

Search Patterns and Information Literacy Competencies among Engineering College Faculty Members in Bengaluru City

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ABSTRACT

The present study examined the information literacy skills, competencies, and search patterns of faculty members in engineering colleges in Bengaluru City, focusing on information-source utilisation, search strategies, plagiarism awareness, and barriers to accessing print and electronic resources. A descriptive survey was conducted across 43 VTU-affiliated engineering colleges, covering five disciplines: Civil, Mechanical, Electronics and Communication, Computer Science, and Biotechnology Engineering. Data were collected through a structured questionnaire and analysed using descriptive and inferential statistics.

The findings revealed that books were the most widely used print resources (96.46%), followed by project reports (81.82%) and journals (68.21%). Among electronic resources, institutional repositories (85.42%) and consortium resources (84.56%) were the most frequently used, followed by online databases (71.57%) and standards and specifications (70.29%). Most respondents (91.15%) reported possessing the necessary skills to identify information sources. Typing specific statements (85.48%) and keywords (82.43%) were the predominant search strategies, while the use of Boolean operators (35.57%) and wildcards or truncation (25.69%) remained comparatively low. The ability to search across multiple search engines simultaneously was the most widely recognised advantage of meta-search engines (87.19%). Awareness of plagiarism was substantial, with 63.33% reporting extremely high or very high awareness. Most respondents reported no difficulties accessing print (80.96%) or electronic (77.67%) resources. However, poor Internet connectivity (62.84%) and server or system-related issues (56.28%) were the leading barriers among those experiencing difficulties with electronic resources.

The study underscores the need to strengthen advanced search skills, research ethics awareness, digital infrastructure, and library support services to promote the effective and ethical use of information resources among engineering faculty.

KEYWORDS: Information Literacy, Information Literacy Skills, Faculty Members, Engineering Colleges, Search Strategies, Plagiarism.

1. INTRODUCTION

Information literacy has become an essential competency for faculty members in the contemporary academic environment, as the effective identification, evaluation, retrieval, utilisation, and communication of information are fundamental to teaching, research, and professional development. The rapid expansion of digital information resources, electronic databases, web-based platforms, and library collections has further emphasised the need for adequate information and digital literacy skills. In higher education institutions, faculty members are expected to access, evaluate, and utilise diverse information sources, including books, journals, project reports, electronic databases, and online resources, to support their academic and research activities.

2. REVIEW OF LITERATURE

Several studies have been reviewed to provide a broader understanding of the research topic. The following studies are particularly relevant to the present investigation.

Mahadeva Prasad and Kumbar (2015) investigated information literacy skills among faculty members of polytechnic colleges in Karnataka. The data were collected through a questionnaire developed based on the ACRL standards, using a random sampling method. The findings revealed that all respondents (100%) required information, while 90.90% used basic search techniques to retrieve information. Approximately 70% of faculty members were able to identify different information sources according to their requirements, whereas only 23.01% could identify appropriate keywords for a given topic. In addition to this, Hemavathi and Ramesha (2017) examined information literacy skills among postgraduate students at Tumkur University, Karnataka, during the academic year 2015–2016. The findings indicated that only a small proportion of students sought information to remain updated on developments in their respective subjects. The study highlighted the need for library and information professionals at Tumkur University to strengthen their efforts to educate postgraduate students in the skills required to search for, locate, evaluate, and use information ethically, which are essential for their academic pursuits.

Ramamurthy et al. (2015) investigated information literacy knowledge and search skills among students in five selected engineering colleges in Chittoor District, Andhra Pradesh. The findings revealed that a considerable proportion of respondents had limited knowledge of information literacy skills and faced difficulties in identifying diverse information sources. The information literacy programmes conducted in the institutions lacked adequate hands-on training. Similarly, Hemamalini and Umesh (2020) examined information literacy competencies among undergraduate students in Mysore City. The study focused on students' abilities to access information, identify different information resources, and understand search strategies. The authors also investigated the difficulties encountered by students in accessing information and their preferred modes of information access. Further, Thirumagal and Mani (2016) investigated information literacy skills among faculty members of engineering colleges in Tirunelveli District, Tamil Nadu. The findings revealed that most faculty members required academic information and relied on the Internet and web-based resources to fulfil their information needs. Keywords and Boolean operators were among the search strategies employed to retrieve relevant information.

3. OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To assess the information literacy skills and competencies of faculty members of engineering colleges in Bengaluru City.
2. To identify the types of information sources frequently used by faculty members of engineering colleges in Bengaluru City.
3. To assess the skill level of faculty members in identifying different information sources.
4. To identify the information-search strategies adopted by faculty members for accessing information resources.
5. To examine the perceived benefits of meta-search engines among faculty members.
6. To assess the level of awareness of plagiarism among faculty members.
7. To identify the difficulties encountered by faculty members while accessing print and electronic information resources.

4. METHODOLOGY

The present study adopted a descriptive survey research design to examine the information literacy skills and competencies of faculty members in selected engineering colleges in Bengaluru City. A structured questionnaire was developed in accordance with the objectives of the study. The study covered Civil, Mechanical, Electronics and Communication, Computer Science and Biotechnology Engineering branches. Convenience sampling was adopted based on the accessibility and willingness of faculty members to participate. At the time of the study, there were 43 VTU-affiliated engineering colleges in Bengaluru City. All these 43 colleges were selected for the investigation. A total of 1,948 questionnaires were distributed, of which 1,639 valid responses were received, yielding a response rate of 84.13 percent. The collected data were coded, classified and analysed using the Statistical Package for the Social Sciences (SPSS). The findings were presented using tables, charts and figures to facilitate systematic interpretation. Descriptive statistics included frequency, percentage, mean, standard deviation, weighted mean, coefficient of variation and ranking. Chi-square test and Cramer's V were employed for inferential.

5. DATA ANALYSIS

The data was collected by different methods, it was analyzed, interpreted and the same is presented in the following tables.

Table 1 Designation wise Distribution of Faculty Members

Designation	Branches of Engineering					Total (n=1639)
	Civil (n=251)	Mechanical (n=338)	Ele. & Com. (n=464)	Comp. Sci. (n=542)	Biotech. (n=44)	
Assistant Professor	167 (66.53)	206 (60.95)	262 (56.47)	335 (61.81)	28 (63.64)	998 (60.89)
Associate Professor	46 (18.33)	78 (23.08)	130 (28.02)	122 (22.51)	11 (25.00)	387 (23.61)

Professor	38 (15.14)	54 (15.98)	72 (15.52)	85 (15.68)	05 (11.36)	254 (15.50)
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Note. Figures in parentheses indicate percentage

Table 1 presents the designation-wise distribution of faculty members across the selected engineering disciplines. In all the selected branches, Assistant Professors constituted the largest proportion of respondents, ranging from 56.47 per cent to 66.53 per cent. Their representation was highest in Civil Engineering and lowest in Electronics and Communication Engineering. Associate Professors accounted for the second largest proportion, with their highest representation in Electronics and Communication Engineering (28.02%) and the lowest in Civil Engineering (18.33%). The proportion of Professors remained relatively uniform across most branches, varying between 11.36 per cent and 15.98 per cent. The overall distribution indicates that Assistant Professors formed the major share of the study sample in all the selected engineering disciplines, reflecting the prevailing faculty composition in engineering colleges and ensuring representation from different academic designations.

Table-2 Availability & Use of Information Sources in the Library

Information Sources	Civil Engg. (N=251)	Mech. Engg. (N=338)	Elect. Engg. (N=464)	Comp. Sci. Engg. (N=542)	Biotech. Engg (N=44)	Total (N=1639)	Mean	SD
Print Sources								
Books	248 (98.80)	326 (96.45)	438 (94.40)	526 (97.05)	43 (97.73)	1581 (96.46)	2.867173	1.121383
Journals	234 (93.23)	301 (89.05)	284 (61.21)	263 (48.52)	36 (81.82)	1118 (68.21)	2.611807	1.148821
Magazines	137 (54.58)	186 (55.03)	172 (37.07)	134 (24.72)	25 (56.82)	654 (39.90)	2.577982	1.141062
Reference Sources	198 (78.88)	264 (78.11)	207 (44.61)	192 (35.42)	31 (70.45)	892 (54.42)	2.544843	1.153668
News Paper	108 (43.03)	124 (36.69)	98 (21.12)	113 (20.85)	22 (50.00)	465 (28.37)	2.606452	1.213704
Bound Volume	86 (34.26)	93 (27.51)	102 (21.98)	84 (15.50)	14 (31.82)	379 (23.12)	2.596306	1.165958
Patents	163 (64.94)	172 (50.89)	143 (30.82)	202 (37.27)	27 (61.36)	707 (43.14)	2.657709	1.219343
Manual	185 (73.71)	196 (57.99)	203 (43.75)	246 (45.39)	32 (72.73)	862 (52.59)	2.703016	1.196462
Thesis /Dissertations	98 (39.04)	108 (31.95)	134 (28.88)	103 (19.00)	11 (25.00)	454 (27.70)	2.605727	1.126791
Projects Reports	206 (82.07)	301 (89.05)	344 (74.14)	451 (83.21)	39 (88.64)	1341 (81.82)	2.862789	1.128161

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$\chi^2=177.463$, df= 36, P=0.00								
Electronic Resources								
Institutional Repositories	201 (80.08)	298 (88.17)	401 (86.42)	468 (86.35)	32 (72.73)	1400 (85.42)	2.880000	1.094741
Consortium	212 (84.46)	313 (92.60)	392 (84.48)	431 (79.52)	38 (86.36)	1386 (84.56)	2.834055	1.109396
Online database	181 (72.11)	264 (78.11)	286 (61.64)	406 (74.91)	36 (81.82)	1173 (71.57)	2.873828	1.138090
Rare Books	52 (20.72)	32 (09.47)	91 (19.61)	86 (15.87)	11 (25.00)	272 (16.60)	2.897059	1.161765
Government Publication	36 (14.34)	148 (43.79)	187 (40.30)	142 (26.20)	23 (52.27)	536 (32.70)	2.940299	0.988827
Technical Report	134 (53.39)	246 (72.78)	301 (64.87)	263 (48.52)	36 (81.82)	980 (59.79)	2.817347	1.086233
Standards and Specifications	159 (63.35)	269 (79.59)	392 (84.48)	298 (54.98)	34 (77.27)	1152 (70.29)	2.808160	1.060907
Case Studies	72 (28.69)	39 (11.54)	33 (07.11)	62 (11.44)	11 (25.00)	217 (13.24)	2.543779	1.336882
Atlas /Maps	31 (12.35)	26 (07.69)	14 (03.02)	23 (04.24)	08 (18.18)	102 (06.22)	2.519608	1.333802
$\chi^2=217.783$, df= 32, P=0.00								

Note: Figures in parentheses indicate percentage and because of multiple choice options the percentage is exceeded to more than 100%.

Table 2 details the use of printed information sources in the library by faculty members across the selected engineering disciplines. Books were the most widely used source in all branches, with usage exceeding 94 per cent in each discipline. Project reports were also extensively used, particularly by Mechanical Engineering (89.05%), Biotechnology Engineering (88.64%), and Computer Science Engineering (83.21%) faculty members. Journal use was notably higher among Civil Engineering (93.23%) and Mechanical Engineering (89.05%) faculty members but considerably lower among Computer Science Engineering faculty members (48.52%). Similar disciplinary variations were evident in the use of reference sources, magazines, patents, manuals, and other printed materials.

Separate chi-square tests showed statistically significant associations between branch of engineering and the use of journals, magazines, reference sources, newspapers, bound volumes, patents, manuals, theses/dissertations, and project reports under the Bonferroni-adjusted significance criterion of $p < .005$. The strongest associations were observed for journals, $\chi^2(4, n = 1639) = 251.29$, $p < .001$, Cramer's $V = .39$, and reference sources, $\chi^2(4, n = 1639) = 238.42$, $p < .001$, Cramer's $V = .38$. Magazines ($V = .26$) and patents ($V = .25$) also showed notable disciplinary variation, while the remaining significant associations were weaker in magnitude. Although book use yielded $\chi^2(4, n = 1639) = 10.59$, $p = .031$, Cramer's $V = .08$, it did not remain significant under the Bonferroni-adjusted criterion, indicating broadly similar use of books across branches.

The use of electronic information sources in the library by faculty members across the selected engineering disciplines. Institutional repositories and consortium resources were extensively used across most branches, while online databases and standards and specifications also recorded substantial use. Technical reports were particularly common among Biotechnology and Mechanical Engineering faculty members. In contrast, rare books, case studies, and atlases/maps were comparatively less used, indicating variations in the preference for electronic information sources across disciplines.

Separate chi-square tests revealed statistically significant associations between branch of engineering and all electronic information sources except institutional repositories under the Bonferroni-adjusted significance criterion of $p < .005$. The strongest association was observed for standards and specifications, $\chi^2(4, N = 1639) = 126.38, p < .001$, Cramer's $V = .28$, followed by government publications ($V = .23$), technical reports ($V = .21$), and case studies ($V = .21$). The remaining significant associations were relatively weak, suggesting that the extent of disciplinary variation differed according to the type of electronic information source.

Table 3 Skills and Competencies in Identifying Information Sources

Response	Branches of Engineering					Total (N=1639)
	Civil (n=251)	Mechanical (n=338)	Ele. & Com. (n=464)	Comp. Sci. (n=542)	Biotech. (n=44)	
Yes	218 (86.85)	296 (87.57)	424 (91.38)	518 (95.57)	38 (86.36)	1494 (91.15)
No	33 (13.15)	42 (12.43)	40 (8.62)	24 (4.43)	06 (13.64)	145 (8.85)
$\chi^2=25.53, df=4, p < .001$ Cramer's $V = .12$						

Note. Figures in parentheses indicate percentages. Post hoc comparisons were examined using adjusted standardized residuals (ASRs) with Bonferroni correction.

Table 3 quantifies faculty members' skills and competencies in identifying information sources across the selected engineering disciplines. A high proportion of faculty members in all branches reported possessing the required skills and competencies, with the highest proportion in Computer Science Engineering (95.57%), followed by Electronics and Communication Engineering (91.38%). Comparatively lower, though still substantial, proportions were observed in Biotechnology (86.36%), Civil (86.85%), and Mechanical Engineering (87.57%).

The chi-square test revealed a statistically significant association between branch of engineering and skills and competencies in identifying information sources, $\chi^2(4, N = 1639) = 25.53, p < .001$, Cramer's $V = .12$, indicating a weak association, showing that the reported skills and competencies vary significantly across engineering disciplines.

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Figure 1 Skills and Competencies in Identifying Information Sources

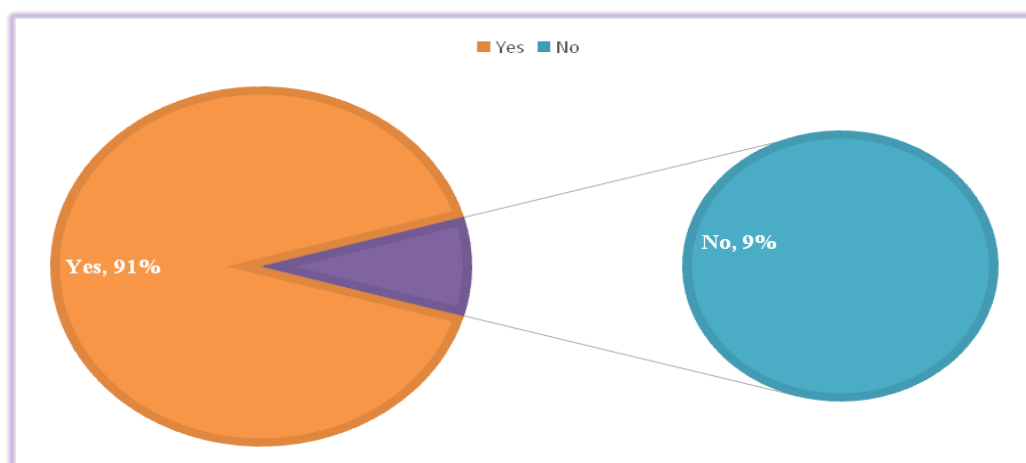


Figure 1 showcases the overall skills and competencies of engineering college faculty members in identifying information sources. A substantial majority (91%) reported possessing the required skills and competencies, while only 9% indicated otherwise. The findings suggest that most faculty members are confident in identifying appropriate information sources to support their teaching, research, and other academic activities.

Table 4 Search Strategies Used in Search Engines

Search Strategy	Civil Engg. (N=251)	Mech. Engg. (N=338)	E and C Engg. (N=464)	Comp. Sci. Engg. (N=542)	Biotech. Engg (N=44)	Total (N=1639)	Mean	SD
Type the required statement in search box	187 (74.50)	301 (89.05)	402 (86.64)	467 (86.16)	44 (100.00)	1401 (85.48)	2.914347	1.095615
Type the keywords in search box	241 (96.02)	187 (55.33)	382 (82.33)	498 (91.88)	43 (97.73)	1351 (82.43)	2.937084	1.159281
Type the keywords using Boolean operators	56 (22.31)	92 (27.22)	71 (15.30)	341 (62.92)	23 (52.27)	583 (35.57)	3.313894	1.089130
Use wildcard/ truncations	15 (05.98)	31 (09.17)	88 (18.97)	282 (52.03)	05 (11.36)	421 (25.69)	3.548694	0.795253
Don't Know	17 (06.77)	11 (03.25)	14 (03.02)	06 (01.11)	02 (04.55)	50 (03.05)	2.300000	1.170470
$\chi^2=327.094$, $df=16$, $P= 0.000$.								

Note. Figures in parentheses indicate percentage and because of multiple choice options the percentage is exceeded to more than 100%.

The information pertaining to the search strategies adopted by faculty members for retrieving information through search engines is summarized in Table 4. The findings reveal that typing the required statement in the search box was the most frequently adopted search strategy, reported by 1,401 (85.48%) respondents, with a mean score of 2.914 (SD = 1.096). This was closely followed by typing keywords in the search box, preferred by 1,351 (82.43%) respondents (Mean = 2.937, SD = 1.159). A comparatively smaller proportion of respondents reported using Boolean operators (583; 35.57%, Mean = 3.314, SD = 1.089) and wildcards/truncation techniques (421; 25.69%, Mean = 3.549, SD = 0.795) to refine their searches. Only 50 (3.05%) respondents indicated that they were unaware of the search strategy they employed while retrieving information through search engines (Mean = 2.300, SD = 1.170). These findings suggest that faculty members predominantly rely on basic search techniques, while the use of advanced search strategies remains comparatively limited.

A discipline-wise analysis further indicates that typing keywords in the search box was the most preferred search strategy among respondents from Civil Engineering (241; 96.02%) and Computer Science Engineering (498; 91.88%). In contrast, respondents from Mechanical Engineering (301; 89.05%), Electronics and Communication Engineering (402; 86.64%), and Biotechnology Engineering (44; 100.00%) predominantly preferred typing the required statement in the search box. These findings demonstrate that simple keyword-based and natural language search strategies are widely practiced across all engineering disciplines, whereas advanced search techniques are used by a relatively smaller proportion of respondents.

The results of the Chi-square (χ^2) test, conducted with 16 degrees of freedom at the 5% level of significance, revealed a statistically significant association between the search strategies used for retrieving information through search engines and the respondents' disciplines ($\chi^2 = 327.094$, $p < 0.001$). Therefore, it is indicating that the search strategies adopted for retrieving information through search engines are significantly associated with the respondents' disciplines.

Table 5 Benefits of Using Meta Search Engines

Benefits	Civil Engg. (N=251)	Mech. Engg. (N=338)	E and C Engg. (N=464)	Comp. Sci. Engg. (N=542)	Biotech. Engg. (N=44)	Total (N=1639)	Mean	SD
Launch a search simultaneously in many search engines	198 (78.88)	293 (86.69)	409 (88.15)	511 (94.28)	18 (40.91)	1429 (87.19)	2.900630	1.075814
Execute a search in all the existing websites	112 (44.62)	321 (94.97)	398 (85.78)	414 (76.38)	34 (77.27)	1279 (78.04)	2.950743	1.014322
Extend the search into foreign language website	54 (21.51)	103 (30.47)	76 (16.38)	136 (25.09)	21 (47.73)	390 (23.79)	2.915385	1.172558

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Execute the search in all databases available in the library	26 (10.36)	39 (11.54)	41 (08.84)	86 (15.87)	11 (25.00)	203 (12.39)	3.083744	1.156639
$\chi^2=79.612$, $df=12$, $P= 0.000$.								

Note. Figures in parentheses indicate percentage and because of multiple choice options the percentage is exceeded to more than 100%.

The information relating to the benefits of using meta search engines as perceived by faculty members is summarized in Table 5. The findings reveal that the most widely recognized benefit of using a meta search engine was the ability to launch a search simultaneously across multiple search engines, reported by 1,429 (87.19%) respondents, with a mean score of 2.901 (SD = 1.076). This was followed by the ability to search across all existing websites, as indicated by 1,279 (78.04%) respondents (Mean = 2.951, SD = 1.014). A comparatively smaller proportion of respondents perceived that meta search engines enabled them to extend searches to foreign-language websites (390; 23.79%, Mean = 2.915, SD = 1.173) and to search across all databases available in the library (203; 12.39%, Mean = 3.084, SD = 1.157). These findings indicate that respondents primarily valued meta search engines for their ability to broaden web-based information retrieval across multiple search platforms.

A discipline-wise analysis further indicates that the benefit of simultaneously searching multiple search engines was most frequently reported by respondents from Computer Science Engineering (511; 94.28%), followed by Electronics and Communication Engineering (409; 88.15%) and Civil Engineering (198; 78.88%). In contrast, respondents from Mechanical Engineering (321; 94.97%) and Biotechnology Engineering (34; 77.27%) predominantly perceived the ability to search across all existing websites as the principal benefit of using meta search engines. These findings suggest that although respondents across all engineering disciplines acknowledged the advantages of meta search engines, the perceived primary benefit varied slightly among the disciplines.

The results of the Chi-square (χ^2) test, conducted with 12 degrees of freedom at the 5% level of significance, revealed a statistically significant association between the perceived benefits of using meta search engines and the respondents' disciplines ($\chi^2 = 79.612$, $p < 0.001$). Therefore, it is indicating that the perceived benefits of using meta search engines are significantly associated with the respondents' disciplines.

Table 6 Level of Awareness of Plagiarism

Level of Awareness	Civil Engg. (N=236)	Mech. Engg. (N=318)	E and C Engg. (N=450)	Comp. Sci. Engg. (N=536)	Biotech. Engg. (N=42)	Total (N=1582)	Mean	SD
Extremely	102 (43.22)	81 (25.47)	106 (23.55)	250 (46.64)	19 (45.23)	558 (35.27)	3.005376	1.208530
Very Aware	28 (11.86)	87 (27.35)	195 (43.33)	118 (22.01)	16 (38.09)	444 (28.06)	3.015766	0.926207
Moderately	56 (23.72)	109 (34.27)	106 (23.55)	157 (29.29)	05 (11.90)	433 (27.37)	2.875289	1.078089

slightly aware of plagiarism	50 (21.18)	41 (12.89)	43 (09.55)	11 (02.05)	02 (04.76)	147 (09.29)	2.142857	1.016865
$\chi^2=204.265$, $df=12$, $P= 0.000$.								

Note. Figures in parentheses indicate percentage

The information relating to the level of awareness of plagiarism among faculty members is presented in Table 6. The findings reveal that 558 (35.27%) respondents were extremely aware of plagiarism, recording a mean score of 3.005 (SD = 1.209). This was followed by 444 (28.06%) respondents who reported being very aware (Mean = 3.016, SD = 0.926) and 433 (27.37%) who indicated that they were moderately aware of plagiarism (Mean = 2.875, SD = 1.078). A comparatively smaller proportion of respondents (147; 9.29%) reported being slightly aware of plagiarism, with a mean score of 2.143 (SD = 1.017). These findings indicate that the majority of faculty members possess a high level of awareness regarding plagiarism.

A discipline-wise analysis further indicates that respondents from Civil Engineering (102; 43.22%), Computer Science Engineering (250; 46.64%), and Biotechnology Engineering (19; 45.23%) predominantly reported being extremely aware of plagiarism. In contrast, respondents from Electronics and Communication Engineering were more likely to report being very aware (195; 43.33%), while Mechanical Engineering respondents predominantly indicated that they were moderately aware (109; 34.27%). These findings suggest that although a high level of plagiarism awareness exists across all engineering disciplines, the degree of awareness varies among the different branches.

Figure 2 Level of Awareness of Plagiarism

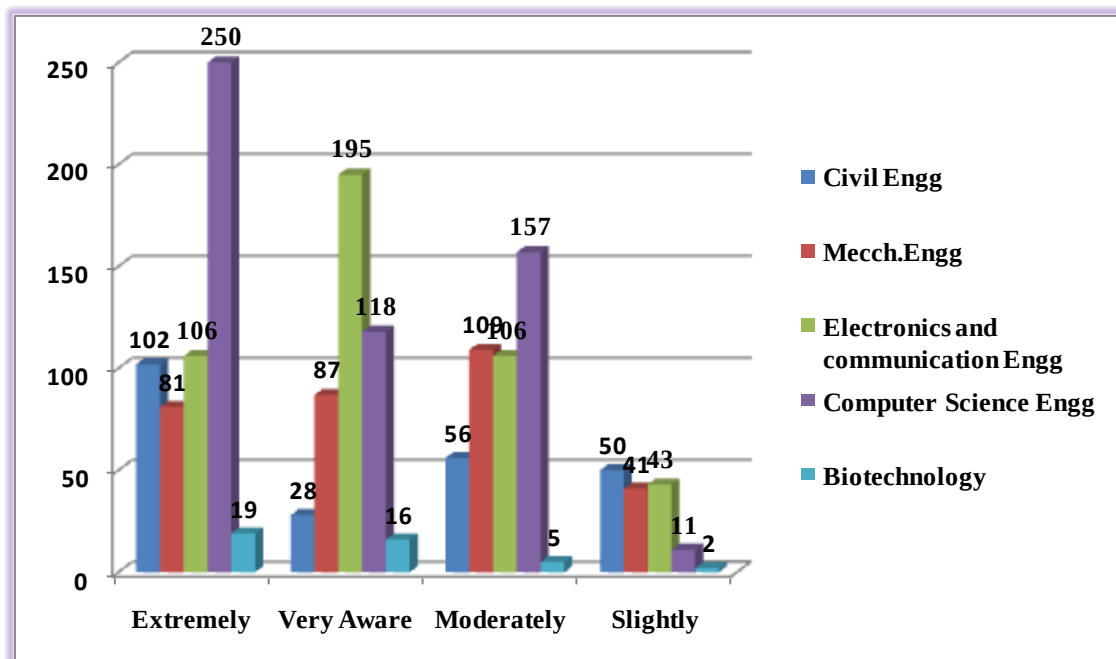


Figure 2 depicts the level of awareness about plagiarism among respondents across different engineering disciplines. The figure reveals variations in awareness levels among the five disciplines, with the majority of respondents demonstrating either an extremely high or very high level of awareness.

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Among the respondents who reported being extremely aware, Computer Science Engineering recorded the highest number (250), followed by Electronics and Communication Engineering (106), Civil Engineering (102), Mechanical Engineering (81), and Biotechnology Engineering (19). In the very aware category, Electronics and Communication Engineering had the highest number of respondents (195), followed by Computer Science Engineering (118), Mechanical Engineering (87), Civil Engineering (28), and Biotechnology Engineering (16).

Table 7 Difficulties Faced in Accessing Required Information from Print Sources

Problems Faced	Printed Sources							
	Civil Engg. (N=251)	Mech. Engg. (N=338)	E and C Engg. (N=464)	Comp. Sci. Engg. (N=542)	Biotech. Engg (N=44)	Total (N=1639)	Mean	SD
Yes	52 (20.72)	79 (23.37)	101 (21.77)	59 (10.89)	21 (47.73)	312 (19.04)	2.737179	1.144172
No	199 (79.28)	259 (76.63)	363 (78.23)	483 (89.11)	23 (52.27)	1327 (80.96)	2.903542	1.104097
$\chi^2=53.692$, $df=04$, $P=0.000$								
Types of Problems Faced	Civil Engg. (N=52)	Mech. Engg. (N=79)	E&C Engg. (N=101)	Comp. Sci. Engg. (N=59)	Biotech. Engg (N=21)	Total (N=312)	Mean	SD
Lack of knowledge about use of library catalogue	21 (40.38)	26 (32.91)	32 (31.68)	22 (37.28)	11 (52.38)	112 (35.89)	2.785714	1.235115
Lack of Knowledge about use of OPAC/Web-OPAC	39 (75.00)	35 (44.30)	21 (20.79)	07 (11.86)	05 (23.80)	107 (34.29)	2.102804	1.110145
Lack of knowledge about arrangement of books on shelves in library	10 (19.23)	12 (15.18)	19 (18.81)	14 (23.72)	03 (14.28)	58 (18.58)	2.793103	1.141062
Lack of Assistance from library	23 (44.23)	33 (41.77)	25 (24.75)	46 (77.96)	17 (80.95)	144 (46.15)	3.006944	1.288283

staff								
$\chi^2=47.124$, $df=12$, $P=0.000$								

Note. Figures in parentheses indicate percentage and because of multiple choice options the percentage is exceeded to more than 100%.

The information gathered regarding the difficulties faced by members of faculty while accessing the required information from print sources is shown in Table 7. The findings reveal that 312 (19.04%) members of faculty reported that they faced difficulties in accessing the required information from print sources, with a mean score of 2.74 and a standard deviation of 1.44. In contrast, 1,327 (80.96%) members of faculty indicated that they did not face any difficulties in accessing the required information from print sources, with a mean score of 2.90 and a standard deviation of 1.10.

Table 7 further shows the branch-wise distribution of responses. Among the respondents, 52 (20.72%) faculty members from Civil Engineering, 79 (23.37%) from Mechanical Engineering, 101 (21.77%) from Electronics and Communication Engineering, 59 (10.89%) from Computer Science Engineering, and 21 (47.73%) from Biotechnology Engineering reported that they faced difficulties in accessing the required information from print sources. On the other hand, 199 (79.28%) faculty members from Civil Engineering, 259 (76.63%) from Mechanical Engineering, 363 (78.23%) from Electronics and Communication Engineering, 483 (89.11%) from Computer Science Engineering, and 23 (52.27%) from Biotechnology Engineering stated that they did not encounter any difficulties while accessing the required information from print sources.

The findings indicate that a substantial majority of faculty members across all branches were able to access the required information from print sources without difficulty. However, Biotechnology Engineering faculty reported the highest proportion of difficulties (47.73%) compared to the other engineering branches, whereas Computer Science Engineering faculty reported the lowest proportion (10.89%).

Table 8 Problems Faced in Accessing Online Electronic Resources

Problems Faced	Electronic Sources							
	Civil Engg. (N=251)	Mech. Engg. (N=338)	E and C Engg. (N=464)	Comp. Sci. Engg. (N=542)	Biotech. Engg. (N=44)	Total (N=1639)	Mean	SD
Yes	80 (31.87)	86 (25.44)	101 (21.77)	70 (12.92)	29 (65.91)	366 (22.33)	2.677596	1.230261
No	171 (68.13)	252 (74.56)	363 (78.23)	472 (87.08)	15 (34.09)	1273 (77.67)	2.927730	1.071428
$\chi^2=91.031$, $df=4$, $P=0.000$								
Types of Problems	Civil Engg. (N=80)	Mech. Engg. (N=86)	E&C Engg. (N=101)	Comp. Sci. Engg. (N=70)	Biotech. Engg. (N=29)	Total (N=366)	Mean	SD
Poor	35	51	75	52	17	230	2.847826	1.152830

Search Patterns and Information Literacy Competencies among Engineering College Faculty Members in Bengaluru City

connectivity (Low bandwidth)	(43.75)	(59.30)	(74.25)	(74.28)	(58.62)	(62.84)		
Retrieval of irrelevant/ junk information	39 (48.75)	45 (52.32)	36 (35.64)	27 (38.57)	09 (31.03)	156 (42.62)	2.500000	1.200961
Server down or system problem	37 (46.25)	33 (38.37)	74 (73.26)	51 (72.28)	11 (37.93)	206 (56.28)	2.834951	1.145672
Change in URL	11 (13.75)	27 (31.39)	56 (55.44)	37 (52.85)	06 (20.68)	137 (37.43)	3.000000	0.981582
Change of the content/ information	27 (33.75)	14 (16.27)	26 (25.74)	19 (27.14)	05 (17.24)	91 (24.86)	2.571429	1.259189
Non availability of latest software	32 (40.00)	21 (24.41)	43 (42.57)	08 (11.42)	09 (31.03)	113 (30.87)	2.477876	1.198061
Unfamiliarity with Search Methods	19 (23.75)	11 (12.79)	09 (08.91)	02 (02.85)	08 (27.58)	49 (13.38)	2.367347	1.438450
Lack of assistance from library staff	27 (33.75)	35 (40.69)	26 (25.74)	49 (70.00)	19 (65.51)	156 (42.62)	2.987179	1.310643
Lack of IT knowledge to effectively utilize the service/ e-resources	22 (27.50)	20 (23.25)	39 (38.61)	05 (07.14)	11 (37.90)	97 (26.50)	2.618557	1.213696

$\chi^2=126.477, df=32, P=0.000$

Note. Figures in parentheses indicate percentage and because of multiple choice options the percentage is exceeded to more than 100%.

The information gathered regarding the problems faced by members of faculty while accessing online electronic resources is presented in Table 8. The findings reveal that 366 (22.33%) faculty members reported that they faced problems while accessing online electronic resources, with a mean score of 2.68 and a standard deviation of 1.23. In contrast, 1,273 (77.67%) faculty members indicated that they did not face any problems while accessing online electronic resources, with a mean score of 2.93 and a standard deviation of 1.07.

Table 8 further presents the branch-wise distribution of responses. Among the respondents, 80 (31.87%) faculty members from Civil Engineering, 86 (25.44%) from Mechanical Engineering, 101 (21.77%) from Electronics and

Communication Engineering, 70 (12.92%) from Computer Science Engineering, and 29 (65.91%) from Biotechnology Engineering reported that they experienced problems while accessing online electronic resources. Conversely, 171 (68.13%) faculty members from Civil Engineering, 252 (74.56%) from Mechanical Engineering, 363 (78.23%) from Electronics and Communication Engineering, 472 (87.08%) from Computer Science Engineering, and 15 (34.09%) from Biotechnology Engineering reported that they did not encounter any problems while accessing online electronic resources.

Table 8 also depicts the types of problems encountered by faculty members while accessing online electronic resources. The most frequently reported problem was poor Internet connectivity, identified by 230 (62.84%) faculty members (Mean = 2.85, SD = 1.15). This was followed by server downtime or system-related problems, reported by 206 (56.28%) faculty members (Mean = 2.83, SD = 1.15). Further, 156 (42.62%) faculty members experienced problems due to the retrieval of irrelevant or junk information (Mean = 2.50, SD = 1.20), while an equal number (156, 42.62%) reported lack of assistance from library staff as a difficulty (Mean = 2.99, SD = 1.31). In addition, 137 (37.43%) faculty members indicated that changes in URLs created access problems (Mean = 3.00, SD = 0.98). Other reported difficulties included non-availability of the latest software (113, 30.87%; Mean = 2.48, SD = 1.20), lack of IT knowledge to effectively utilize e-resources (97, 26.50%; Mean = 2.62, SD = 1.21), changes in content or information (91, 24.86%; Mean = 2.57, SD = 1.26), and unfamiliarity with search methods (49, 13.38%; Mean = 2.37, SD = 1.44).

The branch-wise analysis indicates variations in the predominant problems experienced by faculty members. Among Civil Engineering faculty, 39 (48.75%) reported retrieval of irrelevant or junk information as the major problem. In contrast, 51 (59.30%) faculty members from Mechanical Engineering, 75 (74.25%) from Electronics and Communication Engineering, 52 (74.28%) from Computer Science Engineering, and 17 (58.62%) from Biotechnology Engineering identified poor Internet connectivity as the primary problem while accessing online electronic resources.

FINDINGS

The following are the findings of the study.

1. Books were the most widely used print information source, with usage exceeding 94 percent in all engineering disciplines. Project reports were also extensively used, particularly by Mechanical Engineering, Biotechnology Engineering, and Computer Science Engineering faculty members. Journal usage was highest among Civil Engineering and Mechanical Engineering faculty members but comparatively lower among Computer Science Engineering faculty members.
2. A high proportion of faculty members reported possessing the required information literacy skills and competencies to meet their information needs. The highest proportion was recorded in Computer Science Engineering (95.57%), followed by Electronics and Communication Engineering (91.38%). Although comparatively lower, substantial proportions were also observed in Biotechnology Engineering, Civil Engineering, and Mechanical Engineering.
3. Typing complete search statements (85.48%) and keywords (82.43%) into the search box were the most commonly adopted search strategies. In contrast, only 35.57 per cent used Boolean operators, 25.69 per cent

employed wildcards/truncation techniques, and 3.05 per cent reported being unaware of search strategies.

4. The most widely recognized advantage of meta search engines was their ability to search multiple search engines simultaneously, reported by 87.19 percent of respondents. This was followed by the ability to search across websites (78.04%), whereas comparatively fewer respondents recognized their usefulness for searching foreign-language websites (23.79%) and library databases (12.39%).
5. Level of awareness of plagiarism, was remarkably high among the respondents 558 (35.27%) respondents were extremely aware of plagiarism.
6. A majority of the faculty members (1,327; 80.96%) reported that they did not encounter difficulties in accessing the required information from print sources. However, 312 faculty members (19.04%) experienced difficulties, indicating that a small but significant proportion still faced challenges in locating information from printed resources.
7. Most faculty members (1,273; 77.67%) indicated that they did not encounter problems while accessing online electronic resources. Nevertheless, 366 respondents (22.33%) reported experiencing difficulties in accessing electronic information resources, suggesting the need for improving access infrastructure and user support.

SUGGESTIONS

The followings are the suggestions of the study.

1. Library budgets should not be restricted to the procurement of printed books and journals alone. Adequate financial support should also be allocated for strengthening ICT infrastructure, subscribing to high-quality electronic resources and databases, upgrading digital library services, and maintaining modern information technologies required for teaching and research.
2. The web search engines retrieve information based on the metadata. It is strongly suggested that the search engine should have content based information search facilities for effective information retrieval.
3. Libraries should transform from traditional information centers into comprehensive digital knowledge hubs by integrating ICT-enabled services, digital repositories, remote access facilities, institutional knowledge management systems, and user-centric information services to effectively support teaching, learning, research and innovation.

CONCLUSION

The study concludes that faculty members of engineering colleges in Bengaluru City possess a generally satisfactory level of information literacy skills and competencies, particularly in identifying and utilizing diverse information sources. Books emerged as the most widely used printed information source, while institutional repositories and consortium resources were the most widely used electronic resources. The findings also indicate that faculty members predominantly rely on basic search strategies, such as typing required statements and keywords, whereas the use of advanced techniques including Boolean operators and wildcard/truncation remains comparatively limited. The study further reveals a generally high level of awareness of plagiarism among faculty members. Although the majority of respondents did not encounter difficulties while accessing either print or electronic information resources, a proportion continued to face barriers. Poor Internet connectivity and server or system-related problems

were the major difficulties reported in accessing electronic resources, while lack of assistance from library staff was the prominent difficulty associated with accessing print resources.

Significant disciplinary variations were observed in information-resource utilization, information-source identification, search strategies, plagiarism awareness, perceived benefits of meta-search engines, and access-related difficulties. These variations emphasize the importance of developing need-based and discipline-sensitive information literacy initiatives. Regular hands-on training, strengthened digital infrastructure, effective library support services, and continued development of advanced information-search skills can contribute to more effective, efficient and ethical use of information resources by engineering faculty members.

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