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Information Literacy Instructions in Higher Education Institutions: Enhancing Academic Success and Research Competencies among University Students in the United Arab Emirates

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ABSTRACT

The study explores the impact of Information Literacy (IL) programs on undergraduate students on their learning outcomes and performance in terms of research skills required for academic writing. The study also investigates the significant differences of learning outcomes in terms of gender, year of program and EFL/Non-EFL learners. Through systematic quantitative analysis involving 102 participants using stratified random sampling across multiple universities in the United Arab Emirates, this study seeks to validate assumptions regarding the correlation between information literacy and its significance in academic and research achievement. Findings revealed that there was moderate to higher level improvement in students' critical thinking and overall research skills, with notable advances observed in academic integrity awareness, database searching techniques and source evaluations, whereas citation practices and advanced search strategies need more improvement. Some correlations were also found between IL program usefulness and improvement in academic performance, time utilisation and citation skills. The key findings of this study will underscore the transformative potential of information literacy programs and highlight the need to customize them as per the requirements in academic libraries as learning centers and their essential role in fostering student competencies that correspond with educational and professional success. Recommendations include targeted intervention, curriculum-integrated IL workshops and adoption of citation management tools.

Keywords: Information literacy; Research skills; Critical thinking; Information overload; Lifelong learning; Academic achievement; EFL learners

1. INTRODUCTION

The world has seen unprecedented growth in terms of information resources with the development of information technology in the last two decades, and the phenomenon has been rightly termed "information explosion." This has created a complex situation and has affected the research process tremendously. Bellard[1] stated that academic librarians and various library associations have realised this and have developed a powerful tool to combat the menace of information overload while also refining the research process. This tool or program is called "information literacy" and is capable of equipping students with the necessary skills to handle the menace of information overload and make them information literate. The staggering volume of new databases available, new journal additions, monographs, media resources, and the ever-growing amount of scholarly communication worldwide has complicated the research process and even the best of subject specialists are finding it difficult to stay abreast in their chosen fields According to Tafesse[2], the influence of social media and its popularity has created a digital overload apart from just academic digital resources which is causing psychological strains, exhaustion and overall affecting the mental health and wellbeing of the student community. Zhang[3] stressed the impact of social media, which has caused information overload and has created an "information wall" that can lead to conflicts and problems related to personal development. Alheneidi & Smith[4] found that there is a negative impact of information overload on the overall well-being of students, but its effect on academic ability is still not clear.

According to Baroutian & Kensington-Miller[5], the need to learn information literacy skills is of the highest priority in today's information overload environment to be successful academically as well as professionally. The most important part of this skill acquisition is that these skill sets are highly transferable across other courses or programs of study and can also be applied in professional situations. Sohail[6], *et al*. argued that information literacy has been instrumental in providing strength to the very

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idea of academic libraries as centers of learning. The researcher is subjected to several literacies, allowing one the opportunity to use different contexts, such as information literacy, academic literacy, and scientific literacy. Furthermore, information literacy has been classified into three levels, based on competencies, namely conceptual competencies, human competencies, and practical competencies. Koltay[7], *et al*. Meena[8] & Rachman[9], *et al.* emphasised that Information literacy comes under practical competencies and is probably best known for the attention it has received from the perspective of academic libraries in the last two decades. There is specific training needed to acquire competencies and to become efficient with information literacy skills, and this can only be accomplished in a classroom teaching environment or through online formats.

1.1 Research Problem

The rapid expansion of information resources, pushed by technological improvements in the last two decades, has resulted in an "information explosion," significantly influencing the research process. The academic librarians and professional library associations have acknowledged this difficulty and established "information literacy" programs to provide students with vital skills for navigating and alleviating information overload. Information literacy nurtures analytical, evaluative, and critical thinking abilities, empowering the students to become self-sufficient and lifelong learners. These qualities and abilities are significantly transferable across academic fields and professional backgrounds, augmenting research skills and academic achievement. Information literacy is a very useful strategic educational tool to overcome the information overload problem, which aims to equip students with evaluative skills, critical thinking skills and academic writing skills required for research workflows

The perceived benefits of IL programs are acknowledged, but there are very limited and inconsistent studies that examine the actual impact on students' learning outcomes, academic performance, critical thinking skills and research proficiency. Furthermore, there is a significant gap in understanding the impact of IL programs based on learners' demographics, specifically the differential outcomes between English as a Foreign Language (EFL) and non-English as a Foreign Language (non-EFL) learners, gender, and varying years of programs. There is a need to systematically investigate the effectiveness of these IL programs in universities and evaluate their impact across varied student populations and identify the areas of gain and those requiring pedagogical intervention or reinforcement. The study has long-term implications and is significant as it seeks to address this research gap, which is critical for developing an inclusive, effective and adaptive IL program that can support lifelong learning and improve academic performance in an ever-growing, complex information ecosystem.

2. OBJECTIVES OF THE STUDY

The study intends to understand the impact of the Information Literacy program on students' academic performance, learning outcomes and research skills. The research paper will also delve into comparing the outcome of information literacy programs between EFL and non-EFL learners, as well as junior and senior students enrolled in undergraduate programs in various universities. The key objectives are outlined as follows:

- To examine the perceived influence of the Information Literacy program on student learning outcomes and academic achievement.
- To investigate the relationship between undergraduate learners of the Information Literacy program and the enhancement in their academic writing competencies.
- To assess the measurable impact of the Information Literacy program on the academic performance of the students in terms of gains in critical thinking and research proficiency.
- To evaluate and compare the effectiveness of the Information Literacy program on first-year, second year and third-year students.
- To analyze the significant difference in terms of outcomes of IL program participation across EFL and non-EFL learners.

3. LITERATURE REVIEW

According to the American Library Association[10], the most common and accepted definition of information literacy states that information literate people will be able to recognise when information is needed and can also identify, locate, evaluate, and use information to solve a particular problem. ACRL[11], The Association of College and Research Libraries (ACRL) defines information literacy as "the set of skills needed to find, retrieve, analyze, and use information". According to Snavely & Cooper[12], Information literacy can also be defined as a set of abilities that help individuals to identify when information is needed and the way to locate, evaluate, process, and use the information effectively. Information literacy programs need to actively involve learners in the process of realizing when they need information, identifying the information itself by addressing a particular issue, finding the required information, evaluating it, organising it, and using it effectively to address the problem. Information-literate people are assets to a community, as they are lifelong learners in an information society and can contribute immensely. Aadland & Heinstrom[13] highlighted that the literature available in the scholarly domain focuses on three categories and can be classified as causes, effects and coping strategies of information overload. The key causes of information overload, especially among college and high school students, are exposure to complex information in large volumes, which is passive in nature and does not connect with the end users. This has led to attention disorder and difficulty in processing information effectively.

Masrek & Baharduddin[14] argued that there has been excessive exposure of course materials and notifications for college and university students, many of whom are distance learners, and this has led to digital fatigue and feelings of being overwhelmed. Feroz[15], *et al*. stated that the availability of an abundance of resources on social media, academic resources on online databases, and peer interactions has led to information overload and has been challenging for students to churn out relevant information. Aadland & Heinstrom[13] and Masrek & Baharuddin[14] have concluded in their studies that Information overload has shown a profound effect on students, leading to problems such as negative emotions and stress, which can result in irritation and sadness, and can affect academic performance and overall well-being. Feroz[15] found that the positive impact of social media is being ruined due to the information overload, leading to poor academic performance and less effective learning outcomes. Several studies have suggested or recommended coping strategies to deal with information overload, and some of them include information literacy, time management and information filtering, as stated in Masrek & Baharuddin[14]; interactive learning and simulation games, as stated in Feroz[15], *et al*. and self-care and mindful digital consumption, as put forward by Masrek & Baharuddin[14].

Sohail & Asha[16] found that information literacy assessment and practices have the potential to significantly enhance research competencies among students, and there was a positive correlation between information literacy and research competency among students who were writing their theses or dissertations. Meena[8] concluded that information literacy programs can improve research skills by 23 % on average, while Ferrer[17] argued that information literacy did not have any significant impact on academic performance, but certain skills, such as information evaluation and literature search, show a weak positive relationship. Hossain[18] argued that when it comes to academic integrity, it has been observed that the absence of academic integrity literacy during K-12 years impacts students' ability to handle academic integrity issues at higher education levels. Liu[19], *et al*. found that various factors such as English language proficiency, academic programs and previous educational experiences have an influence on students' understanding of academic integrity.

American Library Association[10], states a definite relationship between information literacy and information technology skills, which has much broader implications for the individual, education systems, and even society at large. Information literacy contains several elements of information technology skills but has a distinct and broader area of competencies. It is not restricted to database use and software applications, among others, and is more likely interwoven, offering collaborative support. Li[20] stated that the most critical feature of information literacy has always been its connectedness with technological developments, and because of this, it has evolved, expanded, and developed as a reflection of shifts in information communication and technological changes. Moruf[21] argued that information literacy, being practical competence, enables the researcher to reason, adapt, and solve problems with the use of information at hand and has been an excellent tool in mastering information overload. It can be countered by possessing the desired information literacy skills, as it will enable learners and researchers to process all types of information content. The impact of information overload and information technology integration in education highlights the need to include information literacy in the curriculum, as pointed out by Qerimi[22], *et al*. and effective use of tools and technologies in ICT literacy, as stated in Elyildirim[23].

Tayia[24] mentions that the combination of Information literacy with Information technology can lead to empowerment and participation, and Lund & Agbaji[25] emphasised the technological adoption and community engagement among students. Tayia[24] identified that the key challenge in the digital age is to tackle the problem of misinformation and disinformation, and Information literacy can play a big role in critically evaluating information while Ramaiah & Rao[26] identified the problem of digital divide and to ensure that every individual has equal access to information and digital tools especially in developing world. Park[27] stated that digital literacy has evolved and has become a core competency for all learners regardless of subject areas and age levels. The use of technology among teenagers and students is at its peak, and as such, it is important to design digital literacy curricula that can nurture it and help in achieving the learning aims. Digital literacy now encompasses data literacy, analytic literacy, computing literacy, and infrastructure literacy. Varela-Prado[28], *et al.* emphasised the need for collaboration between educators and librarians in designing and implementing information literacy programs that can lead to autonomous learning and acquiring much-needed information and technology skills.

As per ALA[10], guidelines in a higher education setting delivery of information literacy are the key requirements of accreditation associations, as it is a tool to evaluate learning outcomes for college and university students. Students need to search, evaluate, manage, and use information in a research-oriented manner and can also deal with online and distributed learning technologies imparted by the institutions of higher learning. The challenge is always there to incorporate information literacy across curricula and various programs offered by the university, and it requires the collaborative efforts of faculty, librarians, and administrators. Sohail & Srikant[29], in a Delphi method approach, tried to assess challenges of information and research literacy in Indian higher education and found that it has a positive impact on building students' confidence and skills level. It was also found that there was a need for cohesion of the curriculum across information literacy sessions and engaging students in more classroom-based activities. Momanyi[30], *et al.*

highlighted the importance of integrating information literacy into the curriculum and suggested it for the introduction of credit courses for developing students' competencies. Aviamu[31], *et al*. emphasised the implementation of effective policy frameworks that can ensure the coherent delivery of information literacy programs across all universities and institutions for the promotion of social inclusion and success in academics. Lloyd[32] argued that for information literacy researchers, the practice of collating information is central to both formal and informal learning. Due to its relational material and nature, it embodies a dimension that can connect people with explicit and implicit knowledge and further engage them in the practice of a particular setting. Akor[33] Alahi & Yesmin[16] and Holili[34], *et. al*. concluded that information literacy programs have significantly improved the academic performance of the students as it enhances their ability to identify, search, evaluate and utilize the information resources effectively. Rahmah & Desriyeni[35] argued that information literacy is crucial for adapting to the rapidly changing information landscape and for producing high-quality scholarly academic research.

According to ALA[10], information literacy competencies require five standards and twenty-two performance indicators; the standards focus upon the academic needs of students in higher education learning environments and list a range of possible learning outcomes for assessing students' progress toward information literacy. Therefore, it is essential to develop a well-structured and comprehensive information literacy program that facilitates lifelong learning, enhances critical thinking skills, and prepares students as global citizens to contribute effectively to society. Akor[32] linked information literacy competencies with career readiness and increased employability, as the students are equipped to handle information in a professional way. Smith[36] also concurred that integrating information literacy into the curriculum enhances students' competencies in scholarly research projects. He also emphasised the importance of developing information literacy skills progressively throughout the undergraduate academic journey.

A study conducted by Webber[37], *et al*. tried to discover how academicians perceive information literacy in a higher education setting and found that various faculty of different disciplines noted its usefulness in varying proportions. To measure the learning outcomes specifically related to research, students need to learn the mechanics of research, and they need to master quotation and citation usage, while also learning the skill of attribution and citation of scholarly sources and the number of appropriate sources used. Fister[38] views the librarian as an agent of change who can influence the faculty with knowledge that can be passed on to their students. ACRL[11] in the "Framework for Information Literacy for Higher Education" clearly states that librarians' teaching output will be termed as "information literacy" and not as a "library skill" moving forward.

4. RESEARCH METHODOLOGY

The present study adopted a quantitative research design to find out and to examine the perceived effects of information literacy programs on multiple facets of student learning. The study explicitly aimed to assess the impact of these programs on the student learning outcomes, research writing proficiency, and overall academic achievement. The researcher used a comparative method to examine the impacts of information literacy programs among various student groups. The groups comprised the undergraduate and postgraduate students, offering insights into the program's impact on students at multiple stages of their academic progression. The study distinguished between English as a Foreign Language (EFL) and non-EFL learners, investigating the effects of language proficiency on the perceived efficacy of information literacy programs.

The study aimed to elucidate how information literacy training might enhance academic achievement, research proficiency, and the cultivation of critical academic abilities among distinct student groups across different situations. The target population for this study consists of undergraduate students enrolled in different academic programs at selected universities. A stratified random sampling method was used to ensure adequate representation of both student categories (EFL and non-EFL) and academic levels (1st year to 3rd year). A total sample of 102 students was selected randomly from the participating universities across different programs to ensure statistical reliability.

A structured questionnaire was developed and distributed to gather data on students' perceptions of the effectiveness of information literacy programs through online surveys. The questionnaire was further divided into three categories, namely collecting the data on academic level and language proficiency (EFL or non-EFL, measuring students' perceived improvement through Likert scale (where 1 is very poor and 5 is very strong) in critical thinking, research skills, and ability to navigate information resources and self-report on their academic performance, including improvements in research writing and overall academic achievement since participation in information literacy programs. The data was gathered, analysed, summarised, cleaned and coded for final data analysis which was done through SPSS software. For the reliability of the data collected, Cronbach's alpha showed a value of 0.96 for 47 tested variables, which indicated a high data reliability. The test included a descriptive test, a T-test for Gender and EFL and non-EFL learners, an ANOVA for comparing the program year of study and a correlation test.

5. DATA ANALYSIS AND INTERPRETATIONS

5.1 Demographic Information

The sample size of 102 comprised university students across the United Arab Emirates. Table 1 shows the demographic distribution of variables according to gender, program year and EFL/non-EFL learners. The gender distribution in the survey was 59.8 % female and male,

comprising 39.2 % of the total respondents. The second-year students were the largest group of respondents in the study, which comprised 54.90 % of the total respondents, whereas 35.29 % were from the first year and 9.8 % were third-year students. A total of 8.8 % of the respondents were EFL learners currently studying or in the past.

Table 1. Demographic distribution

Demographic variable	Category	Frequency	Percentage (%)
Gender	Male	61	59.80%
	Female	41	39.20%
Program	First year	36	35.29%
	Second year	56	54.90%
	Third year	10	9.80%
EFL learners	Yes	9	8.80%
	No	93	91.20%

5.2 Descriptive Details

There were primarily 5 constructs with 47 variables in total, as shown in Table 2 below. The first construct was rating the "general competencies in research skills" and it included 14 variables. The first three ranked top variables were "Searching the Web" (M=4.25, SD=0.70), "Know how to save articles and print them" (M=4.75, SD=0.78), and (Searching online databases" (M=4.24, SD=0.78). This suggests that students are comfortable searching on the web and using various search engines. They know how to save and print articles comfortably and search online databases. The least ranked 3 variables were "Identifying the location (call number) of the book in the library" (M=3.61, SD=0.91), "searching online catalogue" (M=3.55, SD=0.83) and (identifying where to find the online catalogue" (M=3.4, SD=0.95) respectively. This clearly shows students try to rely on the library staff to look for physical books. They do not know the link to the OPAC, and they seldom go to the OPAC to search for physical books or items. The second construct was about "Skills related to searching for information online" and included 7 variables. The highest ranked variable was "browsing through journals", and students were very competent in browsing through various journals (M =4.21, SD = 0.72). This was followed by "use synonyms" (M=4.11, SD=0.73) and "isolate the concepts using keywords" (M=4.03, SD=.71) respectively. The least competent students were in using of "search tricks" (M=3.41, SD=0.95) as it seems they were not using those search tricks while doing the searches online.

The third construct was on "Skills related to referencing/citations" and included 9 variables. The highest ranked variable for "fair use and plagiarism" (M=4.11, SD=0.80). It seems almost all the students were well versed with fair use and understanding of plagiarism and how to avoid it. The second rank variable was "ethical and legal implications of citing websites" (M=4.04, SD=0.72), and this suggests that most of them knew the dangers of using information, images, and videos from websites without acknowledging that they can land them with legal implications.

The third was "correct citation form for websites" (M=3.99, SD=0.76), suggesting that most of them knew how to cite websites easily. The fourth-ranked "intext citation for all types of sources" (M=3.98, SD=0.87) suggests that students were very comfortable doing intext citations. The last ranked variable in this construct was "correct citation forms for print materials" (M=3.78, SD=0.83), which suggests that they were struggling to identify the type of documents if they were given in print format.

The fourth construct, "skills related to reliability and significance of the information found," comprises 6 variables. The highest ranked variable was "identify reliable and significant information sources" (M=4.13, SD=0.66). The second and third ranked variables were" evaluate information located and integrated into assignments" (M=4.07, SD=0.66) and "use of authoritative information sources" (M=4.07, SD=0.70), respectively. This confirms that the majority of students were comfortable in evaluating information located in different media and were able to integrate it into their assignments, as well as knowing that they were using authoritative information sources. The lowest ranked variable in this construct was "estimate that sufficient information for the assignment" (M=4.01, SD=0.69) and this clearly suggests that students are facing problems of information overload and cannot easily judge that the information found is sufficient for doing their assignments.

The fifth Construct was about "importance of information literacy program" and comprises 11 variables. The highest rank variable was "Recommend the information literacy program to other students" (M=4.25, SD=0.62). This suggests that an overwhelming majority of students found value in the program and felt confident in endorsing it to their peers, and the SD score was relatively good, too, which suggests consistency in responses. This also indicates that the students found the IL program beneficial, practical and relevant for their academic success and word-of-mouth recommendations can lead to a broader impact across the student communities. The second-ranked variable in this construct was "My research skills have improved" (M=4.21, SD=0.64). This suggests that IL programs have been very effective in equipping students with research skills such as conducting database searches, identifying credible and reliable sources and evaluating information critically. At the same time, low SD indicates that responses have been evenly distributed and have been consistent, sharing a positive perception. Although the findings suggest that the IL programs have significantly enhanced research competencies, ensuring students can translate these skills in other academic domains, such as critical thinking and writing assignments or research papers, which had a lower Mean score, will be challenging and specific workshops on the application of research skills will be required in future.

Table 2. Descriptive statistics based on constructs and ranking

	N	Mean	Standard deviation	Ranking
General competencies				
Identify scholarly materials	102	3.97	0.79	6
Identify reliable authoritative information	102	4.03	0.78	5
Identifying a specialized source	102	3.95	0.74	8
Cite all types and kinds of sources appropriately	102	3.63	0.86	11
Find relevant materials for assignments dissertations	102	3.86	0.65	10
Identify location of online databases	102	4.12	0.72	4
Search online databases	102	4.24	0.78	3
Identifying each database and its content	102	3.97	0.84	7
Search the web/internet	102	4.25	0.7	1
Synthesize information	102	3.91	0.75	9
Identify the location of the book in the library	102	3.61	0.91	12
Identify where to find online catalog	102	3.4	0.95	14
Search online catalog opac	102	3.55	0.83	13
Can save articles and print them	102	4.25	0.78	2
Skills related to searching for information online				
Isolate the concepts keywords	102	4.03	0.71	3
Boolean operators	102	3.75	0.98	5
Search tricks	102	3.41	0.95	7
Use synonyms	102	4.11	0.73	2
Combine boolean operators	102	3.45	0.9	6
Filters and narrow	102	4	0.76	4
Browse through journals	102	4.21	0.72	1
Skills related to referencing/citations				
Differ printed source and an electronic source	102	3.88	0.89	7
Identify the type of documents and referencing	102	3.95	0.75	6
Correct citation form for print materials	102	3.78	0.83	9
Correct citation form for online resources	102	3.97	0.78	5
Correct citation form for websites	102	3.99	0.76	3
Use appropriate citation format	102	3.82	0.82	8
Fair use and plagiarism	102	4.11	0.8	1
Ethical and legal implications of citing websites	102	4.04	0.72	2
In text citation for all types of sources	102	3.98	0.87	4
Skills related to reliability and significance of the information found				
Identify reliable and significant information sources	102	4.13	0.66	1
Use authoritative information sources	102	4.07	0.7	3
Evaluate information located integrate into assignments	102	4.07	0.66	2
Estimate that sufficient information for the assignment	102	4.01	0.69	6
Identify the authority purpose and reliability of information	102	4.01	0.66	5
Use information sources which are up to date	102	4.06	0.69	4
Importance of information literacy program				
Avoid or minimize plagiarism	102	4.11	0.76	5
Overall academic performance has improved	102	4.1	0.61	6
Critical thinking skills has improved	102	4.04	0.61	8

Plagiarism issues have been minimized	102	4.16	0.7	3
Grades in assignments has improved	102	3.99	0.72	9
My research skills have improved	102	4.21	0.64	2
Confidence level improved writing assignments	102	4.1	0.64	7
Il program is valuable	102	4.12	0.64	4
Il program is strongly recommended	102	4.25	0.62	1

The third and fourth ranked variables are "Plagiarism has been minimized" (M=4.16, SD=0.70) and "Information literacy program is valuable" (M=4.12, SD=0.64), respectively. This clearly suggests that students have largely been successful in minimizing plagiarism issues and consider information literacy programs valuable. The sixth rank variable "Overall academic performance has increased" (M=4.10, SD=0.61) suggests that the information literacy program has helped the students achieve better academic performance overall, and students perceive the IL program as beneficial in helping them navigate through their academic assignments and research more effectively. The least ranked variables in this construct were "critical thinking skills have improved" (M=4.04, SD=0.61) and "grades in assignments have improved" (M=3.99, SD=0.72), respectively. This suggests that there is still room for improvement in these specific areas, and the slightly higher deviation further suggests greater variability in students' experiences, which is most likely due to differences in terms of engagement with the programs or prior knowledge and individual learning styles. There is a need to conduct more workshops on information literacy, which will focus on improving critical thinking and how to write assignments to improve their grades. Critical thinking involves complex cognitive skills that require continuous practice and application in diverse contexts and certainly takes much more time than other academic improvements. As for improvement of academic performance and improving grades in assignments, it also requires mastering academic writing conventions, citing sources properly and structuring the arguments, which all require a sustained effort and support.

The study further conducted an independent sample test to find out the significant difference in one variable between EFL and non-EFL learners, as shown in Table 3 below. This suggests that EFL learners may have different outcomes or perspectives in at least one aspect of information literacy compared to their non-EFL counterparts.

Table 3. Independent samples test for EFL vs non-EFL learners (1 variable had a significant difference)

Independent samples test				
	Levene's test for equality of variances		T-test for equality of means	
	F	Sig.	T	df
My research skills have improved	8.52	0.04	1.59	98
			2.7	15.1

Table 4. Independent samples test for gender (1 variable had a significant difference)

Independent samples test				
	Levene's test for equality of variances		T-test for equality of means	
	F	Sig.	T	df
Find & locate relevant materials for assignments and dissertations	13.05	0.000	1.13	98
			1.21	97.87

An independent sample T test was also conducted for gender as shown in Table 4 below; it was found that there was no significant difference on all the variables except one, which was to "Find & locate relevant materials for assignments, dissertations". This suggests that there was a difference in terms of finding and locating information resources for assignments and dissertation purposes among the male and female students.

6. RESULTS AND DISCUSSIONS

The study included key variables in terms of skills related to academic and research writings, impact of the IL program and the perceptions related to its usefulness, value and recommendations. There were moderate improvements seen in terms of research skills as found in the study by Griffin[39], *et al.* confidence in writing assignments as suggested by Deitering & Jameson[40], and critical thinking as observed by Senkevitch[41], *et al.* while skills such as the use of advanced search and Boolean operators, understanding of searching suggested by Chu[42], *et al.* citation skills and how to avoid plagiarism, as argued by Newton[43], *et al*. were rated positively but still showed room for growth. As for the utility of the IL program, most of the participants found the program useful and were also seen as a good use of time, as found in the study by Shen[44]. The impact on academic performance was acknowledged by most of the participants as found in the study done by Alahi & Yesmin[16] & Holili[33], *et al*. it was agreed that plagiarism issues as suggested by Newton[43], *et al.* have been minimised, which shows that the IL program has been very effective in addressing ethical concerns.

The descriptive statistical analysis shows that the mean scores ranged between 4.25 and 3.40, which suggests that students have moderate levels of research skills. The highest ranked skills were searching on the web (M=4.25), searching online databases (M=1.76), browsing through journals (M=4.21), my research skills have

improved (M=4.21) and taking the Information literacy program seriously and recommending others (M=4.25). The least ranked skills were identified where to find the link of the online catalogue (M=3.40), knowing search tricks (M=3.41), searching online catalogue (M=3.55), identifying the location of the book in the library (M=3.61) and citing all types and kinds of sources appropriately (M=2.37). The other findings related to citation and ethical practices include that there is high awareness related to fair use and plagiarism (M=4.11), and students show moderate understanding of different citation styles, and they understand the ethical implications of citing websites (M=4.04). As for the information source evaluation, students demonstrated moderate ability to identify reliable information sources, as the mean scores range from 4.13 to 4.01. Most of the students can assess the authority and reliability of information sources. The impact of the Information literacy program shows that overall academic performance has improved, as there was overwhelming agreement among the students with the mean score of (M=4.10), as was found in the study conducted by Alahi & Yesmin[16] and Holili[34], *et al.* Research skills improvement has a mean of 4.21, which is high, and critical thinking skills improvement is around 4.04, which is a bit on the lower side. Overall, students view information literacy programs as very useful and valuable. A significant difference was also found in one variable when comparing gender groups. This result implies that male and female participants may differ in their approach or performance in certain aspects of information literacy, as was also found in the study conducted by Bussell[45].

The results of the One-Way ANOVA test showed no significant difference across any variables between first, second, and third-year students. This indicates that information literacy levels, as measured by the variables in the study, do not vary significantly with academic progression from the first to the third year. There was a significant difference found as the F-statistic value was 7.8603 with a p value of 0.0007, indicating a significant difference. The variable that was found to have a significant difference was “my research skills have improved”. This shows that EFL learners still face challenges, and they are not up to the mark as compared with non-EFL learners. The identified difference between EFL and non-EFL learners may highlight language or cultural factors that influence information literacy, which was also observed in the study done by Fathima[46] and Johnston[47], *et al.* This could reflect differing levels of confidence, resources, or familiarity with information sources, especially if much of the instructional material is in English. The gender difference in one variable could suggest that male and female students have varied approaches or comfort levels in aspects of information literacy, such as confidence in research or resource usage, as found in the study done by Garcia[48] & Meena[8]. It may be valuable to examine the specific variable where the difference was found to understand the gender-based perspective. The lack of variation across academic years suggests that students’ information literacy skills are not significantly developing from the first through the third year. This might indicate a need for a structured information literacy program throughout academic progression to reinforce skills at each level.

7. CONCLUSION & RECOMMENDATIONS

The findings of the present study underscore the critical role of information literacy programs in addressing the challenges of information overload and fostering academic success. The study highlights the transformative potential of these programs in enhancing research skills, critical thinking, and academic performance. Statistical analysis provides nuanced insights into how various demographic factors influence information literacy outcomes. The information literacy programs seem to have a positive but incremental impact on students’ research skills and certainly on academic performance, as was found in the study conducted by Alahi & Yesmin[16], and Holili[34], *et al.*

The study reveals that students require more support in advanced search techniques for database searching. The citation and ethical practices are improving, but there is a need for reinforcing and comprehensive sessions delivered at regular intervals. The students recognize the value of information literacy programs, with most of them rating it very positively. The results reveal a significant gender-based difference in one variable, suggesting that male and female students may approach or perform differently in certain aspects of information literacy. This highlights the importance of tailoring instructional strategies to address these differences and promote equitable learning outcomes. The comparison of EFL and non-EFL learners indicates that language and cultural factors may affect students’ confidence, resource familiarity, and engagement with information literacy. These findings emphasize the need for inclusive programs that consider linguistic and cultural diversity, ensuring that EFL learners receive adequate support to develop essential skills as suggested in the study conducted by Garcia46 and Meena[8].

The lack of significant variation in information literacy levels across academic years points to a gap in skill progression throughout students’ academic journeys. This suggests the necessity for a structured, incremental information literacy curriculum integrated across all years of study, reinforcing and expanding these skills as students advance academically. Various strong positive correlations were found between IL program and its usefulness (r=0.919), citations form for online resources and websites (r=0.800) and program usefulness and time (r=0.747). Overall, the study suggests that students’ academic performance has increased, and citation and searching skills have shown moderate performance levels. The study also revealed that information literacy program components are highly interrelated, and database usage skills are strongly correlated with

search capabilities. The key strengths identified from the IL programs were that they enhance students' competencies in searching for information online and recognizing credible sources of information. Secondly, students were aware of academic integrity issues such as plagiarism and fair use guidelines. The key areas of improvement need more training for navigating the physical library and online catalogues. They also require additional practices related to advanced search techniques such as search tricks, Boolean operators and filtering the results. Citation and referencing performance were moderate but needed reinforcement related to identifying different types of documents and formats.

Recommendations from this study include enhanced training on advanced search strategies with dedicated sessions related to online databases and web searching. There needs to be a continuous focus on citation practices and developing more interactive components to enhance critical thinking skills. IL sessions should include hands-on workshops for using online catalogues and databases effectively, practical exercises related to building advanced search strategies, and interactive citations training, such as using citation management tools such as RefWorks, Mendeley and Zotero. It is important to develop targeted interventions for areas that are lacking and have shown weaker correlations, and most probably, restructuring content delivery based on skill correlations can improve the overall literacy skills. Recommendations for future studies should include a comparison of undergraduate and postgraduate students and should also include a comparison of the outcomes when students are enrolled in different programs. A larger sample size would be appropriate for such studies. In conclusion, this study reaffirms the transformative potential of information literacy programs while emphasizing the importance of addressing demographic-specific needs. Academic libraries must adopt a proactive, inclusive approach to ensure that these programs foster lifelong learning, research competency, and academic achievement across diverse student populations.

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