

## **Assessment of Information Literacy Skills among Science-Post Graduate Students in Universities of Karnataka State: A Study**

**Swapna G.**

Librarian

Sir. M.V.Government Science College,  
Bommanakatte, Bhadravathi,  
Karnataka, India – 577 302.  
e-mail:swapna\_ran@rediffmail.com

**Dr. B.S. Biradar**

Professor & Chairman

Dept. of PG Studies & Research in Library & Information Science  
Kuvempu University, Shankaraghatta,  
Karnataka, India – 577 451.  
e-mail:bsbiradar53@rediffmail.com

**Abstract** - *Information literacy is considered as the crucial skill of the 21<sup>st</sup> Century in pursuit of knowledge. It is the ability to recognizing when information is needed and being able to efficiently locate, accurately evaluate, legally and ethically use and also clearly communicate information in various formats. The purpose of this paper is to investigate information literacy skills of the Science Post-Graduate students studying in Kuvempu University and Davanagere University of Karnataka State. The survey method is used to conduct the study. A structured questionnaire with 102 questions to measure 102 variables is used to collect the data. The major findings of the study are that majority (92.5%) of the students are skilled to define, develop and revise the information need on a topic, 83.6% identify the different types, formats and 80.2% identify purpose and target audience of information sources and 97.4% understand the organization and production of universe of knowledge. An average 74.1% of students are skilled to identify and use different information retrieval tools, 62.9% evaluate the information sources available both print and electronic formats and 68.1% able to determine the cost and benefit of acquiring information sources effectively; 51.7%of students are skilled to construct and use different information search strategies; 56.9% able to summarize, synthesize and validate the gathered information; 48.3% plan, develop and communicate the information product or performance, 45.7% able to use information ethically and legally and 36.2% able to acknowledge and document consulted information sources properly. On the basis of the findings, some suggestions have been put forward to improve the information literacy skills of the students.*

**Keywords:** Information Literacy, Assessment, Science Post-Graduate Students, Universities, Karnataka

### **1. Introduction**

Information Literacy (IL) is a set of skills which includes finding information effectively; managing the abundance of information available effectively; thinking critically about information sources; synthesizing and incorporating information into one's knowledge base; creatively expressing and effectively communicating new knowledge; using information legally and ethically; and using knowledge for the betterment of the individual's life and also of the society. Information literacy education has gained more importance in higher education institutions worldwide over the last decade. It empowers peoples in all walks of life to seek,

evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. Through library orientation, user education and bibliographic instruction, university libraries have long been involved in training their users how to use the library, how to access information and teaching the various bibliographic tools. But, in the present information rich society, due to the information explosion, emergence of ICT (Information and Communication Technologies) and WWW (World Wide Web), development of e-information resources, changes in teaching and learning styles, the students are facing problems in finding the most authenticated, reliable and valid information sources for their studies which necessitates them to develop information literacy skills and become information literates. As activators of learning centers, university libraries are needed to play a very significant role to make their users as information literates by effectively conducting information literacy programs. The present study is carried out to assess the information literacy skills of the Science Post-Graduate students studying in Kuvempu University and Davanagere University of Karnataka State. On the basis of the findings some suggestions have been put forward to improve the information literacy skills of the students.

## **2. Review of Literature**

Information literacy has gained more importance and practiced in the higher education institutions of Western countries like USA, UK, Australia etc. Hence more number of studies on information literacy assessment was done in those countries compared to India. Some important studies reviewed are as follows:

Mac-Donald et al.<sup>1</sup> conducted a study on information literacy competencies in University of Rhode Island USA. The study describes a draft plan for building an incremental, multi-year information literacy program to address the information and research needs of the undergraduate and graduate students at the University of Rhode Island. Semans<sup>2</sup> carried out a study on assess the information literacy perception level of freshman students at Virginia Tech University using the *ACRL Information Literacy Competency Standards for Higher Education* as a tool. The findings of the study indicates the lack of understanding of what students know about how to acquire and use information during their first semester and suggested to revise and improvise the current instruction program. Parker<sup>3</sup> conducted a study which focus on online information literacy course called MOSAIC (Making Sense of Information in the Connected Age), and recommends that information literacy is considered at a strategic level in the higher education sector. Mittermeyer and Quirion<sup>4</sup> conducted a study to assess the information literacy skills of the first-year incoming students in Quebec Universities. The survey method was used and 5,281 questionnaires were distributed and 3,003 were returned and analyzed. The findings of the study show that more number of students lack the knowledge of basic skills about the information search process and strongly recommends integrating the information literacy programs in the university curriculum. Kemparaju<sup>5</sup> in his study mentioned the range of education programs developed by academic libraries such as literacy campaign, functional literacy and library instruction to make library users as intelligent users of information and also explained the need of Information Literacy and Information Technology Literacy program in higher education institutions in the present digital environment. Ferguson et al.<sup>6</sup> undertook a online survey of 51 questions to assess the baseline information literacy skills of the first year biological students of University of Maryland. The findings indicate that the significant number of students was not familiar with search techniques, identifying print citations, how to determine bias or quality of sources and correct citation behavior when using research or copyright works. Bavakutty and Nasirudheen<sup>7</sup> carried out a study to assess the IL competency of research students of Kerala University and implies that adequate measures have to be taken in higher educational and

research institutions to equip the students with the information skills during their graduation/post-graduation period. Biradar, B.S. et al.<sup>8</sup> conducted a study to know the information literacy perception of the Bio-science students at Kuvempu University. On the basis of the findings researcher recommended to introduce an effective information literacy program by collaborating librarians and faculty in Universities. Hadimani and Rajgoli<sup>9</sup> conducted a survey to assess the information literacy competency of the undergraduate students at College of Agriculture, Raichur. The findings of the study revealed that though majority of the respondents had the ability to locate the needed information but lacked the competence in accessing electronic information. Baro<sup>10</sup> carried out a survey of 60 library schools in Africa to know the status of information literacy education and found that only 20 of them are offering IL as a stand-alone course in their curricula. Balasubramanion and Vijaya Kumar<sup>11</sup> conducted a study to explore the attitudes of faculty members, research scholars and students towards information literacy in Manonmaniam Sundaranar University Tirunelveli, Tamil Nadu. Issa et al.<sup>12</sup> investigated the IL competency of the undergraduate students in University of Ilorin, Kwara State, Nigeria. The study found that majority of the respondents have low level IL competency expressed their dissatisfaction with their present status of information availability, accessibility and usage. The study recommends that University authorities should consider the teaching of IL as course to fresh students with credit attached.

### **3. Scope and Limitations of the Study**

The present study is an attempt to know the information literacy skills of the Science Post-Graduate students in Universities of Karnataka State. The parameters of the study were:

- Data Collection is confined to Final Year Science Post-Graduate Students of Kuvempu University and Davanagere University of Karnataka State.
- Data is collected using a structured questionnaire from the Final Year Science Post-Graduate Students of Kuvempu University and Davanagere University of Karnataka State.
- The study is qualitative, using small number of samples.
- Data analysis and interpretation are entirely based on the feedback received from the respondents.

### **4. Objectives of the Study**

The present study is undertaken to assess the information literacy skills of the Science-Post Graduate students in Universities of Karnataka State. The important objectives of the study are as follows:

- To assess the students ability to define and articulate the need of information on a topic.
- To assess the students ability to identify, use and retrieve information sources effectively.
- To assess the students ability to understand the information search process and construct search strategies.
- To assess the students ability to evaluate the information sources (both print and electronic) by applying established criteria.
- To assess the students' ability to plan, develop and communicate the information product or performance effectively.
- To assess the students' ability to summarize, synthesize and validate the collected information sources effectively.

- To assess the students ability to understand legal, ethical and social issues surrounding the use of information effectively, and
- To assess the students ability to acknowledging and documenting the use of information sources in communicating the information product or performance.

## 5. Methodology

The survey method is used to conduct the present study. To collect the data, a well structured questionnaire is designed using ACRL *Information Literacy Competency Standards for Higher Education, USA*. It is an information literacy standard in higher education and by Association of College and Research Library (ACRL) of United States (US) in 2000. It consists of five standards and twenty-two performance indicators. The standards are having a logical higherarchy and each standard is divided into several performance indicators. A performance indicator answers the question “What do we want the student to learn?” Each performance indicator has several learning outcomes. A learning outcome answers the question: “How do we know that the student has learned?”. The range of learning outcomes acts as guidelines for faculty and librarians, for assessing the student information literacy skills in the context of a higher education institution’s unique mission. A detailed description of this standard is available at

<http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf>

On the basis of this standard, thirteen skill sets were identified and defined to assess the information literacy skills of the Science Post-Graduate students. Each skill set consists of a set of variables and for each variable a question was formulated in the questionnaire. A total of 120 questionnaires were distributed randomly to the Science Post-Graduate students of Kuvempu University and Davanagere University of Karnataka State. Out of which 116 students responded to the questionnaire. The data collected has been analyzed and tabulated systematically using SPSS software.

## 6. Results and Discussion

### 6.1 Demographic Information

Filled-in questionnaires were received form 116 students of whom were 68 (58.6%) males and 48 (41.4%) female students.(Table 1).

*Table 1. Sex-wise distribution of respondents*

Sl. No.	Respondents	No. of Respondents	Percentage
1	Male	68	58.6
2	Female	48	41.4
	Total	116	100.0

## 6.2. Skill Set One: Ability to identify, define and develop the information need on a topic

*Table 2: Identify, define and develop the information need on a topic*

Sl. No.	Variables	Response	
		Yes	No
1	Consultation with appropriate sources.	116 (100)	-
2	Formulate the questions on information need on a topic.	96 (82.7)	20 (17.3)
3	Developing the thesis statement.	100 (86.2)	16 (13.8)
4	Identification of initial research topic might too be broad.	106 (91.4)	10 (8.6)
5	Identification of initial research topic might too be narrow.	107 (92.2)	9 (7.8)
6	Identification of initial research topic might too be manageable.	112 (96.6)	4 (3.4)
7	Identification of the specific concepts that comprise a research topic.	114 (98.3)	2 (1.7)
	<b>Mean</b>	<b>107 (92.5%)</b>	<b>9 (7.5)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must be able to recognize and define the information need on a topic. Table 2 depicts that all the students (100%) consult their subject teachers as appropriate source to get advice for identifying and defining their research topic. A majority (87.2%) of students are agreed with the statement that “the quickest way to begin a research topic is to put the topic in the form of question”. 86.2 % of students are able to identify the statement “Cell phones can be used by the classroom teachers as a student response tool “as a best thesis statement to write a three to five pages of a paper in supporting the argument on the topic “Use of Cell Phones in Education”. A majority (more than 90%) of the students are able to identify the initial research topics “Impact of Internet on Education” is too broader topic, “Impact of Internet on Chemistry Education” is too narrower topic and “ Impact of Internet on Primary Education” is a manageable topic i.e., neither too broad nor too narrow for doing research. Further, 98.3 % of the students are able to identify “Family relations, academic results, primary school” are the correct specific concepts to understand and make initial search of information of the research topic “The effect of family relations on the academic results of primary school students”.

## 6.3 Skill Set Two: Ability to modify and revise the information need on a topic

*Table 3. Modification and revision of the information need on a topic*

Sl. No.	Variables	Response	
		Yes	No.
1	Change a Research Topic	89(76.7)	27(23.3)
2	When to Broaden a Research topic	92(79.3)	24(20.7)
3	When to Narrow a research topic	96(82.8)	20(17.2)
4	How to “Broaden a narrow topic”	93(80.2)	23(19.8)
5	How to “Narrow a Broader topic”	98(84.5)	18(15.5)
	<b>Mean</b>	<b>94(81.0)</b>	<b>22(19.0)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must know when to change an initial research topic, and when and how to broaden or narrower it. Table 3 depicts that 76.7% of the students able to know that an initial research topic was to be changed, when enough relevant information is not available on that topic. 79.3% of the students are able know that an initial research topic is to

be broadened only when a few articles / lesser amount of relevant information is available on that topic and 82.8 % of the students are able to know, an initial research topic should be narrowed only when abundant information is available on that topic. Further 80.2% of the students are able to identify “*Use of Computers in Library Science Education*” is the best narrower topic to the initial research topic “*Use of Computers in Education*” and also a majority (84.5%) of the students is able to identify “*Second-hand smoke causes childhood illness*” is the best broader topic to the initial research topic “*Second-hand smoke causes asthma in Children*”.

#### 6.4. Skill Set Three: Ability to understand the Organization of the Universe of Knowledge

Table 4. Understanding about the Organization of the Universe of Knowledge

Sl. No.	Variables	Response	
		Yes	No.
1	Major Disciplines of Knowledge.	116(100)	-
2	Subject fields belong to Science.	112(97.9)	4(2.1)
3	Subject fields belong to Social Science.	114(98.3)	2(1.7)
4	Subject fields belong to Humanities.	108(93.1)	8(6.9)
	<b>Mean</b>	<b>113(97.4)</b>	<b>3(2.60)</b>

(Note: Figures in Parentheses give percentage)

Basically, an information literate student must be able to understand about the production and organization of the universe of knowledge or information for effectively identifying and accessing the potential information sources on a topic. Table 4 depicts that 100% of the students are able to understand that universe of information is produced and organized into three major disciplines such as *Science, Social Science and Humanities*. From the given examples, a majority 98.3% and 97.9% of the students is able to identify *Education, Sociology and Geography* are the sub disciplines of Social Science and *Chemistry, Biology and Physics* are the sub-disciplines of Science respectively. Further 93.1% of the students are able to identify *Psychology and Philosophy* are the sub-disciplines of Humanities.

#### 6.5. Skill Set Four: Ability to identify, use and distinguishing among different types of information sources

Table 5. Identify, use and distinguishing among different types of information sources

Sl. No.	Variables	Response	
		Yes	No.
1	Identification of General Information Source.	102(87.9)	14(12.1)
2	Identification of Subject-Specific Information Source	110(94.8)	6(5.2)
3	Use of General Information Sources.	99(85.3)	17(14.7)
4	Use of Subject-Specific Information Sources.	103(88.8)	13(11.2)
5	Difference between General and subject Specific information sources.	100(86.2)	16(13.8)
6	Identification of the various formats of information	98(84.5)	18(15.5)
7	Formal Sources of Information.	104(89.7)	12(10.3)
8	Informal Sources of Information	76(65.5)	40(34.5)
9	Identification of Primary Information sources	92(79.3)	24(20.7)
10	Identification of Secondary Information Sources	90(77.6)	26(22.4)
11	Difference between primary sources and secondary sources of information.	88(75.9)	28(24.1)
	<b>Mean</b>	<b>97(83.6)</b>	<b>19(16.4)</b>

(Note: Figures in Parentheses give percentage)

Information sources are the sources which provide information on a topic. It can be general or subject specific and formal or informal. Formal information sources are categorized into three types as primary, secondary and tertiary sources of information. An information literate student must be able to identify, use and distinguish among different types and formats of information sources.

Table 5 depicts that 87.9% of the students and 94.8% of the students are able to identify *Oxford English Dictionary, Frontline: A magazine and The Hindu- A Newspaper* are the general information sources and *Dictionary of Science, Asian Journal of Chemistry, and McGraw Hill Encyclopedia of Science & Technology* are the subject-specific information sources respectively. 85.3% of the students are able to use *Encyclopedia of Britannica* is the best general information source to be consulted for finding the background information on a topic and 88.8% of the students are able to use a *Subject Thesaurus* is the best subject-specific source to be used for finding the correct terminology on a research topic in Chemistry. Further 86.2% of the students are able to identify correct statements which differentiates the general and subject specific information sources i.e, *General information sources are the information sources which covers the information relating to different aspects of the various subjects , usually consulted by all types of people or public whereas Subject-specific information sources are the information sources which covers information relating to different aspects of a particular subject usually consulted by subject teachers, specialists and scientists.*”. 84.5% of students are able to identify book, audio, video, database, website, dataset are the different formats in which information is available. 89.7% of the students are understood that *formal information sources are impersonal, constituted in some regularized or legal manner in relation to the user which includes both printed and electronic information sources and categorized into primary, secondary and tertiary sources of information* whereas 65.5% of the students are understood that *informal information sources are personal sources not constituted in some regularized or legal manner in relation to the user which includes invisible colleges, conversations with friends, colleagues, list serves, discussion forums etc.*, 75.9% of the students are able to understand and identify the difference between primary and secondary sources of information as “*Primary sources are the first-hand information sources , reports original research and new information whereas secondary sources are the information sources that are written about primary sources.*” Again 77.6% and 79.3% of students are able to identify *Dairies, Autobiographies, Research papers* and manuscripts are the primary sources of information whereas *Textbook, Review Articles, Encyclopedia, Handbooks* are the secondary sources of information respectively.

### 6.6 Skill Set Five: Ability to identify the purpose and audience of information source

*Table 6. Identify the purpose and audience of information source*

Sl. No.	Variables	Response	
		Yes	No.
1	Intended audience of a journal article	101(87.1)	15(12.9)
2	Purpose and audience of Science Journal “Asian Journal of Chemistry”	82(70.7)	34(29.3)
3	Purpose and audience of General Magazine “The Week”	111(95.7)	3(4.3)
4	Purpose and audience of Trade Magazine “Autocar India: A magazine	78(67.2)	38(32.8)
	<b>Mean</b>	<b>93(80.2)</b>	<b>23(19.8)</b>

(Note: Figures in Parentheses give percentage)

Every information source is produced and developed by an author with having a particular purpose and intended for the audience. An information literate student must be able to identify the purpose and audience of different information sources to satisfy his/her information needs effectively. Table 6 depicts that a majority (95.7%) of the students are able to identify the general magazine “*The Week*” covers mostly short articles about events around the world and of our local community, which are written by staff, freelancers or guest contributors and intended for the use of general public. 87.1% of the students are able to identify the “Research Scholar and Teachers” not the lawyer and doctor are the intended audience of the given journal article entitled “*Higher order contribution to the propagation characteristics of low frequency transverse waves in a dusty plasma published in a Physics Journal –Pramana:Journal of Physics.*” Again an average 70.7% of the students are able to identify the Science journal “*Asian Journal of Chemistry*” covers original research, peer reviewed articles which are written by subject experts and usually intended for the use of scholars and researchers in Chemistry field whereas only 67.2% of the students are able to identify trade magazine “*Autocar India: A magazine*” covers short to medium-length articles relating to problems or concerns in a particular automobile profession or industry which may be written by staff, professionals in the field, or freelancers and is intended for the use of practitioners of a automobile profession, trade or industry.

**6.7 Skill Set Six: Ability to determine the Cost and Benefit of acquiring information sources**

*Table 7. Determination of the Cost and Benefit of acquiring information sources*

Sl. No.	Variables	Response	
		Yes	No
1	Availability of Information Source in the library	105(90.5)	11(9.5)
2	Alternative way to obtain an Information source	79(68.1)	37(31.9)
3	Obtain the information source which is not available immediately in the library.	65(56.0)	51(44.0)
4	Obtain the book through inter-library loan.	68(58.6)	48(41.4)
	<b>Mean</b>	<b>79(68.1)</b>	<b>37(31.9)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must have the ability to determine the cost and benefit of acquiring needed information sources effectively. Table 7 depicts that 90.5% of the students are able to determine correctly the availability of a book from the given library catalogue record by checking “*Status record showing the availability*” in it. Again 68.1% of the students are able to determine the alternative way of getting a needed book checked out by someone else in library by *finding out whether the library barrow a copy of needed book from another library or not*. Further a large number (56%) of the students are able to determine the right way of finding a needed book immediately which is checked out by someone else by *searching the library catalogue for another available book on the same topic* and also 58.6% of the students are able to obtain a book which is not available in the library through *inter-library loan*.



### 6.8 Skill Set Seven: Ability to use the different information search and retrieval tools or systems

*Table 8. Identification and use of information search and retrieval tools or systems*

Sl. No.	Variables	Response	
		Yes	No
1	Identification of the different information search and retrieval tools or systems	95(81.9)	21(18.1)
2	Use of Library Catalogue	107(92.2)	9(7.8)
3	Use of Research database	63(54.3)	53(45.7)
4	Use of Library Website	82(70.7)	34(29.3)
5	Use of Controlled Vocabulary i.e., Thesaurus and Subject Heading	70(60.3)	46(39.7)
6	Use of Search Engine	86(74.1)	30(25.9)
7	Use of Call Number System	71(61.2)	45(38.8)
8	Use of Organizational Structure of a Typical Book	92(79.3)	24(20.7)
9	Use of Reference Desk in the Library	109(94.0)	7(6.0)
	<b>Mean</b>	<b>86(74.1)</b>	<b>30(25.9)</b>

(Note: Figures in Parentheses give percentage)

An information literate student must be able to identify and use different information search and retrieval tools to effectively access the needed relevant information on a topic. Table 8 reveals that 81.9% of the students are able to identify *library catalogue/OPAC/WebOPAC, bibliography, index, database, abstract, call number, web search engine* are the important information search systems and retrieval tools used by them to access the information. 92.2% and 94% of the students are able to use *library catalogue* as information retrieval tool to search and locate the information resources available in the library and ask at the *reference desk* of the library as a best service point to get help for using reference sources respectively. Again 79.3% of the students are able to use *organization structure of a book* to locate and retrieve information available on a topic in it i.e., *Introduction part* to locate the statement of goals and purpose, *Table of contents part* to locate the chapters covered, *Glossary part* to locate the definition of the list of difficult terms used and *index part* to locate the information on a particular topic or word available in the book. 74.1% and 70.7% of students are able to identify and use *search engine* as a information search tool to search information on the internet or World Wide Web and *library website* is the best tool to retrieve the information about the research consultation service available in the library respectively. Further 60.3% of students are able to use *controlled vocabulary i.e., subject heading and thesaurus* as information retrieval tool to find good subject headings for searching and locating articles on a topic in a research database. Further 61.2% and 54.3% of the students are able to use *call number* system to locate and retrieve a particular book on the library shelf and use *research database* as an important retrieval tool to locate the good journal articles on a specific topic respectively.

### 6.9 Skill Set Eight: Ability to evaluate the Information Sources

*Table 9. Evaluation of Information Sources*

Sl. No.	Variables	Response	
		Yes	No
1	Application of Criteria's for evaluating an printed information source	89(76.7)	27(23.3)
2	Application of Criteria's for evaluating an e-resource	59(50.7)	57(49.3)

3	Authority of an Information Source	83(71.6)	33(28.4)
4	Validity and Accuracy of an Information Source	81(69.8)	35(30.2)
5	Publisher of an Information Source	68(58.6)	48(41.4)
6	Timeliness/Currency of an Information Source	77(66.4)	39(33.6)
7	Organization of an information source.	75(64.7)	41(35.3)
8	Coverage of an Information source	88(75.9)	28(24.1)
9	“Bias” View Point in an information source	51(44.0)	65(56.0)
10	“Opinion” View Point in an information source	63(54.3)	53(45.7)
11	“Fact” View Points in an information source	71(61.2)	45(38.8)
	<b>Mean</b>	<b>73(62.9)</b>	<b>43(37.1)</b>

(Note: Figures in Parentheses give percentage)

An information literate student must be able to evaluate the identified information sources (both Print and Electronic) in order to obtain most reliable information on a topic. Table 9 reveals that 76.7 % of students able to apply *criteria's* such as authority, validity, accuracy, publisher, currency, coverage, organization of information, bibliography viewpoints such as bias, fact and opinion for evaluating an printed information sources whereas a minimum 50.7% of the them are able to apply URL, Links to external websites and FAQ's are the additional *criteria's* applied to evaluate an e-resource along with the above mentioned *criteria's* used for evaluating a printed source of information. 71.6% of the students are able to evaluate the *qualifications of an author* of the journal article either by searching biography database or by searching the reviews of the author's work in a periodical index or research database and 69.8% of students are able to evaluate the *validity and accuracy* of a journal article by consulting the bibliographic references cited at the end of the article. Again 75.9%, 66.4% and 64.7% of students are able to evaluate the *coverage* of a textbook by checking clearly the overview, in-depth analysis and presentation of new information about the topic, *currency* by checking its year of publication and the *organization of information* in a website by checking the logical and clear presentation of the ideas, ease of navigation of the site, quick loading of pages and working hyperlinks in it respectively. 58.6% of the students are able to evaluate the *publisher of a textbook* either by reading the book reviews if any available about the publisher, by consulting the publisher website or publisher magazine covering the information about its publication history.

Further 52.3%, 61.2%, and 44% of students are able to check and identify the different viewpoints of information provided by the authors such as *opinion* encountered in the excerpt A: "The argument against armed self-defense is one of the most insidious forms of victimization of women. The dominant cultural conditioning tells women that they are not capable of defending themselves with a gun. That's why fewer than 10% of women own guns", *fact* in excerpt B: "According to the U.S. Department of Justice, 39% of adults say they have a gun at home and additional 2% say they have a gun somewhere else on their property or in a car or truck" and *bias* about information covered in the reference book "Encyclopedia of Americana, published by Grolier Inc., respectively.

### 6.10 Skill Set Nine: Ability to Construct, use and revise Information search strategies

*Table 10. Construction, use and revision of Information search strategies*

Sl. No.	Variables	Response	
		Yes	No.
1	Information Search Process	93(80.1)	23(19.9)
2	Author Search	112(96.6)	4(3.4)
3	Title Search	106(91.4)	10(8.6)
4	Subject Search.	105(90.5)	11(9.5)
5	Advanced Search	58(50.0)	58(50.0)
6	Concept of Browsing	63(54.3)	53(45.7)
7	Identification of Boolean Search Operators	53(45.7)	63(54.3)
8	Construction of Search Statement Using Boolean Search Operator “AND”	48(41.4)	68(58.6)
9	Construction of Search Statement Using Boolean Search Operator “OR”	55(47.4)	61(52.6)
10	Construction of Search Statement Using Boolean Search Operator “NOT”	61(52.6)	55(47.4)
11	Identification of Proximity Search Operators	45(38.8)	71(61.2)
12	Construction of Search statements using Proximity Operator “WITH”	43(37.1)	73(62.9)
13	Construction of Search statements using Proximity Operator “NEAR”	42(36.2)	74(63.8)
14	Construction of Search statements using Proximity Operator “ADJ”	41(35.3)	75(64.7)
15	Construction of Nested Search Statement.	51(44.0)	65(56.0)
16	Identification of Truncation Search Elements	37(31.9)	79(68.1)
17	Use of Truncation Search Elements \$ and *	35(30.2)	81(69.8)
18	Construction of the Keyword Search Statement	40(34.5)	76(65.5)
19	Revision of the Information Search Statement	56(48.3)	60(51.7)
	<b>Mean</b>	<b>60(51.7)</b>	<b>56(48.3)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must be able to construct, use and revise information search strategies to access and retrieve his/her needed information on a topic effectively. Table 10 depicts that 80.1% of students are able to identify and understands the steps involved in *information search process* on a topic in correct way. 96.6%,91.4% and 90.5% of students are able to do *author search* to fulfill his information need “ to find all the book written by J. K. Rowling” , *title search* to find the book entitled “ A textbook of Inorganic Chemistry” and *subject search* “to find all books written on Water Pollution” respectively.54.3% of the students are known that the *concept of browsing* refers to “*the exploration of the World Wide Web by following one interesting link to another, usually with a definite objective but without a planned search strategy*”. 45.7%, 38.8% and 31.9% of the students are able to identify AND, OR and NOT are the Boolean Search Operators, NEAR, WITH and ADJ are the Proximity Search Operators and \$ and \* are the Truncation Elements respectively. 41.4% of students are able to construct and use “Hurricanes AND Florida” is the correct Boolean search strategy to search information in a database on Hurricanes in Florida, 47.4% of students are able to construct and use “Ecology OR Pollution” is the correct Boolean search strategy to find information about either ecology or pollution and 52.6% of students are able to construct and use “Website design NOT software” is the correct Boolean search strategy to find information on designing websites but not on specific website design softwares.

A minimum 37.1% of the students are able to construct and use “Internet WITH Education” is the correct Proximity search strategy to search the records which contain information on internet in education in a database, 36.2% of the students are able to construct and use “Apple NEAR Computer” is the correct Proximity search strategy to find the most efficient results in a database containing two words "apple" and "computer" are within a certain distance and 35.3% of the students are able to construct and use “Gene ADJ Technology” is the correct Proximity search strategy for finding most efficient articles on Gene Technology.

50% of the students are able to identify and use “Advanced Search” is the best and correct option to limit the search results to the items available only in English Language while searching in Google search engine and 34.5% of the students are able to identify ‘College and Censorship’ is the correct Keyword search strategy to search information on the topic ‘Should colleges be allowed to restrict student speech? in a Web search engine.

### 6.11 Skill Set Ten: Ability to plan, develop and communicate Information Product or Performance

*Table 11. Planning, developing and communicating Information Product or Performance*

Sl. No.	Variables	Response	
		Yes	No
1	Planning of Information Product or Performance	63(54.31)	53(45.69)
2	Development of Information Product or Performance	51(43.97)	65(56.03)
3	Communication of Information Product or Performance	55(47.41)	61(52.59)
	<b>Mean</b>	<b>56(48.3)</b>	<b>60(51.7)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must be able to plan, develop and communicate effectively an information product or performance. Information product refers to the collection of content that is processed as a unit which consists of a series of elements in a defined order or structure. For examples: assignments, brochures, user guides, project works, printed book or articles etc. Information performance refers to the act of presenting or demonstrating knowledge, skills and material that has been learned. For examples: oral presentation, audio-visual presentation, etc., Table 11 depicts that 54.31% of the students are able to prepare and use a good plan for creating an effective Power Point presentation of a class assignment to present by following some important general guidelines such as avoiding lengthy or wordy sentences, using as many visual and auditory aids as possible to keep the targeted audience interested and by making sure that the contrast between the colors of the text and background is pleasing to the eye, and that the text is easy to read whereas 43.97% of the students are it is essential and necessary to maintain a log of activities before and after searching a database on a topic while developing any information product or performance. Further 47.41% of the students are able to select the best strategy to communicate an information product or performance i.e., using MS-Excel for plotting the data collected from a series of their Chemistry lab experiments and presenting the same by using PowerPoint presentation.

**6.12 Skill Set Eleven: Ability to summarize, synthesize and validate the information gathered.**

Table 12. *Summary, Synthesis and Validation of Information Gathered*

Sl. No.	Variables	Response	
		Yes	No.
1	Summarize the Information Gathered	66(56.9)	50(43.1)
2	Synthesize the Information Gathered	45(38.8)	71(61.2)
3	Validate the Information Gathered	73(62.9)	43(37.1)
	<b>Mean</b>	<b>61(56.9)</b>	<b>55(47.4)</b>

(Note: Figures in Parentheses give percentage)

An information literate student must be able to summarize, synthesize and validate the information gathered on a topic. Table 12 reveals that 56.90% of the students are able to choose the correct summary which represents the main idea in short or concise form of a paragraph of the article titled “*The Quake Makers* by Nicola Jones” given to them whereas a fairly 38.79% of the students are able to effectively synthesize the information of a original book passage from *Bluebeard* written by Kurt Vonnegut given to them. Further an average 62.93% of the students are able to validate i.e. to check or prove the accuracy of the information gathered by asking seeking the subject-experts/teachers opinion, by participating in classroom discussion and class sponsored electronic communication.

**6.13 Skill Set Twelve: Ability to understand the ethical, legal and social issues surrounding the use of information and information technology**

Table 13. *Understanding the ethical, legal and social issues surrounding the use of information and information technology.*

Sl. No.	Variables	Response	
		Yes	No.
1	Understanding of the legal concepts relating to Information use such as intellectual property, copyright, fair use of copyrighted material, right to privacy, freedom of information and censorship.	51(44.0)	65(56.0)
2	Identification of the issues relating to the legal concepts of information use such as intellectual property, copyright, fair use of copyrighted material, right to privacy, freedom of information and censorship.	50(43.1)	66(56.9)
3	Concept of Plagiarism	47(40.5)	69(59.5)
4	Identifying the actions qualify as Plagiarism and not plagiarism	48(41.4)	68(58.6)
5	Ability to know that not all information on the web is free	46(39.6)	70(60.4)
6	Legally obtaining of images available in the web	54(46.5)	62(53.5)
7	Understanding that the library pays for access to databases, information tools, full text resources, etc	56(48.3)	60(51.7)
8	Understanding that terms of subscriptions to databases may limit their use to a particular clientele or location	73(62.9)	43(37.1)
	<b>Mean</b>	<b>53(45.7)</b>	<b>63(54.3)</b>

(Note: Figures in Parentheses give percentage)

An information literate student must be able to understand the ethical, legal and social issues surrounding the use of information and information technology. Table 13 depicts that 43.97% of the students are able to understand the legal concepts such as intellectual property, copyright, fair use of copyrighted material, right to privacy, freedom of information and censorship relating to information use and 43.10% of the students are able to identify and understand the issues relating to them. Again 40.52% of the students understand the concept of plagiarism as “*the use of another’s original words or ideas as though they were your own*” and 41.38% of the students are able to identify the correct actions which qualify as plagiarism or not plagiarism from the given actions. 46.55% of the students are able to legally obtain the images created by another person on their own webpage by asking the permission of the original creator of the image. Further, 39.66%, and 48.28% of the students know that not all the information available in the web is free, and library pays for accessing the full text databases for its users respectively. Further 62.93% of the students are able to understand that the library has restriction for providing access to the subscribed fulltext databases to its clientele within its campus only as per the license agreement and not to others.

**6.14 Skill Set Thirteen: Ability to acknowledge and documenting the information sources.**

*Table 14. Acknowledging and documenting the information sources*

Sl. No.	Variables	Response	
		Yes	No.
1	Concept of “Acknowledging sources”.	43(37.1)	73(62.9)
2	When to acknowledge an information source	46(39.7)	70(60.3)
3	Why to acknowledge an information source	41(35.3)	75(64.7)
4	Concept of “Documenting Sources”	38(32.8)	78(67.2)
5	Concept of ‘Citation’, ‘Reference list’ and ‘Bibliography’	39(33.6)	77(66.4)
6	Concept of ‘Quoting’, ‘Summarizing’ and ‘Paraphrasing’	43(37.1)	73(62.9)
7	When to quote, paraphrase, & summarize	47(40.5)	69(59.5)
8	Identification of the correct direct quotation, paraphrase and summary	51(44.0)	65(56.0)
9	Identification of the different type of information sources from given reference list	57(49.1)	59(50.9)
10	Identification of the citation elements required for recording the bibliographic information of a book and journal article	53(45.7)	63(54.3)
11	Concept of “Documentation Style”	35(30.2)	81(69.8)
12	Identification for different documentation styles	32(27.6)	84(72.4)
13	Consistency in Citation Format	33(28.4)	83(71.6)
14	Location of information about documentation styles.	34(29.3)	82(70.7)
	<b>Mean</b>	<b>42(36.2)</b>	<b>74(63.8)</b>

*(Note: Figures in Parentheses give percentage)*

An information literate student must be able to acknowledging and documenting the use of information source effectively in communicating the information product or performance. Table 14 depicts that 37.1%, of the students are able to understand that concept of ‘Acknowledging Sources’ refers to a ‘*courtesy for providing written recognition of any ideas that are used or adapted in a work, also called as referencing, citing and attribution*, 39.7% of the students are able to know that an information source is acknowledged only when direct quoting, paraphrasing and summarizing or using any exact words, ideas, pictures etc., that are not your own or are not common knowledge and 35.3% of the students are able to know that

reasons behind acknowledging an information source used in a research paper is to support the argument, demonstrating the academic integrity, making it easy for readers for the sources consulted, to fulfill moral and legal obligations to recognizing the author(s) of the original ideas and to avoid plagiarism so that not falsely claiming someone else's work or ideas as own.

A minimum 32.8% of the students are able to understand the concept of 'Documenting Sources' as *'a general practice of acknowledging sources by clearly indicating what you have borrowed and giving the proper bibliographic information for each source'* and also 33.6% of the students are able to understand the concept of Bibliography as *'a list of reference at the end of a paper or work, whether cited or not cited'*, Citation as *'an abbreviated alphanumeric expression embedded in body of an intellectual work that denotes an entry (such as author, title, publisher, place of publication) in the bibliographic references section of the work'* and Reference List as *'a list of works cited at the end of a paper or work'*.

37.1% of the students are able to understand the concept of 'Quoting' as *'Word for word or verbatim, relevant and usually brief, introduced or framed by your writing, and needs attribution and citation'*, concept of 'Paraphrasing' as *'to rewrite and synthesize someone else's ideas without changing their meaning or intent and needs attribution and citation'* and Concept of 'Summarizing' as *'Putting into your own words, including only the main points or main ideas, provides a brief overview, often shorter than the original text, not in quotation marks, and needs attribution to the source'*, 40.5% of the students are able to know when to quote, paraphrase or summarize an information source and 44% of the students are able to identify the correct quote, paraphrase and summary from the given extract.

The Table 14 also depicts that 49.1% of the students are able to identify the information sources such as a book, e-book, journal, e-journal and chapter in a book from the given reference list, 45.7% of the students are able to identify and select the citation elements required for recording the bibliographic information of a book, e-book, a journal article and a e-journal article. Further 30.2% of the students are able to understand the concept of 'Documentation style' as *'a standard approach to the citation of sources, prescribes methods for citing references within the text, providing a list of works cited at the end of the paper, and even formatting headings and margins and there are different types of documentation styles for different subjects or disciplines'*, 27.6% of the students are able to identify the different types of documentation style for different disciplines such as The ACS style guide for Chemistry discipline, The CSE Manual for Authors for Biology discipline, APA style Manual for Social Sciences discipline, IEEE Editorial Style Manual for Engineering, AMS Author Book for Mathematics discipline and AMA Manual of style for Medicine subject, 28.4% of the students rightly opinioned that selecting a citation style and using it consistently is the best thing to do, when the teacher has not instructed, you to use a particular documentation style in an assignment paper and 29.3% of the students are able to know that for effective learning of how to use a particular style manual, the best strategy followed is to either consult the documentation style manual directly or the library website for guides to using documentation styles.

## **7. Findings**

A brief summary of the findings of the study are as follows:

- A majority 97.4% and 92.5% of the respondents are able to understand the organization of the universe of knowledge and able to identify, define and develop the information need on a topic respectively.
- A majority 83.6%, 81% and 80.2% of the respondents are able to identify, use and distinguishing among different types of information sources, able to modify and revise the information need on a topic and also able to identify the purpose and audience of an information source.
- 74.1% of the respondents are able to use the different information search and retrieval tools or systems.
- An average 68.1% and 62.9% of the respondents are able to determine the cost and benefit of acquiring information sources and evaluate the information sources effectively respectively.
- A more than fifty percent of the respondents i.e., 56.9% and 51.7% of the students are able to summarize, synthesize and validate the gathered information effectively and to construct, use and revise information search strategies respectively.
- Substantial number i.e., 48.3% and 45.7% of the students are skilled to plan, develop and communicate an information product or performance effectively and to understand the ethical, legal and social issues surrounding the use of information and information technology respectively.
- Fairly 36.2% of the students are able to acknowledge and documenting the information sources effectively.

## **8. Suggestion & Conclusion**

Concluding it can be said that in contemporary university education, students are required to empower with the essential information literacy skills. Their lack can hinder students' learning and progress. In pursuit of competing in the present higher education area integration of information literacy education into study programmes has become inevitable. Grounding on the above research findings it is suggested:

- To integrate information literacy into the university curriculum emphasizing on information literacy abilities, which are relevant to acquisition of knowledge and skills in a particular subject.
- To involve university library professionals in the study and teaching process of information literacy by encouraging them to prepare special information literacy course modules at university.
- To arrange in-service training for university library staff in the area of information literacy, encourage faculty cooperation aiming at information literacy dissemination at university level. Encourage teachers to apply innovative teaching methods that emphasize the use of ICT and information literacy skills.
- To assess IL skills of students regularly using defined methods and tools.

## **References**

1. Macdonald, Mary C. et al.. (2000). Challenges in Building an Incremental, Multi-year Information Literacy Plan. *Reference Services Review*.28, 3, 240-247



2. Semans, Nancy H. (2002). Students Perceptions of Information Literacy: Insights for librarians, *Reference Services Review*. 30, 2, 112-123
3. Parker, Jo (2003). Putting the pieces together: Information Literacy at the Open University, *Library Management*. 24, 4-5, 223-228
4. Mitemeyer, Daine & Quirion, Daine. (2003). Information literacy: Study of incoming first-year undergraduates in Qubec.
5. Retrieved and Available at: [http://works.bepress.com/karen\\_nicholson/5/](http://works.bepress.com/karen_nicholson/5/)
6. Kemparaju, T.D. (2004). The Information Literacy Program: a case of Digital Libraries, *SRELS Journal of Information Management*. 41, 1, 67-78
7. Ferguson, Jessame E. et al.(2006). A Baseline information literacy assessment of Biology Students, *Reference & User Services*. 46, 2, 61-71
8. Bavakutty, M. & Nasirudheen, T.P.O. (2008). Assessing information literacy competency of research students in India: A case study. In ICOLIS 2008 held at Kuala Lumpur, 109-121.
9. Biradar, B.S. et al.(2010). Information Literacy perception: a study of Bioscience students of Kuvempu University, *International Journal of Library Science*. 2, A10, 1-15
10. Hadimani, Manjunath B. & Rajgoli, Iqbalahmad U.(2010). Assessing information literacy competence among the undergraduate students of College of Agriculture, Raichur: A case study, *DESIDOC Journal of Library & Information Technology*. 30,2, 70-78.
11. Baro, Emmanuel E.(2011).A survey of information literacy education in library schools in Africa, *Library review*. 60, 3,202-217
12. Balasubramanion, P. & Vijaya Kumar, S. (2014). Attitudes of faculty members, research scholars and students towards information literacy, *IASLIC Bulletin*. 59, 2, 73-81
13. ISSA et al. (2015).An assessment of information literacy competency of undergraduate students in University of Ilorin, Kwara State, Nigeria, *Annals of Library and Information Studies*.62,2 , 68-76

