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SCONUL SEVEN PILLARS MODEL TO TEST THE INFORMATION LITERACY SKILLS OF ENGINEERING STUDENTS: A CASE STUDY

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Abstract

Information literacy is a crucial component of developing life – long learning skills. Students need to be information literate to cope up with the challenges in further studies and future profession. The present study investigated the information literacy skills of engineering students of PSR Engineering College, Virudhunagar district, Tamilnadu State, India. It is descriptive survey method. 400 students were randomly selected. Data were collected using questionnaire. Statistical Package for Social Sciences (SPSS), Version 17.0 was used to analyze the data so prepared. Descriptive and inferential statistics have been applied to the data. The results reveal that: The students are better skilled at identifying the concepts and terms related to the information they need ; knowing what they don't know to identify and information gap; defining the scope of search questions clearly in appropriate language ; using a range of retrieval tools and resources and using a range of retrieval tools and resources effectively. They are least skilled at combining the existing information with original concept ; using new tools as they become available; identifying controlled vocabularies and taxonomies to aid in searching if appropriate ; identifying when the information need has not been met and critically appraising and evaluating their own findings and those of others. Majority of the respondents supported the induction of information literacy programmes on the use of internet and online databases.

Keywords: Information Literacy, Engineering students, SCONUL seven pillar model, IL training.

1. INTRODUCTION

Information, these days is considered as an important input to all human activities. The concept of information as a salable commodity is increasingly being recognized and accepted in our present society. Information is needed for a variety of purposes contributing to

decision making or problem solving. It is that which reduces uncertainty. It is that which assists in decision making. It may exist as data in books, computer, people, files and thousands of other sources.

1.1 LITERACY: MEANING AND CONCEPT

Literacy is a simple process of acquiring basic cognitive skills. Literacy is using these skills in ways that contribute to socio-economic development. Literacy is developing the capacity for social awareness and critical reflection as a basis for personal and social change.

Originally, the word 'literate' meant to be 'familiar with literature' or, more generally, 'well educated, learned'. Only since the late nineteenth century has it also come to refer to the abilities to read and write text, while maintaining its broader meaning of being 'knowledgeable or educated in a particular field or fields'. (UNESCO,2006).

1.2. INFORMATION LITERACY

Librarians have tried to help library users to locate and find information under the labels "library instruction", "bibliographic instruction" and "library skills" for many years.

It is generally agreed that user education in libraries evolved at the end of the nineteenth century. However there is evidence that library instruction was given at German universities even in the seventeenth century in the form of lectures about reference books, study techniques, and how to use the library (Salony, 1995; Virkus & Metsar, 2004). Increasing attention to information literacy is partly the result of information overload, especially related to the rapid development of information and communication technologies and the growth of digital information and partly because of the new focus on learning in a lifelong learning context (Breivik, 1998; Rigmor & Luke, 1995; Virkus, 2003; Wilson, 2001).

Information Literacy is the set of skills and knowledge needed to be able to access technological resources and assess their accuracy, reliability, and credibility. As the American Library Association states, Information Literacy is focused on content, analysis, searching and evaluation of information.

1.3. DEFINITIONS OF INFORMATION LITERACY

Information Literacy is “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information” (ACRL, 2000).

Webber and Johnston (2001) define “Information Literacy” as “the adoption of appropriate information behaviour to obtain, through whatever channel or medium, information well-fitted to information needs, together with critical awareness of the importance of wise and ethical use of information in society”.

Information Literacy encompasses knowledge of one's information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues or problems at hand; it is a prerequisite for participating effectively in the Information Society, and is part of the basic human right of lifelong learning (The Prague Declaration, 2003).

Information Literacy is an intellectual framework and a social process for understanding, finding, evaluating, communicating and using information activities which may be accomplished in part by fluency with information technology, in part by sound investigative methods, but most important, through critical discernment and reasoning. Information Literacy initiates, sustains, and extends lifelong learning through abilities which may use technologies but are ultimately independent of them (Abid, 2004).

Information Literacy knows when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner (Chartered Institute of Library and Information Professionals, 2005).

Information Literacy is the array of knowledge and skills necessary to identify the information needed for a task and then to locate, understand, evaluate, and use that information efficiently and effectively within appropriate ethical and legal limits (West Chester University of Pennsylvania, 2006).

Information Literacy may be defined as the ability to know what there is in a landscape and to draw meaning from it through engagement and experience with information. This ability arises from complex contextualized practice, processes and interactions that enable access to social, physical and textual sites of knowledge (Lloyd, 2006).

From the above definitions, it is evident that information literacy could be a skill or ability or knowledge to search, locate, retrieve and use/communicate information in an ethical way. Further, information literacy is related to lifelong learning of an individual.

2. REVIEW OF LITERATURE

Fosnacht (2017) investigated the reliability and validity of the National Survey of Student Engagement's Experiences with Information Literacy module, an assessment instrument developed in collaboration with a group of instructional librarians. In the 2014 and 2015 NSSE administrations, 44,700 senior students responded to the Experiences with Information Literacy module. These students attended 128 U.S. bachelor's-granting institutions. The response rate for the sample was 27%. After identifying three information literacy related constructs in the module, it assessed the relationship between the constructs and students' engagement in Higher-Order Learning and Reflective and Integrative Learning activities and students perceived gains. The results from these analyses indicated that information literacy activities are positively and significantly correlated with student engagement and students' perceived gains.

Kumari and Mallaiah (2017) undertook a study to determine digital information literacy skills among faculty members of engineering colleges in Manalore, Karnataka: A study. The study discussed the highlights the ways and means the faculty members search the information from different digital information sources. The survey method was adopted for the present study and a structured questionnaire was administered to collect the data. Totally 350 questionnaires were distributed among faculty members, out of which 240 filled in questionnaires were received. The study finds the digital information resources used by the faculty members to get information relating to their own areas. The study will definitely help to organize different information literacy programs in the college to promote and to develop the information literacy skills among faculty and to improve the teaching quality.

Xu and Chen (2016) discussed about the traditional basic literacy skills of reading, writing, among the teachers in central Taiwan and Fujian Province. Aiming at university, 450 copies of questionnaires were distributed in this study. Total of 288 valid copies are collected, with the response rate of 64%. The findings are: 1. Information literacy reveals significantly positive effects on information technology integrated instruction. 2. Information technology integrated instruction shows notably positive effects on teaching effectiveness. 3. Information literacy presents remarkably positive effects on teaching effectiveness. The study

recommended to help teachers to promote the teaching effectiveness by applying information technology equipments, mentor teaching activities or processes with sufficient information literacy.

Issar, Amusan, Olarongbe, Igwe and Oguntayo (2015) performed a survey on the IL competence of the final year undergraduate student at the University of Ilorin, Nigeria to identify their information needs and ability to satisfy such needs, exposure to IL programmes, strategies employed and the challenges faced. A 6-sections questionnaire was used for collecting data from 1205 samples drawn with the help of purposive sampling technique. The study revealed that: majority of the respondents had information needs on their academic engagements like class assignments and project writing. Strategies employed in meeting their information needs revealed their limited IL skills even as they only have little exposure to available IL programmes. Majority expressed dissatisfaction with their present status of information availability, accessibility, and usages. Many considered difficulty in identifying their needs, cost of Internet browsing, subscription requirement, as challenges hence their low level IL competence, constituting hindrance against the full exploration of information resources that may be available for their use. The study recommended that the University authorities should consider the teaching of IL as a course to fresh students with credits attachment.

Ramamurthy, Siridevi, Santhiram, Nandyal and Ramu (2015) investigated the knowledge of information literacy and search skills of students in five selected Engineering Colleges in Chittoor district, Andhra Pradesh. It also examined students' ability to distinguish diverse information sources and to assess the effectiveness of information literacy programmes of engineering colleges. The sample consists of 275 respondents drawn proportionately from a population of 300 from the selected Engineering colleges. Descriptive survey method was used to elicit data through Questionnaires. Findings revealed that the respondents had low knowledge of information literacy skills and showed high deficiency in identifying diverse information sources. The various information literacy programmes of the respondents' institutions lacked hands-on. The study suggested the need for an enhanced and continuous library user education geared towards empowering students to be sufficiently familiar with information sources, mutual collaboration between teachers and librarians to ensure integrated mode of lecture delivery, constant advocacy and sensitization outreaches.

Santharoban and Premadasa (2015) undertook a study among the Faculty of Health Care Sciences of Eastern University, Srilanka to develop an information literacy model for the problem based learning (PBL) process. For developing a suitable IL model, the study used the PBL process practiced. The activities of faculty's PBL process were divided into four phases, and skills essential for each phases were determined. Based on this information, a conceptual IL model was created. The proposed model consists of four components- analysis, locate, use and review. Each component has an array of information literacy skills and these skills should be learning outcomes when training the student in information literacy. The study revealed that: the model may be used to train the students before commencing PBL session or by integrating the model with PBL.

Kumbar, Mallinath, Tejashwini and Kirankumar (2011) reported a study on Information literacy skills among engineering students of Sri Jayachamarajendra College of Engineering, Mysore. The study discussed the important aspects of information literacy competencies involving attitudes and values of engineering students. 350 structured questionnaires were distributed among SJCE students and the response rate was 89.33%. The students use various skills to approach for scholarly information. The findings are: majority of students approached internet resources (39.55%), followed by journals (20.52%) and the least approached is reports (7.08%). The analysis of student's extent of awareness in copy right and citation concepts reveals that they are aware about this issue to a little extent 56(44.80%), followed by moderate 42(33.60%) extent and least percentage of students 27(21.60%) said that they are well aware about the concept and apply in their day today information use behavior.

Ali, Hassan, Daud and Jusoff (2010) undertook a study to determine the Information literacy skills among the diploma level engineering students at a Malaysian college. Data were collected using a survey instrument. The findings revealed that: respondents seriously lacked the necessary knowledge and skills to evaluate internet information, to identify the most efficient search strategy, to use scholarly resources, and to use information ethically. Most scholarly resources used were books in print format, while most non-scholarly resources referred to were in electronic format. This study implies the importance of information literacy assessment as the first step in improving students' information skills. It also indicates the need to encourage students to use more scholarly electronic resources in their coursework. The study suggested the introduction of an intervention program to improve students' information literacy skills.

Baro and Fyneman (2009) investigated the undergraduate students' level of awareness of information sources available in the university, to know their level of digital literacy and to determine the different search strategies used by them. It adopts a descriptive survey method and covers the 350 undergraduate students of the four departments in the Faculty of Social Sciences: Economics, Sociology, Political Science, and Geography and Environmental Studies, from which a sample of 105 students is drawn. It revealed that male students in the faculty are more aware and use the information sources available in the university more than the female students. There is significant difference between gender and search strategies used by the undergraduate students in the social sciences. Male students are more digitally literate, they utilize the internet facilities provided in the university library, use different search engines and utilize the CD-ROMs in the e-library section more than the female students.

3. RESEARCH METHODOLOGY

3.1 NEED AND SIGNIFICANCE OF THE STUDY

The academic wings of the students, faculty members, working professional and common people fly freely and effectively in the information proliferated, information polluted, information scattered, and information heaped knowledge sky to reach the destination of a useful, productive and efficient personal, professional and general life. The omnipotent and omniscient information world is not a myth but a reality now. The status and ability of individuals depend heavily on how information literate they are. Mere literacy – the ability to read and write – will not serve the purpose in the present Google era. The ability to realize the need for information, the skills to locate and access the required information, the knowledge to evaluate the collected information correctly, the wisdom to apply the evaluated information rightly and the conscience to acknowledge the sources used judiciously – are all the 21st century information literacy skills needed for the students, faculties and working professionals of all disciplines. This holds good even more for the students of professional courses like medicine, engineering, law etc.

The engineering students need to be information literate. They should develop skills to locate, gather, evaluate, use and credit both print and online e-resources to their benefit. They may develop their information search, information retrieval, information evaluation and information use skills in various information sources available in engineering and allied courses. We need to undertake surveys periodically to measure the information literacy skills of engineering students so as to enable us decide where they stand, what we expect in them

and what gaps exist between these two extremes. This will help the management to take remedial measures and administrative decisions to emulate the engineering students to become better information literates to face the fast growing and challenging engineering education / profession world.

3.2 OBJECTIVES OF THE STUDY

The researcher has set the following objectives for her study, inter alia:

- To elicit the socio-demographic information about the respondents
- To find out the frequency and purposes of library visits
- To measure the information literacy competencies of the respondents in
 - Identifying the need for information
 - Assessing the current knowledge and identifying gaps
 - Constructing strategies for locating information
 - Locating and accessing information needed
 - Reviewing, comparing and evaluating information
 - Organizing information professionally and ethically
 - Applying, presenting, synthesizing and disseminating information
- To understand the need for induction of IL training programmes

3.3 HYPOTHESIS

The researcher has set the following hypotheses for her study.

- There is no association between the nativity of the respondents and the areas of information literacy training needed.
- There is no significant difference between the nativity of the respondents and the information literacy skills.
- There is no significant difference between Formal computer courses of the respondents and the information literacy skills.
- There is no significant difference between the Course / discipline of the respondents and their information literacy skills.

3.4 SCOPE AND LIMITATIONS OF THE STUDY

Every research study has its limitations and this study is not an exception. The limitations of the present study are listed below.

- This study is confined to one engineering college i.e. PSR Engineering College.
- Since all the respondents were drawn from a particular institution, results may not be generalized beyond the specific population from which the sample was drawn.
- This study may suffer from the inherent demerits of the sampling technique employed.
- The study relies on data obtained from self-report measures only; the responses may suffer from human bias and prejudice.

3.5 Research Type

The study undertaken by the researcher belongs to descriptive-cum-evaluative research study. The researcher has used sampling method in his survey study

3.6 Nature of the Data

The data required for the study was collected from primary as well as secondary sources. The primary data was collected from the engineering college students through questionnaires. The secondary data was collected from various books, periodicals, hand books, e-journals, conference proceedings, book chapters, theses, reports etc.

3.7 Sample Required

The sample size calculator from Raosoft is used to find out the minimum number of samples needed for the study. When the population is 1200, the recommended sample size is 374 at 5% margin of error and at 98% confidence interval. The researcher has decided to collect data from 400 samples.

3.8 Sampling Technique

The researcher used stratified random sampling method to draw necessary samples from the population.

Population : 1000						
Samples Required : 400 (Stratified Sampling) = 5 Strata (Disciplines)						
Courses	Civil	Mech	CSE	EEE	ECE	Total
Samples	80	80	80	80	80	400
Selection of 80 respondents from 5 selected Courses						
Stratified Sampling (4 Strata X 20 each for every course (Year of Study)						

Selection of Samples (Random Sampling Method)						
I Year	20	20	20	20	20	100
II Year	20	20	20	20	20	100
III Year	20	20	20	20	20	100
IV Year	20	20	20	20	20	100
Total	80	80	80	80	80	400

3.9 Instrument for Data Collection

A well structured questionnaire was designed to collect required data from the selected 400 respondents. The questionnaire has 4 parts.

Part A : Socio-demographic information of the respondents

Part B : Library visits and usage

Part C : Information Literacy Competency Assessment

Part D : Need and methods for information literacy programmes

3.10 Preparation of Part C of Questionnaire: IL Competency Assessment

Many models of information literacy exist as on the date. The researcher has chosen “The SCONUL Seven Pillars of Information Literacy: Core Model” published by the SCONUL working committee on Information Literacy in 1999 and revised in April 2011. The Society of College, National and University Libraries (SCONUL) represents all University libraries in the UK and Ireland, irrespective of mission group, as well as national libraries and many of the UK’s colleges of higher education.

Questions for all the seven pillars of information literacy as enunciated in the above model were included in Part C of the questionnaire designed by the researcher for her work.

3.11 Data collection period and Method of Data Collection

The data was collected during the month of March 2016. Copies of questionnaires were distributed personally to users. Each questionnaire was distributed after explaining the purpose of the study. The investigator cleared the doubts of users now and then on the spot. Finally duly filled-in questionnaires were collected back from the users.

3.12 Style of in-Text Citation and References

In –text citations and references required for the study are prepared following American Psychological Association Publication Manual 6th Edition. Zotero software (Stand Alone) Version 4.0.28.7 was used for generating the references according to APA 6th Edition.

4 DATA ANALYSIS AND INTERPRETATION

Analysis plan provides insights into the most optimal manner in which the voluminous data collected could be summarized and analyzed, to arrive at the answers to the research questions and to address the research objectives (Ramachandran, 1993).

PSPP – a free and open source software was used for entering the data collected from the respondents. Statistical Package for Social Sciences (SPSS), Version 17.0 was used to analyze the data so prepared. Descriptive and inferential statistics have been applied to the data. The descriptive statistics describe and summaries sets of data. But, inferential statistics help generalize from a sample to a whole population and in testing hypothesis.

The researcher has used MS Excel and MS Word to create and format tables and charts required for the study.

Table 4.1 Gender-wise distribution respondents

Gender	Frequency	Percentage	Cumulative Percentage
Male	230	57.5%	57.5
Female	170	42.5%	100
Total	400	100	

(Source: Primary data)

Table 4.1 makes it clear that out of 400 respondents, 230 (57.5%) respondents are male and the remaining 170 (42.5%) respondents are female.

Table 4.2 Nativity-wise distribution respondents

Nativity	Frequency	Percentage	Cumulative Percentage
Rural	258	64.5%	64.5
Urban	142	35.5%	100
Total	400	100	

(Source: Primary data)

Table 4.2 shows the nativity of the respondents. 258 (64.5%) respondents belong to rural area and 142 (35.5%) respondents belong to urban area. From this it is inferred that majority of the respondents have hailed from rural areas.

Table 4.3 Year-wise distribution of respondents

Year	Frequency	Percentage	Cumulative Percentage
First Year	100	25%	25
Second Year	100	25%	50
Third Year	100	25%	75
Fourth Year	100	25%	100
Total	400	100	

(Source: Primary data)

Table 4.3 shows the year-wise distribution respondents. 100 questionnaires were distributed to the students of each year of study. Thus, questionnaire has been equally distributed to the respondents of four different years. First year students, second year students, third year students and fourth year students all constitute 25 % each of the total sample.

Table 4.4 Discipline-wise distribution respondents

Discipline	Frequency	Percentage	Cumulative Percentage
CE	80	20%	20
ME	80	20%	40
CSE	80	20%	60
EEE	80	20%	80
ECE	80	20%	100
Total	400	100	

(Source: Primary data)

Table 4.4 explores the course/discipline-wise distribution of respondents. Questionnaire has been equally distributed to all five disciplines. Every discipline constitutes 20 % of total sample. Civil Engineering, Mechanical Engineering, CSE, EEE and ECE are the five different disciplines from where equal samples are drawn for the study.

Table 4.5 Frequency of library visits

Year of study	Frequency of library visits								
	Daily	%	Weekly	%	FN	%	OCC	%	Total
I Year	6	1.50	43	10.75	11	2.75	40	10.00	100
II Year	1	0.25	90	22.50	1	0.50	8	2.00	100

III Year	5	1.25	86	21.50	4	1.0	5	1.25	100
IV Year	21	5.25	73	18.25	3	0.75	3	0.75	100
Total	33	8.25	292	73.00	19	4.75	56	14.00	400

(Source: Primary data)

Note. FN – Fortnightly; OCC – Occasionally

Table 4.5 discloses the frequency of library visits of the respondents. Majority of the respondents 292(73.00%) visit the library weekly followed by 56(14.00%) respondents who visit the library occasionally. While 33(8.25%) respondents visit the library daily, 19(4.75%) respondents visit the library once in a fortnight. This indicates that the users use the library frequently.

Table 4.6 Purposes of visiting the Library

Purposes of Visit	Nativity				Total
	Rural	%	Urban	%	
Borrowing Books	50	12.50%	24	6.00%	74
Surfing Internet	50	12.50%	23	5.75%	73
Academic Purposes	81	20.25%	48	12.00%	129
Light Reading	77	19.25%	47	11.75%	124
Total	258	64.50%	142	35.50%	400

(Source: Primary data)

Table 4.6 shows the purposes of visiting the library. Out of the 400 respondents, 129(32.25%) respondents visit the library for academic purposes. 124(31%) respondents visit the library for light reading and 70+ respondents visit the library for borrowing books and surfing internet. A majority of 81 (20.25%) rural respondents and 48 (12%) urban respondents visit the library in pursuit of their academic works.

Table 4.7 Identification of Need for Information

Statement	Gender				Overall	
	Male		Female		WAM	Rank
	WAM	Rank	WAM	Rank		
I can identify a lack of knowledge in my subject area	3.84	I	3.78	V	3.82	IV
I can identify a search topic & define it using simple terms	3.84	I	3.93	II	3.88	II

I can identify concepts & terms related to the information I need	3.82	II	3.98	I	3.89	I
I recognize a need for information to achieve a specific goal	3.78	III	3.92	III	3.84	III
I can modify the need for information in search process	3.58	V	3.78	V	3.67	VI
I can use the background information	3.50	VI	3.73	VI	3.60	VII
I can manage time effectively to complete a search	3.60	IV	3.85	IV	3.70	V
I recognize that existing information can be combined with original concept	3.46	VII	3.71	VII	3.57	VIII

(Source: Primary data)

Male Students:

The male students are better skilled at identifying the search topics and defining them with simple terms and identifying a lack of knowledge in their subject area (WAM of 3.84), followed by the skills to identify concepts and terms related to the information they need (WAM of 3.82) and recognize the need for information to achieve a specific goal (WAM of 3.78). They are moderately skilled at managing time effectively to complete a search (WAM of 3.60) and modifying the need for information in search process (WAM of 3.58). They are least skilled in the use the background information (WAM of 3.50) and combining the existing information with original concept (WAM of 3.46).

Female Students:

The female students are better skilled at identifying concepts and terms related to the information they need (WAM of 3.98), identifying the search topics and defining them with simple terms (WAM of 3.93) and recognizing the need for information to achieve a specific goal (WAM of 3.92). They are moderately skilled at managing time effectively to complete a search (WAM of 3.85), identifying a lack of knowledge in their subject area and modifying the need for information in search process (WAM of 3.78). They are least skilled in the use of background information (WAM of 3.73) and combining the existing information with original concepts (WAM of 3.71).

Overall Analysis:

The students are better skilled in identifying the concepts and terms related to the information they need (WAM of 3.89). They are least skilled at combining the existing information with original concept (WAM of 3.57).

Table 4.8 Assessment of Current knowledge and Identification of Gaps

Statement	Nativity				Overall	
	Rural		Urban		WAM	Rank
	WAM	Rank	WAM	Rank		
I Know what I don't know to identify any information gap	3.94	I	3.75	II	3.88	I
I can identify which types of information will best meet the need	3.88	II	3.73	III	3.83	II
I can Identify the available search tools, such as general and subject specific resources at different levels	3.84	III	3.77	I	3.82	III
I can identify different formats in which information may be provided	3.74	IV	3.56	V	3.68	IV
I can demonstrate the ability to use new tools as they become available	3.60	V	3.61	IV	3.61	V

(Source: Primary data)

Rural Background:

The rural students are better skilled at knowing what they don't know to identify any information gap (WAM of 3.94) and identifying which types of information will best meet their information need (WAM of 3.88). They are moderately skilled at identifying the available search tools such as general and subject specific resources at different level (WAM of 3.84) and identifying different formats in which information may be provided (WAM of 3.74). They are least skilled in using new tools as they become available (WAM of 3.60).

Urban Background:

The urban students have better skills to identify the available search tools such as general and subject specific resources at different level (WAM of 3.77) and know what they don't know to identify and information gap (WAM of 3.75). They have moderately skills to identify which types of information will best meet their information need (WAM of 3.73) and to demonstrate the ability to use new tools as they become available (WAM of 3.61). They

have fewer skills to identify different formats in which information may be provided (WAM of 3.56).

Overall Analysis:

The students are better skilled to know what they don't know to identify and information gap (WAM of 3.88). They are least skilled in using new tools as they become available (WAM of 3.61).

Table 4.9 Construction of Strategies for Location Information and Data

Statement	Gender				Overall	
	Male		Female		WAM	Rank
	WAM	Rank	WAM	Rank		
I can define the scope of search question clearly and in appropriate language	3.79	I	3.99	I	3.87	I
I can define a search strategy by using appropriate keywords and concepts, defining and setting	3.75	II	3.86	II	3.80	II
I can select the most appropriate search tools	3.65	III	3.71	VI	3.68	IV
I can identify controlled vocabularies and taxonomies to aid in searching if appropriate	3.48	VI	3.84	III	3.63	VI
I can identify appropriate search techniques to use as necessary	3.61	IV	3.78	IV	3.69	III
I can identify specialist search tools appropriate to each individual information need	3.57	V	3.74	V	3.64	V

(Source: Primary data)

Male Students:

The male students are better skilled at defining the scope of search questions clearly in appropriate language (WAM of 3.79) followed by the skills to define search strategy by using appropriate keywords and concepts and to define and set limits (WAM of 3.75). They are moderately skilled at selecting the most appropriate search tools (WAM of 3.65) and identifying appropriate search techniques to use as necessary (WAM of 3.61). They are least skilled at identifying specialist search tools appropriate to each individual information need

(WAM of 3.57) and identifying controlled vocabularies and taxonomies to aid in searching if appropriate (WAM of 3.48).

Female Students:

The female students are highly skilled at defining the scope of search questions clearly in appropriate language (WAM of 3.99), defining search strategy by using appropriate keywords and concepts and defining and setting limits (WAM of 3.86). They are moderately skilled at identifying controlled vocabularies and taxonomies to aid in searching if appropriate (WAM of 3.84) and identifying appropriate search techniques to use as necessary (WAM of 3.78). They are least skilled identifying specialist search tools appropriate to each individual information need (WAM of 3.74) and selecting the most appropriate search tools (WAM of 3.71).

Overall Analysis:

The students are better skilled in defining the scope of search questions clearly in appropriate language (WAM of 3.87). They are least skilled in identifying controlled vocabularies and taxonomies to aid in searching if appropriate (WAM of 3.63).

Table 4.10 Location and Accessing of Information and Data Needed

Statement	Nativity				Overall	
	Rural		Urban		WAM	Rank
	WAM	Rank	WAM	Rank		
I can use a range of retrieval tools and resources effectively	3.95	I	3.75	I	3.88	I
I can construct complex searches appropriate to different digital resources	3.67	VIII	3.50	VIII	3.61	VIII
I can construct complex searches appropriate to different print resources	3.66	IX	3.61	IV	3.64	V
I can access full text information (both print and digital)	3.71	VI	3.49	IX	3.63	VI
I can read and download online material and data	3.69	VII	3.70	II	3.70	III

I can use appropriate techniques to collect new data	3.74	V	3.56	VI	3.67	IV
I can keep up –to-date with new information	3.77	III	3.65	III	3.72	II
I can engage with the community to share information	3.83	II	3.53	VII	3.72	II
I can identify when the information need has not been met	3.61	XI	3.49	IX	3.57	IX
I can use online and printed help	3.76	IV	3.58	V	3.70	III
I can find personal and expert help	3.65	X	3.58	V	3.62	VII

(Source: Primary data)

Rural Background:

The rural students are highly skilled at using a range of retrieval tools and resources effectively (WAM of 3.84) followed by the skills to engage with the community to share information (WAM of 3.83), to keep up-to-date with new information (WAM of 3.77) and to use online and printed help to locate and access required information (WAM of 3.76). They are moderately skilled at using appropriate techniques to collect new data (WAM of 3.74) followed by the skills to access full text information - both print and digital (WAM of 3.71), to read and download online material and data (WAM of 3.69) and to construct complex searchers appropriate to different digital resources effectively (WAM of 3.67). They are least skilled at constructing complex searchers appropriate to different print resources (WAM of 3.66), finding personal and expert help to get required information (WAM of 3.65) and identifying when the information need has not been met (WAM of 3.61).

Urban Background:

The urban students are better skilled at using a range of retrieval tools and resources effectively (WAM of 3.75) followed by the skills to read and download online material and data (WAM of 3.70), to keep up-to-date with new information (WAM of 3.65) and to construct complex searchers appropriate to different print resources (WAM of 3.61). They are moderately skilled at using online and printed help to locate and access required information and finding personal and expert help to get required information (WAM of 3.58). It is

followed by the skills to use appropriate techniques to collect new data (WAM of 3.56) and to engage with the community to share information (WAM of 3.53). They are least skilled at constructing complex searchers appropriate to different digital resources effectively (WAM of 3.50), accessing full text information (both print and digital) and identifying when the information need has not been met (WAM of 3.49).

Overall Analysis

The students are better skilled at using a range of retrieval tools and resources effectively (WAM of 3.88). They are least skilled in identifying when the information need has not been met (WAM of 3.57).

Table 4.11 Reviewing, Comparing and Evaluating Information and Data

Statement	Gender				Overall	
	Male		Female		WAM	Rank
	WAM	Rank	WAM	Rank		
I can distinguish between different information resources and the information they provide	3.84	I	3.92	II	3.87	I
I can choose suitable material on their search topic, using appropriate criteria	3.72	II	3.96	I	3.82	II
I can assess the quality accuracy, relevance, bias, reputation and credibility of the information	3.53	VIII	3.85	IV	3.67	VI
I can assess the credibility of the data gathered	3.55	VII	3.75	VII	3.64	VII
I can read critically, identifying key points and arguments	3.69	III	3.78	VI	3.73	IV
I can relate the information found to the original search strategy	3.64	V	3.84	V	3.72	V
I can critically appraise and evaluate my own finding and those of others	3.57	VI	3.68	VIII	3.62	VIII
I know when to stop	3.66	IV	3.87	III	3.75	III

(Source: Primary data)

Male Students:

The male students are better skilled at distinguishing between different information resources and the information they provide (WAM of 3.84), choosing suitable materials on their search topic, using appropriate criteria (WAM of 3.72) and reading & critically identifying key points and arguments (WAM of 3.69). They are moderately skilled at knowing when to stop their information search and retrieval process (WAM of 3.66), relating the information found to the original search strategy (WAM of 3.64) and critically appraising and evaluating their own findings and those of others (WAM of 3.57). They are least skilled at assessing the credibility of the data gathered (WAM of 3.55) and assessing the quality, accuracy, relevance, bias, reputation and credibility of the information resources found (WAM of 3.53).

Female Students:

The female students are better skilled in choosing suitable materials on their search topic, using appropriate criteria (WAM of 3.96) followed by the skills to distinguish between different information resources and the information they provide (WAM of 3.92) and to know when to stop their information search and retrieval process (WAM of 3.87). They are moderately skilled in assessing the quality, accuracy, relevance, bias, reputation and credibility of the information resources found (WAM of 3.85), relating the information found to the original search strategy (WAM of 3.84) and reading critically identifying key points and arguments (WAM of 3.78). They are least skilled in assessing the credibility of the data gathered (WAM of 3.75) and critically appraising and evaluating their own findings and those of others (WAM of 3.68).

Overall Analysis

Majority of the students are better skilled at distinguishing between different information resources and the information they provide (WAM of 3.87). They are least skilled at critically appraising and evaluating their own findings and those of others (WAM of 3.62).

Table 4.12 Organizing Information Professionally and Ethically

Statement	Nativity				Overall	
	Rural		Urban		WAM	Rank
	WAM	Rank	WAM	Rank		

I can use bibliographical software (Zotero, Mendely etc) if appropriate to manage information	3.69	I	3.58	I	3.65	I
I can cite printed sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc.	3.57	V	3.33	VI	3.49	VI
I can cite electronic sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc.	3.47	VII	3.36	IV	3.43	VII
I can create appropriately formatted bibliographies	3.48	VI	3.35	V	3.43	VII
I can demonstrate awareness of issues relating to the rights of others including ethics, data protection, copyright and any	3.59	IV	3.33	VI	3.50	V
I know what is plagiarism and its implication	3.67	II	3.38	III	3.57	IV
I meet standards of conduct for academic integrity	3.59	IV	3.58	I	3.59	II
I can use appropriate data management software and techniques to manage data (like SPSS, Excel, PSPP, SOFA Stat, R etc.)	3.64	III	3.41	II	3.56	III

(Source: Primary data)

Rural Background:

The rural students possess better skills to use bibliographical software (Zotero, Mendely etc) if appropriate to manage information (WAM of 3.69), to know what is plagiarism and its implications (WAM of 3.67), to use appropriate data management software and techniques to manage data like SPSS, Excel, PSPP, SOFA Stat, R etc. (WAM of 3.64). They have mediocre skills to meet standards of conduct for academic integrity, to demonstrate awareness of issues relating to the rights of others including ethics, data protection, copyright and any other intellectual property issues (WAM of 3.59) and to cite printed sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc (WAM of 3.57). They have least skills to create appropriately formatted bibliographies (WAM of 3.48) and to cite electronic sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc. (WAM of 3.47).

Urban Background:

The urban students possess better skills to meet standards of conduct for academic integrity (WAM of 3.58), to use appropriate data management software and techniques to manage data like SPSS, Excel, PSPP, SOFA Stat, R etc. (WAM of 3.41) and to know what is plagiarism and its implications (WAM of 3.38). They have mediocre skills to cite electronic sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc (WAM of 3.36) and to create appropriately formatted bibliographies (WAM of 3.35). They have lowest skills to cite printed sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc and to demonstrate awareness of issues relating to the rights of others including ethics, data protection, copyright and any other intellectual property issues (WAM of 3.33).

Overall Analysis

The students are highly skilled at using bibliographical software (Zotero, Mendely etc) if appropriate to manage information (WAM of 3.65). They are least skilled at creating appropriately formatted bibliographies and citing electronic sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc (WAM of 3.33).

Table 4.13 Application, Presentation, Synthesis and Dissemination of Information

Statement	Gender				Overall	
	Male		Female		WAM	Rank
	WAM	Rank	WAM	Rank		
I can use the information and data found to address the original question	3.83	I	3.94	I	3.88	I
I can summarize documents and reports verbally and inn writing	3.65	IV	3.72	VI	3.68	IV
I can incorporate new information into the context of existing knowledge	3.68	III	3.79	III	3.73	II
I can analyze and present data appropriately	3.63	V	3.76	IV	3.69	III
I can synthesize and appraise new and complex information from different sources	3.60	VI	3.81	II	3.69	III
I can communicate effectively using appropriate writing styles in a variety of formats	3.53	IX	3.75	V	3.63	V
I can communicate effectively verbally	3.57	VII	3.66	VII	3.61	VI

I can select appropriate publications and dissemination outlets in which to publish if appropriate	3.55	VIII	3.59	VIII	3.57	VII
I can develop a personal profile in the community using appropriate personal networks and digital technologies (e.g. discussion lists like whatapps, social networking sites like facebook, blogs etc.)	3.71	II	3.76	IV	3.73	II

(Source: Primary data)

Male Students:

The male students are better skilled at using the information and data found to address the original question (WAM of 3.83), developing personal profiles using appropriate personal network and digital technologies (WAM of 3.71) and incorporating new information into the context of existing knowledge (WAM of 3.68). They are moderately skilled at summarizing documents and reporting verbally and in writing (WAM of 3.65), analyzing and presenting data appropriately (WAM of 3.63) and synthesizing and appraising new and complex information from different sources (WAM of 3.60). They are least skilled at communicating effectively verbally (WAM of 3.57), selecting appropriate publications and disseminating outlets in which to publish if appropriate (WAM of 3.55) and communicating effectively using appropriate writing styles in a variety of formats (WAM of 3.53).

Female Students:

The female students are better skilled at using the information and data found to address the original question (WAM of 3.94), synthesizing and appraising new and complex information from different sources (WAM of 3.81) and incorporating new information into the context of existing knowledge (WAM of 3.79). They are moderately skilled at analyzing and presenting data appropriately, developing personal profiles using appropriate personal network and digital technologies (WAM of 3.76) and communicating effectively using appropriate writing styles in a variety of formats (WAM of 3.75). They are least skilled at summarizing documents and reporting verbally and in writing (WAM of 3.72), communicating effectively verbally (WAM of 3.66) and selecting appropriate publications and disseminating outlets in which to publish if appropriate (WAM of 3.59).

Overall Analysis

The students are better skilled at using the information and data found to address the original question (WAM of 3.88). They are least skilled at selecting appropriate publications and disseminating outlets in which to publish if appropriate (WAM of 3.57).

5. Testing of Hypotheses

Hypothesis : I

H₀: There is an association between the nativity of the respondents and the areas of information literacy training needed

Table 5.1 : Chi-Square Analysis of Nativity of the respondents and Need for IL training on the use of Internet

Internet * Nativity					
Crosstab					
		Nativity			Total
		Rural	Urban		
Internet	Yes	Count	206	115	321
		%	79.8%	81.0%	80.3%
	No	Count	52	27	79
		%	20.2%	19.0%	19.8%
Total		Count	258	142	400
		%	100.0%	100.0%	100.0%

Table 5.1a : Chi-Square Result

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.075 ^a	1	.784		
N of Valid Cases	400				

Tables 5.1a shows that p-value is (.784) more than the significant level of 0.05. So, null hypothesis is accepted. Thus, there is no significant association between nativity of the respondents and the need to have IL training on the use of Internet.

Table 5.2 : Chi-Square Analysis of Nativity of the respondents and Need for IL training on the use of search engines

Search Engines * Nativity

Crosstab					
			Nativity		Total
			Rural	Urban	
Search Engines	Yes	Count	103	62	165
		%	39.9%	43.7%	41.3%
	No	Count	155	80	235
		%	60.1%	56.3%	58.8%
Total		Count	258	142	400
		%	100.0%	100.0%	100.0%

Table 5.2a: Chi-Square Result

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.528 ^a	1	.467		
N of Valid Cases	400				

Tables 5.2a shows that p-value is (.467) more than the significant level of 0.05. So, null hypothesis is accepted. Thus, there is no significant association between nativity of the respondents and the need to have IL training on the use of search engines.

Table 5.3 : Chi-Square Analysis of Nativity of the respondents and Need for IL training on the use of online databases

Online Databases * Nativity					
Crosstab					
			Nativity		Total
			Rural	Urban	
Online Databases	Yes	Count	131	90	221
		%	50.8%	63.4%	55.3%
	No	Count	127	52	179
		%	49.2%	36.6%	44.8%
Total		Count	258	142	400
		%	100.0%	100.0%	100.0%

Table 5.3a : Chi-Square Result

Chi-Square Tests					
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	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.886 ^a	1	.015		
N of Valid Cases	400				

Tables 5.3a shows that p-value is (.015) less than the significant level of 0.05. So, null hypothesis is rejected. Thus, there is a significant association between nativity of the respondents and the need to have IL training on the use of online databases.

Table 5.4 : Chi-Square Analysis of Nativity of the respondents and Need for IL training on the evaluation of information sources

Evaluation of Information Sources * Nativity					
Crosstab					
			Nativity		Total
			Rural	Urban	
Evaluation of Information Sources	Yes	Count	95	44	139
		%	36.8%	31.0%	34.8%
	No	Count	163	98	261
		%	63.2%	69.0%	65.3%
Total		Count	258	142	400
		%	100.0%	100.0%	100.0%

Table 5.4a : Chi-Square Result

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.376 ^a	1	.241		
N of Valid Cases	400				

Tables 5.4a shows that p-value is (.241) more than the significant level of 0.05. So, null hypothesis is accepted. Thus, there is no significant association between nativity of the respondents and the need to have IL training on the evaluation of information sources.

Hypothesis IV : There is no significant difference between the nativity and the information literacy skills

Nativity Vs Information Literacy Skills

Table 5.5 : Descriptive Statistics

Group Statistics						
SCONUL Pillars	Information Literacy Skills	Nativity	N	Mean	Std. Deviation	Std. Error Mean
IDENTIFY	Identification of need for information	Rural	258	30.0271	4.46029	.27769
		Urban	142	29.8380	4.48107	.37604
SCOPE	Assessment of Current Knowledge and Identification of Gaps	Rural	258	19.0116	2.93706	.18285
		Urban	142	18.4225	3.00431	.25212
PLAN	Construction of strategies for locating information and data	Rural	258	22.2946	3.75184	.23358
		Urban	142	22.3099	3.72110	.31227
GATHER	Location and Accessing of information and data needed	Rural	258	41.0388	6.79826	.42324
		Urban	142	39.4366	7.39701	.62074
EVALUATE	Reviewing, Comparing and Evaluating information and data	Rural	258	29.9806	5.28889	.32927
		Urban	142	29.5070	5.02299	.42152
MANAGE	Organising Information professionally and ethically	Rural	258	28.7016	6.04588	.37640
		Urban	142	27.3169	6.16829	.51763
PRESENT	Application, Presentation, Synthesis and Dissemination of Information	Rural	258	33.7132	5.54458	.34519
		Urban	142	32.2606	5.91270	.49618

Table 5.5 gives descriptive statistics showing the number, mean, standard deviation and standard error mean for all the 7 pillars of information literacy.

Table 5.5a: Independent Samples ‘t’ Test

Independent Samples Test										
	Levene's Test for Equality of Variances			t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
IDENTIFY	EVA	.459	.498	.405	398	.686	.18910	.46683	-.72865	1.10686
	EVNA			.405	289.476	.686	.18910	.46746	-.73094	1.10915
SCOPE	EVA	.409	.523	1.904	398	.058	.58909	.30940	-.01917	1.19736
	EVNA			1.891	285.076	.060	.58909	.31144	-.02393	1.20212
PLAN	EVA	.040	.841	-.039	398	.969	-.01529	.39090	-.78376	.75319
	EVNA			-.039	292.660	.969	-.01529	.38996	-.78277	.75220
GATHER	EVA	3.638	.057	2.185	398	.029	1.60214	.73313	.16085	3.04343
	EVNA			2.132	270.499	.034	1.60214	.75130	.12300	3.08128
EVALUATE	EVA	.275	.600	.872	398	.384	.47358	.54296	-.59385	1.54100
	EVNA			.885	303.564	.377	.47358	.53488	-.57897	1.52612
MANAGE	EVA	.084	.772	2.176	398	.030	1.38465	.63630	.13373	2.63557
	EVNA			2.163	285.707	.031	1.38465	.64001	.12491	2.64439
PRESENT	EVA	.076	.783	2.449	398	.015	1.45261	.59327	.28629	2.61894
	EVNA			2.403	275.152	.017	1.45261	.60444	.26269	2.64254

Note. EVA = Equal variances assumed EVNA = Equal variances not assumed

Table 5.5a shows the result of Levene' statistics and t-test.

The Levene's Test for Equality of Variances shows that the p value is more than 0.05 for all the seven information literacy skills. So, the null hypothesis is accepted. There is no variation between the groups. So, we have to look for the results of t test under the column Equal Variance Assumed for the results.

The p-value of the t-test for the information literacy skills - Identify, Scope, Plan and Evaluate are more than 0.05. Thus, the null hypothesis is accepted. There is no significant difference between the nativity of the respondents and these information literacy skills.

The p-value of the t-test for the information literacy skills – Gather, Manage and Present are less than 0.05. Thus, the null hypothesis is rejected. There is a statistically significant difference between the nativity of the respondents and these information literacy skills.

Formal Computer Course Attended Vs Information Literacy Skills

Table 5.6: Descriptive Statistics

Group Statistics						
SCONUL Pillars	Information Literacy Skills	Computer Course(s)	N	Mean	Std. Deviation	Std. Error Mean
IDENTIFY	Identification of need for information	Undergone	248	30.4839	4.21388	.26758
		Not Undergone	152	29.1053	4.73280	.38388
SCOPE	Assessment of Current Knowledge and Identification of Gaps	Undergone	248	18.9758	2.89762	.18400
		Not Undergone	152	18.5197	3.07515	.24943
PLAN	Construction of strategies for locating information and data	Undergone	248	22.9315	3.35717	.21318
		Not Undergone	152	21.2697	4.09000	.33174
GATHER	Location and Accessing of information and data needed	Undergone	248	41.1492	7.18734	.45640
		Not Undergone	152	39.3618	6.69442	.54299
EVALUATE	Reviewing, Comparing and Evaluating information and data	Undergone	248	30.4435	5.25666	.33380
		Not Undergone	152	28.7829	4.93792	.40052
MANAGE	Organising Information professionally and ethically	Undergone	248	28.6976	6.02502	.38259
		Not Undergone	152	27.4145	6.20451	.50325
PRESENT	Application, Presentation, Synthesis and Dissemination of Information	Undergone	248	33.7782	5.68854	.36122
		Not Undergone	152	32.2500	5.64426	.45781

Table 5.6 gives descriptive statistics showing the number, mean, standard deviation and standard error mean for all the 7 pillars of information literacy.

Table 5.6a : Independent Samples ‘t’ Test

Independent Samples Test										
	Levene's Test for Equality of Variances			t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
IDENTIFY	EVA	1.397	.238	3.029	398	.003	1.37861	.45510	.48392	2.27330
	EVNA			2.946	291.334	.003	1.37861	.46794	.45764	2.29957
SCOPE	EVA	.911	.340	1.493	398	.136	.45607	.30555	-.14463	1.05677
	EVNA			1.471	304.866	.142	.45607	.30995	-.15384	1.06598
PLAN	EVA	8.702	.003	4.416	398	.000	1.66171	.37625	.92202	2.40140
	EVNA			4.214	272.999	.000	1.66171	.39433	.88539	2.43804
GATHER	EVA	1.045	.307	2.477	398	.014	1.78735	.72153	.36887	3.20584
	EVNA			2.520	336.921	.012	1.78735	.70932	.39210	3.18260
EVALUATE	EVA	.235	.628	3.138	398	.002	1.66065	.52927	.62013	2.70118
	EVNA			3.185	334.853	.002	1.66065	.52138	.63506	2.68624
MANAGE	EVA	.038	.845	2.044	398	.042	1.28311	.62772	.04904	2.51717
	EVNA			2.030	312.223	.043	1.28311	.63217	.03926	2.52696
PRESENT	EVA	.001	.981	2.616	398	.009	1.52823	.58425	.37962	2.67684
	EVNA			2.621	321.387	.009	1.52823	.58316	.38094	2.67551

Table 5.6a shows the result of Levene' statistics and t-test.

The Levene's Test for Equality of Variances show that the p value is more than 0.05 for all the seven information literacy skills except 'Plan'. So, the null hypothesis is accepted. There is no variation between the groups. So, we have to look for the results of t test under the column Equal Variance Assumed for the results for 6 variables and under Equal Variance Not Assumed column for the Variable 'Plan'.

The p-value of the t-test for the information literacy skills – Scope – is more than 0.05. Thus, the null hypothesis is accepted. There is no significant difference between the respondents who have attended formal computer course and those who have not and this particular information literacy skill.

The p-value of the t-test for the information literacy skills – Identify, Plan, Gather, Evaluate, Manage and Present are less than 0.05. Thus, the null hypothesis is rejected. There is a statistically significant difference between the respondents who have attended formal computer course and those who have not and these information literacy skills.

Hypothesis V : There is no significant difference between the Course / discipline of the respondents and their information literacy skills

Table 5.7 One-way ANOVA – Discipline of the Students Vs Information Literacy Skills : Part A

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower	Upper		
IDENTIFY	Civil	80	30.0500	4.63039	.51769	29.0196	31.0804	19.00	40.00
	Mech	80	29.4625	4.31935	.48292	28.5013	30.4237	19.00	38.00
	CSE	80	29.2750	4.54785	.50846	28.2629	30.2871	15.00	40.00
	EEE	80	31.2875	4.23725	.47374	30.3445	32.2305	21.00	40.00
	ECE	80	29.7250	4.39210	.49105	28.7476	30.7024	16.00	40.00
	Total	400	29.9600	4.46298	.22315	29.5213	30.3987	15.00	40.00
SCOPE	Civil	80	19.0250	3.28007	.36672	18.2951	19.7549	8.00	25.00
	Mech	80	18.6625	3.27995	.36671	17.9326	19.3924	12.00	25.00
	CSE	80	17.7375	2.49934	.27943	17.1813	18.2937	11.00	25.00
	EEE	80	19.8625	2.55939	.28615	19.2929	20.4321	13.00	24.00
	ECE	80	18.7250	2.81036	.31421	18.0996	19.3504	13.00	24.00
	Total	400	18.8025	2.97078	.14854	18.5105	19.0945	8.00	25.00
PLAN	Civil	80	22.2625	4.08065	.45623	21.3544	23.1706	11.00	30.00
	Mech	80	21.6750	3.84436	.42981	20.8195	22.5305	12.00	28.00
	CSE	80	22.2625	3.16525	.35389	21.5581	22.9669	12.00	28.00
	EEE	80	23.4750	3.54349	.39617	22.6864	24.2636	14.00	29.00
	ECE	80	21.8250	3.80464	.42537	20.9783	22.6717	10.00	29.00
	Total	400	22.3000	3.73629	.18681	21.9327	22.6673	10.00	30.00
GATHER	Civil	80	40.8250	7.92173	.88568	39.0621	42.5879	12.00	53.00
	Mech	80	39.8750	6.64731	.74319	38.3957	41.3543	23.00	52.00
	CSE	80	39.1750	6.60221	.73815	37.7057	40.6443	20.00	54.00
	EEE	80	43.2875	6.24438	.69814	41.8979	44.6771	22.00	54.00
	ECE	80	39.1875	7.04074	.78718	37.6207	40.7543	17.00	53.00
	Total	400	40.4700	7.04935	.35247	39.7771	41.1629	12.00	54.00

Table 5.7 : One-way ANOVA – Discipline of the Students Vs Information Literacy Skills – Part B

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
EVALUATE	Civil	80	30.2625	5.93583	.66365	28.9415	31.5835	8.00	40.00
	Mech	80	28.9375	4.95893	.55443	27.8339	30.0411	18.00	40.00
	CSE	80	29.6375	4.45865	.49849	28.6453	30.6297	16.00	40.00
	EEE	80	31.6625	4.69566	.52499	30.6175	32.7075	13.00	40.00
	ECE	80	28.5625	5.33639	.59663	27.3749	29.7501	9.00	38.00
	Total	400	29.8125	5.19469	.25973	29.3019	30.3231	8.00	40.00
MANAGE	Civil	80	27.5000	6.67131	.74587	26.0154	28.9846	8.00	38.00
	Mech	80	27.7000	5.99873	.67068	26.3650	29.0350	13.00	38.00
	CSE	80	27.8625	5.23074	.58481	26.6985	29.0265	10.00	40.00
	EEE	80	31.0250	5.92565	.66251	29.7063	32.3437	13.00	40.00
	ECE	80	26.9625	5.96497	.66690	25.6351	28.2899	11.00	39.00
	Total	400	28.2100	6.11796	.30590	27.6086	28.8114	8.00	40.00
PRESENT	Civil	80	33.8000	5.59023	.62501	32.5560	35.0440	18.00	41.00
	Mech	80	33.0375	5.27580	.58985	31.8634	34.2116	21.00	43.00
	CSE	80	31.8500	5.99388	.67014	30.5161	33.1839	15.00	45.00
	EEE	80	35.2000	5.95638	.66594	33.8745	36.5255	15.00	45.00
	ECE	80	32.1000	5.18176	.57934	30.9469	33.2531	20.00	43.00
	Total	400	33.1975	5.71315	.28566	32.6359	33.7591	15.00	45.00

Table 5.7 (in two parts) gives descriptive statistics for all the seven pillars of information literacy skills and the course/ discipline of the students.

Table 5.7a: Test of Homogeneity of Variances

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
IDENTIFY	.304	4	395	.875
SCOPE	2.607	4	395	.035
PLAN	1.414	4	395	.229
GATHER	1.096	4	395	.358
EVALUATE	1.427	4	395	.224
MANAGE	1.539	4	395	.190
PRESENT	.500	4	395	.735

Table 5.7a shows the result of Levene' statistics. The Levene's Test for Equality of Variances show that the p value is more than 0.05 for six information literacy skills. So, the null hypothesis is accepted. There is no variation between the groups. So, we can go ahead with the result of ANOVA test for these variables. But p value is less than 0.05 for the variable 'Scope'. Thus, null hypothesis is rejected. There is a variance among the groups. So, the researcher has conducted Welch and Brown-Forsythe test for getting the result.

Table 5.7b: ANOVE TEST

		Sum of	df	Mean	F	Sig.
IDENTIFY	Between	203.385	4	50.846	2.594	.036
	Within	7743.975	395	19.605		
	Total	7947.360	399			
PLAN	Between	159.975	4	39.994	2.920	.021
	Within	5410.025	395	13.696		
	Total	5570.000	399			
GATHER	Between	939.215	4	234.804	4.910	.001
	Within	18888.425	395	47.819		
	Total	19827.640	399			
EVALUATE	Between	478.700	4	119.675	4.595	.001
	Within	10288.238	395	26.046		
	Total	10766.938	399			
MANAGE	Between	829.235	4	207.309	5.805	.000
	Within	14105.125	395	35.709		
	Total	14934.360	399			
PRESENT	Between	593.510	4	148.378	4.715	.001
	Within	12429.888	395	31.468		
	Total	13023.398	399			
Robust Tests of Equality of Means						
		Statistic ^a	df1	df2	Sig.	

SCOPE	Welch	7.130	4	196.862	.000
	Brown-Forsythe	5.527	4	374.582	.000

Table 5.7b shows the result of one-way ANOVA test for 6 information literacy skills and Welch and Brown-Forsythe test for one information literacy skill ‘ Scope’.

The p-value is less than 0.05 for all the seven information literacy skills. Thus, null hypothesis is rejected and alternate hypothesis is accepted.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in the identification of need for information.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in the assessment of current knowledge and Identification of Gaps.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in the construction of strategies for locating information and data.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in the location and accessing of information and data needed.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in reviewing, comparing and evaluating information and data.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in organising Information professionally and ethically.

There is a statistically significant difference between discipline/ course of the engineering students and their IL skills in the application, presentation, synthesis and dissemination of information.

VI FINDINGS

6.1 Socio-Demographic Profile

- It is clear that out of 400 respondents, 230 (57.5%) respondents are male and the remaining 170 (42.5%) respondents are female.
- Majority of the respondents have hailed from rural areas.
- The users use the library frequently.
- A majority of 81 (20.25%) rural respondents and 48 (12%) urban respondents visit the library in pursuit of their academic works.

6.2 Identification of Need for Information

The students are better skilled at identifying concepts and terms related to the information they need (WAM of 3.89). They are least skilled at combining the existing information with original concept (WAM of 3.57).

6.3 Assessment of Current knowledge and Identification of Gaps

The students are better skilled at knowing what they don't know and identifying any information gap (WAM of 3.88). They are least skilled in using new tools as they become available (WAM of 3.61).

6.4 Construction of Strategies for Location Information and Data

The students are better skilled at defining the scope of search questions clearly in appropriate language (WAM of 3.87). They are least skilled at identifying controlled vocabularies and taxonomies to aid in searching if appropriate (WAM of 3.63).

6.5 Location and Accessing of Information and Data Needed

The students are better skilled in using a range of retrieval tools and resources effectively (WAM of 3.88). They are least skilled in identifying when the information need has not been met (WAM of 3.57).

6.6 Reviewing, Comparing and Evaluating Information and Data

Majority of students are better skilled at distinguishing between different information resources and the information they provide (WAM of 3.87). They are least skilled at critically appraising and evaluating their own findings and those of others (WAM of 3.62).

6.7 Organizing Information Professionally and Ethically

The students are better skilled at using bibliographical software (Zotero, Mendely etc) if appropriate to manage information (WAM of 3.65). They are least skilled at creating appropriately formatted bibliographies and citing electronic sources using suitable referencing styles like APA, MLA, Chicago, IEEE etc. (WAM of 3.33).

6.8 Application, Presentation, Synthesis and Dissemination of Information

The students are better skilled at using the information and data found to address the original question (WAM of 3.88). They are least skilled at selecting appropriate publications and disseminating outlets in which to publish if appropriate (WAM of 3.57)

VII SUGGESTIONS

The researcher has presented the following suggestions to have information literate engineering graduates in the campus.

7.1 General Suggestions

- Some special classes or coaching camps or evening classes may be organized for those few students who are not having much familiarity with the usage of computers.
- All the Engineering Graduates may be asked to undergo certain computer courses under dual degree programme.
- The students should be motivated to visit the library often. The congenial reading atmosphere, sophisticated furniture arrangement, good quality books, recent editions, popular copies etc may be thought of to invite the readers.
- A sort of library time table may be initiated to encourage the students to visit the library and spend fixed time.
- The library should build a good ICT environment with necessary computers, scanners, printers, internet connection and wi-fi access to satisfy the information needs of the users.

- The library may plan to go subscribing few more e-resources like e-journals, e-books, e-theses to satisfy the demands of the users.

7.2 Suggestions to have an information literate campus

- Some of the respondents lack certain information literacy skills. The college management should conduct some specific surveys to exactly find out the lacuna in their IL skills. Department-wise or Year-wise surveys may be conducted to elicit the exact requirements of the respondents. Even the library may take up this job.
- Introduction of Information literacy as a core paper in the engineering curriculum.
- Conduct of evening / certificate course in information literacy skills.
- Providing additional credit to those students who complete a course in Information Literacy.
- Conduct of seminars, workshops and conferences on information literacy skills.
- Invited talks of external experts on information literacy skills.
- Provision of online tutorials on information literacy competencies
- Week-end demos on use of various information sources and services
- Showcase of the availability of open educational resources in the field of engineering
- Best information literate award to the students of different years of study/ course
- Conduct of fairs / melas / eves on information literacy competencies
- Distribution of brochures / handouts to the students now and then on the importance of being information literate.
- Conduct of competitions among the students on various information literacy skills (inter-course or intra-course).
- Up-date classes on the arrival of new tools for information search, information retrieval and information processing.
- Special user education classes on engineering sources and services available – both offline and online.
- User meets by the publishers to elaborate the users on the new products made available in the market.
- The library may prepare a list of subject specific resources for various engineering courses and this may be made available in the library or departments.

- The library website may be effectively utilized as a tool for promoting information literacy among the students.
- An information officer may be appointed in the college to address the issues related to information literacy in the campus.
- An information literate club may be started in the college so as to bring together the like-minded students who long to develop their IL skills.
- Special orientation classes may be organized on the user of appropriate search tools and techniques, controlled vocabularies etc.
- The student should be taught very practically the use of various referencing styles like APA, MLA, IEEE, MALA etc.
- The importance of acknowledging the works of others is to be instilled in their minds. Plagiarism check may be introduced in the college for their term projects or assignments.
- Use of softwares like Zotero, Mendeley etc for citing both printed and digital resources should be demonstrated.
- Special classes / summer courses may be introduced to teach data processing tools like SPSS, R etc.
- The students should be encouraged to write articles for various journals and magazines.
- As per the demands of the respondents, the library / faculty / college may organize information literacy programmes on the use of internet, search engines and strategies, e-journals, online databases, evaluation of online resources and writing engineering projects by adopting appropriate methods.

VIII CONCLUSION

The present study gives a status quo report on the information literacy skills of engineering students of the selected college. The analysis reveals that most of the engineering students do possess various information literacy skills which are very much required in this modern information-filled world. Certain specific skills they lack in, may be taught to them using various modes of teaching IL skills. Let the professional students better themselves in all the information literacy skills so as to go up in their career with a confidence to face this competitive world.

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