DESIDOC Journal of Library & Information Technology, Vol. 43, No. 5, September 2023, pp. 336-346 , DOI : 10.14429/djlit.43.5.18868

Assessment and Practice of Information and Research Literacy Skills Among Students in Indian Higher Education Institutions

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ABSTRACT

The study presented and focused on the process and implementation of the information and research literacy program, the level of awareness among students and research scholars, and their potential after receiving information and research literacy training. The purpose of this study is to learn more about user's information and research literacy skills when it comes to various information sources and services. The essential component of information literacy provided students with a significant amount of insight into the practical instructional methods they could use to use the information sources without difficulty. The aim of this study is to assess the level of information and research literacy among students in Indian higher education institutions and to identify areas for improvement. The study found that while students have basic knowledge of information and research literacy, they struggle with more advanced research skills such as finding, evaluating, and synthesising information. To separate the content, a list of 33 topics was used, covering the majority of topics to measure the awareness of information and research literacy skills and how to overcome their improper implementation among students and research scholars. The study highlights the need for institutions to prioritize the development of these skills through targeted training and practice opportunities.

Keywords: Information literacy; Information skills; Library instructor; Library tutorials; Research literacy

1. INTRODUCTION

Information literacy refers to the skills and knowledge required to declare the information required for a task, then locate, comprehend, evaluate, and use that information efficiently and effectively while remaining within moral and professional boundaries. Defining the target criteria can make it easier to develop several tactics suited for achieving high-essential results. The higher education institution's library system must keep an effective way of communicating with its students to fulfill its mission of providing prominent resources and services.[1] On the other hand, academic libraries must improve the quality of the services and resources they provide to continue existing in this precious environment. Information literacy programs are mainly dependent on the library's essentials. It is essential to assess and evaluate a library service and its resources from the student's perspective because university library systems have a variety of resources and distribute the services to the students based on the resources. As a result, it is very important to evaluate the service provided by the library from the student's perspective. In addition, the library must understand its students and their needs in order to provide a user-centric service. A user survey is one of the most important tools for assessing and evaluating library services. It is not possible to assess a student's dynamic needs without conducting user surveys to determine user needs and reading interests.[2]

Learning new skills, which have the biggest priority in today's information overload environment necessitated by information literacy, which is required for success in academics and the workplace. When students develop analytical, evaluative, and critical thinking abilities as part of their information literacy education, they have the opportunity to reflect on their knowledge and the learning process. Instead, information and research literacy abilities have the power to change a learning process into one that allows students to engage in self-directed, lifelong learning. In terms of developing skills, the most important thing is that skills used in many different courses or degree programs, as well as in professional settings.[3]

Received : 11 July 2022, Revised : 12 June 2023
Accepted : 07 July 2023, Online published : 26 October 2023

1.1 Why Information Literacy Become Important

Information literacy is a crucial skill in higher education because it empowers students to effectively find, evaluate, and use information in their academic and professional lives. In an age where access to information is easy, it's more important than ever to be able to differentiate between credible and unreliable sources. Possessing information literacy skills helps students make informed decisions and effectively communicate their ideas and research findings. Furthermore, information literacy is a key competency that employers look for in job candidates, making it a valuable skill to have in the current job market. By developing information literacy skills, students are better equipped to succeed in their academic and professional pursuits. UNESCO and IFLA have emphasised the development of instructional methods for information literacy adopted by various institutions worldwide by developing standards and guidelines in this regard. The foundation for lifelong learning is information literacy. The basic rules of information literacy are the same for all subjects, levels of education, and types of learners.[4]

As per the basic guidelines in academic librarianship, the instructor's conversations about information and research literacy focused on the individual's skills to effectively access and implement information, which has prompted discussion about what information and research literacy is and how it is described and practiced in education settings. On the one hand, many believe that information and research literacy should be skills- based literacy, which case it is equivalent to the information skills required to find information. According to the opposing viewpoint, information literacy is viewed as a complex phenomenon that catalysis educational growth. This represents the research and critical thinking processes that academic librarians and educators are familiar with and understand most of the time. In the same way, the literature talks about how information and research literacy taught and whether it should be a part of a discipline or a separate specialisation.[5]

1.2 Influential Role of the University Library System in Information and Research Literacy

Information and research literacy has become more important in today's scenario; it has a broader concept with many curriculum and application options. The basic concept of information literacy is to educate students on how to access library resources from different clusters. If we look back at the library's history, they always focused on the search process and provided the basic root of the information, which could be helpful to the students. The preparation of search information in the right direction has become important for libraries. Libraries care more and more about making sure that search results are organised logically.[6]

Information and research literacy programs offered by university libraries can play a vital role in helping students and faculty develop the skills they need effectively find, evaluate, and use the vast amounts of information available to them. These programs can include instruction on topics such as search strategies, database navigation, and citation management, as well as workshops and one-on-one consultations. By providing access to these resources, university libraries can help ensure that students and faculty have the knowledge and skills they need to succeed in their academic and professional pursuits.[7] To know about the student's status in the information and research literacy program, which the central library teach to the university student across the country. All the central university library systems are well equipped with their resources and services and libraries have departmental libraries as well. Usage of library services static has become high every year. The predominant mission of the university library has to be to develop a user-friendly system. They provide quality information at a quick finger-point, a lifelong learning phase with knowledge-based to excel in the teaching-learning environment. The nation's development and research contributions have become important aspects.

1.3 Impact of Technology on Information and Research Literacy

Digital literacy has evolved and has become a core competency for all learners, regardless of subject areas and age levels. The number of researchers and students who use technology is at an all-time high. Because of this, it is important to create curriculums for digital literacy that can encourage this use and help students reach their learning goals.[8] Web 2.0 and AI tools presented a new dimension in the way researchers create, review, annotate, reuse, and represent information and has led to innovations in research communication practices.[9]

Gunasekera noted that surveys are essential to validate and increase library services and usage and understand how individuals transfer information. Researchers must conduct user studies to learn how people use libraries and why, as well as to identify which groups borrow what sorts of resources and develop strategies for promoting library use amongst those groups. In the information and research literacy program, the students' unsure minds brainstormed and realised that it was significant for their academic function.[10]

2. REVIEW OF RELATED LITERATURE

The review of related literature on information and research literacy is an important step in understanding the current state of knowledge on the topic. This literature review aims to examine the existing research on information and research literacy skills among students and research scholars in higher education institutions. There are a variety of studies used to form opinions on current information and research literacy practices, and library instruction programs are available.

A recent study by Ward, K.L., *et al.*[11] assess the research literacy training, study participants in a chiropractic programme had their information literacy levels evaluated

to the clinical and medical professionals. The findings stated that the students did top on standard 3 of the ACRL (average score: 67 %) and the lowest on standard 2 (average score: 59 %), which measures one's capacity to obtain information. The study recommends the inclusion of library professionals in the teaching and orientations.

Eriksen[12] argues for a new definition of research literacy for professionals that balances practical knowledge and evidence-based practice. A craft model of professional practice to replace the art/science divide and views research literacy as a virtue that upholds the integrity of the subject of expertise. The virtue serves a set of sensibilities that enable information professionals to incorporate evidence-based research tools into practice in a cooperative and situationally aware manner.

According to a study by Hatlevik[13], *et al.* self-efficacy plays a significant effect on student motivation and learning outcomes. The study examines how ICT used to contextualise students' self-efficacy; a theoretical model was constructed and tested from the sample of fifteen countries. Information literacy proficiency clearly linked to students' ICT self-efficacy when other student traits and backgrounds taken into account.

Evans, C.[14], *et al.* explores the value of incorporating research into the classroom and the advancement of research literacy in early career teachers (ECT). The study places a strong emphasis on the need for teachers to conduct research to support their instruction and work with their students to hone their research abilities. In order to eliminate unequal learning results, the paper also emphasises the significance of encouraging a critical pedagogical approach as a component of an inclusive pedagogy. Policy, collaboration, and professional developments highlighted in the study as important variables that affect the genuine incorporation of research literacy into teaching.

Squibb & Mikkelsen[15] suggested TRAIL (Teaching Research and Information Literacy) programme at the University of California, Merced has introduced courses by way of a curriculum developed by librarians and writing faculty. Students surveyed at the end of their first semester of college about their perspectives and the consequences of adopting the curriculum into the course syllabus. The ability to learn and seek, in particular the information literacy and critical thinking skills of pupils, taken to the next higher level with the help of TRAIL project.

Tang & Chaw[16] The findings of digital literacy were examined and presented, with proper information management, critical thinking skills, and advanced online habits being highlighted as some of the most important takeaways. The quality of learning skills required for this particular work assessed by looking at four different aspects of digital literacy: the foundations, knowledge, central competencies, and mindsets and perspectives. They are all the bridge between the students and instructor.

Baykoucheva[17], *et al.* recommendations for information and research literacy teaching were laid out for a partnership between the course instructors and a head librarian (chemistry). Using a bibliographic management application, the model's IL education helps students locate scientific materials and the properties of chemical substances. Face-to-face training combined with online instructions on a LibGuides page specifically created for each course in the model. To apply the model, the chemistry librarian and course instructors worked closely together.

Coats, J.V.[18], *et al.* discuss the significance of involving community members in community-based participatory research (CBPR) and the absence of community involvement in the interpretation and dissemination of research findings. The article proposes a conceptual model for improving collaborations and partnerships between community partners and academic. It involves the creation of a public health training programme that equips local residents to work in tandem with academic researchers.

While extensive study of this topic, a decade old study also found by Tuñón[19] highlights the difficulties in preparing PhD candidates in education to use internet resources for their literature review process. The study was conducted at Nova Southeastern University's Programmes for Higher Education in both face-to-face and online formats. The study addresses the use of WebCT versus standard web pages and web board discussions, incorporating active learning, pacing and structuring delivery, catering to the needs of various learners, assessing learning outcomes, and the effect of working in collaboration with an academic programme on the design process.

3. OBJECTIVES OF THE STUDY

The main objectives of this study is to address the information and research literacy provided by university libraries in the diverse needs of student's tutorials at the university. In order to obtain the aim of this study, the university librarie's research on information literacy are to help students and faculty find, evaluate, and use information more effectively and efficiently, as well as to contribute to the field of information literacy as a whole.

- To evaluate the existing tutorials and their competencies to teach the information literacy tutorials module
- To find out how the tutorial is covering the students' needs for online information literacy.
- To determine the top ten subject-based tutorials that meet the student's needs.
- To determine the participants' degree of satisfaction with the coverage of the information literacy programme offered by the university
- To suggest ways to improve how libraries work and how well the respondents can find and use information.

4. RESEARCH METHODOLOGY

The research methodology for data collection on information and research literacy among higher education students and researchers can involve a multi-step process and a combination of qualitative and quantitative research methods. The researcher conducted a mixed-methods survey using online as well as printed questionnaire tools to select students from a larger population group across the Indian

higher education system. The population was divided into strata based on academic level, such as undergraduate (UG), postgraduate (PG), and research scholars (RS), and conducted among the students and researchers at 18 universities and 8 institutes of national importance across the country. The institution where the survey was carried-out was chosen using a set of predefined criteria to ensure a diverse sample of participants, as well as providing information, research literacy orientation, and formal sessions for their students and research scholars. The online and printed questionnaires were sent to 243 students and research scholars, and 203 questionnaires were returned or received from participants. Out of all the received questionnaires, inaccuracies were identified in the fourth questionnaire. For data analysis, all the valid 193 returned questionnaires were coded, and statistical methods were used to make sure that they were all the same. The male frequency was 104 (53.9 %), while the female frequency was 89 (46.1 %). The male presentations were high as compared to the females.

5. DATA ANALYSIS AND INTERPRETATION

The research methodology designed to provide a comprehensive and valid picture of the information and research literacy skills and practices of students and research scholars in higher education in India. The study will also look into how hard it is for users to find and get the information they need for their teaching and research. Many academic libraries offer information and research literacy tutorials, such as workshops, library orientations, LibGuides and handout to help students develop these skills and competencies.

Table 1 listed below the gender representation of data for the student category. Out of 193 respondents, 35 (18.1 %) were male undergraduates followed by 26 (13.5 %) females; postgraduate students, 49 (25.4 %) male students followed by 41 (21.2 %) females; and research scholars, 20 (10.4 %) followed by 22 (11.4 %) females.

A list of tutorials used to measure the awareness and evaluation of information and research literacy among the undergraduate, postgraduate and research scholars given in Table 2. The library tutorials examined for this study

Table 1. Demographic representation of the participants

Category of the students	Gender	N	% of total N
Undergraduate	Male	35	18.1%
	Female	26	13.5%
Postgraduate	Male	49	25.4%
	Female	41	21.2%
Research scholar	Male	20	10.4%
	Female	22	11.4%
Total	Male	104	53.9%
	Female	89	46.1%
	Total	193	100.0%

covered a wide range of skills and topic areas, but there was a lot of variation in how much attention paid to each topic among users. The information divided into 33 categories, covering most of the aspects of information and research literacy provided by the library. Although the essential information and research literacy skills and subject areas covered by the library's information literacy program and online tutorial, this study examined diverse topics in students' skill sets for awareness of information literacy in their academia. There was little consistency in how different institutions approached the subjects. The total 33 major topics created from the content and coverage listed down by topic.

Table 2 and Figure 1 shows that, most of the topics reached 50 % coverage among UG students only. Fair use policy, CRAAP Test, etc., Information life cycle, Creative Commons and Search Strategies: Proximity found to be less than below 50 %. Among PG students, most of the topics reached 50 % coverage except Fake news/ Misinformation, Search strategies: Proximity found with below 50 %. Additionally, in case of RS all the topics covered more than 50 % of the coverage.

To check the first hypotheses i.e. related to the information literacy skills and its aspects with among UG, PG and RS, we have conducted ANOVA test.[20] The below table provides information on the coverage of topics in online library tutorials, with evaluations of the topics by UG, PG, and RS participants. It shows the topic, the average score by participant group, the F-value, and the p-value. The F-value and p-value suggest whether the difference between the mean scores for each topic is significant for the different student groups.

The results from the analysis show in table 3 that the the UG, PG, and RS groups. The topics where significant differences observed include Databases search, Search strategies: Facets/limiters, Locating the resources /Access, Catalog Search/discovery, Search strategies: Keyword/ subject, Evaluation of Information, and many others. These findings suggest that there is a difference in the level of understanding and competence among the groups in these topics. It is important to note that the significance level of p-value <0.05 indicates that the observed differences are statistically significant and highly unlikely to occur by chance. This highlights the need for targeted training and support to help the groups who are not as proficient in these areas to improve their skills. On the other hand, no significant difference observed in the mean scores for the topics such as searching for Information, Searching the Web, Fake news/Misinformation, and Using archives and findings aids. This indicates that the groups have a similar level of understanding and competence in these topics, which is a positive outcome. The results of this analysis provide valuable insights into the strengths and weaknesses of the UG, PG, and RS groups in terms of their online library tutorial skills. These insights can be used to design and implement tailored training programs to help the groups improve their skills in the areas where they need more support.

Table 2. Coverage of topics in research and information literacy

Coverage of topics in online library tutorials	UG	%	PG	%	RS	%
Searching for information	54	88.52	87	96.67	37	88.10
Databases search	43	70.49	83	92.22	41	97.62
Search strategies: Facets/limiters	54	88.52	89	98.89	40	95.24
Locating the resources /access (reading call, physical layout, availability, ILL, etc.)	60	98.36	81	90.00	42	100.00
Catalog search/discovery	42	68.85	80	88.89	41	97.62
Search strategies: Keyword/subject	54	88.52	77	85.56	39	92.86
Evaluation of information	60	98.36	69	76.67	34	80.95
Citing sources	55	90.16	80	88.89	34	80.95
Search strategies: Boolean	23	37.70	87	96.67	40	95.24
Scholarly v. popular resources	56	91.80	71	78.89	42	100.00
Authority	54	88.52	81	90.00	41	97.62
Search strategies: Phrases	55	90.16	80	88.89	40	95.24
Use of citation tools	54	88.52	77	85.56	42	100.00
Orientation/ assistance	60	98.36	69	76.67	41	97.62
Gathering background context	42	68.85	80	88.89	39	92.86
Search strategies: Truncation	34	55.74	86	95.56	26	61.90
Finding peer review	44	72.13	78	86.67	29	69.05
Searching the web	54	88.52	81	90.00	31	73.81
Awareness of plagiarism	58	95.08	80	88.89	40	95.24
Defining a research topic	56	91.80	68	75.56	39	92.86
Reading citations	45	73.77	69	76.67	39	92.86
Choosing databases	52	85.25	80	88.89	38	90.48
Distinguishing primary/secondary sources	49	80.33	77	85.56	29	69.05
Understanding copyright Bias	53	86.89	65	72.22	40	95.24
Developing research questions	54	88.52	88	97.78	38	90.48
Fair use policy	26	42.62	81	90.00	37	88.10
CRAAP Test, etc.	23	37.70	80	88.89	24	57.14
Understanding peer review	37	60.66	77	85.56	40	95.24
Information life cycle	27	44.26	69	76.67	23	54.76
Creative commons	19	31.15	80	88.89	28	66.67
Fake news/ misinformation	51	83.61	44	48.89	31	73.81
Using archives and findings aids	37	60.66	65	72.22	28	66.67
Search strategies: Proximity	29	47.54	39	43.33	31	73.81

The coverage of topics in library tutorials for UG tends to be more basic and introductory, focusing on the fundamentals of library research and information literacy. On the other hand, PG and RS require more in-depth and specialised knowledge, thus the library tutorials for these groups often cover advanced topics such as database searching techniques, systematic review methods, and literature synthesis. In addition, the library tutorials for PG and RS often include modules on interdisciplinary research, information management, and publication ethics, which not typically covered in library tutorials for under-graduates. These more advanced library tutorials designed to equip post-graduates and research scholars with the necessary skills and knowledge to effectively navigate the complex information landscape and advance their research objectives. Furthermore, the level of interactivity in the library tutorials for undergrads generally lower compared to post-graduates and research scholars. This is because under-graduates tend to have limited experience with library research and information literacy, thus the tutorials designed to be more straightforward and easy to follow. On the other hand, post-graduates and research scholars have a greater level of experience and knowledge in library research, thus the tutorials for these groups often include interactive elements such as quizzes, simulations, and case studies to challenge

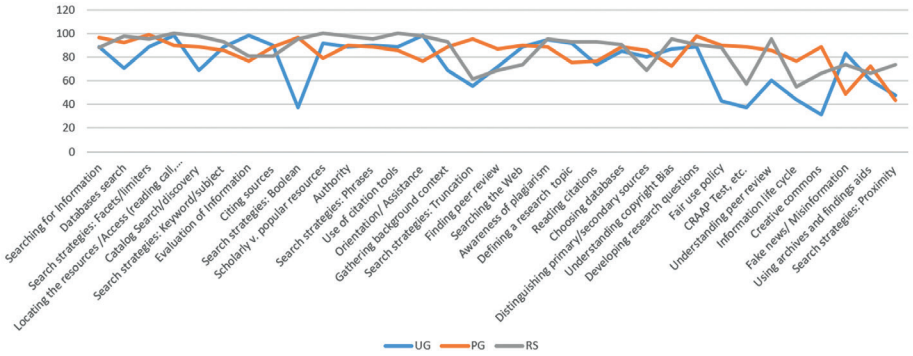

Figure 1. Coverage of topics in online research and information literacy.

Table 3. ANOVA result: Coverage of the topics in research and information literacy tutorials

S. No.	Coverage of the topics in research and information literacy tutorials	UG	PG	RS	F-Value	p-value
1	Searching for information	3.3752	2.5577	3.9874	3.3255	0.0951
2	Databases search	3.0572	3.8464	3.6581	3.9458	0.0068
3	Search strategies: Facets/limiters	3.6879	4.6305	2.5051	4.4060	0.0019
4	Locating the resources /access (reading call, physical layout, availability, ILL, etc.)	3.6875	3.0997	4.4766	3.0865	0.0086
5	Catalog search/discovery	3.3309	4.7883	2.7668	3.7935	0.0073
6	Search strategies: Keyword/subject	2.2048	3.8400	3.0610	4.6093	0.0052
7	Evaluation of information	2.7768	3.9566	4.0948	3.7929	0.0055
8	Citing sources	3.1605	2.4918	2.7114	4.9174	0.0353
9	Search strategies: Boolean	3.2601	4.2305	3.2423	3.0518	0.0054
10	Scholarly v. popular resources	3.5681	2.6025	4.4758	4.5597	0.0076
11	Authority	2.1679	3.8233	4.8444	3.8688	0.0006
12	Search strategies: Phrases	2.5101	2.2861	2.3993	4.4004	0.0008
13	Use of citation tools	3.2401	3.0976	2.5528	4.5269	0.0015
14	Orientation/ assistance	2.5994	4.8081	3.8214	4.4320	0.0090
15	Gathering background context	4.7275	3.3769	2.3074	4.9535	0.0060
16	Search strategies: Truncation	3.5804	2.6209	4.5441	4.9131	0.0004
17	Finding peer review	4.7891	3.5770	3.3083	4.9091	0.0087
18	Searching the web	2.5980	4.8617	4.4707	40.8307	0.0971
19	Awareness of plagiarism	4.8082	2.6243	2.8423	4.6301	0.0038
20	Defining a research topic	3.6610	4.4478	2.0687	3.5033	0.0062
21	Reading citations	2.0442	3.4502	2.0386	3.3430	0.0006
22	Choosing databases	4.1614	2.7282	4.4086	4.2564	0.0288
23	Distinguishing primary/secondary sources	2.3189	4.7501	3.8755	4.7313	0.0037
24	Understanding copyright Bias	3.5275	2.7633	2.5055	3.5806	0.0009
25	Developing research questions	3.5347	3.1380	2.7010	3.2418	0.0006
26	Fair use policy	2.5902	3.1500	3.7027	3.7329	0.0099
27	CRAAP Test	4.8139	2.7878	2.1257	3.3247	0.0018
28	Understanding peer review	3.1914	4.7708	3.3869	3.7182	0.0341
29	Information life cycle	4.5138	2.7418	2.9358	3.2703	0.0008
30	Creative commons	2.7857	3.3841	4.3352	3.6764	0.0294
31	Fake news/ misinformation	2.9908	2.3581	3.0353	4.2492	0.0618
32	Using archives and findings aids	3.3717	3.0926	2.0322	3.3176	0.0895
33	Search strategies: Proximity	4.5381	4.9678	2.1658	3.5930	0.0455

their existing knowledge and skills. In conclusion, the coverage of topics in library tutorials tailored to meet the specific needs and requirements of different student populations. Under-graduates receive introductory and basic instruction in library research and information literacy, while post-graduates and research scholars receive advanced training in interdisciplinary research, information management, and publication ethics. These library tutorials play a critical role in preparing students for academic success and research excellence.

The results of the Chi-Square test stated in the appendix on 33 topics in the library's tutorials. The results show that, there were no significant difference in the awareness of information literacy skills and its aspects between male and female students in regards to topics, such as searching for information, gathering background context, awareness of plagiarism, reading citations, choosing databases, distinguishing primary and secondary sources, and recognising fake news and misinformation.

The p-value for these topics is greater than 0.05, indicating that there is no significant difference in the awareness of these topics between male and female students. The results of the Chi-Square test suggest that male and female students have similar levels of awareness when it comes to information and research literacy and its aspects. This could be due to a variety of factors, including equal access to library tutorials, similar levels of engagement with the tutorials, and similar educational experiences that emphasise the importance of information literacy.[21] Additionally, it is possible that the library tutorials designed in a way that was accessible and relevant to both male and female students, thereby promoting equal levels of awareness. It is also possible that cultural and societal factors play a role in promoting information literacy skills among both male and female students, further contributing to the similarity in their levels of awareness. However, for the remaining topics, the p-value found to be less than 0.05, which shows there is a significant difference in the awareness of these topics among males and females. The differences in awareness are due to the students' experiences, their engagement with the library tutorials, or their learning styles.

Additionally, it is possible that gender-based biases or preconceptions are affecting the students' awareness of these specific topics. Further, the research conducted to determine the root causes of these differences in awareness, in order to address any potential disparities and promote equal understanding of information literacy skills and its aspects among both male and female students.

The Chi-Square hare result analysis of the data indicated in the appendix reveals the high level of dedication to the information literacy program and the difficulties of the instructor's task. Therefore, it looks like there are many ways in which teaching practices made better. Instructional goals and methods are an essential part of determining student achievement and the efficiency of an educational strategy. In light of this conclusion, the study results indicated that assessment and evaluation still carried out in a primarily advisory capacity. When there is no systematic linkage of learning outcomes with the information literacy skills instructor, the return on investment of instructional work is questionable. As a result, administrators may have trouble sustaining instructional efforts. In addition, promotion of educational possibilities still done in a much more unstructured manner, indicating that this domain has room for improvement.

This research shows that undergraduates, postgraduates, and research scholars should be the primary focus of information literacy instruction. This population of students primarily been reached through formal and informal information literacy opportunities offered by librarians. The library does make an effort to ensure that its students are familiar with information literacy. The utilisation of databases, various search tactics, general library use, and online catalogues are frequently the focal points of training. The idea reflects the required abilities, but they also constitute the central focus of learning programs. The majority of instruction is skills-based, which inculcates the high demand for information technology. The underlying ideas presented in the framework for information literacy in higher education have not been implemented as of yet. Although some students have reported topics such as usage of prominent databases, open access publishing, images, fair use, citation metrics, and bibliography, the concepts have defined using various sources.

6. OPPORTUNITIES AND STRATEGY FOR IMPROVEMENT

The evaluation of students' learning and the effectiveness of instruction done by the librarian using a wide range of strategies. However, the primary data sources for the measurement and evaluation depend primarily on students' reviews and user feedback to measure student's learning and on evaluations for feedback when determining the quality of the instruction. According to this study, academic librarians continue to have difficulty evaluating the quality of education and programs. To overcome these problems of improper implementation of an information and research literacy program in higher education, the following steps could be taken

7. CONCLUSION

Information literacy considered as a key component of high practice in academic institutions, universities, and research organisations and librarians are the principal instructors to provide information literacy. Libraries offer tutorials and other self-paced instruction materials in classrooms as well as on their websites to make information literacy instruction more accessible to students and allow them to access these tutorials in a flexible and convenient way. The variety of tutorials available likely covers a wide range of topics, and the

Upgradation of information literacy modules	• Clearly define the goals and objectives of the IL program, and align them with the overall mission of the institution. • Engage all stakeholders, including students, faculty, and librarians, in the development and implementation of the program to ensure its success. • Provide adequate resources and support for the program, including funding, staffing, technology, and training. • Develop a comprehensive and integrated curriculum that incorporates IL skills into courses across all disciplines.
Skilled librarian/instructor required to deliver information literacy sessions	• The implementation of an IL program requires a skilled and knowledgeable team, including librarians, instructional designers, and technology specialists. • The information literacy program's frequent scheduling of sessions across the cources and implement the standard modulesof Information Literacy. • Formal training needed to academia and skilled library professionalrequired to conduct the training and orientation sessions.
Smooth implementation of information literacy instruction	• Effective planning and strategy required to balance between instruction and other library responsibilities. • Proper scheduling and managing conflicts with other classes or obligations • Proper orientation and hands on training provides to use library resources or accessing information resources. • Institutions can offer flexible scheduling and instructional materials that can be easily integrated into existing coursework • Institutions can create a cross-functional team and take student wish to develop and implement information literacy programs.
Allocation of funds and infrastructure support	• Institutions can allocate a portion of their budgets specifically for information literacy initiatives. • Sufficient funding is necessary to support the development and implementation of the IL program, as well as the ongoing maintenance and improvement of the program. • Adequate technology, including hardware and software, is necessary to support the delivery of IL programs and to ensure that students have access to the information they need. • A dedicated and well-equipped space, such as a library or learning commons, needed to provide students with access to information and technology resources.
Resistance to change and coordination	• Institutions can provide professional development opportunities for faculty to help them understand the importance of information literacy and incorporate it into theircourses. • The IL program team should receive ongoing professional development to stay current with developments in the field of information literacy. • Proper coordination between different departments, libraries, and other stakeholders required to implement effective of information literacy programs. • Assessment and evaluation needed to check the effectiveness of the IL program and to make ongoing improvements. • Collaborate with other institutions and organisations to share best practices and resources.

information literacy instruction provided by the library is an effective tool for helping students develop the skills they need to find, evaluate, and use information effectively. Studies have shown that library instruction can improve student's ability to locate and use information resources, as well as their understanding of the research process. However, there are also challenges to providing information literacy instruction, such as limited resources and a lack of student engagement. To address these challenges, librarians and educators may need to explore new and innovative ways of delivering instruction, such as online tutorials and interactive workshops. Additionally, more research needed to better understanding the factors that influence student attendance and engagement in information literacy instruction, and to develop effective strategies for addressing these issues.

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She reviewed, edited, and gave an overview and constructive ideas of this research.

Appendix: I

Chi-Sq result on the coverage of the topics in research and information literacy tutorials

Variable	Gender		N^2 Value	df	p-value
	Male	Female			
Searching for information					
Yes	92	81	0.4905	1	0.06509
No	12	8			
Databases search					
Yes	87	75	0.2598	1	0.00312
No	17	14			
Search strategies: Facets/limiters					
Yes	99	83	0.4858	1	0.00090
No	5	6			
Locating the resources/access (reading call, physical layout, availability, ILL, etc.)					
Yes	98	81	0.6819	1	0.00324
No	6	8			
Catalog search/discovery					
Yes	79	66	0.8277	1	0.00166
No	25	23			
Search strategies: Keyword/subject					
Yes	67	59	0.5996	1	0.00382
No	37	30			
Evaluation of information					
Yes	57	49	0.9742	1	0.00281
No	47	40			
Citing sources					
Yes	51	46	0.6601	1	0.0008
No	53	43			
Search strategies: Boolean					
Yes	49	45	0.7651	1	0.00151
No	55	44			
Scholarly v. popular resources					
Yes	42	41	0.3579	1	0.00874
No	62	48			
Authority					
Yes	69	63	0.7139	1	0.00069
No	35	26			
Search strategies: Phrases					
Yes	47	41	0.4818	1	0.00053
No	58	48			
Use of citation tools					
Yes	39	43	0.5169	1	0.0000
No	65	46			
Orientation/ assistance					
Yes	93	76	0.4856	1	0.0026
No	11	13			
Gathering background context					
Yes	68	49	0.9152	1	0.07408
No	36	40			
Search strategies: Truncation					
Yes	39	51	0.2758	1	0.00074
No	65	38			
Finding peer review					
Yes	59	55	0.7684	1	0.00092
No	45	34			
Searching the Web					
Yes	65	56	0.3589	1	0.08430
No	39	33			
Awareness of plagiarism					
Yes	63	47	0.8562	1	0.0860
No	41	42			
Defining a research topic					
Yes	39	37	0.2809	1	0.00097
No	69	52			
Reading citations					
Yes	59	44	0.4981	1	0.0614
No	45	47			
Choosing databases					
Yes	39	26	0.6271	1	0.09171
No	65	63			
Distinguishing primary/secondary sources					
Yes	68	48	0.0386	1	0.08873
No	36	42			
Understanding copyright bias					
Yes	74	59	0.0125	1	0.0043
No	30	30			
Developing research questions					
Yes	76	59	0.9571	1	0.0021
No	28	31			
Fair use policy					
Yes	59	58	0.9304	1	0.0023
No	45	31			
CRAAP Test					
Yes	85	68	0.4349	1	0.0000
No	19	21			
Understanding peer review					
Yes	34	38	0.9277	1	0.0022
No	70	50			
Information life cycle					
Yes	85	76	0.0856	1	0.0003
No	19	13			

Creative commons					
Yes	74	43	0.8188	1	0.00401
No	30	46			
Fake news/ misinformation					
Yes	86	82	0.9691	1	0.0611
No	18	7			
Using archives and findings aids					
Yes	71	59	0.2637	1	0.0030
No	33	30			
Search strategies: Proximity					
Yes	67	62	0.0468	1	0.00030
No	37	27			