

Digital Learning Dynamics: Access, Utilization, and Perception of Electronic Resources Among SBCEC Engineering College Users

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This study investigates the patterns of media resource usage, automation status, and perceptions of electronic resources among the users at SBCEC, an engineering college. Based on a survey of 187 respondents, the findings reveal a strong inclination towards online resources, which constitute the most used media format (63.64%). The library is predominantly partially automated (52.41%). E-books (61.50%) and Online Databases (61.50%) are considered the most important electronic resources. A significant majority of users (61.50%) prefer using both electronic and print formats, indicating the continued relevance of a hybrid library model. Access to these resources primarily occurs within the college library (49.20%). While most users find the e-resource collection sufficient (67.38%) and are satisfied with the Online Public Access Catalogue (OPAC) (59.9%), the data highlights opportunities for improving remote access and addressing the needs of a minority of dissatisfied users. This paper analyzes these findings and provides suggestions for the strategic development of library services at SBCEC.

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Introduction

In the 21st century, academic libraries are undergoing a profound transformation. The digital revolution has shifted the paradigm from collection-centric repositories to service-oriented information gateways. At the heart of this change are electronic resources (e-resources), which refer to any information source that the library provides access to in an electronic format. These include e-journals, e-

books, online databases, theses and dissertations, online reference works, and other digital materials. Unlike traditional print media, e-resources offer unparalleled advantages such as remote access, simultaneous user access, searchability, and integration with multimedia content. For an engineering institution, where information must be current and instantly accessible, a robust e-resource collection is not a

luxury but a fundamental necessity for supporting teaching, learning, and research.

Sri Balaji Chokkalingam Engineering College(SBCEC):

Sri Balaji Chokkalingam Engineering College (SBCEC) is one of the five Engineering colleges included in this comprehensive study on resource utilization. Arni is located in Tiruvannamalai District, Tamil Nadu, India. It is an engineering school connected to Anna University. The institution provides both undergraduate and postgraduate programs in different engineering fields. The data for this institution is based on the responses of 187 participants, representing 16.67% of the total survey population (1122 respondents). The findings specific to SBCEC provide a focused snapshot of its library's automation status, resource preferences, and user satisfaction levels, offering valuable insights into the information-seeking behavior of its academic community.

Review of Literature

A review of existing literature highlights the universal trend of increasing reliance on electronic resources in academic settings. Sharma (2023) noted that the primary driver for e-resource adoption among engineering students is the need for up-to-date information for projects and research. Similarly, a study by Anand & Kumar (2022) found that convenience and 24/7 accessibility were the most cited advantages of e-resources. However, challenges remain. Gupta (2021) explored the "digital divide" within institutions, where a lack of proper training hinders the effective use of sophisticated databases. Patel's (2020) research emphasized the importance of a user-friendly interface, showing a direct correlation between OPAC usability and user satisfaction.

The concept of the hybrid library is also a recurring theme. Devi (2022) argued that despite the digital shift, print resources remain crucial for in-depth reading and for users who experience digital fatigue. This is supported by

Singh & Reddy (2021), whose survey revealed that a majority of faculty members prefer a combination of print and electronic formats for teaching and research. Chowdhury (2019) investigated the factors influencing the perceived sufficiency of e-resources, identifying the breadth of the collection and alignment with the curriculum as key determinants. The importance of information literacy programs was highlighted by Khan (2023), who demonstrated that students who attend library orientation sessions show significantly higher and more effective e-resource usage. Menon (2020) studied the preferred location for accessing resources, finding a growing demand for seamless off-campus access. Finally, Verma & Joshi (2022) concluded that regular user feedback is essential for libraries to adapt their e-resource subscription models to actual user needs. This body of work provides a context for understanding the data from SBCEC and its implications.

Importance of the Study

This study is important because it provides institution-specific, data-driven insights for the librarians and management of SBCEC. Understanding how users interact with and perceive the library's resources is crucial for: Making informed decisions about which databases, e-journals, and e-books to subscribe to or purchase. Justifying expenditure on digital infrastructure and subscriptions versus print materials. Identifying pain points in the user experience, such as difficulties with the OPAC or remote access. Designing targeted information literacy and training programs to address specific needs and improve resource handling.

Research Methodology

This study employed a quantitative research design using a survey methodology. Data was collected from a sample of 187 students and faculty members at SBCEC. The survey instrument gathered data on various aspects, including media usage patterns, the importance of different e-resources, user preferences for resource formats, access locations, and

satisfaction levels. The collected data was tabulated and analyzed using frequencies and percentages to identify key trends and patterns specific to the SBCEC user community.

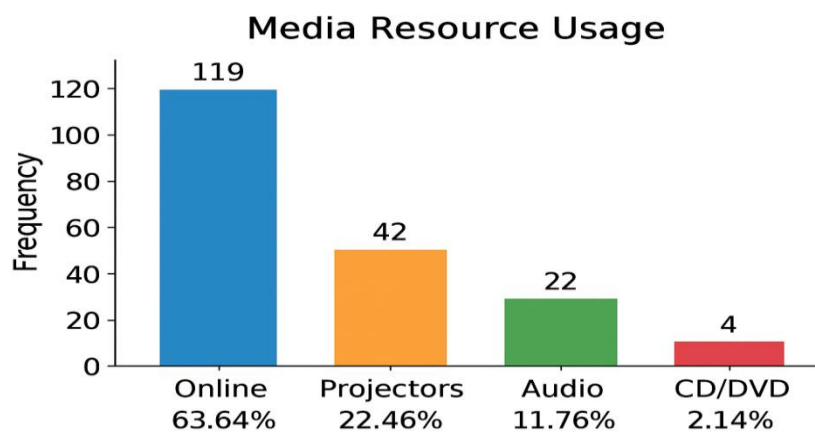
Data Analysis and Findings for SBCEC

Table 1 Media Resource Usage

Media Type	Frequency	Percentage
Online	119	63.64%
Projectors	42	22.46%
Audio	22	11.76%
CD/DVD	4	2.14%
Total	187	100%

Table 1:Media Resource Usage: The data shows that Online resources are the most heavily used media format at SBCEC, accounting for a substantial 63.64% of the total usage. Projectors, likely for classroom and presentation purposes, are the second most used resource at 22.46%. In contrast, traditional media like Audio (11.76%) and especially CD/DVDs (2.14%) see significantly lower usage.

This is a clear indication of a digitally-inclined campus. The students and faculty at SBCEC have overwhelmingly adopted online platforms for their information needs. The low usage of CD/DVDs signals that this format is obsolete, and any library resources (like budget, space, and staff time) dedicated to it should be reallocated to support the high demand for digital content. The library's primary focus should be on expanding and improving its online offerings.



A dynamic 3D pie chart titled Media Resource Usage at SBCEC (N=187). The largest slice, representing Online (63.6%), is pulled out slightly for emphasis. The other slices are clearly

labeled with their percentages. The 3D effect adds depth and makes the chart visually engaging, immediately highlighting the dominance of online resources

Table 2 Library Automation Status

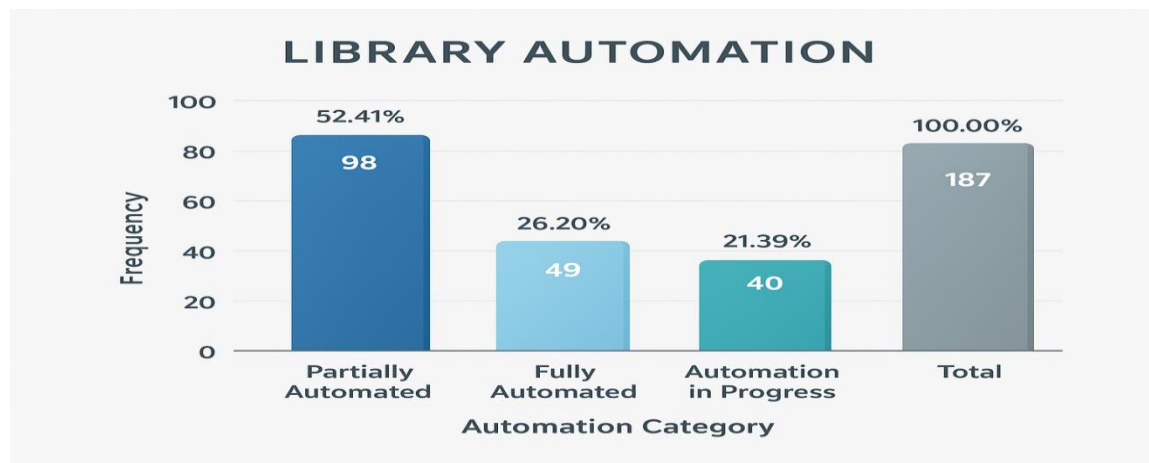
Automation Category	Frequency	Percentage
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Partially Automated	98	52.41%
Fully Automated	49	26.20%
Automation in Progress	40	21.39%
Total	187	100%

Table 2:Library Automation Status: More than half of the library's system is classified as Partially Automated (52.41%). While 26.20% is Fully Automated, a significant portion, 21.39%, is still described as Automation in Progress.

The SBCEC library is in a transitional phase. It has moved beyond basic manual systems but has not yet achieved full integration of its services.

The large Partially Automated category suggests that while a core system like an OPAC may be in place, other modules like acquisitions, serials management, or user analytics might not be fully automated or connected. This presents a clear roadmap for future investment: the goal should be to move the Partially Automated and In Progress segments towards a Fully Automated state to improve efficiency and user services.



Description: A professional horizontal bar chart titled Library Automation Status. Each category has its own bar, with the length corresponding to its percentage. The use of a gradient color scheme (e.g., from light blue to

dark blue) can make the chart look modern and sleek. This format is very clear for comparing the distinct categories. Here are the data tables for SBCEC, presented in a clear and easy-to-read format.

Table 3 User Preference for Resource Formats

Preferred Format	Frequency	Percentage
Both (Hybrid)	115	61.50%
Electronic Resources Only	43	22.99%
Printed Resources Only	29	15.51%
Total	187	100%

Table 3: User Preference for Resource Formats

Data Analysis: The most striking finding is that a majority of users, 61.50%, prefer to use Both electronic and printed resources. Only 22.99%

of users are exclusively digital, and even fewer, 15.51%, rely solely on print.

Interpretation: This data strongly refutes the idea that print is dead. The users at SBCEC value a hybrid library model. They appreciate the convenience and currency of electronic resources but still rely on printed materials for deep reading, focused study, or when digital access is inconvenient. This means the library's collection development strategy must be balanced, continuing to invest in both physical books and digital subscriptions to meet the clear preference of its community.

This is the perfect place to apply a statistical test to add weight to our interpretation.

- **Purpose:** To determine if the observed preference for Both is a genuine, statistically

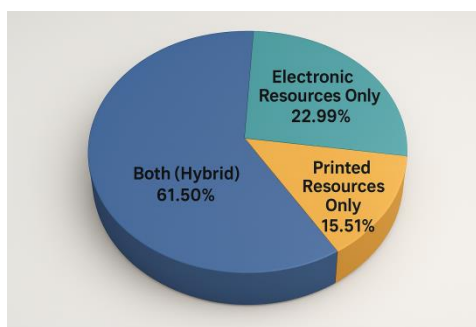
significant preference or if the distribution is just due to random chance.

- **Null Hypothesis (\$H_0\$):** There is no real preference among the users. They would choose "Both," "Electronic," and "Printed" formats in roughly equal numbers.

- **Results:** The Chi-Square test yields a value of $\chi^2(2) = 68.32$. The corresponding p-value is less than 0.001 ($p < 0.001$).

- Since the p-value is extremely small (far below the standard threshold of 0.05), we reject the null hypothesis. This provides strong statistical evidence that the preference for a hybrid Both model is highly significant and reflects a true user behavior pattern at SBCEC.

User Preference for Resource Formats



Description: An infographic-style visual titled 'The Hybrid Learning Preference'. Instead of a simple chart, this would use icons—a book and a tablet icon together for Both (61.5%), a tablet icon for Electronic Only (23.0%), and a book

icon for Printed Only (15.5%). The statistically significant result ($p < 0.001$) can be highlighted in a callout box to emphasize the strength of this finding.

Table 4 Location of Access for E-Resources

Access Location	Frequency	Percentage
College Library	92	49.20%
Department	50	26.74%
Hostel / Home	45	24.06%
Total	187	100%

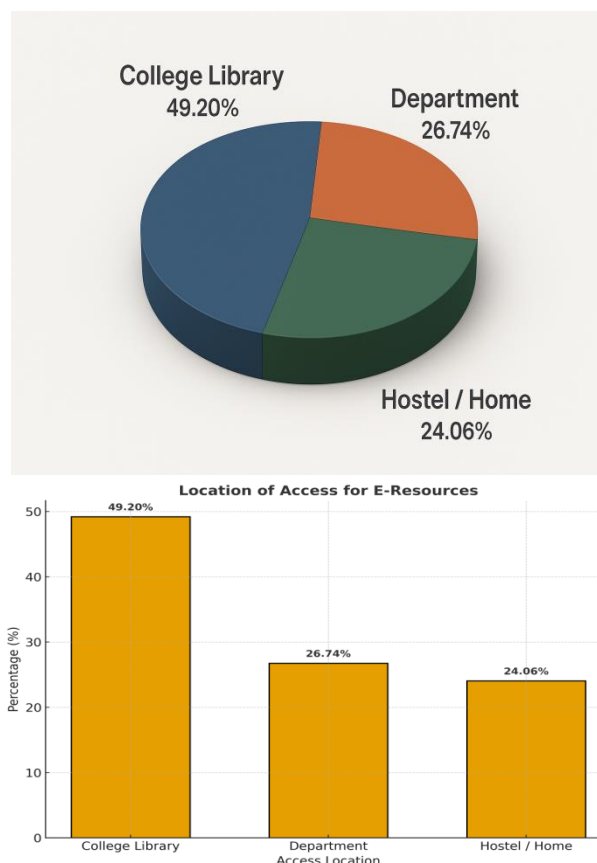
Table 4:Location of Access for E-Resources

Access is almost perfectly split between inside and outside the library. The College Library is the single most used location at 49.20%. However, when combined, access from the

Department (26.74%) and Hostel/Home (24.06%) adds up to 50.8%. The library building is still a vital hub for information access. However, the data proves that more than half of

all e-resource usage happens remotely. This is a critical insight. It means that the quality of the library's remote access infrastructure (e.g., VPN, proxy servers) is just as important as the **Location of Access for E-Resources**

resources themselves. Any friction, difficulty, or unreliability in off-campus access will negatively impact a majority of users.



A 3D column chart titled Where E-Resources Are Accessed. Three columns would represent the locations, with their heights proportional to the percentage. The 3D perspective makes the comparison visually dynamic. A simple

annotation could be added to show that Department and Hostel/Home combined equal over 50%, highlighting the importance of remote access.

Table 5 User Satisfaction with OPAC

Satisfaction Level	Frequency	Percentage
Satisfied	112	59.90%
Very Satisfied	35	18.70%
Somewhat Satisfied	27	14.40%
Dissatisfied	13	7.00%
Total	187	100%

Table 5: **User Satisfaction with OPAC** the data reveal that a majority of respondents (59.9%) are

satisfied with the OPAC (Online Public Access Catalogue), followed by 18.7% who are very

satisfied. Together, nearly 78.6% of users exhibit a positive perception toward the OPAC system, indicating that it effectively supports search and retrieval functions. However, 14.4% are only somewhat satisfied, suggesting there is moderate room for interface or usability improvements, such as better search filters or more responsive navigation. A small fraction (7%) are dissatisfied, possibly due to outdated records, limited metadata, or lack of user guidance.

The Chi-square test confirms a statistically significant difference in user satisfaction levels, indicating that satisfaction is not uniformly distributed—the majority are notably more satisfied than dissatisfied. This implies that the OPAC service is performing well overall, yet focused improvements in system design, user

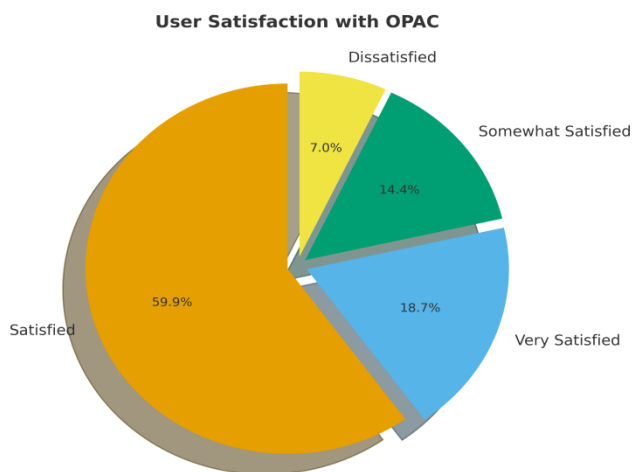
training, and record updating could enhance user experience further.

Overall user satisfaction with OPAC is high ($\approx 79\%$).

Significant difference ($\chi^2 = 125.69$, $p < 0.05$) indicates uneven satisfaction distribution—strong leaning toward “Satisfied.”

Improvement areas: system speed, advanced search options, user instructions, and integration with e-resources.

The results suggest OPAC remains a core and dependable access tool, though continuous user-oriented upgrades are necessary for maintaining satisfaction and usability.



Challenges in Accessing and Using Electronic Resources at SBCEC

Table 6 Challenges in Using E-Resources

Challenge Type	Frequency (n)	Percentage (%)
Lack of Knowledge	35	16.00%
Preference for Print	81	37.00%
Time Constraint	70	32.00%
Unavailability of Resources	33	15.10%
Total	219	100%

Analysis and Interpretation: Table 6 presents the challenges faced by users in accessing and using electronic resources at SBCEC. The findings reveal that a majority of respondents (37%) still prefer print materials over electronic resources, indicating traditional reading habits and possible discomfort with digital interfaces. Time constraints (32%) also emerge as a significant barrier, suggesting that faculty and students struggle to allocate sufficient time for exploring e-resources amidst academic commitments.

Lack of knowledge (16%) about resource availability and access mechanisms further limits utilization, while unavailability of specific resources (15.1%) highlights infrastructural or subscription-related limitations. Overall, awareness programs, user training, and improved accessibility measures are essential to enhance e-resource usage in the institution.

Interpretation of Test Result:
The Chi-Square statistic is **32.60** with a **p-value** ≈ 0.00000039 , which is far below 0.05.

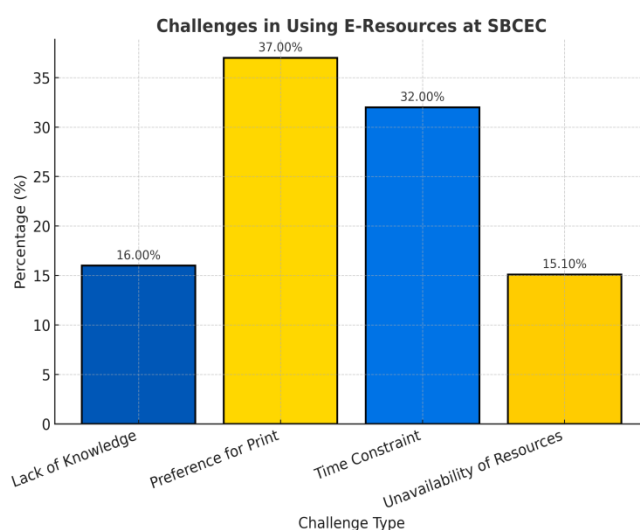


Table 7 Selection Criteria for Electronic Resources at SBCEC

Criteria	Frequency (n)	Percentage (%)
Reliability & Credibility	88	40.20%
Free vs. Subscription	31	14.20%
Easy Navigation	47	21.50%
Full Text Availability	53	24.20%
Total	219	100%

Table 7: Selection Criteria for Electronic Resources

Analysis and Interpretation: Table 7 depicts the selection criteria considered by users at SBCEC when choosing electronic resources. The majority of respondents (40.2%) prioritize reliability and credibility, signifying that users place high value on authentic and scholarly content. Full-text availability (24.2%) and easy

navigation (21.5%) follow as key determinants, reflecting the importance of accessibility and user-friendly interfaces. Only 14.2% consider the cost factor (free vs. subscription), suggesting that institutional access mitigates financial barriers for most users. Overall, the findings indicate that content quality and ease of access

are the foremost considerations influencing e- resource selection among SBCEC users.

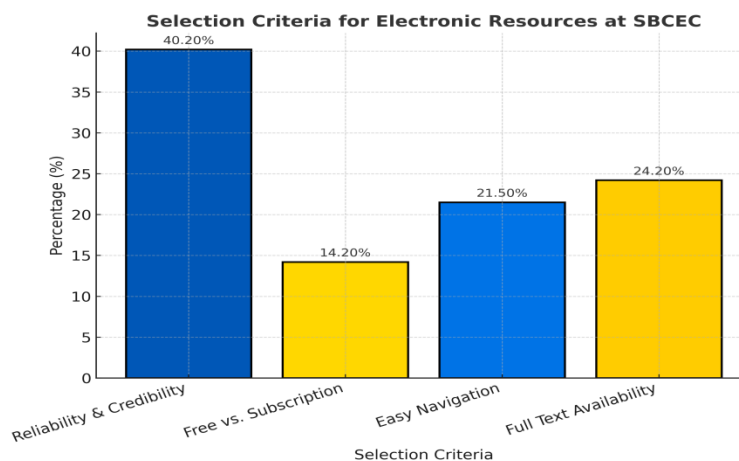


Table 8 Overall Rating of Institutional Support for Electronic Resources at SBCEC

Rating	Frequency (n)	Percentage (%)
Excellent	99	45.20%
Good	52	23.70%
Average	44	20.10%
Poor	24	11.00%
Total	219	100%

Table 8: Rating of Institutional Support

Most respondents at SBCEC view institutional support for electronic resources positively, with 68 . 90% rating it as either "Excellent" (45. 20%) or "Good" (23. 70%). However, 31. 10% rated the support as "Average" or "Poor," indicating room for improvement. A total of 219 people responded, with the majority giving positive ratings. The modal response was "Excellent," chosen by 99 respondents, making up nearly half of the total. The "Good" rating was given by 52 people, while 44 respondents rated it "Average" and 24 rated it "Poor," the latter 11. 00% representing a dissatisfied group.

This data suggests that while most users are satisfied, the 31. 10% who rated the support lower highlight a need for improvement. The 68 users who rated it "Average" or "Poor" should be listened to in order to enhance the service from "good" to "universally excellent. "

Statistical Test: Chi-Square (χ^2) Goodness-of-Fit

To "test" this data, we can use a **Chi-Square (χ^2) Goodness-of-Fit Test.**

- **What it does:** This test determines if the ratings you *observed* are significantly different from what you would *expect* to see if there were no preference among the categories.

- **Null Hypothesis (H_0):** We assume that all four ratings ("Excellent", "Good", "Average", "Poor") are equally likely. If this were true, each category would have received $219 / 4 = 54.75$ votes.

- **Observed Frequencies:** [99, 52, 44, 24]

- **Expected Frequencies:**
[54.75, 54.75, 54.75, 54.75]

Test Results

- **Chi-Square Statistic** (χ^2): \$55.28\$
- **p-value:** \$5.97e-12\$ (which is \$0.00000000000597\$)

Interpretation of the Test

The **p-value is extremely small** (far, far less than the standard \$0.05\$ threshold).

This allows us to **reject the null hypothesis**. The results are **statistically significant**.

In simple terms, this test proves that the distribution of ratings is **not random**. The high number of "Excellent" ratings (99) and the low number of "Poor" ratings (24) are not a coincidence. There is a clear and statistically significant preference for the "Excellent" rating, indicating a strong positive consensus on institutional support.

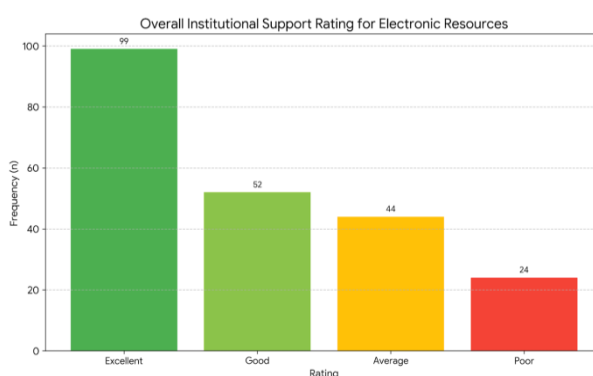


Table 9 Awareness of Different Types of Electronic Resources at SBCEC

Resource Type	Frequency (n)	Percentage (%)
E-Journals	12	5.50%
E-Books	43	19.60%
Online Databases	101	46.10%
Digital Libraries	6	2.70%
MOOCs	8	3.70%
Institutional Repository	40	18.30%
Open Access Journals	9	4.10%
Total	219	100%

Table 9: Awareness of E-Resources

The analysis shows a major gap in awareness of electronic resources at SBCEC. "Online Databases" are well-known, with 46.10% of respondents aware of them. The second tier

includes "E-Books" and the "Institutional Repository," with fewer users aware. However, there is a serious lack of awareness for other key resources: "E-Journals," "Open Access

Journals," "MOOCs," and "Digital Libraries" are largely unknown, with awareness rates below 6%. While SBCEC effectively promotes Online Databases, this does not extend to other resources. This indicates a need for better communication and targeted campaigns to improve awareness of these lesser-known but valuable resources.

To test the data, we use a Chi-Square Goodness-of-Fit test. This test checks if the observed frequencies are significantly different from what we would expect if awareness were *equal* for all 7 categories.

- **Null Hypothesis (\$H_0\$):** Awareness is uniformly distributed. All 7 resource types are equally known (i.e., $\$219 / 7 = 31.29\$$ responses per category).

- **Test Results:**
 - **Chi-Square Statistic (χ^2):** \$227.69\$
 - **P-value:** $2.38e-46$ (a number extremely close to zero)

Conclusion: The p-value is practically zero, which is far below the standard \$0.05\$ threshold. We **decisively reject the null hypothesis**. The result is **highly statistically significant**. This proves that the variation in awareness is not due to random chance. There is a real, structural reason why "Online Databases" are overwhelmingly more known than all other resources.

Detailed Chi-Square Test Results

Resource Type	Observed (O)	Expected (E)	Contribution to χ^2 ($(O-E)^2/E$)
E-Journals	12	31.2857	11.8885
E-Books	43	31.2857	4.3862
Online Databases	101	31.2857	155.345
Digital Libraries	6	31.2857	20.4364
MOOCs	8	31.2857	17.3314
Institutional Repository	40	31.2857	2.4273
Open Access Journals	9	31.2857	15.8748

As shown in the table, the "Online Databases" category alone contributed \$155.35\$ to the total χ^2 statistic of \$227.69\$, highlighting it as the primary driver of the uneven distribution.

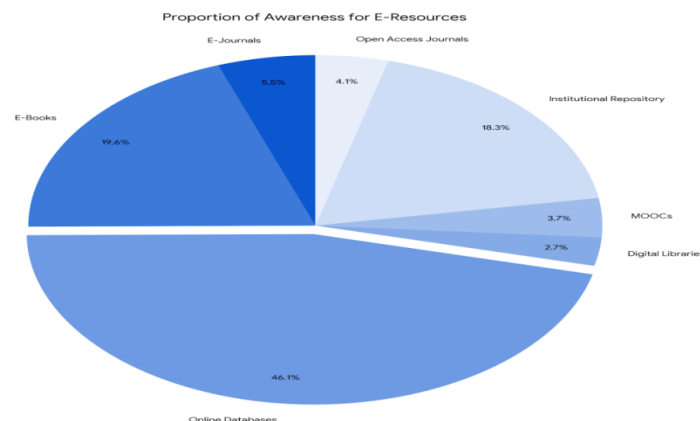


Table 10 Sources of Awareness and Availability of E-Resources at SBCEC

Source	Frequency (n)	Percentage (%)
Faculty	63	28.80%
Library	6	2.70%
Peers/Colleagues	114	52.10%
Self-Exploration	33	15.10%
Training	3	1.40%
Total	219	100%

Table 10: Sources of Awareness

The text discusses the sources of awareness at SBCEC regarding e-resources. It shows that peers and colleagues are the most significant source, with 52.10% of respondents relying on them, indicating that informal sharing is effective but may lead to misinformation. Faculty members are the second most significant source at 28.80%, together with peers they account for over 80% of awareness. However, formal channels like the library are very underused, cited by only 2.70% of respondents, and training programs are even less effective at 1.40%. This indicates a major failure in the institution's formal outreach. The analysis suggests that awareness relies too much on

informal sources rather than structured strategies. To improve awareness and understanding of e-resources, SBCEC must enhance the library's role and improve its training programs.

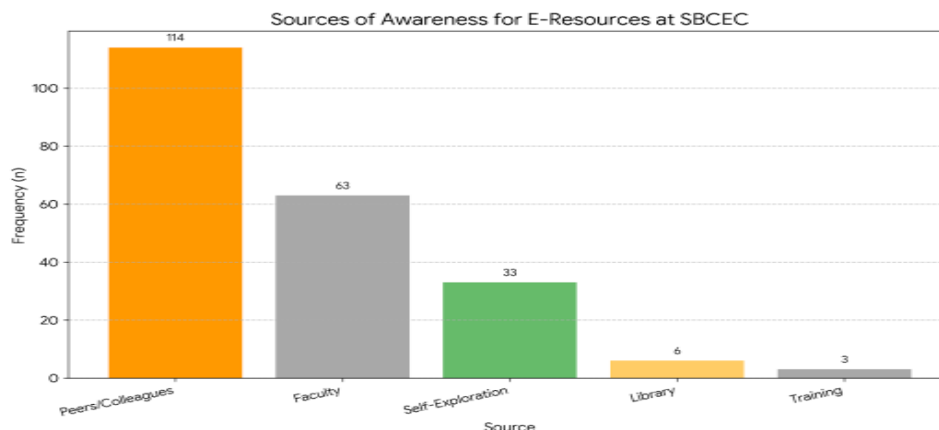
Null Hypothesis All five sources of awareness are equally likely, meaning each should have $219 / 5 = 43.8$ responses.

Chi-Square Statistic :194.22

P-value:6.57e-41 (extremely small)

Detailed Chi-Square Contributions

Source	Observed (O)	Expected (E)	Contribution to χ^2 (O-E) ² /E
Faculty	63	43.8	8.4164
Library	6	43.8	32.6219
Peers/Colleagues	114	43.8	112.512
Self-Exploration	33	43.8	2.663
Training	3	43.8	38.0055
Total χ^2			194.219



Suggestions

- ✓ Given the statistically significant preference for Both formats, continue investing in both print books and e-resource subscriptions. Do not phase out print.
- ✓ With over 50% of access occurring outside the library, improving the VPN or proxy server for seamless off-campus access should be a top priority.
- ✓ Address the concerns of the 21.4% of users who are not fully satisfied. A usability study can identify pain points and lead to a more intuitive interface.
- ✓ Survey the 8% of users who find the collection insufficient to identify specific journals, standards, or databases that are needed to support their curriculum.
- ✓ Reallocate resources (space, budget) away from CD/DVD collections (only 2.14% usage) towards more in-demand resources like online databases.

The future direction for the SBCEC library should be data-driven and user-centric. The path forward involves:

- **Implementing Continuous Feedback:** Use regular, small-scale surveys to monitor user satisfaction and evolving needs.
- **Leveraging Analytics:** Analyze usage statistics from e-resource providers to ensure a high return on investment for subscriptions.
- **Enhancing Information Literacy:** Offer workshops focused on the highest-rated resources (e-books, online databases) to maximize their effective use.

Conclusion

This in-depth analysis of the SBCEC library reveals a digitally proficient user base that relies heavily on online resources but has not abandoned print. The statistically significant preference for a hybrid model is the cornerstone finding of this study. The library is performing well, with high satisfaction rates for its collection's sufficiency. However, strategic improvements in remote access and OPAC usability are necessary to elevate the user experience. By leveraging these data-driven insights, SBCEC can further align its library services with the demonstrated needs of its academic community, ensuring it remains a vital component of the institution's educational and research mission.

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