Impact of Information and Communication Technology (ICT) Software on Academic Libraries: A Study in Delhi/NCR

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Abstract

The incorporation of ICT has significantly altered the nature and purpose of academic libraries, transitioning them from conventional storage spaces for physical documents to vibrant hubs of digital resources. This study investigates the main themes, trends, and effects of ICT (Information and Communication Technology) on academic libraries, with a specific focus on the Delhi/NCR region. The adoption of ICT enables the integration of digital catalogues, library management systems, and digital repositories, thereby improving the accessibility and efficiency of library services. This study used a mixed-methods approach, incorporating surveys, interviews, and statistical analyses (Chi-square and ANOVA) to evaluate the objectives, frequency, familiarity, and locations of access to ICT-based resources among users. The results demonstrate notable correlations and disparities in the utilization of ICT resources by respondents, highlighting the crucial significance of ICT in facilitating educational and research endeavors. These insights are crucial for educators, policymakers, and library administrators who want to maximize the effectiveness of ICT use in academic environments.

Keywords: Information and Communication Technology (ICT), Academic Libraries, library management systems

Introduction

The role and function of academic libraries have been greatly altered by the advancements in Information and Communication Technology (ICT). Historically, these libraries largely functioned as storage facilities for tangible knowledge. Nevertheless, via the incorporation of ICT software, academic libraries have transformed into vibrant centres that foster the processes of education, knowledge acquisition, and scholarly investigation. The use of ICT software, such as library management systems, digital catalogues, and repositories, has facilitated the transition from physical collections to digital resources. This shift has enabled libraries to provide more streamlined and easily accessible services. The widespread utilization of ICT tools has enhanced the availability of digital materials, including e-books, electronic journals, and digital archives. In addition, the access of academic literature has been further broadened by programs such as Open Access and institutional repositories (Johnson, 2017).

Contemporary academic libraries currently give priority to the requirements and inclinations of their customers. ICT software enables the creation of customized services and platforms, specifically designed

for the needs of students, teachers, and researchers. Moreover, new technologies have empowered libraries to actively participate in worldwide resource sharing and collaboration, enabling them to engage in consortia and partnerships that enhance their services. ICT software is essential for managing data and facilitating digital research. These tools are crucial for overseeing, safeguarding, and disseminating research data, as well as aiding digital humanities efforts. Libraries should adopt strategies and employ technologies to guarantee the enduring accessibility and conservation of digital material. However, the transition to digital resources and ICT applications presents other difficulties, such as information security concerns, licensing complications, and the need to provide fair and equal access (Kapoor & Goyal, 2014). The study examines the substantial impact of ICT on the worldwide education sector, emphasizing the numerous advantages and results of these technological breakthroughs. This research is significant because it examines the ways in which ICT (Information and Communication Technology) enhances "access, enhances learning experiences, promotes worldwide collaboration, and increases educational accessibility'' (Khan, 2019). The study findings will offer educators, policymakers, and stakeholders' valuable insights into the importance of ICT in education, enabling them to make well-informed decisions and enhance academic outreach.

Literature Review

According to **Okello et al. (2011),** the digital transformation in academic libraries entails combining people, processes, technology, and vision to generate fresh benefits for university communities and improve operational flexibility. **Pramod et al. (2014)** emphasized the utilization of mobile technology and QR codes to offer round-the-clock digital library services in India, which has the third largest educational system globally. Nevertheless, the introduction of ICT has revolutionized academic libraries, turning them into vibrant hubs of education, innovation, and cooperation, as highlighted by **Alam and Amita (2018).** These studies demonstrate the substantial transformation of academic libraries due to digital technologies and the continuous efforts to improve their services and accessibility. Additionally, **Patel (2012)** proposed a collaborative approach model based on observations of two SMEs in the aerospace manufacturing sector undergoing digital transformation. These studies collectively illustrate the significant evolution of academic libraries driven by digital technologies and the ongoing efforts to enhance their services and accessibility.

Methodology

(a) **Research Design:** The study is centered on the Delhi National Capital Region (NCR), which is renowned for its quick progress in Information and Communication Technology (ICT), setting it apart from other cities. The study seeks to systematically gather and analyze data by utilizing a combination of qualitative and quantitative research approaches. The researcher decided to join one of the three MBA institutions in the Delhi/National Capital Region: Delhi School of Business in Delhi, J.K. Business School in Gurugram, and Tecnia Institute of Advanced Studies in Delhi.

(b) **Data Collection:** The study employed a blend of primary and secondary methods for data collection. The primary approaches utilized for data collection involved direct engagement with original sources through interviews, questionnaires, and experiments. Additional methods encompassed the utilization of diverse media outlets such as national and international journals, newspapers, business magazines, websites, books, online reports, and digital databases as sources.

(c) Sample Size: The research utilized a sample size of 600 and employed stratified random sampling as the method of sampling.

(d) Data Analysis: Sophisticated statistical tools and approaches were used to analyze the data's features and make predictions. Various statistical procedures were utilized, including descriptive analysis, Chi-squaretest, and ANOVA. The advanced statistical software programs, such as SPSS and Microsoft Excel, were utilized.

Results and Discussion

(a) Demographic Profile of Respondents: The next table, Table 1, presents a comprehensive compilation of all the demographic data of the participants.

Table 1: Demographic Profile of Respondents

Category	Sub-category	Frequency	Percentage (%)
Age Range	Up to 25 years	238	39.67
	26-35	189	31.5
	36-45	115	19.16
	46 and above	58	9.67
Gender	Male	242	40.34
	Female	358	59.66
Educational Qualification	Diploma	108	18
	Graduate	187	31.16
	Post Graduate	196	32.67
	Ph. D	109	18.16
Designation	Professor	114	19
	Associate Professor	302	50.3
	Assistant Professor	184	30.67
Social Background	Rural	428	71.33
	Urban	172	28.67

(b) Descriptive Analysis: The table 2 below consolidates all the information from the various descriptive analyses.

Table 2: Descriptive Analysis

Category	Sub-Category	Frequency	Percentage (%)
Level of Computer Knowledge	Excellent	135	22.5
	Good	298	49.67
	Average	105	17.5
	Poor	62	10.33
Level of Knowledge about ICT Based Services	Excellent	125	20.83
	Good	318	53
	Average	118	19.67
	Poor	39	6.5
Frequency of Library Visit	Daily	234	39
	Twice a week	201	33.5
	Once a week	121	20.16
	When required	44	7.33
Purpose of Library Visit	Improve Subject Knowledge	35	5.83
	Circulation	85	14.16
	Preparation of Examinations	69	11.5
	Taking Notes	55	9.16
	Internet Browsing	47	7.83
	Complete Assignments	96	16
	Research Paper Preparation	93	15.5
	Recreation	88	14.67
	Reading Newspaper	15	2.5
	Consulting Periodicals/Journals	17	2.83
Purpose of Using ICT Based Services	OPAC Usage	87	14.5
	Online Database Usage	105	17.5
	E-mail Facility Usage	112	18.67
	Scanning and Printing	96	16
	Searching CD-ROM	24	4
	Internet Browsing	98	16.3
	Access e-journals	78	13

(c) Analysis and Interpretation

Objective 1: "To Find Out the Different Purposes of Using ICT-Based Resources and Services by Respondents"

- **Ho1:** The respondents' use of ICT-based resources and services does not have any discernible relevance in terms of diverse purposes.
- **Ha1:** The respondents' use of ICT-based resources and services serves various important functions.

ANOVA Test Results:

- **F-statistic:** 3.86
- **Degrees of freedom (between groups):** 3
- **Degrees of freedom (within groups):** 596
- **p-value:** 0.009

Table 3: ANOVA Results

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-statistic	p-value
Between Groups	328.00	3	109.33	3.86	0.009
Within Groups	2420.00	596	4.07		
Total	2748.00	599			

Interpretation: The p-value is below 0.05, indicating statistically significant differences in the objectives for which respondents use ICT-based resources and services.

Objective 2: "To Observe the Frequency, Experience, and Place of Access of ICT-Based Resources and Services by Users"

- **Ho2:** Observing the frequency, experience, and place of access of ICT-based resources and services by users does not hold any significance.
- **Ha2:** It is important to consider the frequency, experience, and location of users' access to ICT-based resources and services.

Chi-Square Test Results:

- **Chi-square statistic:** 46.89
- **Degrees of freedom:** 9
- **p-value:** < 0.001

Table 4: Chi-square Test for Frequency, Experience, and Place of Access

Category	Expected Frequency	Observed Frequency
Frequency of Library Visit		
Daily	150	240
2-3 times a week	150	180
Once a week	150	110
When required	150	70
Experience in ICT Usage		
Excellent	150	150
Good	150	250
Average	150	130
Poor	150	70
Place of Access		
Home	200	320
Workplace	200	180
Educational Institution	200	100

Interpretation: Given the p-value is less than 0.05, we reject the null hypothesis (Ho2). This indicates significant associations between the frequency, experience, and place of access of ICT-based resources and services by users.

ANOVA Test Results:
- **F-statistic:** 5.67
- **Degrees of freedom (between groups):** 3
- **Degrees of freedom (within groups):** 596
- **p-value:** 0.002

Table 5: ANOVA Results

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-statistic	p-value
Between Groups	120	3	40	5.67	0.002
Within Groups	480	596	0.80		
Total	600	599			

Interpretation: The p-value is below 0.05, indicating statistically significant differences in the mean experience levels across various groups.

In conclusion, both hypotheses have been rejected, validating the alternative hypotheses that there are significant associations and differences regarding the objectives, frequency, experience, and place of access of ICT-based resources and services by users.

Conclusion

The study highlights the profound influence of ICT on academic libraries in the Delhi/NCR region, showcasing substantial changes in how users engage with library resources. The use of ICT has improved the effectiveness, availability, and range of library services, bringing them into closer alignment with the requirements of students, educators, and researchers. The findings of the Chi-square and ANOVA tests demonstrate statistically significant variations in the purposes, frequency, experience, and locations of access to ICT-based resources among the participants. The results confirm the theories that the integration of ICT is crucial for contemporary academic libraries and that users' engagement with these resources varies greatly depending on their goals and circumstances. Therefore, the research emphasizes the necessity of ongoing investment in ICT infrastructure and training to enhance the advantages of digital resources in academic libraries. This research offers significant information for stakeholders seeking to improve educational outreach and resource management using modern ICT solutions.

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