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Awareness and Utilization of ICT-Based Resources among Medicals Professionals of IGIMS, Patna

Amit Kumar Sen¹, Debashish Pandit Paul², Avishek kumar³

¹Library Assistant, (Senior Technical Assistant) Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar

²Research Scholar (PhD), Faculty of Library Science, Mansarovar Global University, Sehore (M.P.) -466001.

³Librarian grade III Mahatma Gandhi Central University Bihar Indira Gandhi institute of medical sciences, Patna

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ABSTRACT

The use of Information and Communication Technology or ICT is important in reforming or modernizing medical education and the healthcare system. The present study investigates the use of ICT tools by students, faculty and researchers at Indira Gandhi Institute of Medical Sciences (IGIMS), Patna. A total of 80 people were surveyed through a structured questionnaire, of which 65 valid responses were used for the analysis. It aimed to measure ICT use, frequency of use, awareness, and specific usage in the academic-clinical setting. The Results show a high percentage of use of ICT for academic learning, research, references for clinical practice and online resources. Nonetheless, the paper reveals that there is also little familiarity with more sophisticated ICT tools from an awareness perspective, lack of experience with user education workshops, and infrastructural and accessibility issues. But, in spite of these challenges there was significant receptivity towards the use of institutional repositories, medical databases, and ICT-based education among respondents. The findings provided perspectives on ICT's increasing role in medical education and the need for digital skills to be dynamic. It also suggests better ICT training on a regular basis, a better infrastructure for ICT and awareness raising in order to make optimal use of online resources. This must be done to better use ICT in IGIMS, Patna for academic and clinical learning.

Introduction

Information and Communication Technology (ICT) is revolutionizing medical education by improving learning, scholarship, communication and clinical care. The use of

ICT in education and healthcare includes today e-learning platforms, virtual classrooms, simulations, and mobile health applications among other tools and technologies, all of which are becoming more frequently seen within academic and healthcare institutions.

*Corresponding author.

E-mail address: amitsen1410@gmail.com

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The Indira Gandhi Institute of Medical Sciences, IGIMS Patna, an institute of medical and research excellence was established in 1983 by the Government of Bihar on the lines of AIIMS. It runs programs in UG, PG and super-specialty courses alongside high end healthcare provisions. IGIMS is also an important educational and research center in the region. Central library plays a vital role in promoting digital learning and research among students, faculty and healthcare professionals by supporting academic and clinical learning with access to ICT based tools, online journals, medical databases, and national consortium resources.

The most important support for ICT in medical education has probably come from the formation of digital academic consortia, and access to specialized medical databases. Digital resources are increasingly accessible, but their use is still not effectively consistent as a result of some of the same issues at play – a lack of awareness, infrastructure limitations, insufficient training, and poor internet connectivity. It is important to know the level of digital competence and knowledge of students and faculty in IGIMS regarding the use of ICT, e-resources, databases through consortium, and medical information systems.

The present study attempts to analyze the existing state of use of ICT resources and access to online resources in IGIMS, Patna and its role in enhancing students' academic and clinical learning and the challenges in its optimal utilization. The results will serve as a pathway toward more effectively embedding digital technologies within medicine and the medical curriculum.

Review of Literature:

Anikewe et al. (2022) in their study examined the use of ICT resources for students with special needs in Enugu State. The results showed that ICTs enhance teaching and research, and made recommendations for government funding and infrastructure support. Ezekwe (2019) in his study found that this study assessed access to ICT resources among undergraduate students of Anambra State University and found a positive correlation between availability and use of resources. The challenges included inadequate facilities and poor service, with suggestions for increased funding and resources. This research assessed access to ICT tools among undergraduate students of the University of Maiduguri. It highlighted barriers such as power supply and training and recommended improved infrastructure and user training (Madu, 2018).

Ani et al. (2016) in their study identified challenges faced by postgraduate scholars in accessing ICT-based library resources in Nigeria, including cost and lack of training. Recommendations included improvements in

affordability and training. Ntui and Inyang (2015) in their study found that this study assessed the impact of ICT on the effectiveness of library personnel in Nigeria. Positive correlations were found between work performance and ICT use, with recommendations for training workshops for library staff. Agbar and Agwu (2013) in their study found that the research analysed the use of online resources by agricultural science lecturers in Benue State, Nigeria. Despite the high use of online journals and books, there were barriers such as cost and lack of subscription, highlighting the importance of access initiatives. Angelo (2010) in their study focused on livestock researchers in Tanzania, assessing their information literacy skills and access to electronic resources. The study found that many researchers lacked adequate information literacy, which negatively affected their ability to use e-resources.

Objectives of the study:

- To understand library usage in terms of frequency, purpose, and engagement by user category.
- To find out the awareness and use of ICT tools to access e-resources by library users.
- To determine ICT-based information resources and access devices of preference among the respondents.
- To examine user interest and access to repositories and databases of medical institutions.
- To explore user interest in the use of emerging (4IR) technologies such as AI, VR, AR, and Web3 within library services.

Methodology:

The present study attempts to understand the knowledge and use of ICT resources among medical practitioners at the Indira Gandhi Institute of Medical Sciences (IGIMS) Patna. Data was obtained using a structured questionnaire and a quantitative study design was employed. A well-structured questionnaire was provided to a total of 80 medical doctors, professors, researchers and post graduate students. Of these, 65 returned and completed the questionnaire representing an 81.25% response rate. It was comprised of Open and closed ended questions and elicited demographic data, frequency and purpose of ICT resource use, knowledge of various e-resources and medical databases, access to consortium services, and satisfaction with the ICT resources available at the library and institution. The process used in this study gives a broad picture of ICT resources usage by medical professionals at IGIMS which can be useful to improve the digital infrastructure, training programs and access of resources at the institution.

Analysis and interpretation of survey data

Table 01: Gender –wise respondents

Gender	No. of Respondents	Percentage
Male	30	46.15%
Female	35	53.85%
Total	65	100%

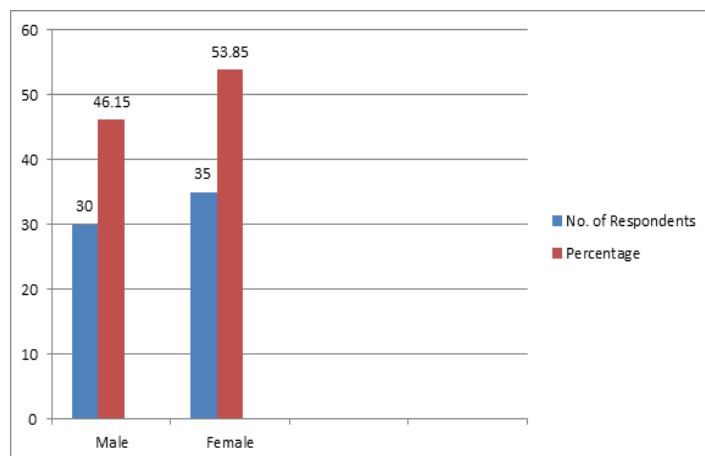
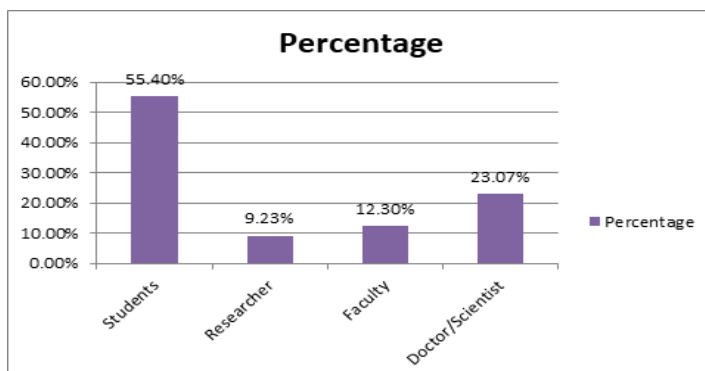


Table 01 shows the male and female distribution of users, which indicates that the total sample comprises 46.15% of males and 53.85% of female respondents. This information is representative of a general understanding of gender inclusion, relevant as it may inform expectations about patterns of use, access, or choice in a specific situation.

Table 02: Classification of users by professional

Category	No. of Respondents	Percentage
Students	36	55.40%
Researcher	06	09.23%
Faculty	08	12.30%
Doctor/Scientist	15	23.07%
Total	65	100%



As shown in Table 02, among the 65 respondents, the data indicate the following distribution: The clear majority of

them, 55.40%, are students, showing their major interest in academic resources. The second largest type is Doctors/Scientists, with 23.07% of the respondents, which implies a role of professional growth and learning, research and expert knowledge. Faculty members (12.30 %) are also a moderate proportion, presumably involved in the academic facilitation and guidance as well as institutional resources management. The category of researchers is the smaller group, at 9.23%, who perhaps could benefit from more direct outreach or support mechanisms, as they may not be as familiar with or have access to research-based tools.

Table 03: Purposes of library visit

Purposes	No. of Respondents	Percentage
Study	45	69.23%
Research work	05	07.70%
Teaching	07	10.77%
To update knowledge	08	12.30%
Total	65	100%

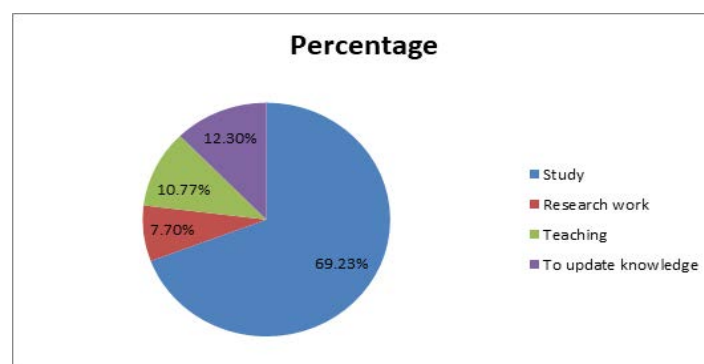


Table 03 highlights the purposes of using library on the base of 65 respondents. 45 respondents (69.23%) answered that they utilized the library for study purpose. The second most cited response, updating knowledge, came from 8 users (12.30%), which indicate that the users also use the library for personal or professional development. Teaching was the goal of 7 respondents (10.77%) indicating a supportive role for libraries in instruction endeavors as well. Research work is the least frequent reason; only 5 users (7.70%) engaged with the library for research purposes. In general the data reveals that most users perceived library's role as a place for study, while few used it for teaching, keeping up with information, or research.

Table 04: Age-wise distribution of respondents

Age -Group	No. of Respondents	Percentage
Under 20 years	04	06.15%
21-27 years	39	60.00%
28-34 years	17	26.15%
35 years & above	05	07.70%
Total	65	100%

Table 04 shows the age distribution of library users among the 65 respondents. A total of 39 users (60.00%) belong to the 21–27 years age group, which reflects that the library is mostly used by young adults, probably college and university students. Another 17 users (26.15%) fall within the 28–34 years age range. Library usage is lower among those under 20 years (6.15%) and those aged 35 years and above (7.70%), indicating limited engagement from younger students and senior professionals. In general, the findings indicate that the library is most frequently used by patrons in the 21–34 years age range (86.15%).

Table 05: Library visit frequency

Frequency	No. of Respondents	Percentage
Daily	18	27.70%
Weekly	20	30.77%
Fortnightly	15	23.07%
Monthly	09	13.85%
Whenever needed	03	04.61%
Total	65	100%

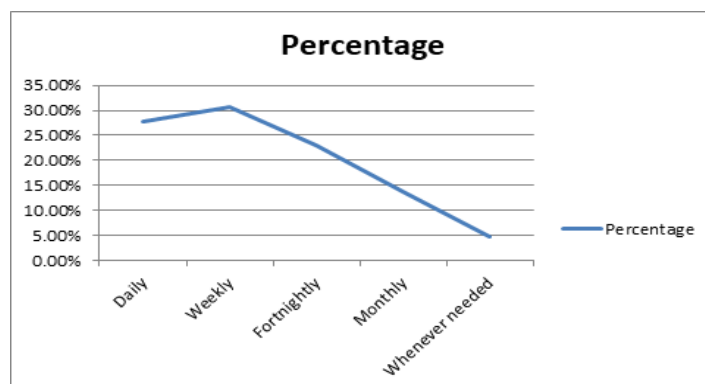


Table 05 reveals the frequency of visit the library by the medical professionals. Study demonstrates that 81.54% of the users frequent the library either daily, weekly or every two weeks, which indicates that the library plays an important role in the continuity of their academic and professional work. 09 (13.85%) users are monthly visitors, & only 03 (4.61%,) users, go to the library whenever they have to, suggestive of infrequent or specific-use purposes. Overall, this information gives us a picture that the library plays a major role in supporting continuous academic and professional work.

Table 06 User awareness on utilization of E- Resources

Awareness about ICT	No. of Respondents	Percentage
Yes	59	90.77%
No	06	09.23%
Total	65	100

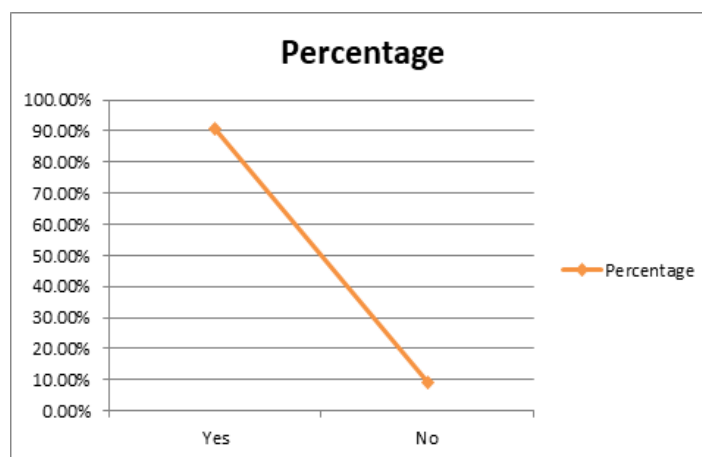


Table 06 highlights the awareness and utilization ICT based tools and techniques for accessing of e-resources in the library among the users. Majority, 59 users out of 65 (90.77%) were aware of the ICT tools thus indicating very high level of familiarity of digital technologies among the users. Only 6 users (9.23%) were unaware, indicating a minor gap of digital literacy that could probably be filled in with an orientation or training program. In briefly we can say that the data indicates that the vast majority of library users are well-informed about ICT tools, which is crucial for effectively accessing and utilizing electronic resources in modern libraries.

Table 07: Awareness on users programs

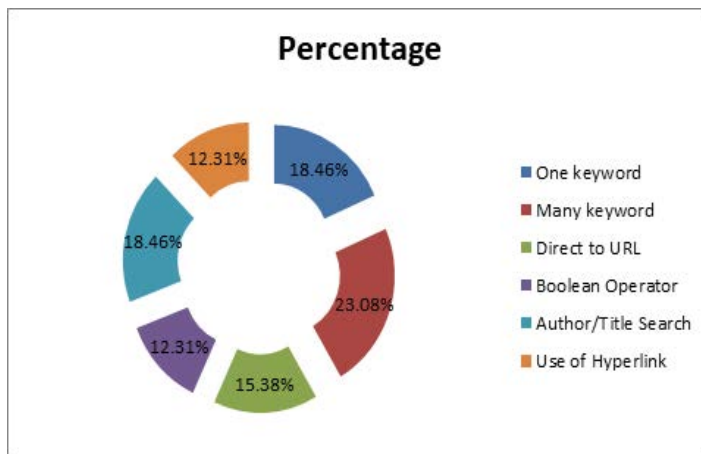
User education program	No. of Respondents	Percentage
Yes	48	73.85%
No	17	26.15%
Total	65	100

Table 07 indicates the presence of user education programs in libraries, which enable users to know the resources and services offered by the library. The majority, 48 (73.85%) of the respondents acknowledged that their library runs user education programs, which is a positive sign that libraries are institutionally committed to facilitating users to know and use the library effectively. 17 of the respondents, or 26.15% indicated that there were no such programs at their library, meaning more than a quarter of the users may not have any formal instruction on how to access library services. Overall, the study indicates that user education is a priority for the majority of libraries, a factor that could correlate with efficient use of their resources.

Table 08: Adoption of search techniques by the respondents

Search Techniques	No. of Respondents	Percentage
One keyword	12	18.46%
Many keyword	15	23.08%
Direct to URL	10	15.38%

Boolean Operator	8	12.31%
Author/Title Search	12	18.46%
Use of Hyperlink	8	12.31%
Total	65	100



As shown in table 08, among the 65 completed responses, there are different types of search methods adopted by users when accessing e- resources via ICT tools. The “Many keywords” method was the most frequent one with 15 users (23.08%), which could indicate that a considerable number of users have developed a more refined and specific search strategy. 12 respondents (18.46%) have also selected “one keyword” and “author/title search”, which also suggest basic and straightforward searching methods. “Direct to URL” is used by 10 users (15.38%), which indicates that some users are accessing e-resources by keying in web addresses that they already know, which may refer to specific databases or journals. “Boolean Operators” and “Use of Hyperlinks” were each answered by 8 participants (12.31%), indicating a slightly more sophisticated or navigational search strategy but not frequently utilized.

Table 09: Availability of Medical Institutional Repository

Availability of Medical Repository	No. of Respondents	Percentage
Yes	57	87.69%
No	08	12.31%
Total	65	100%

Table 09 shows the presence of Medical Institutional Repository in the colleges/institutes of the respondents. Of these, 57 (87.69%) indicated that their institution has a medical repository, which means that most institutions have organised electronic databases of medical documents, research papers, theses, and publications. Only 08 (12.31%) users reported that their institution does not have a repository, suggesting limited gaps in access. Overall, this indicates a strong presence of institutional repositories

in medical colleges, which implies that most colleges and institutes understand the value of preserving and providing access to digital knowledge in medicine

Table 10: Willingness for accessing any medical related Institutional Repository

Interest	No. of Respondents	Percentage
Yes	49	75.39%
No	16	24.61%
Total	65	100%

Table 10 examines respondents’ attitudes towards access to institutional repositories of medical-related materials via their library. A total of 49 (75.39%) participants would like to have such repositories, showing that medical academic resources and research materials are needed by library users. 16 users (24.61%) were not interested, perhaps due to a lack of need, knowledge, or relevance to their studies/ field of work. To summarize, the study reflect that most users show interest in medical institutional repositories and thus emphasize the need for making them accessible, easily, through library systems.

Table 11: Interested for accessing medical related databases

Interest	No. of Respondents	Percentage
Yes	43	66.15%
No	22	33.85%
Total	65	100%

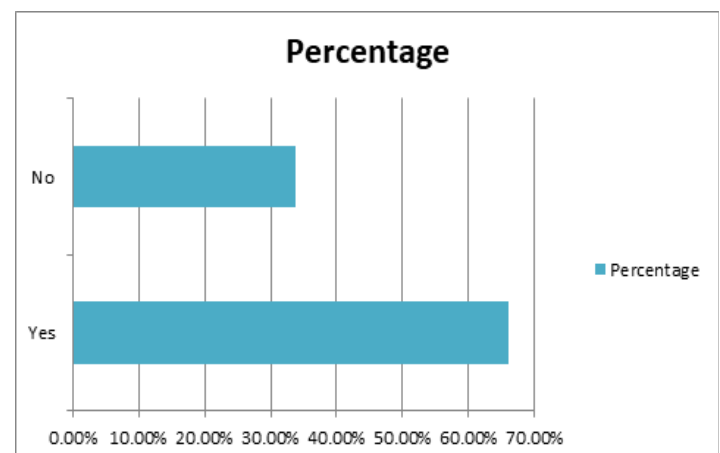


Table 11 looks at the interest of users in obtaining medical-related databases through their library. Of the total number of respondents, 43 (66.15%) would like to have access to medical databases, which demonstrates that the large majority of the users see the benefit of medical databases for study, research or career development. 22 ((33.85%) participants indicated they would not be interested, which may be attributed to being unaware, not relevant to their

field, or looking for different sources of information. In summary, there appears to be a need by users to access medical databases in the library and thus libraries should subscribe to medical databases, promote them and make them available to users to meet this need as well as to assist with research for academics and clinicians.

Table 12: Preferred ICT-based information resources by the respondents

Resources	No. of Respondents	Percentage
Online Journals	31	47.70%
Online Database	10	15.38%
E-Book	07	10.77%
Library Website	03	04.61%
Library Network	00	00%
Repositories	14	21.54%
Total	65	100%

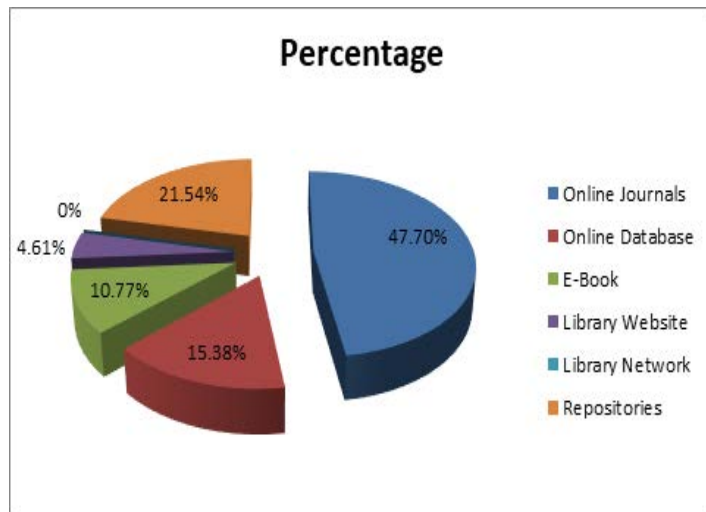


Table 12 indicates the preferences for ICT-based information resources used by users. In this regard, Online Journals emerges as the most popular ICT-based information resource, having been accessed by 47.70% (31 users). Institutional Repositories come next at 21.54% (14 users), indicating a potential interest in archived and institutional research materials. A smaller collective group is found in Online Databases users, with 15.38% (10 users) who seem to prefer more structured information of an academic nature. E-Books are used to a moderate degree by 10.77%, or 7 users. Library Website was selected by a mere 4.61% (3 users), and Library Networks were not used at all (0%), indicating less preference for these sources or informational access.

Table 13: User-preferred devices for accessing digital resources

Devices	No. of Respondents	Percentage
Laptop	39	60%
Palmtop	00	00%

Projector	00	00%
Tablet	17	26.15%
iPad	09	13.85%
CD/DVD	00	00%
Total	65	100%

Table 13 gives an overview of the particular devices that users reported using while accessing e-resources. 60% (39 users) stated they use laptops to access e-resources, the highest percentage, as they are the most convenient device for academic work. Tablets also figure among the most common devices, used by 26.15% (17 users), indicating their popularity as portable reading/browsing devices. 9 users, or 13.85%, use iPads, which suggests a fair user preference, perhaps because they are Apple users. The other tools, palmtops, projectors and CD's/ DVD's are not used at all.

Table 14: User satisfaction with ICT based library services

Satisfaction Level	No. of Respondents	Percentage
Strongly disagree	00	00
Disagree	07	10.77
Neutral	09	13.85
Agree	32	49.23
Strongly agree	17	26.15
Total	65	100

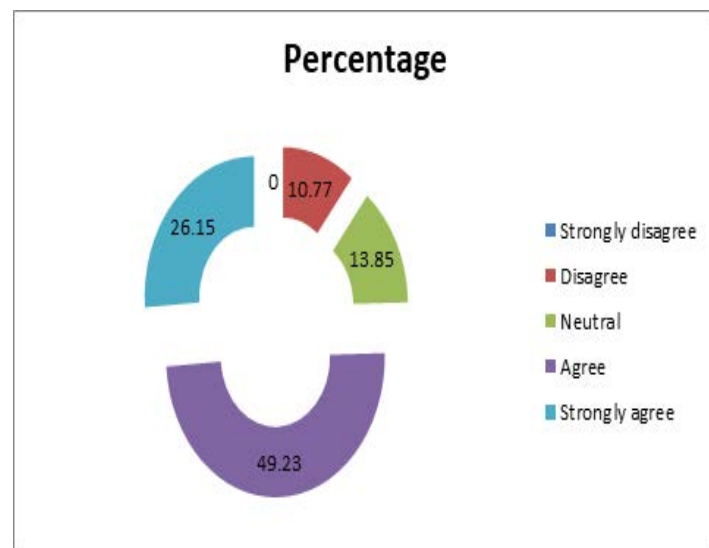


Table 14 indicates the satisfaction level of ICT-based services in the medical library. The majority, 75.38%, were satisfied, out of which 32 (49.23%) had an agreement, while 17 (26.15%) showed strong agreement. On the other hand, 09 (13.85%) were uncertain, and 07 (10.77%) were not satisfied at all, but 0% strongly disagreed. Overall, the survey responses reflect a positive view of ICT-based library services, and these scores indicate a positive view among respondents, with very little negativity.

Table 15: Adoption of Fourth Industrial Revolution (4IR) Technologies in Libraries

Services	No. of Respondents	Percentage
AI-Based Services	15	23.08%
Internet of Things	07	10.77%
Web3 Technology	08	12.30%
Robotics services	00	00%
Virtual Reality	23	35.38%
Augmented Reality	12	18.47%
Total	65	100%

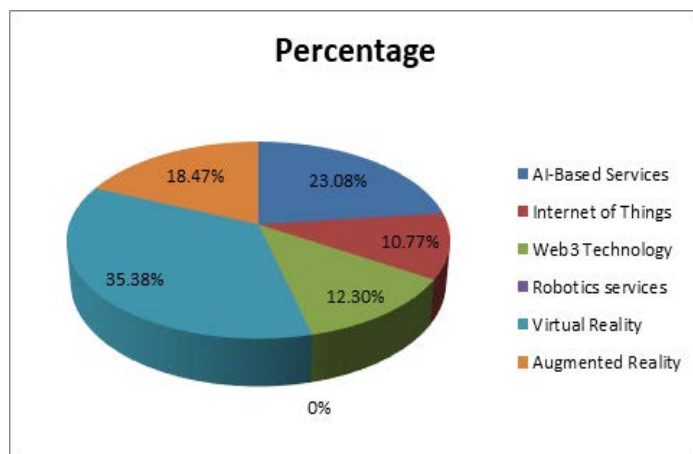


Table 15 indicates users' preferences in terms of the adoption of Fourth Industrial Revolution (4IR) technologies to improve library services. The highest percentage of preference, Virtual Reality, received 35.38%, followed by AI-based services at 23.08% and Augmented Reality at 18.47%, reflecting good interest in immersive and intelligent tools. Web3 technology, standing at 12.30%, and Internet of Things, at 10.77%, are also promising technologies, but with narrower applicability. No interest was shown in robotics services. In general, the data shows a desire for more interactive and smart technologies to enhance the library experience.

Major Findings of the study:

Among the data collected, there are some significant findings that emerge on use and perceptions of library services by the respondents.

- There is a slightly higher proportion of female respondents (53.85%) than male respondents (46.15%). It indicates that library use is balanced between both gender
- Students comprise the largest number of users at 55.40% followed by doctors/scientists at 23.07%. This shows that the library is predominantly used by academic community and people engaged in research or ongoing education.
- The major reason to use library is Studying (69.23%)

while very few had use for research (7.70%) and teaching (10.77%). This uncovers a heavy academic and examination-oriented use.

- Majority of users, 60% are in the age group of 21-27 which indicates that the library is used mainly by young adults who are in colleges and universities. When combined with the 28-34 group (26.15%), 86.15% of the users fall within the 21 to 34 years of age. A large percentage of the users (81.54%) are regular visitors to the library, which indicates the importance of library in conducting regular academic or professional work.

- Digital literacy, as an important prerequisite for being able to access e-resources, is thus evidently high, with 90.77% of users familiar with ICT tools.

- 73.85% of participants indicated that their libraries offered some type of user education initiative, a sign of commitment to library literacy at the institutional level.

- The majority of the search techniques employed are multiple keywords searches (23.08%), while basic searches of one keyword and author/title searches follow closely at 18.46% each. The low use of Boolean operators and hyperlinks, at 12.31% each, indicates a possibility for training in advanced search methods.

- There is also a strong interest in accessing academic repositories, as 75.39% stated they would like to access them, while 87.69% already had access to medical institutional repositories.

- A strong majority, 66.15%, would like to have access to medical databases, which reinforces the argument that libraries should subscribe to databases.

- The online journal, with 47.70%, is the most preferred digital resource followed by a repository with 21.54%. This indicates a strong inclination towards scholarly peer-reviewed materials.

- The most frequently used device is the laptop, with 60% of responses, while a smaller percentage indicates the use of tablets and iPads. This suggests that libraries must provide access to digital content in a mobile-friendly way.

- This shows that 75.38% of the users are satisfied with ICT based services and are happy with the technological services provided by the library.

- These included Virtual Reality at 35.38%, AI-based services at 23.08% and Augmented Reality at 18.47%. This shows an acceptance of new technologies to improve learning and research experience.

Conclusion:

The findings also emphasize the importance of Information and Communication Technology in Patna IGIMS quintessentially in medical education and research. The results show an acceptable awareness and use of ICT based facilities like e-resources, medical databases, consortia services

etc. among the students, faculty and health professionals. Nonetheless, factors such as low levels of digital literacy, lack of infrastructure, and unreliable access to high-speed internet prevent these technologies from reaching their highest potential. The study further identifies the requirement of continuous ICT training, better infrastructure, and stronger marketing of digital resources in order to allow users to become skilled and use these platforms. By harnessing the potential of digital learning and 4th industrial revolution technologies, IGIMS can provide leadership in medical teaching and research, put strengths in its student's hands in a more empowering learning environment, and enhance its stature regionally.

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