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Scholars' Perception on Use of Artificial Intelligence Tools in Research: A Pre-Post Study

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Abstract: It's proven that AI has made an impact on the world and augmented human capabilities in significant ways. Education and research are not odd to this. Many useful web-based intelligence tools have been developed to assist with the research activities. Awareness of these tools leads to their use and using these tools will help the researchers to make proper decisions in time on their research work and it will enhance the quality of research. A pre-post survey was conducted with an open-ended questionnaire, among the participants who took part in the Two Days National Workshop on Scholarly Writing: Strategies and Techniques organized by the Department of Studies and Research in Library and Information Science, Tumkur University to get valid inputs from the participant to modify the contents of the session 'research literacy'. The study evidenced the lack of awareness of the use of AI tools/web intelligence tools in research. Based on the study pre-study results, the added demonstration along with the lecture and discussion method and the post-study results indicated the session was very useful and it the concepts covered in the session enhanced the knowledge about the concepts among the participants.
Keywords: *AI Tools, Research Tools, pre-post study, scholars' perception*

1. Introduction

Artificial intelligence (AI), is a branch of computer science, at present, AI has become a holistic concept pulled from many areas of academic arenas from philosophy to physics. The term was coined by John McCarthy in 1956 at Dartmouth's summer research project on Artificial Intelligence. Artificial intelligence is a comprehensive discipline developed by computer science, control science, information science, cognitive science, neuroscience, neurophysiology, psychology, linguistics, brain science, and other disciplines. Its essence is to study the production of intelligent machines or intelligent systems, simulate human intelligence activities, and extend the science of human intelligence. AI is defined as intelligence exhibited by machines and has many applications in today's society. Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing (NLP), speech recognition, and machine vision (Tucci, L., Burns, E. & Laskowski, N. (contr.) (2020).

Encyclopaedia Britannica States, "Artificial intelligence is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings". According to Paul Marsden, "Artificial intelligence is a technology that behaves intelligently using skills associated with human intelligence, including the ability to perceive, learn, reason and act autonomously". According to Demis Hassabis, "Artificial intelligence is the making machines smart"."Artificial intelligence is an entity (or collective set of cooperative entities), able to receive inputs from the environment, interpret and learn from such inputs, and exhibit related and flexible behaviours and actions that help the entity achieve a particular goal or objective over a while (Faggella, D, 2018)".

Therefore, AI is machine intelligence, which avoids human interference in executing the assigned work in an almost perfect way. AI is preferred to improve workplace efficiencies and can augment the work humans can do. It helps in executing repetitive or dangerous tasks and frees up the human workforce to do work creatively and innovatively. In simple terms, artificial intelligence is machine

intelligence, it may be hardware or software, that helps humans in executing dangerous and repetitive jobs and it helps humans to make almost perfect decisions in the management of day-to-day activities of the workplace efficiently and effectively.

2. Application of Artificial Intelligence in Libraries

Smart machines entered the library long back during the 1960s, the smart users' requirements, needs, wants and demands influenced greatly the libraries to adopt and apply smart intelligence tools to address the informational requirement and to offer web-based information sources and facilities to the digital natives and digital emigrants.

In earlier days, intelligence tools were developed to manage the activities of a particular section of the library or to provide a particular service to the end users. Today, technological advancements have made library automation a basic step in managing the library. Intelligent security management systems such as barcode and RFID, intelligent application services for self-service libraries, ATM libraries, print and copy management, lecture training appointment management, and many more web assistance tools have been developed and updated as per the trend. Intelligent knowledge service tools like knowledge discovery tools become part and parcel of the library. Cloud services have become popular and libraries are not behind in utilizing them to serve their users. Many web intelligence tools have been developed toaddress and comfort the informational needs of the present information society.

3. Background of the study

Artificial intelligence tools are encouraging researchers to access greater data without compromising users' personal private lives, promoting new models of digital education assisting in the enhancements of skills needed in a 21st-century tech-savvy environment, and maintaining the mechanisms for human oversight and control, and also penalizing malicious AI behaviour and promoting the cyber security. It's proven that AI has made an impact on the world and augmented human capabilities in significant ways. Education and research are not odd to this. Many useful web-based intelligence tools have been developed to assist with the research activities. Awareness of these tools leads to their use and using these tools will help the researchers to make proper decisions in time on their research work and it will enhance the quality of research.

The Department of Studies and Research in Library and Information Science, Tumkur University has organized a two-day National Workshop on Scholarly Writing: Strategies and Techniques in 2020. A Session on 'Research Literacy' was assigned and it was scheduled on the 2nd day of the workshop. To design the session with need-based content, an attempt was made to understand scholars' perceptionsand use of web intelligence tools or AI tools in research studies. An open-ended questionnaire was distributed among the participants and the input was utilized to design the session assigned. The study has presented the results of the pre-post study conducted among the participants of the National Workshop.

4. Study objectives

The main objective of the present study was to understand the researchers' perception of different AI tools or their use and awareness of the web intelligence tools essentially needed in their research work. Concepts such as academic search engines and social networks, plagiarism-avoiding strategies, online plagiarism-checking tools, knowledge mapping tools, information repackaging tools, citation types, referencing standards, and reference management tools were planned to be covered in the session. Before finalizing the concepts and the instruction material, the study has attempted to understand the researchers' awareness of the concepts and use of AI tools or web intelligence tools related to these concepts, aim of modifying the session content based on the participants' requirements.

5. Methodology

The pre-post-study design was adopted in the present study. An open-ended questionnaire was used to collect the data among the participants who took part in the Two Days National Workshop on Scholarly Writing: Strategies and Techniques organized by the Department of Studies and Research in Library and Information Science, Tumkur University to get valid inputs from the participant to modify the contents of the session 'research literacy'. The study utilized the data collected before the session to design and fine-tune the content to be covered in the assigned session, and later at the end, after the session, feedback was collected from the participants to evaluate the content demonstrated and delivered in the session. 56 participants participated in the workshop, survey was conducted among them. Open-ended questionnaires were used for the data collection.

Scope and Limitation of the Study

The present study was limited to only the participants of the workshop.

6. Results and Discussion

Data collected by using the open-ended questionnaire is tabulated and presented in the following section with suitable sub-headings. The demographic details of the respondents are presented in the following table 1.

6.1. Designation-wise Gender Distribution of Respondents

Table 1: Designation-wise Gender Distribution of Respondents

SN	Gender Category	**Age Group (in years)**				**Total**
		21-25	26-30	31-35	above 35	
a	**Male**	1 (1.8%)	9 (16.1%)	8 (14.3%)	13 (23.2%)	**31 (55.4%)**
b	**Female**	3 (5.4%)	6 (10.7%)	7 (12.5%)	9 (16.1%)	**25 (44.6%)**
Total		**4 (7.1%)**	**15 (26.8%)**	**15 (26.8%)**	**22 (39.3%)**	**56 (100%)**

As per Table 1, on the whole, 56 respondents took part in the study, among them more of them are in the age group of above 35 years. The majority of the 31(55.4%) respondents are male and the remaining 25(44.6%) of them are female.

6.2. Designation and mode of research Pursuing by the Respondents

Table 2: Designation and Mode of Research Pursuing by Respondents

SN	Designation	**Mode of Research**			**Total**
		Full Time	Part-Time	Interested in Research	
a	Assistant Librarian	1 (1.8%)	2 (3.6%)	-	**3 (5.4%)**
b	Assistant Professor	2 (3.6%)	4 (7.1%)	-	**6 (10.7%)**
c	Librarian	3 (5.4%)	14 (25.0%)	7 (12.5%)	**24 (42.9%)**
d	Research Scholar	14 (25.0%)	7 (12.5%)	2 (3.6%)	**23 (41.1%)**
Total		**20 (35.7%)**	**27 (48.2%)**	**9 (16.1%)**	**56 (100%)**

As shown in Table 2, 24 (42.9%) librarians, 23 (41.1%) research scholars, 6(10.7%) assistant professors and 3(5.4%) assistant librarians responded. It is evident that the majority of the respondents who participated are from the subject Library and Information Science and the group research scholars who participated are from different subjects. More of them 27 (48.2%) are pursuing their research in part-time mode 20(35.7%) of them are doing research as full-time scholars, even 9(16.1%) of them are interested in research also took part in the present study.

6.3. Concepts Planned to be Covered in the Session and the Inputs Provided by the Respondents

The session had planned to cover concepts such as research literacy, the concept of plagiarism, and strategies to avoid plagiarism such as citation methods, referencing standards/styles, block quotation, short quotation, paraphrasing, summarizing, using online reference management tools for generating the error-free citation and references, online plagiarism checking tools, search engines provide scholarly content, knowledge mapping tools, information repackaging tools, and academic social networks. The same concepts were questioned among participants with open-ended questions and the inputs received are presented in table 3.

Table 3: Concepts Planned for the Session and Respondents Inputs

SN	Concepts planned to be covered in the session	Inputs given by the Respondents	Frequency	Total
a	Referencing styles/ standards	**APA/APA & MLA**	31(55.4%)	**34 (60.7%)**
		Googlesc	1(1.8%)	
		Zotero	1(1.8%)	
b	Type of Citation	In text	30(53.6%)	**51 (91.1%)**
		End text	21(37.5%)	
c	Academic Search Engines	DOAJ	15(26.8%)	**51 (100%)**
		Google	1(1.8%)	
		Google Opera	13(23.2%)	
		Google Scholar	1(1.8%)	
		Scirus	22(39.3%)	
		Yahoo	1(1.8%)	
d	Reference Management Tools	EBSCO Emerald insight	1(1.8%)	**2 (3.6%)**
		LISTA/Emerald insight/J-store	1(1.8%)	
e	Online Plagiarism Checking Tools	Mendeley	9 (16.1%)	**41 (73.2%)**
		Zotero	4 (7.1%)	
		Zotero Mendeley	13(23.2%)	
		Plag check	2(3.6%)	
		Plagiarism checker	1(1.8%)	
		Turnitin	6(10.7%)	
		Urkund	5(8.9%)	
		VIPER	1(1.8%)	
f	Knowledge Mapping Tools	Zendesk	1(1.8%)	**1(1.8%)**
g	Information Repackaging Tools	CAS	2(3.6%)	**3 (5.4%)**
		CAS, SDI	1(1.8%)	
h	Academic Social	Academia	1(1.8%)	**20**

	Networks/sites	Blogger	1(1.8%)	**(35.7%)**
		Facebook	2(3.6%)	
		Facebook Twitter	2(3.6%)	
		LinkedIn	2(3.6%)	
		Research Gate	4(7.1%)	
		Research gate academia	6(10.7%)	
		Shodhaganga DOAJ	1(1.8%)	
		SPSS	1(1.8%)	

As per the data presented in Table 3, the majority of the 31(55.4%) respondents were aware of the referencing style manuals/standards.30(53.6%) of them indicated that they prefer In-text citations and 21 (37.5%) of them end-text citations. With related to the academic search engines, only 1(1.8%) respondent mentioned correctly, remaining them were wrong. Only 2(3.6%) respondents responded about reference management tools and the inputs were wrong. 41(73.2%) of the respondents responded about online plagiarism checking tools, 3(5.4%) inputs were right and remaining were wrong. 3(5.4%) respondents responded with the wrong answer to the question on information repackaging tools, even for the question on academic social networks, only 20 (35.7%) respondents answered and 10(17.9%) responses were right and the remaining answers were wrong.

The session was planned with lecturing about the concept with detailed discussion, based on the inputs received by the respondents; the study has adopted the demonstration method along with lecturing. The session has demonstrated the web platforms provide open access books such as DOAB, Open Textbook Library, Open texts, Openstax, Textbook Revolution, open access journals platforms such as DOAJ, Highwire press, OAJSE, Omics International LOADB including Open DOAR and CORE, theses repositories like NDLTD, Shodhganga, Krishikosh, plagiarism-checking tools like Copy Leaks, Dupli Checker, Paper Rater, Grammarly, Search Engines Report, information repackaging tools like Summary Generator, Online Summarize Tool, Paper Digest, knowledge mapping tools like Open Knowledge Map, My Science Work, citation generating tools- Citavi, Cite This For Me, Bibliography, Bib Me, Citation Machine academic social networks like Academia, Semantic Scholar, Research Gate, SSRN, Microsoft Academic were introduced and demonstrated the way of work process in these platforms to make optimum utilization of these platforms for getting assistance in their research Work

6.4. Respondents' Opinions on the Helpfulness of the Session

At the end of the session, the study evaluated the contents and concepts delivered and demonstrated in the session. All the 56 respondents responded. Data presented in Tables 4 and 5.

Table 4: Respondents' Opinions on the Helpfulness of the Session

Category of Research Scholars	**Responses**					Total
	Extremely helpful	Very helpful	Somewhat helpful	Slightly helpful	Not at allhelpful	
Full-time	11 (19.6%)	8 (14.3%)	1 (1.8%)	0 (0.0%)	0 (0.0%)	**20 (35.7%)**
Part-time	11 (19.6%)	16 (28.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	**27 (48.2%)**
Interested in Research	4 (7.1%)	4 (7.1%)	1 (1.8%)	0 (0.0%)	0 (0.0%)	**9 (16.1%)**

Total	**26 (46.4%)**	**28 (50.0%)**	**2 (3.6%)**	**0 (0.0%)**	**0 (0.0%)**	**56 (100%)**

Table 4 shows that 28(50.0%) respondents opined very helpful and 26(46.4%) of them opined extremely helpful about the session. It's observed that the respondents involved in the research, i.e. all the full-time and part-time research scholars opined as helpful and all the respondents interested in research opined as somewhat helpful about the session.

6.5. Respondents' Opinions on the enhancement of their knowledge with the concepts covered and demonstrated in the session

Table 5: Respondents' Opinions on the enhancement of their knowledge with the concepts covered and demonstrated in the session

SN	Concepts covered in the session	Responses				
		Strongly Agree	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
a	Research literacy and plagiarism and types	30(53.6%)	24(42.9%)	0(0.0%)	0(0.0%)	2(3.6%)
b	Difference b/w short quotation and block quotation	24(42.9%)	20(35.7%)	6(10.7%)	6(10.7%)	0(0.0%)
c	Referencing standards and type of citation	30(53.6%)	24(42.9%)	0(0.0%)	0(0.0%)	2(3.6%)
d	Online reference management tools	29(51.8%)	25(44.6%)	2(3.6%)	0(0.0%)	0(0.0%)
e	Online plagiarism-checking tools	26(46.4%)	28(50.0%)	2(3.6%)	0(0.0%)	0(0.0%)
f	Search Engines for scholarly content	20(35.7%)	24(46.4%)	6(10.7%)	4(7.1%)	0(0.0%)
g	Knowledge mapping tools	25(44.6%)	25(44.6%)	6(10.7%)	0(0.0%)	0(0.0%)
h	Information repacking tools	27(48.2%)	21(37.5%)	8(14.3%)	0(0.0%)	0(0.0%)
i	Academic Social Networks	25(44.6%)	24(46.4%)	2(3.6%)	0(0.0%)	0(0.0%)

Data presented in Table 5, the majority of the respondents strongly agreed as they enhanced their knowledge of research literacy and plagiarism and its types, referencing standards, and type of citation. For remaining concepts, such as the difference between short quotations and block quotations, online plagiarism-checking tools, search engines for scholarly content, knowledge mapping tools, and academic social networks, more respondents strongly agreed and agreed for the same. Therefore, the session has provided valid inputs needed for the research scholars.

7. Conclusion

Research literacy involves skills such as identifying reliable sources, assessing the validity and reliability of research methods, understanding statistical analyses, and discerning biases or limitations in research studies. Research literacy empowers individuals to make informed decisions, whether in academic pursuits, professional settings, or everyday life, by enabling them to evaluate and apply research findings effectively (Grinnel college library, n.d.).

The pre-post studies were popular in the field of medicine. The present study has adopted the same method to understand the respondents' perception ofthe use of web intelligence tools/AI tools in their

research work. The study has received 56 pre and post-interventions and evidenced the lack of awareness and use of web intelligence tools including the platforms meant to provide the scholarly content in their research work. Based on the pre-interventions received by the respondents, the study has adopted the demonstration method along with lectures and discussion. The pre-testing helped in designing the material with suitable URLs of the web platforms and web intelligence tools to demonstrate in the session. The post-intervention of the study evidenced that the session was helpful for the participants and it enhanced the knowledge among the participants on the concepts covered in the study. Libraries can adopt the same method in developing need-based information products and services to meet the diverse informational needs of its user community.

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