (2.5)	11 (0.9)	82 (6.9)
11	Pondicherry Engineering College	40 (3.4)	33 (2.8)	10 (0.8)	83 (7.0)
12	Perunthalaivar Kamarajar Institute of Engineering & Technology	45 (3.8)	29 (2.4)	11 (0.9)	85 (7.2)
13	Bharathiyar College of Engineering and Technology	43 (3.6)	28 (2.4)	9 (0.8)	80 (6.7)
14	RVS College of Engineering and Technology	42 (3.5)	31 (2.6)	8 (0.7)	81 (6.8)
	Total	566 (47.7)	427 (36.0)	193 (16.3)	1186 (100.0)

The findings from Table 4.1 and Figure 4.1 reveal the distribution of respondents across 14 engineering colleges by designation. The total number of respondents was 1,186, comprising 566 (47.7) assistant professors, 427 (36.0) associate professors, and 193 (16.3) professors. Among the colleges, Rajiv Gandhi College of Engineering and Technology had the highest total respondents at 90 (7.6) while Bharathiyar College of Engineering and Technology had the lowest at 80 (6.7) respectively.

It is evident that assistant professors constituted the largest group in all colleges, followed by associate professors, with professors being the least represented. This indicates a higher presence of assistant professors in the surveyed engineering colleges.
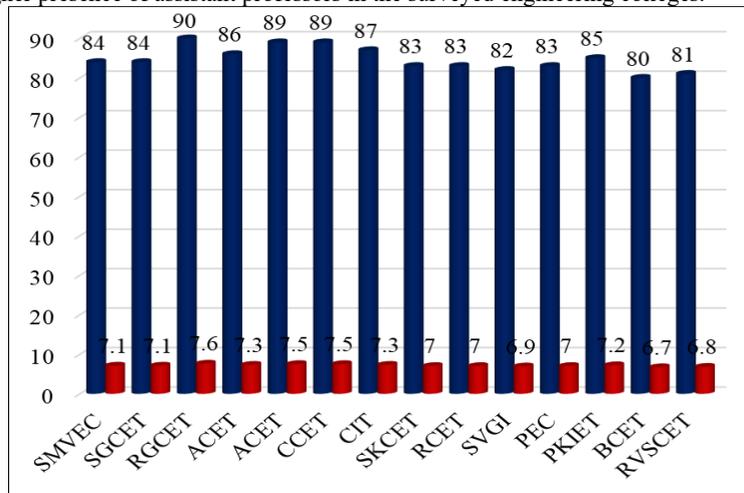
Figure 4.1: Demographics of Respondents by Engineering Colleges and Designations

Table 4.2: Awareness of ICT-Based Library Resources and Services Among Respondents

S. No	Awareness about ICT-Based Resources	SD	D	N	A	SA	Total	M	SD	R
1	I am aware of the ICT services provided by the library.	70 (5.9)	85 (7.2)	420 (35.4)	222 (18.7)	389 (32.8)	1186 (100.0)	3.6535	1.1751	6
2	I learned about the library's ICT services through orientation programs	67 (5.6)	68 (5.7)	499 (42.1)	296 (25.0)	256 (21.6)	1186 (100.0)	3.511	1.0659	7
3	I am aware that the library provides access to e-books and digital databases	51 (4.3)	63 (5.3)	126 (10.6)	177 (14.9)	769 (64.8)	1186 (100.0)	4.3069	1.1229	1
4	I have received sufficient information about the ICT services offered in the library	74 (6.2)	84 (7.1)	350 (29.5)	281 (23.7)	397 (33.5)	1186 (100.0)	3.7108	1.1799	5
5	I am aware that the library provides access to online journals and e-resources	62 (5.2)	79 (6.7)	215 (18.1)	286 (24.1)	544 (45.9)	1186 (100.0)	4.0008	1.1584	2
6	I am aware of the availability of online public access catalogue (OPAC) and web OPAC services	58 (4.9)	72 (6.1)	260 (21.9)	309 (26.0)	487 (41.1)	1186 (100.0)	3.9266	1.1435	2
7	I am aware that the library conducts training programs/workshops to enhance ICT skills	81 (6.8)	102 (8.6)	288 (24.3)	315 (26.6)	400 (33.7)	1186 (100.0)	3.7229	1.1978	4

Source: Primary Data *SD: Strongly Disagree D: Disagree N: Neutral A: Agree SA: Strongly Agree*

The results found that the respondents expressed different levels of awareness about ICT-based resources and services. The study measured five-point scale parameters, and the mean values indicate the overall awareness levels. The highest mean value was recorded for awareness about access to e-books and digital databases (M = 4.3069), which is ranked first. This implies that the majority of respondents are well aware of the availability of e-books and digital databases in the library. The second-highest mean value was found for awareness about access to online journals and e-resources (M = 4.0008) and awareness of OPAC and web OPAC services (M = 3.9266), which are ranked second and third respectively. On the other hand, the lowest mean value was observed for awareness gained through orientation programs (M = 3.511), which is ranked seventh. This indicates that orientation programs are less effective in creating awareness about ICT-based resources and services among respondents.Similarly, awareness about general ICT services provided by the library (M = 3.6535) also received a relatively lower rank (sixth). It can be noted that the results in Table 5.6 and Figure 5.6 are identified the overall ranking of ICT awareness, where awareness of e-books and digital databases secured the first rank, followed by awareness of online journals and e-resources. In contrast, orientation programs received the lowest rank. This reveals that respondents are more aware of digital content and access tools than of awareness initiatives conducted by the library.

Table 4.3: Frequency of Library Visits by Designation and Gender

S. No	Library Visits	Asst. Professor	Associate Professor	Professor	Male	Female	Total
1	Daily	107 (9.0)	102 (8.6)	57 (4.8)	213 (18.0)	53 (4.5)	266 (22.4)
2	2–3 times a week	103 (8.7)	79 (6.7)	44 (3.7)	117 (9.9)	109 (9.2)	226 (19.1)
3	Once a week	172 (14.5)	101 (8.5)	20 (1.7)	215 (18.1)	78 (6.6)	293 (24.7)
4	Occasionally	113 (9.5)	80 (6.7)	52 (4.4)	159 (13.4)	86 (7.3)	245 (20.7)
5	Rarely	71 (6.0)	65 (5.5)	20 (1.7)	60 (5.1)	96 (8.1)	156 (13.2)
	Total	566 (47.7)	427 (36.0)	193 (16.3)	764 (64.4)	422 (35.6)	1186 (100.0)
Pearson Chi-Square		Value	Df	Sig. (2-sided)	Value	Df	Sig. (2-sided)
		40.530	8	0.000	100.366	4	0.000

Source: Primary Data

It can be noted from Table 4.3 that present the frequency of library visits by designation and gender of the respondents from engineering colleges. It is clear that out of 1,186 respondents, 566 (47.7) were assistant professors, 427 (36.0) were associate professors, and 193 (16.3) were professors, while 764 (64.4) were male and 422 (35.6) were female. The study found that 293 (24.7) respondents visited the library once a week, followed by 266 (22.4) who visited daily, and 245 (20.7) who visited occasionally. About 226 (19.1) visited 2–3 times a week, while 156 (13.2) rarely used the library. The results found that among assistant professors, weekly visits 172 (14.5) were the highest, while daily visits were most common among associate professors, 102 (8.6). Professors showed notable participation in both daily and occasional visits. Male respondents 215 (18.1) showed a higher tendency for weekly visits, while female respondents 109 (9.2) frequently visited the library 2–3 times a week. There is consistent library usage across designations and gender, with assistant professors and male faculty showing slightly higher engagement. The study revealed that the majority found weekly and daily visits most preferred among all groups.

Chi-Square Analysis for Hypothesis Testing

The chi-square analysis revealed values of 40.530 with 8 degrees of freedom for academic designation and 100.366 with 4 degrees of freedom for gender, with both tests showing a significance level of 0.000. Since the Asymptotic Significance (2-sided) values are below 0.05, the null hypothesis is rejected in this study. The results indicate a statistically significant association between the frequency of library visits and both the academic designation and gender of the respondents in the engineering colleges.

Table 4.4: Purpose of ICT-Based Resource Usage by Department

S. No	Purpose of Using ICT-Based Resources	ECE	EEE	CIVIL	CSE	MECH	CHEM	IT	Total
1	Academic learning	46 (3.9)	2 (0.2)	4 (0.3)	41 (3.5)	9 (0.8)	29 (2.4)	4 (0.3)	135 (11.4)
2	Teaching and lecture preparation	29 (2.4)	21 (1.8)	0 (0.0)	36 (3.0)	2 (0.2)	18 (1.5)	4 (0.3)	110 (9.3)
3	Research work and projects	22 (1.9)	18 (1.5)	25 (2.1)	10 (0.8)	21 (1.8)	1 (0.1)	26 (2.2)	123 (10.4)
4	Accessing e-journals and databases	16 (1.3)	18 (1.5)	11 (0.9)	15 (1.3)	33 (2.8)	4 (0.3)	32 (2.7)	129 (10.9)
5	Communication (emails, video conferencing, etc.)	15 (1.3)	16 (1.3)	30 (2.5)	6 (0.5)	42 (3.5)	0 (0.0)	41 (3.5)	150 (12.6)
6	Administrative tasks	7 (0.6)	5 (0.4)	14 (1.2)	0 (0.0)	24 (2.0)	0 (0.0)	26 (2.2)	76 (6.4)
7	Skill development and training	17 (1.4)	11 (0.9)	0 (0.0)	45 (3.8)	9 (0.8)	34 (2.9)	19 (1.6)	135 (11.4)
8	Improving subjective knowledge	4 (0.3)	14 (1.2)	4 (0.3)	9 (0.8)	31 (2.6)	8 (0.7)	24 (2.0)	94 (7.9)
9	Saving time	9 (0.8)	11 (0.9)	5 (0.4)	0 (0.0)	30 (2.5)	10 (0.8)	20 (1.7)	85 (7.2)
10	Fast access to information	3 (0.3)	7 (0.6)	7 (0.6)	0 (0.0)	7 (0.6)	4 (0.3)	6 (0.5)	34 (2.9)
11	Keeping up-to-date with current developments	0 (0.0)	6 (0.5)	7 (0.6)	0 (0.0)	13 (1.1)	4 (0.3)	0 (0.0)	30 (2.5)
12	Conducting literature search	0 (0.0)	6 (0.5)	7 (0.6)	0 (0.0)	7 (0.6)	2 (0.2)	0 (0.0)	22 (1.9)
13	Preparing assignments and seminars	0 (0.0)	4 (0.3)	5 (0.4)	0 (0.0)	5 (0.4)	5 (0.4)	0 (0.0)	19 (1.6)
14	Gathering career-related information	0 (0.0)	5 (0.4)	4 (0.3)	0 (0.0)	4 (0.3)	0 (0.0)	0 (0.0)	13 (1.1)
15	Entertainment and personal use	0 (0.0)	6 (0.5)	9 (0.8)	0 (0.0)	9 (0.8)	7 (0.6)	0 (0.0)	31 (2.6)
	Total	168 (14.2)	150 (12.6)	132 (11.1)	162 (13.7)	246 (20.7)	126 (10.6)	202 (17.0)	1186 (100.0)
Pearson Chi-Square					Value	Df		Sig. (2-sided)	
					628.601	84		0.000	

Source: Primary Data

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Table 4.4 identify the major purposes for which faculty in different departments use ICT-based resources. The majority of respondents, 150 (12.6), reported using ICT resources for communication activities such as emails and video conferencing, followed closely by academic learning, skill development, and training, with 135 (11.4) respondents. Accessing e-journals and databases 129 (10.9) and research work and projects 123 (10.4) were also among the major purposes. Teaching and lecture preparation accounted for 110 (9.3), making it another important use of ICT.In terms of departments, the highest contribution came from mechanical engineering faculty with 246 (20.7), followed by IT with 202 (17.0) and CSE with 162 (13.7). This indicates that ICT use is most prevalent in these three departments.

Chi-Square Analysis for Hypothesis Testing

The chi-square test results indicate that the Pearson Chi-Square value is 628.601 with 84 degrees of freedom and a significance level of 0.000. Since the Asymptotic Significance (2-sided) value is less than 0.05, the null hypothesis is rejected in this study. This implies that there is a significant association between faculty department and the various purposes for which ICT-based resources are used.

Table 4.5: Awareness of the Types of Electronic Resources – Ranking Given by Respondents

S. No	Awareness of electronic resources	Not aware	Less Aware	Neutral	Aware	Very Aware	Total	M	SD	R
1	E-Books	194 (16.4)	297 (25.0)	283 (23.9)	179 (15.1)	233 (19.6)	1186 (100.0)	2.9663	1.35717	8
2	E-Journals and E-Magazines	182 (15.3)	117 (9.9)	225 (19.0)	297 (25.0)	365 (30.8)	1186 (100.0)	3.4604	1.40842	5
3	Online databases (e.g., IEEE, Springer, Scopus)	564 (47.6)	274 (23.1)	110 (9.3)	121 (10.2)	117 (9.9)	1186 (100.0)	2.1172	1.36091	11
4	Institutional repositories (theses, dissertations, reports)	457 (38.5)	416 (35.1)	116 (9.8)	107 (9.0)	90 (7.6)	1186 (100.0)	2.1206	1.23033	10
5	Open access resources (e.g., DOAJ)	168 (14.2)	176 (14.8)	238 (20.1)	270 (22.8)	334 (28.2)	1186 (100.0)	3.3592	1.39347	7
6	Digital archives and E-conference proceedings	173 (14.6)	105 (8.9)	83 (7.0)	90 (7.6)	735 (62.0)	1186 (100.0)	3.9351	1.53442	1
7	Audio-visual materials (video lectures, podcasts, CDs/DVDs)	287 (24.2)	429 (36.2)	112 (9.4)	164 (13.8)	194 (16.4)	1186 (100.0)	2.6197	1.40688	9
8	Library website and online services	147 (12.4)	222 (18.7)	168 (14.2)	262 (22.1)	387 (32.6)	1186 (100.0)	3.4384	1.42076	6
9	Subject gateways and portals	110 (9.3)	159 (13.4)	166 (14.0)	298 (25.1)	453 (38.2)	1186 (100.0)	3.6956	1.34231	2
10	Mobile library apps/tools	148 (12.5)	127 (10.7)	214 (18.0)	298 (25.1)	399 (33.6)	1186 (100.0)	3.5675	1.37215	4
11	Internet search engines for academic use (Google Scholar, etc.)	141 (11.9)	123 (10.4)	221 (18.6)	282 (23.8)	419 (35.3)	1186 (100.0)	3.6029	1.36686	3

Source: Primary Data:

Table 4.5 illustrated through an analysis of the theoretical literature and past research that looked into the notion of awareness of electronic resources, the usage of electronic resources was assessed using a Likert scale with a five-point scale from Not aware-1 to Very aware-5. The study also has eleven resources identified and ascertained. Based on the ranking given by respondents, the first rank with a mean value (3.9351) was Digital archives and E-conference proceedings, followed by the second rank with a mean value (3.6956) Subject gateways and portals, the third rank with a mean value (3.6029) Internet search engines for academic use, the fourth rank with a mean value (3.5675) Mobile library apps/tools, the fifth rank with a mean value (3.4604) E-Journals and E-Magazines, the sixth rank with a mean value (3.4384) Library website and online services, the seventh rank with a mean value (3.3592) Open access resources, the eighth rank with a mean value (2.9663) E-Books, the ninth rank with a mean value (2.6197) Audio-visual materials, the tenth rank with a mean value (2.1206) Institutional repositories, and the eleventh rank with a mean value (2.1172) Online databases in that order.

5. FINDINGS

- It is found that Faculty members demonstrate the highest level of awareness toward e-books and digital databases compared to other ICT-enabled library services.
- The library is the most preferred location for accessing ICT-enabled resources, indicating strong institutional dependence on library infrastructure.
- A majority of faculty members visit the library at least once a week, reflecting regular engagement with ICT-enabled services.
- ICT resources are primarily utilized for communication and academic-related activities, including research and teaching preparation.
- Most faculty members spend between one to two hours per day using ICT-enabled information resources, indicating moderate to high digital engagement.

6. CONCLUSION

The research paper entitled "Assessment of Awareness, Accessibility, and Utilization of ICT-Enabled Information Resources and Library Services among Faculty Members of Engineering Institutions in Puducherry and Karaikal" throws light on the increasing use of ICT in academic libraries. The results of the study indicate that the faculty members have a strong level of awareness of the major ICT-enabled resources, especially e-books, e-journals, digital archives, and internet search engines. However, the awareness level of advanced resources like institutional repositories and online databases is relatively low.

The results also indicate that most of the faculty members are regular visitors to the library, and weekly and daily visits are quite common. The statistical analysis establishes a significant relationship between designation, gender, and the frequency of visits to the library. The ICT-enabled resources are used for communication, learning, research, teaching preparation, and skill development. The department-wise analysis shows that the Mechanical, IT, and CSE faculty members make extensive use of ICT-enabled resources.

Though the overall usage level is satisfactory, the ineffectiveness of the orientation programs indicates the need for better awareness programs. The conclusion drawn from the study is that by improving the ICT infrastructure, training programs, promoting digital services, and providing better access to electronic resources, the academic productivity and research efficiency of engineering institutions can be largely improved.

This research aimed to know how best the Faculty Members of Engineering colleges in Puducherry and Karaikal region. The Faculty Members spend more than two hours per day in the library. The yare also satisfied about the overall performance of the library. But, they need to experiment with the latest technology in the field.

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