CHAPTER II

REVIEW OF LITERATURE

A substantive, thorough, sophisticated literature review is a precondition for doing substantive, thorough, sophisticated research. “Good” research is good because it advances one’s collective understanding. To advance one’s collective understanding, a researcher or scholar needs to understand what has been done before, and the strengths and weaknesses of existing studies. A researcher cannot perform significant research without first understanding the literature in the field. Not understanding the prior research clearly puts a researcher at a disadvantage (Boote & Beile, 2005).

The primary objective of this chapter is not only to summarise the research literature concerning the research problem by providing an overview of the concept and details of exemplary studies in the area of study. Thus this chapter on review of literature helps understand the state of affairs pertaining to the research problem and also helps identify potential research gaps for further study. Library orientation, User education, library skill, information skill are various states in the libraries to educate the users in terms of information and resources available in the libraries. Nowadays, these states have been transformed and enhanced as Information Literacy. Therefore in this chapter, the researcher presents the literature review in the following order.

2.1. Information Search

2.2. Information Search through Technology

2.3. Information Literacy - Different Models and Standards
2.4. Information Literacy/ Information Literacy Competency Programmes,

2.5. Tool construction for Information Literacy Competency Assessment

2.6. Information Literacy Competency Assessment

2.7. Summary of the Literature Review

2.1. Information Search

Zaporozhetz (1987) as cited by Boote & Beile (2005) reported that doctoral candidates felt their library skills were inadequate, while their faculty advisors admitted expecting their candidates to possess advanced bibliographic skills even though the advisors themselves had little knowledge of information retrieval.

In a study conducted by Coupe (1993) at Johns Hopkins University freshman assessment participants had Scholastic Aptitude Test scores averaging above 1,280, yet only 15.2 percent knew not to search the online catalog for articles in journals; 31.6 percent knew the difference between citations of books and citations of journal articles.

Bowler, Large and Rejskind (2001) followed three Grade six primary school students as they accessed, interpreted and used information found on the web in order to complete a class assignment. The key findings could be summarized as (i) information-seeking and knowledge making process was determined by the learning-task assigned to the information seekers, (ii) efficient use of the web depended upon digital literacy, (iii) the reading experience on the web was qualitatively different from the reading experience
Brown and Nahl (2001) conducted a study to measure the affective skills taught in an instruction on web searching. A pre-test survey was conducted a week before the administration of the test instrument. Then the test was administered in three parts namely Students Participation Grid, Quiz and Post survey. Three instruments of the study had elements testing student affect. The Student Participation Grid was developed solely for measuring affective skills. The Quiz administered at the end of the instruction measured multiple skills taught, including affective skills. The Post Survey included a Likert-type scale to measure level of confidence and open-ended questions were also used. The method of data collection for the Participation Grid relied on the instructor to observe, record, and interpret student participation levels. The Quiz questions provided data on student choice of a particular tool, student reasoning and student vocabulary retention. The Post Survey allowed to measure level of commitment in choosing to use these skills again and student reasoning. An open-ended question at the end of the survey allowed for students to choose their own words, comments, and suggestions on the unit, on which we could later use content analysis to gain insight on affective skills. It was found that majority of the students (say 75%) understood the class. It was also stated that having a summary on students’ attitude was also important to conduct the study.

Maughan (2001) assessed graduating senior students of University of California Berkeley. Among the 1999 UC Berkeley sociology respondents, 69 percent could not
identify Sociofile as an index. The results of the pre-assessment should be viewed as part of a national problem rather than a reflection of the skills of Douglass college students.

Knight (2002), has assessed user education. Each type of assessment device yielded unique and interesting data. The online exercise was intended to address very basic skills. The students scored well on this exercise. Upon completion of the Web-based tutorial, over 95 per cent of the students were able to decipher bibliographic records in the online catalog for both books and periodicals, and they were also able to locate a periodical database from the library home page. Students were less successful in two areas: only 54 per cent could locate journal holdings records in the online catalog and a mere 24 per cent were able to distinguish between citation only and full-text articles in the database.

Curzon (2002) has stated that to improve information competence of graduates, a commitment to cooperation, supporting creativity, understanding the environment, maintaining flexibility, sending a clear message developing a shared view, the sharing of knowledge, maximising credibility and managing well were vital.

Joint (2003) at the Andersonian Library of the University of Strathclyde conducted well-established traditional user education programme, and it was fairly easy to convert significant numbers of our traditional user education workshops into hybrid courseware-based workshops run by professional librarians. However, it was far more difficult to create a controlled environment in which students would take the courseware package without the ritualised teaching environment of an on campus workshop attended by tutor librarians. This meant that the numerical distribution of students between comparison groups was very uneven. In the hybrid sub-group where students were
taught by courseware with librarian-tutors in attendance, the highest level of returns (50 per cent) was lower. So most claimed to have learned "a fair amount", whereas most in the traditional sub-group had made the more impressive claim of having learned "quite a lot". The traditionally taught group had nearly four times as many students claiming to have learned "a lot" when compared with the hybrid group. And where only the 8 percent in the traditional sub-group learnt “a little”, 13 percent in the hybrid sub-group made this claim.

A study by Dewald (2005) of business faculty in the Pennsylvania State University system reported that business faculty accepted the students’ use of Internet resources and did not routinely encourage use of library subscription databases. Part time instructors especially were unaware of or had limited knowledge of library databases. Over 72 percent of part time faculty did not tell their students about specific library databases. The library’s subscription databases offer high quality information that lead to better business research. It is in working with the business faculty, that librarians can demonstrate the value of the subscription databases for their students. The librarians, in consultation with the faculty, can help the students to critically evaluate all sources.

Catherine (2005) studied Information Search Skill (ISS) among students of University of Western Australia. The ISS was administered to first year medical students in 2004 and to fourth year medical students in 2005. To confirm the validity of the survey results, other forms of evaluation were also used. At the time the ISS was administered, students were also asked to answer two written questions on whether or not they thought the ISS covered all areas of information literacy that would be required by medical students in that academic year. Fourth year students were also interviewed to determine
additional information literacy areas that may not have been covered by the ISS. This triangulation was designed to identify any weakness in the design of the ISS. The study had some limitations. The first year students were surveyed in October 2004 and had only general information literacy knowledge and it was hypothesised that the ISS would be valid for this group. The students in their fourth year were surveyed in January 2005 and were expected to show a significant amount of discipline specific knowledge - a factor essential to identify the appropriateness of the ISS for this discipline. The major outcome of the research was, the first year students rated themselves more highly in all areas. Analysis of the areas of difference showed that the fourth year students’ approach to finding, evaluating and using information has begun to change in line with their exposure to clinical practice. First year students focus their information skills around the use of textbooks, journal articles and web sites. Fourth year students are becoming aware that there is a much broader range of resources to draw from, including colleagues. The world of information resources is changing for fourth year students and their lower self-rating on the ISS illustrate their increasing awareness of the complexity of information retrieval.

All 15 librarians and six graduate Library Science students of Douglas College agreed to be research participants for a study by Stec (2006). The researcher employed an assessment tool prepared by the Douglass Library’s Reference Team to trace the search strategies adopted by the participants. The tool was administered as pre and post assessment. Data was analysed using a t-test, paired-two sample for mean. The Reference Team developed assessment items based on the minimum library skills needed to complete the final course project. Students were able to correctly identify the best search strategy for an index using simple terms (85 percent answered correctly) but had
difficulty with a more complex keyword search in the catalog using search fields (37 percent answered correctly). Given three item lists from which to select, students could identify the appropriate index to search for journal articles (93 percent) and 82 percent correctly identified the catalog as the appropriate tool for locating a book.

Petrak, Markulin and Matic (2007) of the Central Medical Library of the University of Zagreb Medical School developed a hands-on course on searching and appraisal of medical information. The course consists of three main sections:

- main characteristics of web medical resources
- building an effective search strategy
- web resource search (bibliographic databases, evidence-based medicine sources, e-journals and e-books)

The course was planned to run for 2 days, starting with a lecture on the main characteristics of medical resources on the Web, proceeding with two seminars on building search strategy, and scientific evidence in making clinical decisions, and five hands-on exercises in a computer lab. The member of participants was limited to 15 per session. The assessment of the course content by the respective school’s committee was positive.

Chu & Law (2007) conducted a study on research students in particular Doctor of Philosophy students’ development of information search expertise. It focused on their growing understanding of different types of information sources as they progressed through their research studies. This research study confirmed past finding that the source types - refereed journals, books, theses, students’ supervisors, conference papers, outside experts and bibliographies, were important to research students. It was also observed that
the nature of their information needs changed too, as a result of the development in their subject knowledge. 17-33 percent (two to four out of 12) research students did not know 42 percent (11 out of 26) of the source types initially, but in the latter stages of the study, 82 percent (nine out of 11 of these 'unknown' sources) were rated as fairly important (a rating of 3) or above at least once by one or more students. Gradually, students became more knowledgeable about different source types and because of that they were able to obtain better search results. Due to the qualitative nature of this study, the sample size of the participants was small, and the findings of the study, though interesting, cannot be generalised as a common phenomenon for a big population.

Study conducted by Fatima & Ahmad (2008) on data collected from 60 students by administering questionnaires on their information seeking behaviour at Ajmal Khan Tibbiya College, Aligarh Muslim University, India indicated that guidance in the use of library resources and services was necessary to help students meet their information requirements. The study found that textbooks and journals were the most popular sources of information for the students’ course work.

Singh & Satija (2008) traced information seeking strategies among agricultural scientists using a structured questionnaire. They found that library/information centre was the most preferred source for 72.05 per cent of the respondents for all categories of agricultural scientists with a mean ranked from 2.85 to 2.27. The 'review articles in periodicals' were ranked first priority by 51.34 per cent of the respondents and it occupied second position in the rank order. 'Discussion with colleagues' within the organisation was the third preferred source of information. Out of 332 respondents of this source, 39.46 per cent gave it first priority whereas 38.55 per cent and 21.89 per cent
responded for second and third priority, respectively. 42.42 per cent of the respondents gave first priority to indexing journals. The agricultural scientists heavily relied on computerised information search facility. This indicated that they were more familiar and comfortable with the computerised information search facility and found it more reliable. Journals have been reported as a significant source with 78.4 per cent of responses.

Edwards (2006) identified four main categories which described different ways of experiencing the search and reveals different awareness structures, different approaches to learning, and different search outcomes. Information searching is conceptualised as:

1. *Looking for a needle in haystack*. Students here operate under the assumption that understanding the research topic is a necessary step to find information “out there”. There is little reflection on the research process and this is illustrated by the fact that students lack an appreciation of the information environment structure, or of the range of research tools at their disposal. In particular, students in this category are not aware that these tools are instrument in retrieving the information they need.

2. *Finding a way through a maze*. Here the metaphor is changed from a needle in a haystack to a maze, implying the students perceive information searching as involving the systematic processing and planning of a search. Students in this category also become aware of the wide range of search tools they have access to. Whilst they prioritise the topic of research, students engage with advance facilities of the available tools, and begin to assess the quality of the information retrieved.
(3) *Using the tools as a filter.* Searching for the information at this point involves the use of searching tools as a way of filtering the information. Here planning and reflection are evident as students concentrate on a thorough analysis of the initial terms used, apply appropriate synonyms, and ultimately adapt their searching strategy in response to previous searching attempts. Their awareness of the structure characterising the tools used is also heightened, as is their ability to adapt their searching strategy according to the tool they use.

(4) *Panning for gold.* This stage builds on the previous one where the search tools are used to filter the available information with the added outcome of limiting the results to high quality information. Students in this category select the appropriate tools to retrieve the required resources, and the required strategy is rooted in systematic planning and careful reflection of information searching as a process.

Edward concluded that there was a major conceptual gap between students in the first category, who experience information searching as a helpless task of finding a needle in the haystack, and those in categories two, three, and four whose conceptual engagement with the process of searching is illustrated by increasingly complex ways of interacting with the tools and complemented by reflective topic and search formulation practices.

Kamatchi, Muralidhar & Balasubramani (2009) conducted an experimental study among the students of bachelors of teacher training education, using a single group experimental design. This type of experiment was carried out comparing the growth of a single or group. The group was administered with a pre test questionnaire in order to assess the library skill comprising of location and selection skill, organising skill,
interpretation skill and conclusion and generalising skill possessed by the participants. Same library skill was assessed after a month’s training in the post test and found that library skill has been enhanced due to the training provided. It was also unanimously accepted by all respondents that ability to apply library skill is essential to life-long independent learning.

2.2. Information Search through Technology

Kafai & Bates (1997) were two of the first researchers to look at the use of the web by schoolchildren aged 6 to 12 years. In a study of children in Grades One to Six in four schools, searching for information on the Web was incorporated into a classroom project. Special attention was paid to evaluating the relevance and reliability of the information. The researchers observed both the teachers and the children during classroom activities, and the products of the children's work (for instance, notes about specific websites) were included in the study. All of the children received instructions that were suitable for their age and experience. Most of the children appeared to benefit from the instruction and supervision and ultimately were able to find relevant information themselves for their projects. The oldest children were also eventually able to work with search engines and keywords, but it was difficult for them to select good sites. Students did not have enough patience to read the descriptions of sites or to go through a whole list of results; instead, they tended to choose sites purely by title.

Lyons, Hoffman, Krajcik & Soloway (1997) placed the use of the Web in the context of inquiry activities in the science domain. They observed four students (two in the sixth grade and two in the ninth grade) using the Web to search for answers to their own
questions in the same specific scientific domain. They concluded that the students needed additional help in searching online information. With regard to the actual search, students clearly had particular difficulty in searching with keywords. The choice of keywords, incorrect spellings, and the use of Boolean operators caused many problems. Nevertheless, with sufficient help students were ultimately able to find suitable information.

Schacter, Chung & Dorr (1998) concluded on the basis of an experimental study of 32 students (fifth and sixth grade) that children preferred to browse rather than use keywords. They searched fairly intuitively and did not work systematically. The students were given two tasks, one "well defined" and one "ill defined." They were far more successful with the ill-defined task than the well-defined one. The authors concluded that searching for precise, concrete information made high demands on the search strategies of the Web user.

Fidel, Davies, Douglass, Holder, Hopkins, Kushner, et al. (1999) observed eight 11th and 12th grade students searching for information on the Web for a homework assignment. It was found that this group searched for information unsystematically. The interactive nature of the Web supported the students' belief that there was no need to plan ahead because the progression of a search would be largely determined by what they saw on the screen. The students often began searching by entering a Web address or a keyword that they had used before.

D’Angelo (2001) stated that Information competency instruction was an essential component of the strategic mission of Fletcher Library at Arizona State University West. Instruction programmes include drop-in basic skills classes, course-integrated instruction taught by subject librarians, and an online tutorial currently under development. From summer 1999 through summer 2000, faculty members and subject librarian for the
Integrative Studies Programme collaborated to integrate information competency instruction and assessment into the programme's gateway course. Two sessions were developed and taught by the librarian. A preliminary assessment programmes developed to evaluate student outcomes and to serve as the foundation of a future programmatic assessment programme. Based on the progress made in the use of assessment and evaluation to develop more effective information competency sessions over the course of the year of this collaboration, it appeared that the work resulted in a more cohesive and seamless presentation of information competencies. Integration of the competencies into the coursework provided timely and relevant learning of skills.

Jones (2002) analysed the results of 100 students searching the web under two different conditions: a less structured condition in which the students were free to search the web as they wished and were given little online support and a structured condition in which students had access to only selected web sites which were relevant to the subject and received extensive online support. All the students were given the same research question on which they had to collect information and write a paper. The students who were not allowed to search freely on the web said that they missed the freedom. Students who were allowed to search freely made little use of the opportunity. It was concluded that the students needed access to pre-selected websites as well as the opportunity to search freely on the web. In both the cases, online support and support from the teacher were absolutely essential.

Rockman (2005) has stated that the Educational Testing Service had been working with several colleges and universities in the United States for two years to develop a new Information and Communication Technology Literacy assessment tool as
part of the National Higher Education ICT Initiative. Informed by such standards as those published by the Association of College and Research Libraries and the International Society for Technology in Education, the tool was ground-breaking and cutting-edge for several reasons. First, it was scenario, performance, and problem based - not multiple choice - students must demonstrate their knowledge. Second, it was interactive and delivered over the World Wide Web - students must engage in the content to solve real-life academic or workplace problems. Third, it recognised that workers and students need to integrate cognitive skills, technology skills, and the ethical use of information to effectively solve problems and make decisions in today's information-rich, globally-connected, multicultural society. The new ICT literacy assessment tool was literally a bridge between information literacy and technological literacy. It not only asked students to be able to define, access, manage, integrate, evaluate, create, and communicate information, but it did so with the underpinnings of cognitive, technical, and ethical components. It was unique, flexible for use in two and four year institutions, useful for student placement or as a workforce certification test. It was unique and filled an important assessment gap.

Lopez-Varela & Sanz (2007) documented the work of LEETHi (Spanish and European Literatures from Text to Hypertext), a research group based at Universidad Complutense Madrid and stated that the combined use of a hypertext tool and blended learning strategies encouraged learning processes in accordance with the European Space of Higher Education requirements. These technologies helped students achieve cooperative abilities, make decisions and transfer their learning in relation to their professional profile and to other social areas. Students learn in dynamic situations where
information constantly changes and they need to learn to manage information excess and select pertinent resources. Further, the development of students’ information literacy and competence in tasks required by the knowledge society helps link the main structural and institutional factors that shape relations between higher education and the labour market.

Huerta & Sandoval-Almazan (2007) conducted a study among the users of 49 Community Learning Centers in Mexico. Data collection was performed in three stages namely, interview, questionnaire and focus group discussion. E-mail was the most common activity performed on the Internet followed by searching for information. Users expressed their frustration for not finding the information they needed. Hence it was identified in this study that the participants lacked three abilities from the Digital Literacy framework – branching, recreation and information abilities. In this research, users did not mention the ability to assess the information quality as a skill required to use the Internet. For this reason, users did not mention the problems to assess the veracity and relevance of the information.

Biradar & SampathKumar (2008) studied use of search engines by research scholars and faculty members of physics departments in the universities of Karnataka State, India. The respondents of the survey constituted all the 189 research scholars and faculty members in the department of physics in six universities in Karnataka State and the Indian Institute of Science, Bangalore. It was found that majority of the respondents were aware of Yahoo and Google while they were not aware of many other search engines like, Lycos, Hotbot, Excite, Northern light and so on. Study also showed that few respondents learnt Internet use through library staff and quite a good number of users learnt through using help features and by reading articles
on search engine. In this regard, it was suggested that librarians should organise workshops on use of search engines and also assist users at the time of searching literature using search engine. Library instructional programs could emphasise on the use of different search engines and their search strategies in retrieving need-based information.

Mansourian (2008) identified the main coping strategies to rectify failed searches. He categorised them into "passive" and "active" strategies. Passive strategies included the strategies that involved less action toward modifying the situation and mainly related to accepting the situation as it was. For instance, giving up after facing an initial failure could be considered as a passive coping strategy. Active strategies referred to those methods that require further activities to change the search results from unsatisfactory to satisfactory. There are two levels of active coping strategies. At the first level, users may try to find a solution to overcome their search failure on their own. At the second level, they may look for help from other people. In this research, the first level was called "revising" strategies and the second level was called "help-seeking" strategies. When users employed passive coping strategies they usually changed their initial search goals and tried to avoid any further action. This type of strategy consisted of indirect approaches including avoidance and giving up the search. In contrast, active coping strategies entailed following new directions to gain more satisfactory results and included refining the initial search techniques or changing databases. These included revising strategies, help seeking and postponing the search.

Bansode & Pujar (2008) studied use of internet by research scholars in Shivaji University, India. They found that nearly 78% of the students used internet for
communication purposes and that 68.03% of researchers were using internet for research purposes. Majority of the users made use of search engines for locating the desired piece of information rather than using subject directories or subject gateways. The study showed that all the respondents made use of keywords to retrieve information, followed by 60 respondents (49.18%) who used authors as the option for search. Search by title was used by 49 (40.16%), date of publication, source, use of Boolean operators and wild card as search techniques were used by some of the researchers, ranging between 30.32% and 1.63%. It was observed that researchers from the field of science made frequent use of keyword, author, title or the Boolean logic as search techniques where as researchers from social sciences and humanities did not make use of wild card for searching the information. The responses revealed that 88 (72.13%) users found it very difficult to extract exact information from the retrieved results. This highlighted the need for the university library to undertake orientation programmes on search techniques. Sixty one (50%) users accepted that they lacked searching skills and training was necessary. The researchers in the sciences (up to 90%) were making maximum use of internet facility provided by the university to meet their information requirements. However, majority of researchers in social sciences (64%) and humanities (85%) were still relying on bibliographies and printed journals available in the university library.

Haneefa & Shukkoor (2010) studied the Information and Communication Technology literacy among the library professionals of Calicut University, India. Structured questionnaire was used for the study. The study revealed that the professional assistants were more Information and Communication Technology (ICT) literates than the Junior Librarians and Assistant Librarian. The use of ICT-based resources and
services, library automation software, and general purpose application software was high among the Professional Assistants than the Junior Librarians and Assistant Librarians. The use of digital library and institutional repository software was very low among the library professionals. Majority of the professionals had confidence in routine ICT and Internet tasks and needed training or orientation in library automation, digital library and institutional repository software.

2.3. Information Literacy - Models and Standards

2.3.1. Models of IL

The Big6™ by Eisenberg & Berkowitz (1987) is a process model of how people of all ages solve an information problem. It includes the six skills namely, Task Definition, Information Seeking Strategies, Location and Access, Use of Information, Synthesis and Evaluation of information.

Kuhlthau’s (1991) model of the six stages of the information search process offers a multi-faceted picture of the affective, cognitive and physical realms experienced by students in information-seeking situations. These six stages are Initiation, Selection, Exploration, Formulation, Collection and Presentation. Conducting qualitative research, Kuhlthau reviewed user logs written during the course of the information search process and noted feelings, thoughts and actions that occurred at various stages. Charting the overall progression through the information search process, Kuhlthau’s study elucidates how users struggle to make sense of new information by its integration into their existing knowledge base.
Bruce (1997) identified seven different ways in which individuals experience information literacy, popularly known as the 'seven faces' of information literacy, ranging from an 'information technology conception' to a 'wisdom conception':

Face 1: The *information technology* conception, where information literacy is seen as using information technology for information retrieval and communication.

Face 2: The *information sources* conception where information literacy is seen as finding information located in information sources.

Face 3: The *information process* conception where information literacy is seen as executing an information-related process

Face 4: The *information control* process where information literacy is seen as controlling information.

Face 5: The *knowledge construction* conception where information literacy is seen as building up of personal knowledge base in a new area of interest.

Face 6: The *knowledge extension* conceptions where information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained.

Face 7: The *wisdom* conception where information literacy is seen as using information wisely for the benefit of others.

Johnson (2003) as one of the committee members The Society of College, National and University Libraries group devised a model (refer diagram 2.1) to the perceived need for a greater intellectual underpinning to the practical work going on in higher education libraries. This model (the 'Seven Pillars' model) includes a set of seven 'headline' skills closely modeled on pre-existing work. Perhaps more
importantly, the model articulates the notion of development from a 'novice' level of engagement to an 'expert' level. This was a direct response to a perceived need for this work to be seen to be engaging with the range of higher education levels of work from sub- degree to postgraduate and research.

Diagram 2.1 – Seven Pillars Model
Empowering 8™ IL Model

According to Wijetunge (2008), Empowering 8™ can be defined as a model which can be used to solve any information problem effectively using eight stages with several sub-stages under each component. It is not necessary to complete these stages in a linear order, but one can enter the cycle from any point taken through all stages in a successful information problem solving situation. Two arrowed lines denote the teacher and the teacher librarian getting involved in the process (Diagram 2.2). Empowering 8™ has a set of 108 corresponding skills ranging from defining the need for information to application of new concepts learned to other situation. This list of skills is still being reviewed depending upon the experience gained. Developing competencies in these skills will take place according to the nature and complexity of the problem being solved using Empowering

Diagram 2.2 – Empowering 8 Model
Empowering process and the skills are applicable to all subject areas across the full range of levels from kindergarten to postgraduate. It is not limited only to the educational context but can be applied in a variety of problem-solving situations in the personal and work environments as well.

2.3.2. Information Literacy Standards – Development across the globe

Several information literacy standards and guidelines have been developed and used in schools and institutions of higher education worldwide. These standards and guidelines not only list the competencies that students ought to possess and exhibit, but also make recommendations as to how these competencies can be integrated within the school curricula and also the various strategies that can be implemented in order to effectively impart these competencies to students. Various Information Literacy standards and guidelines that have been implemented in various parts of the world have been given below.

In United States, the American Library Association and Association for Educational Communications and Technology’s landmark publication Information power, and the Association of College and Research libraries’ publication Information Literacy Competency Standards for Higher Education have both become de facto standards for IL competencies from kindergarten to college, both across the US and in many other nations throughout the world.

In Canada, a three-year information literacy research project funded by the Social Sciences and Humanities Research Council and the Canadian Ministry of Education included the
skills finding information, using documents and continuous learning, all of which are components of information literacy.

The United Kingdom Standing Committee for National and University Libraries (SCONUL) first convened and proposed the Seven Pillars of Information Skills in their position paper in December 1998. Best practices in the area within the UK higher education sector and from abroad were explored, and seven core skills were finally identified, developed and proposed in October 1999. However, the focus of the seven core skills was on ICT literacy and information access and use, and not quite specifically on information literacy.

Australia and New Zealand - The Council of Australian University Librarians (CAUL), and other educational bodies in Australia and New Zealand reviewed the US Information Literacy Standards for Higher Education by ACRL for adaptation and implementation. They renamed the adapted standard as the Australian and New Zealand Information Literacy Framework (ANZIIL) and essentially provided four guiding principles and more comprehensive details for each of the six core standards. The ANZIIL information literacy framework has been extensively adopted or adapted for use in many educational institutions throughout the region.

In Singapore, after the cease of important information literacy documents, Ministry of Education (MOE) started formulating the Master plan for information technology (IT) in education (MP 1) in the mid-1990s. There were two foci in the development and execution of MP1. First was to present an overall blueprint for the use of IT in schools, and the second was to provide every school-going child access to an IT-rich curriculum and school environment.
In Southeast and South Asia, in a 2003 regional workshop organised by the International Federation of Library Associations (IFLA) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) that involved seven countries in Southeast Asia, the participants recommended to UNESCO for Southeast Asian countries jointly improve information literacy education in schools. This spawned a project for the development of information literacy education through school libraries in Southeast Asia with financial assistance under the UNESCO's ‘Information for All Programme' (IFAP) in 2004. Follow-up workshops were held in different parts of Asia in many years. It was found, through the surveys conducted in the seven Southeast Asian countries, that only half of the respondents indicated that their school had a policy statement on information literacy, although it was rarely explicitly stated. Information literacy training for educators was somewhat low across all schools in the region, whereby most information literacy training stemmed from external courses, seminars and user education programmes. There was generally a lack of leadership for information literacy standards and implementation in these countries. Other factors that contributed to the low rate of information literacy implementation in schools included low literacy rate, lack of funding, lack of awareness, shortage of classroom or library space, and insufficient guidelines on information literacy integration into the school curriculum, among others. However, the participants saw opportunities for information literacy implementation to be improved in their respective countries, such as ICT infrastructure in school curriculum reforms especially where ICT developments was concerned, national policies that emphasise the creation of a knowledge society, and enhanced regional and international partnerships in information literacy policy and implementation.
In India, an international workshop to promote information literacy in South and Southeast Asia was held in October 2005 in Punjabi University, India, with the objectives of improving educators understanding of the importance of information literacy in teaching and learning, developing strategies in educational institutions to incorporate information literacy within the curriculum, and generating appropriate information literacy standards and guidelines in the respective countries within the region, among others. The workshop was attended by 65 delegates from the academic fraternity representing Bangladesh, India, Malaysia, Nepal, Pakistan, Singapore, Sri Lanka, and Thailand. Although the United Nations Educational, Scientific and Cultural Organisation (UNESCO)’s effort has been instrumental in attempting to develop an Asian-centric set of information literacy standards, the distinct characteristics and different socio-economic status of each Asian nation throughout the region makes it a challenge to adopt an overarching standard for the region (Mokhtar & Majid, 2008)

2.4. Information Literacy/ Information Literacy Competency Programme

Some of the information literacy programmes offered by select universities that deal with information literacy are:

- **Open University** - MOSAIC (Making Sense of Information in the Connected Age) module (www.open.ac.uk/mosaic/index.cfm)

- **Strathclyde University** - a credit bearing information literacy optional module available to business and to computing undergraduate students (www.dis.strath.ac.uk/literacy/sbsclass.html)

- **University of North of London** - an information literacy module, a credit-
bearing class for undergraduate students at the Faculty of Environmental and Social Studies and the Faculty of Humanities and Education (law students) (http://www.university-directory.eu/United-Kingdom-(UK)/University-of-North-London.html) and

- Chalmers University - a credit bearing course offered by the library to both undergraduates and postgraduates, including doctoral students (http://www.librarytechnology.org/lwc-displaylibrary.pl?RC=2111)

In universities, there is a push to include information literacy as part of course curricula, rather than stand-alone sessions run by the library. Many librarians now work closely with faculty staff to ensure that information literacy is included in curricula along with other generic skills, such as communication skills (Bundy, 2004).

Mathies (2004) highlighted how a library liaison to Butler University's College of Business Administration effectively built relationships that resulted in a 93 percent increase in the number of information-literacy instruction sessions over six years.

According to Avdjieva, Callagher, Knight & Mitchell (2004), information-literacy instruction in an electronic format was embedded in a compulsory introductory management course taken by students in their first semester at the University of Auckland Business School. The modules of an online tutorial were designed to complement and to be accessed in conjunction with course assignments by students in multiple sections of the course.

Duran (1992) conducted focus group discussion and telephone interviews among 24 tribal community college presidents to determine the role that libraries currently played and could play in addressing the mission of their colleges in fostering information
literacy among students and community members. Five presidents indicated that their libraries were currently assisting in the development of information literacy among students and community members. Although the term "information literacy" was new to some of the presidents, their colleges had apparently applied the concept in meeting the components of the tribal college mission. When asked how information literacy had been introduced into the library, three presidents responded that the accreditation process had spurred the library in that direction. Other attendees of the focus group discussion also emphasised the role of the library in directly contributing to accreditation of the college, since the status of the library was a factor in the accreditation process.

Hawes (1994) reviewed articles on business schools’ commitment to integrating information literacy into the curriculum. He contended that the integration of information literacy skills into the business curriculum was a growing concern in colleges of business and in the academic libraries that served them. He concluded that as of that time the concept of information literacy had not “percolated up in the collective conscience of the business school leadership to the point of becoming a salient issue”.

University of Tennesse, Knoxville conducted an undergraduate programme review in 1995-1996 and a librarian and a faculty member from the School of Information Science served on the review committee. They were able to use the review process as an opportunity to promote information competency as a necessary component of undergraduate education that was as critical to student development and learning as writing, oral communications, and mathematics. In its review document, the committee recommended that a foundational course be incorporated into the general education
curriculum that would include "learning the art and science of information gathering ... and transmission" (General Education Programme Review Self Study, 1996).

Rader (1997) reviewed materials dealing with information literacy including instruction in the use of information resources, research and electronic skills related to retrieving, using and evaluating information. It was understood from the review that publications dealing with user instruction in academic libraries continued to be the largest number and increased by three percent. Further in 1997, articles dealing with instruction in the use of electronic information and the World Wide Web increased substantially as did articles dealing with Information Literacy, resource-based and active learning, and integrating literacy information into the curriculum both in the schools and in higher education. Publications from other countries dealing with the topic of information literacy in schools and higher education were more apparent.

The National Forum on Information Literacy (NFIL) (1998) studies the information literacy needs of students, businesses and citizens in the information age and produced a report on the necessity of integrating information competence concepts into the curriculum and into workforce training programmes. Almost ten years later NFIL revised its original study and produced an update that listed recommendations aimed at colleges, librarians and business leaders. These recommendations included i) collaboration of teaching faculty with librarians and subject specialists; ii) support of educational accrediting agencies in the area; iii) encouragement of school reform movements to include information literacy skills in the curriculum and the demonstration of the need for these skills to business leaders.
Information Skills Survey (Catts, 2002) has provided an evidence-based test instrument for evaluating law, education and social science students' information literacy skills. However, there is currently no equivalent instrument for the sciences, including medicine.

Nyamboga (2004) stated that inclusion of information literacy programmes in universities in India was entirely the responsibility of library and information professionals. Universities in India recognise the need to train and provide the right skills not only to their library and information professionals, but also to the users of libraries. The author suggests that all Indian universities unify and undertake a programme in information literacy and further make it compulsory for all students whether undergraduates, postgraduates or research scholars. Facilities including computer laboratories for hands-on training should be provided and the courses should be assessed/examined with relevant credits awarded. To achieve this effectively the library and information professionals need to possess the right skills in appropriate areas, as well as have a wide range of knowledge in various sources of information and teaching skills.

Macklin and Fosmire (2004) have presented the process of information literacy integration in the curriculum in Purdue University. Pre and post intervention assessment of information literacy skill was made. Information literacy skill was assessed based on the Association of College and Research Libraries’ core competencies for information literacy. In the pre-assessment, 59% of the students reported high confidence in the information literacy skill set compared to 41% reporting high confidence, post-intervention. Nevertheless, student performance improved as more relevant, scholarly materials were cited for research papers and projects.
Ellis (2004) stated that many academic libraries are committed to teaching not only in classrooms but also at the reference desk. As sources of reference had expanded to include e-mail and chat, reference librarians are prompted to consider teaching through digital reference is an application of the ACRL Information Literacy Competency Standards. Analysis of the data, revealed that standard one (nature and extent of information need) and standard two (information access) were taught the most, representing 22 percent and 62 percent of the total chat transcripts, respectively. This was understandable given the ongoing difficulties users had with defining their information needs, especially with narrowing the focus of their research topics. Similarly, the changes brought by the Internet had expanded the number of formats available for information, thus confounding access. Users had difficulty locating information from the innumerable sources of information. Besides, standard four (effective use of information) was hardly taught or taught one percent of the time, since it is not the typical kind of assistance offered by librarians. Standard four was better addressed by faculty responsible for the research assignment or those skilled in advising users on writing. Furthermore, standard five (economic, social and legal implications of information use) was seldom taught, representing three percent of the total chat transcripts reviewed. In the few instances standard five was taught, users needed help with citation formats for online sources. The most revealing data of the study, the lack of any chat interactions that related to standard three (evaluating sources), indicated the extent of time required to teach information evaluation. Standard three also requires users to think critically about how information satisfies the criteria for selection and may even be dependent on their completion of the research project. Of the total number of transcripts reviewed, 35 percent or a little more than
one-third of all chat transcripts reviewed demonstrated no ACRL information literacy competency standard. This was either because of early terminations or because of reference interactions were just pointed explanations of library services or policies. Despite the importance of knowing the degree to which information competency was taught, there were unavoidable limitations to the study that made it less of an ideal model for gauging the possibilities for teaching information competency through digital reference. For example, the facility for teaching through chat reference varied from librarian to librarian. Although this study was a preliminary attempt to understand the extent to which the ACRL information literacy competency standards could be taught in chat reference services, practical approaches to teaching information competency through digital reference needed to be examined.

Jacobson & Germain (2004) stated that the Middle States Commission on Higher Education accreditation guidelines suggested an enhanced role for faculty members in information literacy instruction. A campus-wide information literacy committee could play a key role in accomplishing this. At the University of Albany, SUNY, has been critical in addressing this recommendation, and in advancing a general education information literacy requirement. Some of the information literacy initiatives offered in the university were, Evaluating Internet Resources, a University Library Virtual Tour and Plagiarism and so on. To educate faculty members about implementing information literacy courses, ‘Resources for Information Literacy Courses’ was developed. The page collects together all online tutorials offered by the University Libraries and provides a link to a form through which faculty members could register their courses, so that they automatically received reports of which students had completed the tutorials. A link is
also provided to the ACRL Information Literacy Competency Standard for Higher Education.

Boisselle, Fliss, Mestre & Zinn (2004) have reported about the Mellon workshop that created teams including faculty, librarians, instructional technologists and students from nine educational institutions to incorporate technology into curricula. The workshop proceedings illustrated the differences and challenges of collaboration in small colleges and large universities.

A study on the level of information literacy competency amongst Library and Information Science students at the University of Botswana by Mutula, Wamukoya & Zulu (2005) revealed that most students had an attitude of unwillingness to learn and read, displayed lack of proficiency in English language, were not competent in questioning what they were taught, and largely added little value to the learning process. Moreover, students generally showed inability to provide reviews of papers, to cite documents appropriately, to demonstrate competency in report-writing skills, to express themselves clearly and correctly, to use correct spellings, demonstrate competency in search strategy formulation, and demonstrate respect for copyright laws. The most basic core competency, organisation of knowledge and knowledge resources includes not only the intellectual process of knowledge organisation but also the activity of resource collection. It deals with recorded information and in particular how information in all formats is identified, selected and acquired and recorded information. The next two broad core competencies, technology and management, are the means whereby the organisation of knowledge was facilitated and focused on client’s needs. In the core competency of technology utilisation, the knowledge base
should enable one to employ appropriate technologies in library and information applications and understand emerging trends in technology and appreciate how these might impact on the information profession. The third core competency, management is the ideal accompaniment for technology utilisation because it focuses on the human component of not only the technology but also the range of processes related to knowledge and client use of knowledge resources. In this competency focus is on how to apply contemporary management principles impractical and productive ways, and on understanding the need to balance physical, human, financial and client resources. The fourth competency related to information and knowledge management. Business uses information as a means of enabling decision-making, planning, developing strategy, customising process and control, of engaging in negotiations; resolving issue and conflict resolution; organisational and leadership management.

Cochrane (2006) studied the nature of information literacy within an academic programme. Data was collected in a number of ways. The questionnaire was distributed to the students. The assessed work submitted by 183 students. An auditing tool, based on the seven SCONUL ‘pillars’ was designed and distributed to all lecturers responsible for the delivery of modules on the Management degree. Ten out of 14 lecturers completed the auditing tool. Further, student assessment was used to indicate students' abilities in aspects of learning. By analysing the assignments submitted by students and the marks they gained, it was possible to provide a broad indication of their performance. These marks also reflected students' strengths and weaknesses. The average mark for the assignment as a whole was high (67.4%), although there was a wide range of student performance. No
student failed, but one might have expected a narrower range in an assignment based on skills. The second assignment tested the abilities of individual students to undertake a range of activities. Marks were allocated to the construction of a bibliography, writing evaluative annotations and students’ reflective comments on the tasks undertaken. It was found that students at all levels were provided with advice and support, however, the overall approach varied between modules. Lecturers provided support in aspects of information literacy to ensure that their students were able to complete specific, assessed assignments. However lecturers focus primarily on the value of online searching and bibliographic skills in an educational context. They viewed these skills from their perspective as academics, but did not necessarily stress the value of IL as a competency for lifelong learning. In the absence of an overall policy and strategy aimed at developing information literate students this attitude was inevitable. The analysis of assessed work submitted by the students taking the modules indicated that the majority were able to achieve an acceptable level of performance in a range of information skills.

Wu and Kendall (2006) captured teaching faculty’s perspectives on business information literacy. Data were collected using a survey from business teaching faculty at California State University to determine their expectations with regard to student information literacy skills. As for skills that students had to acquire, writing skills are the number one expectation, followed by critical and analytical thinking, research skills, speech and oral presentation, and data analysis. The top five rankings among the 15 business information literacy criteria were company information, current awareness, presentation tools, industry information, and international information. They called for
integrating the information literacy skills into the course plan to prepare business students for lifelong learning beyond graduation.

Mutula, Kalusopa, Moahi and Wamukoya (2006) delivered the online information literacy module for six weeks to 100 students. The students were divided into three equal groups for effective management. The first and second groups had 34 students each, while the third had 35 members. The online information literacy module consisted of various components, divided into six topics using the Australian Capital Territory Library and Information Services information literacy model. The model provided six stages for developing information literacy skills, namely: i) defining the task; ii) locating resources; iii) selecting the most useful resources; iv) organising the information; v) presenting the information effectively; and vi) assessing what has been done. Respondents were asked to state their perceived level of information literacy competency before they undertook the online information literacy course. Out of 86 who responded to this item 14 per cent of them perceived their competencies to be poor; 47.7 per cent noted that their competencies were fair; 36.0 per cent felt that their competencies was good; and only 3.5 per cent thought their competencies were excellent. Respondents were asked to indicate their perceived level of information literacy competency at the conclusion of the online information literacy module. The results from 86 respondents revealed that none of them perceived their information literacy competencies as poor; 3.5 per cent perceived their skills as fair; 65.1 per cent perceived their skills as good, 31.4 per cent thought that their skills were excellent. The respondents in general felt that the online information literacy course increased their competencies. However, the author admitted that these results could not be definitive unless they were corroborated further through objective statistical measures.
Wang (2006) introduced socio-cultural learning theories and made an attempt to apply them to information literacy teaching activities. He stated that the focus of information literacy teaching needed to move from specific skills to general, transferable critical thinking and lifelong learning skills. When teachers and librarians shifted their teaching focus, they needed to rethink pedagogies in information literacy teaching. He reiterated that learning theories and information literacy standards should be used as the foundation of all information literacy learning design and activities.

Dadzie (2007) traced various studies conducted on information literacy in universities and also in the workplace. For example Clyde, 2005; Lloyd, 2006; Parker, 2003 and so on. He summarised that these studies have demonstrated that information literacy was a competency required right from the first year of academic study, and was particularly important for independent essay and thesis writing. It was also required for subsequent professional activity, as part of lifelong learning. A number of institutions in the developed countries have produced standards, guidelines, models and research reports on information literacy.

Hurley, Hegarty & Bolger (2006) highlighted the experiences Library of Waterford Institute of Technology (WIT), Ireland in delivering on-demand information and research skills courses including an information literacy tutorial. It not only posed an exciting opportunity for the learning support team to advance the teaching and learning of information skills on to new levels but was also a step forward in the library’s campaign for a mandatory, accredited information literacy module for all students of WIT. One of the first tasks was to develop a set of learning outcomes. The outcomes were largely modeled on the information literacy standards as developed for
OLAS (Online Information Literacy Tutorial) and on the Australian and New Zealand Information Literacy Framework. The ultimate aim of the library module was for students to develop a sense of information literacy. In order to make the training as beneficial as possible, a number of teaching methods were incorporated into the sessions, including traditional face-to-face learning, practical online experience and group discussions. Information discussions with lecturers revealed that due to the language barrier, class progress was likely to be slow. Training was based on a PowerPoint presentation, which included a number of graphics. A separate set of slides was used to present each new topic or concept. Students had an opportunity to ask questions and to practice their skills in smaller groups before completing the relevant worksheet for that section. Take-home assignments were broadly based on the worksheets that were distributed during class and included a sample answer sheet for guidance purposes.

Despite the fact that course outcomes were very difficult to quantify, the team believed that the library module benefited the bridging studies students in several ways. The group’s knowledge of the library was certainly enhanced. Students displayed an increased familiarity with library resources and services as the training and desk staff in the library noted a marked improvement in the range and depth of library related queries. Assessment results also revealed that all students could manage to pass the library section of the paper.

Karisdappa & Rajgoli (2008) using questionnaire method studied information literacy programme of library and information centers of higher learning and research at Bangalore. In all, questionnaire was circulated to 31 selected libraries out of which 29 (93.55 per cent) responded. Among 29 respondents, 6 respondents had indicated that they
did not provide any information literacy instruction or training to their users. Hence, these 6 libraries were excluded and only 23 libraries were considered for data analysis and interpretation. 43.48 per cent of the respondents conducted information literacy programmes only for the new users of the library followed by 26.10 per cent of respondents conducted it when requested and annually, respectively. Only four (17.40 per cent) respondents conducted such programmes at a regular interval. The respondents had understood well their teaching roles. In majority (78.26 per cent) of libraries, it was the librarian who conducts information literacy programmes. Some of the libraries (13.04 per cent) conducted information literacy programmes by inviting guest professionals and with the library staff. Only 8.70 per cent of respondents arranged demonstrations and presentations of the resources procured for the users from publishers, representatives and agents. Out of the 23 respondents, 15 (65.22 per cent) respondents revealed that they did not receive any technological training which is very essential as the technology is getting obsolete at a greater pace. But, it can be taken as a positive indication that majority of respondents were self learners and had good technological knowledge and skills. Among the eight respondents who received technological training, majority (87.50 per cent) were trained by the product vendors followed by only one (12.50 per cent) respondent who received training from outside trainer/consultants. Some of the respondents were keeping themselves technologically up-to-date by attending workshops, seminars, lectures and training programmes organised by professional organisations. Teaching knowledge and skills must take an essential rather than desirable place in the library professionals' portfolio because quite a sizeable majority, 20 (86.95 per cent) respondents designed, developed and updated products in-house as part of their normal range of duties where as
two (8.70 per cent) respondents had mixed team of library professionals, information technology staff and administrative people for planning, designing and delivering information literacy programmes. Libraries today introduced many new services, either by converting existing services into e-services or by developing and implementing entirely new services for search, delivery and use of information, for instance, online delivery, portals, personalised services, online teaching modules, online reference, and digitised collections or electronic publishing. The time available for library staff to perform information literacy teaching was a major issue. This was expressed by a large number of respondents, 16 (69.56 per cent). This problem could be tackled by appointing separate staff for planning, designing and delivering information literacy programmes.

Thornton (2008) conducted two studies – one among 19 students of third year graduates and another study among 90 students of second year graduates on how to find relevant information as a precursor to embedding information literacy into a politics module at Cardiff University. These studies suggested that the students regard such projects as enjoyable and worthwhile exercises. Moreover, there were strong indications that those who attended the sessions were considerably more information literate than those who did not. It was contended that these students could be more effective Politics students. At the very least, most of those who attended the sessions would be aware of and able to access, the wealth of good-quality material available on the University’s databases unlike the non-participants.

Kaur, Sohal and Walia (2009) developed Information Literacy curriculum for undergraduate students. Course content included inputs on concept of information, information providers, sources of information, library services, networks, information
technology, information searching, library tour, evaluation of information, presentation of information and barriers of information literacy education.

Pattar and Kanamadi (2010) conducted a survey of the information literacy programme being provided at the engineering colleges in Navi Mumbai, India. The study revealed that majority of the libraries were providing information literacy at the beginning of the academic year and librarian was the anchor person for this initiative. Faculty members or external agencies were not engaged. Methods used for delivery were limited to brief introduction by lecture method and library tours. Web based instructions were not provided. Majority of the librarians agreed that Information Communication Technology had great influence on literacy programmes. Study also revealed that majority of the libraries was not conducting such literacy programmes.

Birch, Burnett and Sayed (2010) selected the ACRL Information Literacy Competency Standards for Higher Education as the conceptual framework for the District eLibrary Information Literacy Programme. It was this planning effort that prompted the librarians to consider multimedia tools, such as videos, to complement the librarians’ classroom instruction, and to enhance the students’ information related learning experiences and knowledge base. District eLibrary began developing a formal information literacy programme, which initially was focused on Weill Cornell Medical College in Qatar foundation and pre-medical (or undergraduate) student populations. The information literacy programme sought to teach information literacy skills related to scholarly information as a viable alternative to the Internet to the students of Weill Cornell Medical College in Qatar foundation and the same was aligned with the mission of the institution to support lifelong learning. To enhance the implementation of these
information literacy standards, District eLibrary’s librarians designed a set of strategically planned instructional videos, District eLibrary Casts. The topics of the videos were been mapped to the ACRL Information Literacy Competency Standards for Higher Education, enhancing District eLibrary’s workshops supporting the Information Literacy Programme. The videos were promoted in a number of ways, including District eLibrary’s web page and publications. The videos were marketed directly by the librarians in their workshops, and on the final slide of each video, referring the viewer to other District eLibrary Casts available. The increased usage of the videos that is, from 13 hits by December 2009 to 434 times by October 2010 was very encouraging to the staff involved in the project.

2.5. Tool Construction for IL Assessment

Hardesty, Lovrich & Mannon (1979) developed a tool to evaluate library-use instruction. Their instrument, which contained ten attitudinal items and 26 items to test library use skills, underwent rigorous pre-testing for reliability and validity. They also utilised a control group in the testing phase to ensure the legitimacy of any significant differences discovered in their study. The pre-test was administered to 162 freshman prior to instruction and to the same group of students eight weeks following instruction. The pre-test was identical to the post-test, and no assessment was made of the effect the test-taking experience may have had on post-test results. Larger numbers of subjects would also have strengthened the authors' ability to generalise their results to their institutional population.
Colborn & Cordell (1998) developed an instrument to measure knowledge in five fundamental areas. The instrument was administered to 131 students who returned 129 completed and usable tests. Their resulting data showed no significant difference between pre- and post-test results. Although this study detailed the most rigorous development process, in which the authors used both a difficulty and discrimination index to examine all items and revising their instrument accordingly, no definite conclusions were drawn about the disappointing results. The authors were fairly certain that the test itself was not the weak link, however inadequate data was collected to rule that out. Their experiences at the very least were instructive about how difficult and unpredictable the test development process could be. Their instrument, even if it had proven successful, would be difficult to administer institutionally or across institutions because it contained fill-in-the-answer types of questions that would be cumbersome to score in a very large group setting.

Williams's (2000) article serves as a good primer on methods to use when assessing information literacy skills, common place terminologies and practices, as well as alternative methods that could be employed. She provided a succinct definition of reliability and validity in assessment development. The assessment tool would be reliable if it could be used to test the skills of another group of students and if it provided similar information about the skills meant to be measured. Validity of the assessment tool components assures that the questions are legitimate measures of what the researcher intends to measure. Williams looks at a variety of methods for asking questions in an assessment that will demonstrate competency of certain skills, or conceptual master.
In an effort to find an existing instrument, O’Connor, Radcliff and Gedeon (2001) searched the literature since 1980 for an instrument that could be used to assess the information literacy skills of students longitudinally and across institutions. Upon finding no adequate existing instrument, authors reviewed the literature for information to assist them in the process of creating a new instrument. The literature on information literacy assessment fell into distinct categories: literature review articles that described the need for assessment and discussed the political and pragmatic barriers to library assessment; theoretical articles that discussed the various types of assessment and described the strengths of each type for evaluating library instruction; and reports of assessment projects. Authors reviewed eight articles that reported using a "paper and pencil" test to assess information literacy skills. All of the instruments included questions on basic library skills, such as Library of Congress Subject Headings, call number comprehension, locations of various services or resources within the libraries, the purpose of Boolean operators, citation interpretation, online public access catalogue usage, and basic search construction. Most also included items to (1) assess library related attitudes and behaviors; (2) allow for student self-assessment of skills, and (3) gather basic demographic information. Instruments contained between nine and 28 items and were administered to as few as 111 students and as many as 1,702, with most studies including between 200 and 400 students. Five of these studies used a pre- and post-testing process; three of the pre- and post-tests were identical instruments, with the exception of additional affective questions added to the post-test. First, based on the Americacn Association of School Librarians (AASL) and ACRL standards, O’Connor, Radcliff and Gedeon (2001) identified specific skills to demonstrate understanding of each of the sub-
areas of information literacy standard. Two standards, dealing with efficient and
effective access to big information (AASL standard number 1; ACRL standard number 2),
and evaluating information critically andcompetently (AASL standard number 2; ACRL
standard number 3) were focused. Following theidentification of standards, items were
identified items which could be easily depicted and understood in a paper and pencil
format. Refinement of the items took place over several meetings, as each author reacted
to what the others had written. After reasonable items had been written, refined, and
agreed upon, they conducted one-on-one.

O'Connor, Radcliff and Gedeon (2002) used a single group of 554 students
(after the initial pilots) to check the reliability of their instrument, which was carried
out as an early part of project SAILS - www.projectails.org - which produced a
standardised information literacy site that can be licensed for use by other
organisations. They checked the distribution of test scores and concluded that most
of their test items were reliable and 'that the items worked together to measure at
least some portion of the trait of information literacy'.

Ondrusek (2005) has discussed about the formal-information literacy quiz that
serves as a performance measure of the Orientation Seminars. It was proposed by the
librarians who handled these orientation sessions. A collection of potential quiz items
was developed by a reference librarian particularly interested in learning assessment.
Teaching librarians reviewed this list, identified a "core" collection of items, and
suggested additional quiz content. Based upon the librarians' recommendations, a 42-item
quiz was created. The online tutorials developed during the summer months were
predicated, in part, upon the call number, reference material, and OPAC knowledge that
formed the basis of quiz items. The quiz was transferred to a web-administered format. Then based on the feedback from the students, some items were rewritten and the problematic items were reviewed. The data were subjected to factor analysis to check the validity.

The main aim of this study by Kurbanog, Akkoyunlu and Umay (2006) was to describe the development of an information literacy self-efficacy scale (ILSES) designed to measure self-efficacy for information literacy and find out how well the instrument measures what it claims to assess. Participants included randomly chosen 415 teachers from various branches. The response rate of the participants was 90 percent (374 teachers) of whom 62 percent were female, and 38 percent were male. The participants ranged in age from 20 to 52 years (mean = 34.5, SD = 2.2) and were drawn from five private and 14 public schools, of which 60.4 percent taught primary level, and 39.6 percent taught secondary level. Although the reliability of the 40-item scale was reasonable (0.84), item analysis to find out about the item validity indicated that there were items in the 40-item scale, which either repeated each other or did not measure well-enough the related category. Based on the results of this analysis, the scale was refined into a 28-item scale, and the use of 40-item scale was not recommended although the longer session seemed to be more comprehensive. The results indicated the 28-item scale, with the highest Cronbach's alpha (0.92 for the Turkish version and 0.91 for the English version) among the three versions, could be considered highly reliable. It was of reasonable length and served to be a useful tool for researchers who are interested in measuring individual's self-efficacy levels for information literacy. The use of 28-item scale is highly recommended to identify individuals, with low self-efficacy beliefs,
which may be a significantly limiting factor for them to explore their information literacy skills.

Cameron, Wise and Lottridge (2007) checked the reliability of their 60-item test using 524 students. The test showed strong reliability overall, though with slightly lower levels of reliability for the individual sections of the ACRL competency standards. They also checked construct and content validities. Content validity (does each question test the property that the designers intended?) was tested by three librarians, rating whether or not each question matched the standard that the item was intended to measure (by three categories - 'matched the standard'; 'uncertain'; or 'did not match the standard'). There was good inter-rater agreement between the three librarians. Construct validity (does the whole test measure the 'idea', that is 'information literacy', that they were intending to measure?) was tested in three ways, comparing data from people who took the information literacy test with another similar but older test (not following the exact same competencies) taken by all students at the institution; a second check used a group of students who rated their own use of information sources and information literacy related activities, along with confidence in finding and evaluating information. This was compared to their results in the newly developed test. Thirdly they compared the results of a new group of students with students who had already received information literacy instruction. All three of these showed evidence that the test had construct validity.
2.6. Information Literacy Competency Assessment

According to McBride (1999), there are seven basic steps to designing an assessment: (1) What is the purpose of the assessment? (2) What decisions will be made with the information from the assessment? (3) Does the test parallel the work covered in class? (4) Are there at least ten questions for every skill area (selected response/fill in the blank)? (5) Is it focused on the most important information, rather than small irrelevant facts? (6) Is the test too difficult? (7) Is it relevant to the students?

Lannuzzi (1999) stated that there were at least four levels at which information literacy outcomes could be assessed: within the library; in the classroom; on campus; and beyond the campus. There is an increased need for collaboration at each level as the logistics of assessment become more complex. The measure of student learning also became more meaningful at each level. Information literacy assessment within the library included measures that could be conducted by the library independently because it had control over the process and could generate and analyse the data. Such measures included the successful completion of in-class assignments or activities, self-directed learning tutorials such as workbooks or Web-based modules, and competency tests or self-assessments administered as pre- or post tests. It was within the library's control to develop assessment tools that measured a student's ability to complete a task before he or she left the classroom. Information literacy assessment within the classroom includes strategies that focus on the course syllabus, the products for the course, and the process by which students create those products. Methodologies could include evaluation of bibliographies, reviews of assignments that underscored the research process, and the use of portfolios or journals. The possible indicators of information literacy included
identifying, accessing, and locating information; evaluating information critically; selecting information to incorporate into one's knowledge base; synthesizing new ideas and constructing new concepts; and using technology effectively, appropriately, and ethically throughout the process. When considering campus wide information literacy assessment, it would be difficult to separate information literacy from the overarching goals of undergraduate education and the overall assessment of student learning.

Samson (2000) provides a less ambitious but still very useful example of an assessment project which used a web-based assessment questionnaire to gather data on student skills. The scope and scale of the assessment is what sets her research apart from other assessment projects, as well as the early use of web-based questionnaires to collect the data, and as a handy tool to generate collections of data that could be easily analysed later. Samson also reports on the development of the assessment questions, starting with instruction goals and building questions that would assess students' success at reaching those learning outcomes.

Brown & Krumholz (2002) is a good example, however, of assessment plans that utilised the tool development with close association between assessment questions and methodologies and the desired learning outcomes to be measured, for course-integrated library instruction sessions. Their research exemplifies the multifaceted approach that seeks data on students' skills throughout the semester. Brown and Krumholz utilised pre- and post-test assessments via a paper survey, as well as through student presentations, progressive paper writing and class participation to measure student gains in conceptual mastery of information literacy skills and other desired learning outcomes. Done in collaboration with teaching faculty, their research utilised techniques most suitable for
assessing certain skill sets. Some methods did not measure levels of competency but gave either credit or no credit for demonstrating a given competency. This research is notable as it provides examples of a range of techniques that can be employed to gauge students’ ongoing acquisition of skills.

Dunn (2002) described the assessment of information literacy skills of about 3,70,000 students of California State University. Six competencies and corresponding scenarios formed and assessment was done on phased manner. Phase I was a survey method which revealed that students quickly thought of using Internet, computer and other books, reference books and so on, as various information resources. Phase II was a qualitative study that captured what students did when they searched for information on particular tasks assigned to them. Students’ computer work was captured using Camtasia Recorder, screen capture software. It was found in Phase II that students spent maximum time for searching in web and internet in library databases.

Cooney and Hiris (2003) evaluated skills of graduate students after course-integrated instruction. The important strength of the method was the use of the final paper to assess the development of higher order learning outcomes and skills; and strong collaboration with the business faculty to integrate information literacy learning outcomes into the curriculum of the graduate level course.

A study by Flaspohler (2003) examined the effectiveness of an instruction programme offered at a four-year liberal-arts college with fewer than 3,000 students. The research was designed to assess the effectiveness of the current programme and measure it against a pilot group of students exposed to enhance information literacy opportunities based on the Association of College and Research Libraries (ACRL) Information
Literacy Competency Standards for Higher Education. Working with five faculty members, information literacy goals were clearly articulated and implemented into nine sections of first-year writing and speaking courses. Bibliographic analysis, an information literacy questionnaire, and an in-class writing exercise were used to determine whether students in the pilot groups performed better than students receiving the programme customary library training. Information literacy questionnaire was divided into two parts. The first part asked freshmen to comment on how frequently they used certain library research tools during their first discourse class. The second portion of the survey required students to demonstrate specific information literacy competencies. While students in the pilot groups scored better than students in the control groups on each of the information competency questions, four of the nine remaining questions demonstrated significant improvement in the pilot students' information literacy. This study taught a number of things about students and research at Concordia College. First and foremost, it was learnt that though students were increasingly computer literate, they are certainly not information literate. Even though they scored higher than students in the control groups, pilot study students did not cite as many academic sources in their bibliographies or score as well as it was hoped on the information literacy questionnaire. Even though advances in information technology made it easier than ever to access reputable academic sources, students continued to evaluate their research in terms of facility rather than quality. Another thing learnt was that quantitatively measuring the results of improved information literacy was very difficult. However, many outcomes of this study were intangible.
Andretta (2005) described the use of a portfolio of information and communications technologies tasks as one assessment component of an information literacy module at the University of North London. Students were required to perform a number of set tasks, which included word processing, file management, email communication and online searching skills. The portfolio also included a reflective self-evaluation report, requiring students to describe their personal experiences of learning in the context of the set tasks. The data gathered through the self-evaluation exercise over three academic years was later analysed using a phenomenographic approach, to provide the instructors with feedback on the learning strategies adopted by the students, as well as the nature of their interaction with specific sources and their views on the transferability of the skills mastered.

Information Skills Survey for Assessment of Information Literacy in Higher Education (ISS) was done by Clark (2005). This survey was designed to address concerns about how to measure students' information literacy skills. The ISS was designed and developed by the Council of Australian University Librarian Information Literacy Assessment Project Team using the Information Literacy Standards. ISS was administered to first year medical students in October 2004 and to fourth year medical students in January 2005. The major outcome of the research was the recognition by the fourth year students that the information resources they need for the clinical years of their medical course is different to that of the pre-clinical years. This was apparent from the ISS where the first and fourth year students were significantly different. In fact, first years rated themselves more highly in all areas. Analysis of the areas of difference showed that the fourth year students’ approach to finding, evaluating and using
information has begun to change in line with their exposure to clinical practice. First year students focussed their information skills around the use of textbooks, journal articles and web sites. Fourth year students were becoming aware that there was a much broader range of resources to draw from including colleagues. The world of information resources is changing for fourth year students and their lower self-rating on the ISS illustrates their increasing awareness of the complexity of information retrieval.

Ferguson, Neely & Sullivan (2006) stated that the University of Maryland, Baltimore County Information Literacy Task Force developed a survey primarily based on the Association of College and Research Libraries Information Literacy Standards to gather baseline data about the skills of incoming students. Although multiple departments were involved, the biological sciences provided the highest number (151) of initial participants for the 51 item online survey. Findings indicated that the majority of students had some understanding of information literacy skills; however, a significant number were not familiar with important concepts such as search techniques, identifying print citations, how to determine bias or quality of sources, and correct citation behaviours when using research or copyrighted works. These data are being used to further develop an information literacy programme that focused on faculty development and targets areas where students lacked the necessary skills for academic success and lifelong learning.

Terry Egan (as cited by Costello, Cox, Daugherty, Haley, Jackson, Junus & Zhuo, 2006) at the Educational Testing Service gave an overview of Information Communication Technology Literacy Assessment. The assessment measured students’ technical literacy skills in combination with information literacy. Two versions of the test
were introduced: one aimed at rising juniors and another at students transitioning from high school to college. As on date, 100,000 students from 68 institutions had taken the assessment, and development has moved out of the development phase for both tests so that continuous testing will occur starting in August 2006. Preliminary findings indicated that students in general had difficulty narrowing an overly broad topic and roughly half could successfully evaluate web resources. Student comments about the test showed that 90 percent noted they had never taken on like it, 80 percent thought it was challenging, and 78 percent thought, the tasks reflected what they actually did.

Knight (2006) stated that assessing information literacy through rubrics, had many advantages. First, it was easy to adapt the learning objectives from bibliographic instruction to the new standards proposed by ACRL. Second, it fitted the prevailing library environment and, more importantly, was sufficiently flexible for responding to an ever-changing environment. Third, it provided clear measures of the level of learning attained and explicitly stated those measures at the outset. And finally, with grading rubrics, it was easy to incorporate a feedback loop into the learning environment to close the gap between objectives and attainment. The assessment project was initiated as a part of an Institute of Museum and Library Science grant that provided training in assessment techniques for academic librarians. The author was a participant in the training. Bibliographic analysis using rubrics was one of the methods taught in the grant project. The author's pilot project involved an analysis of term paper ‘bibliographies’ submitted as part of a senior capstone course. The librarian and the professor collaborated in the design of a scoring rubric that was shared with the students and later used for the assessment. To conduct the assessment, the librarian and several faculty members
developed the rubric based on guidelines in the literature and the learning objectives of the course. Outcomes and indicators were specified for each objective. Subsequently, these were matched to the ACRL Standards.

i. **Standard I. The information literate student determines the nature and extent of information needed**

The students were asked to locate scholarly resources. The objective for this requirement was to teach students how to distinguish between the popular and scholarly literature and to identify the library research tools necessary to locate it.

Approximately 35 percent of the students scored in beginning, proficient, and advanced. Although scholarly sources were required in the assignment, the students' work indicated the influence of the convenience and familiarity of popular, web-based sources. The Honors section demonstrated a lead in the selection of scholarly sources.

ii. **Standard II. The information literate student accesses information effectively and efficiently**

The students were proficient in this area, with almost 80 percent, distributed among the three sections, providing two or more explanations of the value of the source. This was an encouraging result, discrediting a pre-conceived faculty hypothesis that only the first few sources on the list of search results would be selected. This result showed that, while students valued the efficiency of finding full-text source, they also recognised the need to evaluate them in the context of their research needs.
iii. **Standard III.** The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base

The students showed minimal accomplishment in this area, most mentioning only one aspect of credibility. As this course dealt with contemporary and controversial issues, the use of very current and argumentative sources was an expected result. However, it was disappointing that more students did not clearly demonstrate an understanding of how to identify and articulate the critical attributes of the information.

iv. **Standard IV.** The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose

Only a small group of students achieved advanced status by including all three components within their annotations. However, more than half of both the Regular and Honors sections achieved a proficient level.

v. **Standard V.** The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally

The majority of the students achieved a proficient level in documentation. Extensive class time and instruction was devoted to this effort. The students were informed of the requirement to differentiate between print and electronic sources. However, many students failed to use a consistent and correct citation format, relying instead upon the style of notation employed by the database.
It was concluded that the analysis of student work product was a useful and authentic assessment, especially in the context of information literacy. It was risky to assume that students could identify a research need, locate the essential tools to satisfy it, and critically select useful materials. While it appeared that truly information competent students were successful at selecting and using information, the challenge of evaluating the application of these skills remained. A rubric is a useful tool for such an endeavor. It allows for the development of objective criteria against which assignments, such as bibliographies, can be evaluated. The process of creating a rubric encourages collaboration with teaching faculty, thus optimising the development of shared information competency beliefs.

Emmett and Emde (2007) conducted a study to assess information literacy of Chemistry students at the University of Kansas. Bibliography of Chemistry (CHEM 720) is a one hour credit course offered to first and second year chemistry graduate students. The course satisfies the Foreign Language or Research Skills requirement expected of all chemistry PhD students. After co-teaching CHEM 720 for one year the instructors decided to initiate a project that would assess the information literacy skills students had at the onset of the class, and on completion of the class. The study results would be used to inform the course and assessment development for the following year. The instructors developed their research question "to what degree does the students' participation in CHEM 720 impact their information literacy skills?" The assessment tool was designed to be a pre- and post-test, with the data collected in one-on-one interviews with one of the instructors prior to the first class of the semester and after the final class at the end of the semester. Out of a total possible score of 120 that an individual student could receive on
either the pre- or post-test, the mean score on the pre-test was 61 for the enrolled CHEM 720 students, and the post-test was 99. The control group students had a mean score on the pre-test of 73 (higher than the students enrolled) but a post of 85. The rate of improvement increased significantly between 2004 and 2005 for the enrolled students from 44 per cent to 62 per cent. The percentage increase (57 per cent) for the year 2006 was comparable to 2005. Although statistically invalid due to low number of participants, improvement rates for the control groups (non-enrolled students) were significantly lower. Nevertheless, it was interesting to note however that some skill development occurred without formal instruction.

McGuinness & Brien (2007) used the reflective learning journals as one component of the assessment protocol for a Stage One information literacy module, which was offered for the first time in September 2005 by the School of Information and Library Studies in University College Dublin. The course, entitled ‘IS10020: Introduction to Information Literacy’ (since retitled ‘Information Literacy: Developing Information Skills for Effective Academic Writing’) constituted a core module. The reflective research journal constituted the most innovative component of the assessment protocol, and was a novel experience for instructors and students alike. Basically, the journal had two key purposes:

(1) To keep students on track with their research and writing, and to help them maintain a clear vision of what they were trying to accomplish in the essay assignment, and the steps that they should follow to get them there.
(2) To demonstrate the extent to which students had absorbed and understood the research topics that were covered in class, and whether they had applied them to the practice of preparing and writing an essay.

Using reflective research journals to assess a Stage One IL class proved challenging for the instructors. From a logistical perspective, the sheer number of assignments which "required grading (300 + ) was a particular issue, mainly since both essays and journals were submitted on the same day. External graders (who were not familiar with the course content), were included to deal with the workload, which made it difficult to ensure consistency in the grading. Other challenges related to student motivation.

Walsh (2009) reviewed the literature regarding methods developed and used by librarians to measure information literacy and also inputs on their reliability and validity. Among 127 articles on information literacy measurement, he identified 91 articles that were most relevant and made the following inferences.
Table 2.1

Type of assessment tools

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of articles</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of bibliographies</td>
<td>17</td>
<td>18.7</td>
</tr>
<tr>
<td>Essay</td>
<td>6</td>
<td>6.6</td>
</tr>
<tr>
<td>Final grades</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Multiple choice questions</td>
<td>31</td>
<td>34.1</td>
</tr>
<tr>
<td>Observation</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Portfolio</td>
<td>8</td>
<td>8.8</td>
</tr>
<tr>
<td>Quiz/test</td>
<td>14</td>
<td>15.4</td>
</tr>
<tr>
<td>Self-assessment</td>
<td>10</td>
<td>11.0</td>
</tr>
<tr>
<td>Simulation</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>91</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Out of the nine types of assessment tools found, the most popular, used by over a third of the studies, was multiple choice questions, but four out of the nine accounted for 79 percent of the studies.

2.7. Summary of the Literature Review

Creswell (1994) suggested that literature review should meet three criteria: "to present results of similar studies, to relate the present study to the ongoing dialogue in the literature, and to provide a framework for comparing the results of a study with other
It is inferred from this chapter that there are numerous studies on information search, information skill, information seeking behaviour, user education, information search in the web, information search through technology and so on for many years. It is also inferred that the users of any library need some sort of education or training certainly to meet out their information demand. It has also been highlighted in many studies that the information skill of the users have been enhanced after the training or education offered by the library professionals. With respect to information literacy, many models (Big 6Skills, Seven faces of information literacy, Empowering 8 and so on) and standards (Information Literacy Competency Standard for Higher Education, Australian and New Zealand Information Literacy Framework, IL standards and indicators of school libraries, Alaska Association of School Librarians Standards and so on.) have been developed by various associations and institutions in almost all the developed countries. Developing countries like India are following the existing models and standards. There are a number of institutions and universities across the world offering information literacy programmes either as compulsory programme, or as a course completion work or as a credit course or an optional one. Courses are offered in various forms like online tutorial, power point presentation, quiz, bibliography writing and so on.

Assessing information literacy competency is the main dimension of information literacy. Assessment is done either to know the level of information literacy competency of the individuals or to know the effectiveness of a particular information literacy programme after it is offered. It is understood from many studies that the information
literacy competency of the students has remarkably enhanced after attending the information literacy programme or training. To scientifically assess information literacy competency of the individuals, a standard tool or instrument is required and the same has been developed by some authors. However, though many tools have been developed, not all tools include all the dimensions of information literacy. Moreover not all the tools are standardised. Further there is a dearth of tools to assess information literacy. Having seen the literature review, in the following chapter, the research methodology for the present study is presented.