the emergence of the lifelong learning, role of education has become more crucial. Hence the key of the 21st century is Lifelong learning which has as its aims: promoting employability and promoting active citizenship (Communities, 2000). Becoming a lifelong learner is only one aspect to survive in this society, but a concept of citizenship and the active participation in democracy is also important. As a result the need for flexible education increases, focus of which should be on developing abilities to learn and to be a lifelong learner. However this is not possible without the individuals’ commitment, responsibility and engagement in their own education. Thus information literacy is becoming a priority for the twenty-first century (Rockman, 2003). Information literacy should support people in developing critical thinking skills and a reflective attitude, thus enhancing lifelong learning and personal growth. Information literacy is about people’s ability to operate effectively in an information society. This involves critical thinking, information evaluation, conceptualising information needs, making effective use of information in problem-solving, decision making and research […]. We need something that emphasises reflective competence and the ability to continue to learn. (Bruce, 2002).

3.1.2 Historical Overview of Information Literacy

Paul G. Zurkowski, President of the Information Industry Association coined the term "Information Literacy" in 1974 in a report submitted to the National Commission on Libraries and Information Science (“The Information Service Environment Relationships and Priorities) he wrote: "Information is not knowledge; it is concepts or ideas which enter a person's field of perception, are evaluated and assimilated reinforcing or changing the individual's concept of reality and/or ability to act. As beauty is in the eye of the beholder, so information is in the mind of the user” (Zurkowski, 1974). With these words, he opened a door to a new way of understanding our emerging information age. Even in 1974, he wrote that people were encountering an increasing variety of information-seeking procedures, resulting in a "multiplicity of access routes and sources' to fulfill information needs. Yet these new routes to information were "poorly understood and vastly underutilized.' He set the agenda for the future by saying, "[M]ore and more of the events and artefacts of human existence are being dealt with in information equivalents, requiring retraining of the whole population. It is important to note here that Zurkowski used the term in a business context and he associated information literacy with using information
resources specifically in relation to problem solving. It can be said that Zurkowski in his definition suggested that
1. Information resources are applied in work situations
2. Techniques and skills are needed for using information tools and primary resources
3. Information is used in problem solving. (Badke, 2010)

Information literacy has progressed since then but the term still remains ambiguous. Laura Saunders (Saunders, 2009) based on a Delphi study, surveyed 13 information literacy experts about proposed futures that explore the possible evolution of information literacy concepts over the next decade. Experts asserted the continued importance of information literacy and the role librarians would play in its future. Though this study demonstrates the importance of information literacy, in order to make it acceptable among the disciplines it is necessary that it should be defined clearly. Yet it is quite apparent from the different literature published, that like the elephant in the Indian parable about the blind men, different schools of thought define information literacy variously.

According to Loanne Snavely, (1997) there are objections to the term information literacy. These objections fall into 2 categories (I) objection to the term itself and (II) objection to the definition. According to them objection to the term information literacy is fairly strong and seems to be widespread. Objections to the definition of the term revolve around some of the broader and more extraneous elements that have been added to the definition. To tackle this there are three options: the choice is to go back to an older term that is bibliographic instruction or library instruction, to create a new term or to continue to use information literacy and discuss the pros and cons of each (Snavely & Cooper, 1997).

3.1.3 Information Literacy Perspectives
Despite its frequent use, there are numerous definitions and there is resultant ambiguity. In order for information literacy to be embraced by non-librarians and academe at large, clarification of the definition is essential.

In the year 1976 the concept of information literacy appeared again in a paper presented by Lee Burchinal, (1976) at the Texas A &M University library’s symposium which considered the future of organising knowledge.
“To be information literate requires new set of skills. These include how to locate and use information needed for problem solving and decision making effectively”. Burchinal’s definition linked information literacy with

1.) skills that include locating and using information
2.) the use of information for problem solving and decision making
3.) efficient and effective information location and utilization (Burchinal, 1976).

In the same year Major Owens (1979) suggested “Information literacy is needed to guarantee the survival of democratic institutions. All men are created equal but voters with information resources are in a position to make more intelligent decisions than citizens who are information illiterates. The application of information resources to the process of decision-making to fulfill civic responsibilities is a vital necessity.” Thus this definition suggested connection between active citizenship and information literacy (Owens, 1976).

In 1979, Robert Taylor in an article on the future of the profession of librarianship noted that an approximate definition of information literacy would include the following elements:

- that solutions to many (not all) problems can be aided by the acquisition of appropriate facts and information problems;
- that knowledge of the variety of information resources available (who and where) is a requisite of this literacy;
- that the informing process, which is continual, is as important as the spot information process, which is occasional;
- that there are strategies (when and how) of information acquisition (Taylor, 1979).

Here the library profession was clearly linked with information literacy.

In higher education settings a definition created by Martin Tessmer states: “information literacy is the ability to effectively access and evaluate information for a given need”. It gave a list of skills required as characteristics of information literacy. Characteristics of information literacy given by Tessmer are an integrated set of skills and knowledge -skills(research strategy, evaluation)
knowledge of tools and resources
Developed through acquisition of attitudes
-persistence
-attention to detail
-caution in accepting printed words and single sources
Time and labor intensive
Need –driven (a problem solving activity)
Distinct but relevant to literacy and computer literacy

**Information literacy is not:**

(only) knowledge of resources
Library dependent (as sole source)
Information finding (also understanding and evaluating) (Behrens, 1994)

In 1987 Carol Kuhlthau emphasised that Information is closely tied functional literacy. It involves the ability to read and use information essential for everyday life. It also involves seeking information to make informed decisions. Information literacy requires the abilities to manage complex masses of information generated by computers and mass media, and to learn throughout life as technical and social changes demands new skills and knowledge. Thus Kuhlthau included *library skills* and *computer skills* in the definition and contributed to the development showing that information literacy is not a discrete set of skills, but rather *a way of learning.* (Kuhlthau, 1987)

A major document related to Information literacy appeared in 1989 in the form of the report of the ALA Presidential Committee on Information literacy (Association, 1989). According to ALA

“To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (Spitzer, Eisenberg, & Lowe, 1998). The report stressed that students should be competent in six general areas: a) recognizing a need for information b) identifying what information would address a particular problem c) finding the needed information d) evaluating the information found e) organizing the information found f) using the information effectively in address the specific problem (Association, 1989). It also
viewed information literacy in a lifelong learning context: “Producing such a citizenry will require that schools and colleges appreciate and integrate the concept of information literacy into their learning programs and that they play a leadership role in equipping individuals and institutions to take advantage of the opportunities inherent within the information society. Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information and how to use information in such a way that others can learn from them. They are people prepared for lifelong learning, because they can always find the information needed for any task or decision at hand” (Association, 1989). Owusu – Ansah (2005) argues that while the ALA report provided a list of skills and aptitudes that made individual information literate and by doing so successfully established the parameters and content of information literacy, the expectations attendant to those parameters and content were unfortunately too overwhelming. They involved universal principles and implicated the whole society in the attainment of the goal set forth. Though libraries were thrust into a lead position the onus was also placed on individuals, schools and the workplace. The expressed desirable encompassed, in one breadth such a broad array of outcomes and processes like problem solving, decision making, critical thinking, lifelong learning, learning processes and performance of professional and civic duties (Owusu-Ansah, 2005).

According to Behrens by the start of the 1990s, the meaning of information literacy as proposed by ALA was generally accepted. Even after the wide acceptance of the definition proposed by ALA, several attempts were made during the 1990s to develop this definition further.

Rader (1990) extended the definition by adding that information-literate people know how to be lifelong learners in an information society and becoming information literate is essential for survival in the future. She stress that information literate citizens will be prepared to acquire and use information appropriate for any situation, within or beyond the library, locally and globally. (Rader, 1990)

In 1992 Doyle provided the following definition “Information literacy is the ability to access, evaluate and use information from a variety of sources”.
She enumerated attributes that represented steps in the progress through accessing, and evaluating information. According to Doyle the information literate person is one who-

- recognizes that accurate and complete information is the basis for intelligent decision making,
- recognizes the need for information,
- formulates questions based on information needs,
- identifies potential sources of information,
- develops successful search strategies,
- accesses sources of information including computer based and other technologies,
- evaluates information,
- organizes information for practical application.
- integrates new information into an existing body of knowledge,
- uses information in critical thinking and problem solving (Doyle, 1992).

Whereas according to Shapiro and Hughes Information literacy is an ambiguous concept and should be conceived as a new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure and its social, cultural and philosophical context and impact as essential to the mental framework of the educated information age citizen. Shapiro also gives a prototype curriculum in which seven dimensions of literacy are identified (Shapiro J. J., 1996).

Bruce (1997) through her phenomenographic research identified seven conceptions of information literacy among academics in Australia. She based her definition of information literacy on the ways in which it is experienced by people.

1. Information Technology Conception: Information literacy is seen as using IT for information retrieval and communication.
2. Information Sources Conception: Information literacy is seen as finding information.
3. Information Process Conception: Information literacy is seen as executing a process.
4. Information Control Conception: Information literacy is seen as controlling information.
5. Knowledge Construction Conception: Information literacy is seen as building up personal knowledge base in a new area of interest.
6. Knowledge Extension Conception: Information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained.
7. Wisdom Conception: Information Literacy is seen as using information wisely for the benefit of others (Bruce C. S., 1997).

In the Information Literacy Initiative Final Report of the State University of New York Information Literacy (1997) is viewed as

“constituting the abilities to recognize when information is needed and to locate, evaluate, effectively use and communicate information in its various formats. It showed the importance of recognizing the need of information and communicating information in various formats. This may be due to bloom of computer use in the 1990s in the information retrieval area that enabled use of information in various formats.” (York, 1997)

Michael Eisenberg and others (1998) suggest that in future there may be other formats for presenting information, formats not yet imagined. It is important that we consider all these possibilities when we use the term “information” and that we not are tied to mental image of printed words and numbers. So using information in a variety of format requires literacies beyond the basic ones of reading and writing. To negotiate complex information we must also be skilled in other literacies visual, media, computer, network as well as basic literacies (Spitzer, Eisenberg, & Lowe, 1998).

A feasibility study for the development of a National Coalition for Information Literacy cites a DETYA study and argues that literacy has been revolutionized by information and communication technologies and thus needs to be reconceptualised to better meet the demands of an information age and an increasingly competitive global economy.

This report states that there appears to be two discernible trends in the definition of information literacy. On the one hand information literacy is conceptualized as a
competency or set of skills separate from but allied with other set of skills, such as other literacies. In this view information literacy is subsumed under the traditional umbrella of literacy alongside print, visual, computer, cultural, scientific, media, and multimedia and library literacies. On the other hand, the term information literacy is equated with a more generic literacy similar to traditional literacy, but adapted to the new circumstances of the digital age. The former interpretation of information literacy surfaces in popular usage as information technology skills and the latter is closer to the ALA view of a broader kind of literacy (DETYA, 2000).

Yet another conceptualization of what is called the ‘new literacy’ can be found on the 21st Century Literacy Summit Website. Here 21st century literacy is said to incorporate technology literacy, contextual literacy, media literacy, creativity and social competence and responsibility. These abilities extend beyond the traditional ones associated with reading, writing and mathematics to encompass the familiarity with and confidence in using the new tools of the 21st century as well as the ability to think critically about the use and management of information. This report suggests that information literacy is equated with computer literacy, digital literacy and so on. And yet the new technologies that are being used increasingly in the education and corporate sectors are simply tools in the same way that library catalogues or encyclopedia are tools. Information literacy not only encompasses all of the skills associated with information retrieval and use but also the capacity to think about the quality of the tools and the information generated/created these tools. In its broadest sense information literacy means to be able to locate, critically reflect upon, adapt and apply full range of tools, both electronic and non-electronic that currently exists and to adapt to new tools as they emerge. Information literacy then is both a set of skills and metacognitive, it is the capacity to know what to do and to reflect upon knowing and doing.

Webber & Johnston (2002) define information literacy as efficient and ethical information behaviour:

...information literacy is the adoption of appropriate information behaviour to obtain, through whatever channel or medium, information well fitted to information needs, together with critical awareness of the importance of wise and ethical use of information in society (Webber & Johnston, 2002).
UNESCO sponsored Meeting of Experts on Information Literacy held in Prague 20-23, September 2003 which defined information literacy as

“Information literacy encompasses the knowledge of one’s information concerns and needs and ability to identify, locate, evaluate, organize and effectively, create, use and communicate information to address issues or problems at hand, it is prerequisite for participating effectively in the information society and is part of the basic human right of lifelong learning. (Spencer & Cody, 2003)

Lloyd (2003) attempted to conceptualise what it means to be information literate in a specific workplace. Conceptualising information literacy leads to the following working definition:

An information literate person has a deep awareness, connection and fluency with the information environment. Information literate people are engaged, enabled, enriched, and embodied by social, procedural and physical information that constitutes an information universe. Information literacy is a way of knowing that universe (Lloyd, 2003).

An even broader term that is starting to enter the literature is ‘e-literacy’, which has been defined as the converging of IT literacy and information literacy. It been closely linked to e-learning and has been the subject of an international conference since 2002. The conference describes eLiteracy as:

“a crucial enabler of individuals and institutions in moving successfully in a world reliant upon electronic tools and facilities”. (Conference)

Martin (2003) describes how e-literacy encompasses aspects of computer literacy, information literacy, thinking and learning skills, and what he terms media and moral literacy (Martin, 2003). He argues:

E-literacy is gradually coming to be seen as a challenge which educators, and those who shape education, must address as a priority. At the least, it means avoiding the inequalities brought by differential access to e-facilities; at the most, it means enabling everybody to make their way with confidence in the e-world. (Secker, 2004)

One of the most recent definitions of Information literacy was given by CILIP in October, 2005 which states:
“Information literacy is knowing when and why you need information, where to find it and how to evaluate, and communicate it in an ethical manner. This implies several skills required if an individual is to be information literate

- need for information
- the resources available
- how to find information
- the need to evaluate results
- how to work with or exploit results
- ethics and responsibility of use
- how to communicate and share your findings
- how to manage your findings (C.I.L.I.P, 2005)

Andersen (2006) describes information literacy as a socio-political skill. Using concepts from composition studies that deal with the question of what a writer needs to know in order to produce a text, the paper outlines some ideas and key concepts in order to show how these ideas and concepts are useful to our understanding of information literacy. To demonstrate how information-literacy is to have knowledge about information sources and that searching and using them is determined by an insight into how knowledge is socially organized in society; the paper takes a point of departure from Habermas’ theory of the public sphere. It concludes that information seeking competence is a socio-political skill, like reading and writing skills, connected to human activity. Searching for documents in information systems is a complex and socio-political activity. As an expression of human activity we might say that searching for documents and reading and writing constitutes each other. The genre knowledge necessary in reading and writing does also apply when seeking information in systems of organized knowledge as the forms of information determine what can be expected and found in these systems. Information literacy covers, then, the ability to read society and it’s textually and genre-mediated structures. Information literacy represents an understanding of society and its textual mediation (Anderson, 2006).

Spiranec and Zorinica (2010) introduce the term Information Literacy 2.0 as a subset of information literacy, to describe its development and significance. Many of the aspects of current information literacy practices originate from a print-based culture,
which is incongruent with the transient and hybrid nature of digital environments. These radically changing environments are causing the appearance of anomalies in the information literacy paradigm, which could effectively be resolved through the introduction of a sub-concept of information literacy (Spiranec & Zorica, 2010).

Mackay and Jacobson (2011) suggest reframing of the term information literacy to metaliteracy. According to them Social media environments and online communities are innovative collaborative technologies that challenge traditional definitions of information literacy. Metaliteracy is an overarching and self-referential framework that integrates emerging technologies and unifies multiple literacy types. This redefinition of information literacy expands the scope of generally understood information competencies and places a particular emphasis on producing and sharing information in participatory digital environments (Mackey & Jacobson, 2011). Thus it can be said that information literacy is viewed as a set of skills, but many researchers have challenged and tried to reconceptualise it. There are various perspectives: Information Literacy is viewed as a way of, or an approach to learning; a way of knowing; as a cognitive process of consuming, interacting and constructing information and of using information in different way and contexts as well as using information to learn.

3.1.4 Information Literacy Process
Information literacy is a dynamic process of recognising information needs, retrieving, evaluating, using and dissemination of information to acquire, extend or create new knowledge as well as making decisions for self-actualisation and development (Boekhorst, 2004; Sayed, 1998). Hence information literacy is not a single act of collecting facts, but the product of a process of information education (Marais, 1994). The present research used the work done by Kuhlthau to develop an active learning information literacy spiral (Kuhlthau C. C., 2004).

3.1.5 Information Literacy skills
According to Catts and Lau (2008), the following information literacy elements are consistent with the definitions of IL developed for use in higher education and as argued by Campbell, 2004 these are applicable across all domains of human developments. These are: recognising information need, locating and evaluating the
quality of information, storing and retrieving information, making effective and ethical use of information and applying information to create and communicate knowledge (Catts & Lau, 2008).

Whereas CILIP believes that the skills that are required if an individual is to be information literate necessitate an understanding of - a need for information, the resources available, how to find information, the need to evaluate results, how to work with or exploit results, ethics and responsibility of use, how to communicate and share findings and manage findings (CILIP, 2005).

Allan Bundy (2004) defined information literacy elements under three categories of:
1. Generic skills which involves
2. Information skills which involves
   a. Information seeking b. Information use c. Information technology fluency
3. Values and beliefs which involves
   a. Using information wisely and ethically

Jeremy J. Shapiro and Shelley K. Hughes (March/April 1996) identified seven dimensions of literacy which are as follows:

Tool literacy: or the ability to understand and use the practical and conceptual tools of current information technology.

Resource literacy: or the ability to understand the form, format, location and access methods of information resources.

Social-structural literacy: or knowing and how information is socially situated and produced.

Research literacy: or the ability to understand and use the IT-based tools relevant to the work of today's researcher and scholar.

Publishing literacy: or the ability to format and publish research and ideas. Emerging technology literacy, or the ability to ongoingly adapt to, understand, evaluate and make use of the continually emerging innovations in information technology so as not to be a prisoner of prior tools and resources, and to make intelligent decisions about the adoption of new ones.
Critical literacy: or the ability to evaluate critically the intellectual, human and social strengths and weaknesses, potentials and limits, benefits and costs of information technologies (Shapiro J. J., 1996). (Barry, 1997); (DeMars, Cameron, & Erwin, 2003) and (Eisenberg & Berkowitz, 1995) summarised information literacy skills into the following sequential stages:

- Define, formulate and analyse the task or problem
- Describe services typically available in libraries
- Choose appropriate reference sources for particular information need
- Employ an efficient search strategy for a research paper or speech
- Search library catalogues, research databases and the Internet effectively
- Locate, access and extract relevant information in sources
- Evaluate sources in terms of accuracy, authority, bias and relevance
- Record and store collected information
- Organize and synthesis information in the required format from multiple sources
- Apply information ethics by citing sources appropriately and observing copyright
- Evaluate how well the task was completed or the problem solved

Accordingly it can be identified that attributes of information literacy belongs in three groups of information skills, cognitive skills and values and beliefs (Andretta, 2005), (Hernon & Dugan, 2002), (Scott, Mandel, Brock, & Kim, 2000). Information literacy skills are also considered generic (Grafstein, 2002). However research has proved that these skills are effectively taught when incorporated into a specific discipline (Rockman I. F., 2004).

Information literacy skills are also related to other literacies. It is assumed that an information literate person will be literate, visual literate, library literate, information communication technology literate, computer literate, media literate, network literate as well as numeracy literate (Makhubela & Koen, 1995; McClure, 1994; Sayed & De Jager, 1997).

According to Abilock, (2004) information literacy is a transformational process in which the learner needs to find, understand, evaluate and use information in various forms to create for personal, social or global purposes. If students are taught not only
information skills, but also to transfer that skill, it will become a lifetime habit of the mind (Abilock, 2004).

3.2 Information Literacy in Higher Education

According to the Association of College and Research Libraries (American Library Association, 2000) information literacy is a key component of lifelong learning and a key learning outcome. Information Literacy is considered so important that accrediting agencies demand information literate students in their standards and expectation (Baker, 2002), (Gratch-Lindauer, 2002), (Owusu-Ansah, 2003), (Ratteray, 2002). In order to integrate information literacy it is necessary to develop a culture among university communities to embrace the value of information literacy (Bruce & Candy, 1995), (Clay, Harlan, & Swanson, 2001), (Owusu-Ansah E. K., 2004) and (Rockman I. F., 2004). As information literacy is one of the four essential abilities, along with reading, writing and mathematics that students in higher education should acquire (Sun, 2002). Even though information is important in higher education, there is an uncertainty about what it entails, who is responsible for teaching it and uncertainty about the curriculum, outcomes and assessment, information literacy is irrespective of the fact that it is regarded as one of the most important aspects as well as one of the least discussed academic themes (Sonntag & Ohr, 1996).

3.2.1 Information Literacy and Graduate Attributes

Graduate attributes are defined as skills, qualities and understanding that students develop during their time in an institution. These attributes shape the contribution they are able to make to their profession and as a citizen (Bowden, 2000). Thus attributes which pertain to citizenship contribute towards a well-functioning society (Rychen & Salganik, 2005). Attributes pertaining to profession contribute towards economic productivity (Harvey, 2001), (McQuaid & Lindsay, 2005). Graduate attributes refers to two main types of student achievement:

i) the attainment of a discipline- or field-specific body of knowledge; and

ii) the attainment of more general, or generic, attributes which might be common to all, or most graduates (Tucker & Palmer, 2004).

In a rapidly changing information and knowledge intensive economy, workers must be immediately and sustainably employable. Hence they should maintain and develop
knowledge and skills specific to their own discipline or occupation and also develop
generic skills that are transferable to situations and areas.

Kearns (2001) defined generic skills as ‘those transferable skills which are essential
for employability at some level for most’ (Kearns, 2001). These are also known as
‘core skills’, ‘key competencies’, ‘transferable skills’ or ‘underpinning skills’ (Mayer,

Many universities now include information literacy, either explicitly or implicitly,
amongst their graduate attributes/outcomes (Tucker & Palmer, 2004).

Barrie (2004) identified generic graduate attributes as capacities for scholarship,
global citizenship and lifelong learning. In order to develop these it is necessary to
develop skills and abilities in 5 key clusters. These include
1. Research and inquiry: students should be able to create new knowledge and
understanding through research and inquiry.
2. Information literacy: ability to use information effectively in a range of contexts.
3. Personal and intellectual autonomy: ability to work independently and sustainably,
with a desire to meet new challenges.
4. Ethical, social and professional understanding: their role as responsible members of
local, national, international and professional communities.
5. Communication: recognizing the value communication as a tool for negotiating and
creating new understanding, interacting with others, and furthering their own learning
(Barrie, 2004).

Christensen and Natalie (2002) listed the following graduate attributes which a law
student should possess: discipline knowledge, ethical attitude, communication,
problem solving and reasoning, information literacy and interpersonal focus
(Christensen & Natalie, 2002).

The generic attributes normally include information literacy, lifelong learning, critical
thinking, problem solving and communication, all of which enable graduates to be
effective contributors in the workplace and to society.

These requirements of information literate graduates have an impact on the
information literacy and curricular development in higher education. Information
Literacy research is closely associated with development of graduate attributes,
generic skills and lifelong learning skills. ( (Briguglio, 2000), (Robley, S., &
3.2.2 Transferability of information literacy competencies

Research done on information literacy has indicated that information literacy is not catching on in schools. Factors responsible for these are confusion over what information literacy entails, not enough contact time with learners to teach information literacy, less or no collaboration between educators and teacher librarians. (Merchant & Mark, 2002) and (Whelan, 2003). Thus it can be assumed that learners leaving schools are not fully prepared for higher education. Teachers and librarians have also experienced that undergraduates do not possess adequate skills required to complete course work (Caravello, Herschman, & Mitchell, 2001), (Curzon, 2000), (Fitzgerald, 2004) and (Nofsinger, 1989). According to Castro (2002) “students arrive at information-rich academic libraries encountering electronic databases, online catalogues, web sites and multimedia but they are without information skills to gain knowledge from it (Castro, 2002). It is therefore necessary that students need initial training to utilise these effectively (Atkins, 2002).

Underlying problems experienced by students who find it difficult to handle information are poor reading techniques, inability to find relevant information in the library or elsewhere, the uncritical acceptance of information as well as the insufficient synthesising and technical management of academic writing assignments (Van der Walt, 1992).

Studies done by Eisenberg (1991) and Whitmire (2001) indicated that high school learners who received instruction on library use, effective search strategies and information-gathering skills scored significantly higher on a college library research skills test than students who did not receive training. They felt more confident to enter college and identified the library media specialist (teacher-librarian) as the linking agent between school and college (Eisenberg M. B., 1991) (Whitmire, 2001).

In order to initiate a smooth transition from school to higher education, Ercegovac (2003) suggests that partnerships between higher education and secondary school librarians must be formed to bridge the knowledge gap (Ercegovac, 2003).

Studies like De Jager (De Jager, 1997) and (Fitzgerald, 2004) indicate that students who are not library users or not information literate will struggle to, among other tasks, synthesize ideas from multiple resources and it will impact seriously on students’ academic achievement in general.
The challenge to produce information literate graduates is according to Rockman (2004) becoming acute because of the following factors:
• the range of information choices continues to broaden
• technology continues to influence the behaviour patterns of learners
• employer needs are becoming more complex and global
• trends towards distributed education (distance learning) affect the way in which instruction is delivered
• student populations are becoming more culturally and linguistically diverse, with uneven academic preparation
• financial restraints make it difficult for institutions to maintain resources
• curricular change to keep pace with current trends and needs (Rockman I. F., 2004).

3.3 Information Literacy Education in Higher education

Over the last few years information literacy is recognised as a crucial skill for students at higher education institutions. Researches done indicate that most tertiary institutions will base their formal structured courses in information literacy on the following five assumptions (Bracollini & Heyns, 1994) and (White & Quinn, 2000)
• The information environment is too complex and changing too rapidly to expect students to acquire information literacy without a planned, cumulative instructional program
• The most effective learning about library and information use is tied to a specific information need and is often discipline-specific
• Students learn critical thinking and research skills in their disciplines as preparation for a lifetime of changing information needs to cope in society and the workplace
• Students have different learning styles and acquire information in different ways. Any information literacy program must accommodate these differences by using a variety of approaches that provide practice in these skills
• Collaboration between university libraries and faculties is needed to ensure that all students are reached.
3.3.1 Approaches to Information Literacy

Information literacy programs and activities mirror different approaches rooted in current educational paradigms. Various approaches to information literacy are outlined below:

**Behaviourist Approach**

The behaviourist approach is based on the principle that an information literate person exhibits certain characteristics and demonstrates certain abilities. Here an emphasis is more on a user’s desired behaviour and skill than process. ACRL standards developed are based on behaviourist perspectives. According to Webber and Johnston, (Webber & Johnston, 2000) behaviourism leads to fragmentation of knowledge and assume that information literacy skills are mastered once each unit of program has been completed. Harley, Dreger et al.(2001) believe that this leads to surface learning with short term focus and does not help students reflect on what they are learning (Harley & Dreger, 2001). Eisenberg and Berkowitz Big 6 skills model is based on the behaviourist approach. According to Webber and Johnston, (2000) Big 6 model presents the research process as a linear path instead of iterative process, thus proposing a simplified model of research (Webber & Johnston, 2000).

If the behaviourist approach is adopted it may lead to perceive the research process not as complex and challenging task but as a step by step activity requiring nothing more than an orderly and disciplined series of actions. However it has been found that a large number of programs, online courses and tutorials put the focus on research skills even though critical thinking and evaluation are listed as outcomes, contents and activities are limited to “how to do”.

Edwards and Bruce (2002) feel that the skill-based approach to teaching and learning, particularly in the electronic domain, lacks didactic power both because of the changing nature of technology contents and because it does not provide the intellectual tools on which lifelong learning is founded. Teachers as well as technology need something that emphasises reflective competence and the ability to continue to learn (Edwards & Bruce, 2002).

**Constructivist Approach**

The constructivist approach is based on constructivist theory of learning, where it emphasises the role of learners, who have intention, form plans and adopt particular strategies according to their learning styles. According to Kelly’s (1955) theory learning takes place through an active, confusing, complex process of making sense of
new experiences. New information must be reconstructed to fit into our existing system of knowledge (Kelly, 1955).

Kulthau’s Information Search Process model is based on the constructivist approach which emphasises the recursive nature of the research process as an emotional aspect of learning. Kulthau is of opinion that constructivism is appropriate for the new environment of digital libraries. Students are taken out of the “pre-digested” format of textbooks into the use of digital resources, so that skills and strategies, acquired during the information search process, are transferable into real world’s new situations. In the constructivist approach, students “learn to think through issues that do not have prescribed responses or pre-set solutions” (Kulthau C. C., 1993).

In fact, students learn to identify what is important for them and construct their individual “new meaning”. The constructivist approach, says Kulthau, seeks to foster deep learning, going beyond the ability to respond to a test, to application in different contexts.

**Relational Approach**

Christine Bruce “The Seven Faces of Information Literacy” is based on the relational approach (Bruce C., 1997). It is an alternative model to the behavioural and constructivist approaches, founding it on the phenomenographic theory of (Marton, 1994), which is widely used in higher education to explore qualitative variations in people’s experience or understanding of important phenomenon (Laurillard, 2002), (Ramsden, 1992). The phenomenographic model, when applied to higher education, emphasises the need to help learners broaden their repertoire of existing conceptions or experiences and to understand the world also through other people’s perceptions. Seven different “faces” of experiencing information literacy represent different ways in which individuals interact with information and, taken together, represent the “phenomenon” of information literacy. (Bruce c., 1999). The relational approach adopts teaching methods which encourage reflection and involve participants in reviewing their learning, in analysing their development as literate people in demonstrating progress over a period of time, exercising different aspects of information literacy in different contexts. (Limberg, 1999). The SCONUL model of Seven Pillar developed in United Kingdom is founded on the relational approach to information literacy. (Vezzosi, 2005)
3.3.2. Information Literacy Models

Different models have been developed and propagated by authors, theorists and academicians.

**Information Search process** (Kuhlthau C. C., 1993)

Information Search process model based on constructivist approach was developed by Kuhlthau. The model has seven stages which include initiation, selection, prefocus exploration, formulation, collection, presentation and assessment. This model demonstrates users’ approach to the research process and how users’ confidence increases.

**Seven Pillars of Information Literacy** (Society of College, 1999)

SCONUL Advisory Committee on Information Literacy developed Seven Pillars of Information Literacy model in 1999. The model has seven competence levels which include the ability to recognise a need for information, the ability to distinguish way in which the information gap may be addressed, the ability to construct strategies for locating information, the ability to locate and access information, the ability to compare and evaluate information obtained from different sources, the ability to organise, apply and communicate information, to others in ways appropriate to the situation and the ability to synthesise and build upon existing information, contributing to the creation of new knowledge.

**The Big6 Skills** (Eisenberg & Berkowitz, 1990)

This is a process model developed to solve an information problem. It has 6 stages of the information problem-solving process that students apply in their information problem solving process, namely task definition, information seeking strategies, location and access, use of information synthesis and evaluation.

**Research Process Model** (Stripling & Pitts, 1988)

This model is used by students as a guide through the stages of creating a research paper. It has ten steps starting from choosing a research topic and ending with the presentation of the final topic.

**Pathways to Knowledge** (Pappas & Tepe, 2002)

The Information Inquiry model by Pappas and Tepe includes pathways to knowledge and is meant to encourage students to continuously explore and reassess as they go about with their information process. The model has six steps namely appreciation and enjoyment, pre-search, search, interpretation, communication and evaluation.
3.3.3 Information literacy standards for higher education

Information Literacy standards has three basic components of access, evaluation and use of information. Information Literacy standards are created by library associations and different institutions. Following are some of the well-known standards in higher education

**Information literacy competency standards for higher education by ACRL**

According to ACRL, there are five standards and twenty-two performance indicators. The standards focus upon the needs of students in higher education at all levels. The standards also list a range of outcomes for assessing student progress toward information literacy. Following are the standards given by Association of College and Research Libraries

- The information literate student determines the nature and extent of the information needed.
- The information literate student accesses needed information effectively and efficiently.
- The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.
- The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.
- 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 (ACRL, 2000).

**The Council of Australian University Librarians (CAUL) Information Literacy standards** (CAUL, 2001)

The Council of Australian University Librarians (CAUL) produced IL standards for higher education in 2001 at a national workshop initiated and conducted on 22-23 September 2000 by the University of South Australia for the Council of Australian University Librarians (CAUL). The relational model of information literacy developed by Christine Bruce was considered in this context. Their standards presuppose differing levels of thinking skills and appear less mechanistic than the ACRL standards.
The information literate person recognizes the need for information and determines the nature and extent of the information needed.

The information literate person accesses the needed information effectively and efficiently.

The information literate person evaluates information and its sources critically and incorporates selected information into their knowledge base and value system.

The information literate person classifies, stores, manipulates, and redrafts information collected or generated.

The information literate person expands, reframes, or creates new knowledge by integrating prior knowledge and new understandings individually or as a member of a group.

The information literate person understands cultural, economic, legal, and social issues surrounding the use of information and accesses and uses information ethically, legally, and respectfully.

The information literate person recognizes that lifelong learning and participative citizenship requires information literacy.

Information Literacy Standards for Teacher Education

The Information Literacy standards for Teacher Education were approved by ACRL board of directors on May 11, 2011. The main purposes of the Information Literacy Standards for Teacher Education are to:

- Guide teacher education faculty and instruction librarians in developing information literacy instruction for teacher education students.
- Enable the evaluation and assessment of such instruction and curricula through benchmarking outcomes.

The Standards also aim to lead teacher education students to consider how they might integrate information literacy into their future curriculum, instruction, and assessment activities once they become members of the teaching profession.

- The information literate teacher education student defines and articulates the need for information and selects strategies and tools to find that information.
• The information literate teacher education student locates and selects information based on its appropriateness to the specific information need and the developmental needs of the student.

• The information literate teacher education student organizes and analyzes the information in the context of specific information needs and the developmental appropriateness for the audience.

• The information literate teacher education student synthesizes, processes, and presents the information in a way that is appropriate for the purpose for which information is needed.

• The information literate teacher education student evaluates discrete pieces of information as well as the entire information seeking process.

• The information literate teacher education student knows how to ethically use and disseminate information.

Though the standards are used as a guide to assessment, it has been found that use of this standards on the college campuses has not been absolute- rather pieces have been used as a framework for discussion and components have been adopted to reflect the need of constituencies.

Cain (2002) has been critical of the standards as an assessment tool. She claimed that „assessment tools assume that there is discernible evidence or proof of what is being measured.” Without a concrete understanding of what is meant by information and with thought processes and the like being difficult to measure exactly, applying standards may well result in the measurement of existing knowledge rather than development of knowledge. (Cain, 2002)

The importance of these information literacy standards for higher education lies in the fact that it provides frameworks for teaching information literacy as well as assessing the information literacy level of individuals (Senlson & Stillwell, 2001). The standards can be used to develop information literacy programs and will ensure that information literacy training efforts will be unified and will contribute towards the clarification of desired outcomes (O'Connor, Radcliff, & Gedeon, 2001)
3.3.4 Information Literacy Programme Characteristics

The ACRL (ACRL., 2003) document on best practices indicates characteristics of IL programmes at a macro level. These characteristics cover ten areas which are as follows

1. Mission: a mission statement for an information literacy programme should include definition of information literacy, must be consistent with the information literacy standards. It should include the institutional stakeholders mentioning their contribution and expected benefits. It should appear in appropriate institutional documents and should be in tandem with the institutional mission statement.

2. Goals and objectives: for an program should be consistent with the mission, goals and objectives of the library and the institution, establish measurable outcomes for evaluation of the program; Accommodate sequential growth of students’ skills and understanding throughout their education, Clearly present the integration of information literacy across the curriculum for students’ academic pursuits and effective lifelong learning.

3. Planning: this includes articulating the programmes” mission and goals incorporating findings from environmental scans; involving students, faculty, librarians and other appropriate constituents.

4. Administration and institutional support: assign information literacy leadership and responsibilities to appropriate staff, provides funding, encourages collaboration and rewards individual and institutional achievement.

5. Articulation (program sequence) within the curriculum: helps to identify the skills and competencies to be acquired at disciplinary and course level, emphasizes for learner centred learning.

6. Collaboration: covers working together of faculty and librarians to develop and deliver a programme.

7. Pedagogy: supports diverse approaches to teaching and learning and takes into account diverse teaching and learning styles, incorporates relevant and appropriate information technology and other media sources to support pedagogy.

8. Staffing: should include librarians, faculty and other program staff as needed. They should work collaboratively with other and support each other’s learning.
development. They should be knowledgeable in instruction/teaching, curriculum development, and assessment of student learning.

9. Outreach: helps in describing the program and its value to the targeted audience, advises to market the program through creation and distribution of publicity materials. Contribute to information literacy’s advancement by sharing information, methods, and plans with peers and stakeholders both within and outside of the institution.

10. Assessment and Evaluation of information literacy program includes program performance and student outcomes. It also focuses on the need for diverse assessment methods that are applicable; addresses both process and product and includes student and peer evaluation.

Programme design
The ACRL has also produced a useful document for the actual development of IL programmes. The document contains five recommendations for programme design. These are:

- **statement of purpose** – which should acknowledge institutional goals; learner variables and lifelong learning
- **identification of content of instruction** – which involves establishing learning outcomes based on standards and objectives
- **identification of modes of instruction** – which involves adopting a variety of teaching methods that employ active learning techniques, the development of critical thinking skills and draws on expertise from a variety of personnel
- **programme structures** – this should involve clearly articulated relationships between programme components as well as the relationship of the programme to other courses and possibilities for integration
- **evaluation and assessment** - multiple appropriate methods that are ongoing and the results of which inform the continual development of the programme.

There needs to be an evaluation plan for any programme. (A.C.R.L., 2002)

Programme design should also take cognisance of human resource needs; support in the form of institutional facilities, equipment, services; financial support and continuing education for staff involved in information literacy instruction.
3.3.4. Information literacy pedagogy

Education system has transformed from being teacher centred to student centred due to rapid proliferation of information communication technology and internet. (Intan & Foo, 2008). These changes affecting education system has made IL as critical campus wide issue, a learning issue and education issue rather than a library issue. (Rockman I. F., 2004). Even though earlier IL teaching was developed by librarian, this picture is changing gradually. The Commission on Higher Education (Education, 1994) feels that IL goes beyond instilling information retrieval skills and has a pedagogical element. (Bruce C., 1997). It is considered as “pedagogical glue” with the aim to create an environment from which information literacy behavior is more likely to emerge than it was before the education took place (Andretta S., 2005). However the selection of pedagogical approach and supporting resources depends on one’s interpretation of Information Literacy (Bruce, Lupton, & Edwards, 2006). Pedagogy is a technical tool, which is a mix of pure technique personal preferences and knowledge about how learners learn, developed through scientific study or through intimate knowledge of a specific discipline or group of learners (Bruce C. S., 2008).

**Pedagogy, Learning Theories and Learning Styles**

Educational theorists have broadly classified learning theories into four categories: behaviorist, cognitive, humanistic, and social/situational (after Merriam & Caffarella, 1991 as cited in (Smith, 1999). Knowledge of the various learning theories is important in understanding how the teaching of IL skills can be practiced.

**Behaviourism**

According to behaviourism the teacher is the authority in the classroom and students do as the teacher instructs. Here learning occurs through the “instructor” presenting the learner with the required stimuli along with the required behavioural responses within an effective reinforcement regime. In behaviourism the teacher manages the pace and direction of learning. Understanding of learners is displayed through declarative, procedural and conditional knowledge. Thus the degree of learning is assessed through observable measures such as tests, assignments and examinations (Phillips, Wells, Ice, & Curtis, 2008) (Ward, Monaghan, & Villing, 2006).
According to Learning Theories and Information Literacy following are the critique of behaviorism

1. Learning is seen as a response to a stimulus and the formation of habits rather than as an intellectual process for understanding and knowledge development.
2. This theory is more concerned with learning that is observable through behavior, than with new knowledge that remains in the memory.
3. It abstracts isolated events from their total context. An example could be at the start of learning to drive a car when this is a dominant form of learning. However as the learner becomes more competent in operating the vehicle, this learning becomes automatic and the driver becomes less aware of changing gear or braking and accelerating. The learner then needs to learn to ‘read the road’ and drive safely anticipating other traffic and pedestrian behaviors. This needs a constructivist approach that combines knowledge, understanding and skill to become a proficient driver.
4. It de-humanizes learning by almost seeing the learner as an automaton. This has manipulative undertones but it has been successful in behavior modification programmes.
5. Such learning has very little lasting value without reinforcement and periodic reward. However, it has been successful in cognitive behavior therapy. (HEAICS)

Constructivism

Gergen (2001) defined constructivism as a view in which an individual mind constructs reality but within a systematic relationship to the external world (Gergen & Wortham, 2001).

Learning, is “an active process that requires change in the learner … achieved through the activities the learner engages in … and through reflection” (Lamon, 2003). The role of teacher is not to impart knowledge but to facilitate dialogue, to prompt and to challenge. This theory states that:

- Learning is continuous. It is a function of the natural and continual variability in the world and our actions upon it
- Learning involves constructing cognitive representations (abstract models) to reflect variable experiences
• Learning involves verifiable mental operations that reflect these abstractions. These evolve and change over time to incorporate new knowledge.
• Motivation to learn is an intrinsic desire, which is not only dependent on reward but on other factors such as a desire for knowledge and self improvement.
• New experiences are continuously assimilated into existing schemata, which are always changing to accommodate new experiences in a continual, dynamic process of consolidation & growth.

As it is a process of constructing knowledge rather than acquiring knowledge, learners need authentic and engaging activities in order to create meaning (Bullen & Janes, 2007). Students learn by combining the social cultural knowledge of individuals with the interaction of others. Through social interaction, learners create a knowledge community of trust where they can communicate, interact, collaborate and reflect (Biggs, 1996). Although there are variations in definition and degree, there are four generally agreed upon aspects of constructivist lessons, extensively explained in Good and Brophy (Good & Brophy, 1994), they include:

• Learners construct their own meaning.
• New learning builds on prior knowledge.
• Learning is enhanced by social interaction.
• Meaningful learning develops through “authentic” tasks.

**Constructivism – Critique**

1. Constructivism places emphasis on activities in the brain which cannot be measured as easily as stimulus /response Learning. It claims that some learning cannot be measured in this way. Grades and other formal assessment methods should be eliminated in favour of students’ own forms of assessment. This would be difficult for the purposes of comparison within and between groups and ages of pupils.

2. It is difficult to know when the infant or child develops a concept. Children develop at different stages over time so how helpful is it to generalize to developmental stages? There is a danger of labeling!

3. Constructivist approaches seem to be based on ‘common sense’ learning & understanding, we need to understand the basics before we develop our
understanding of more complex knowledge. However, this is a useful approach to all learning but is criticized by some as being too vague, ‘trendy’, left-wing and liberal.

4. It is useful where class members are at different stages of learning (mixed ability) but can be criticized for ‘holding back more able pupils’.

5. This type of learning may initially take longer to establish new knowledge but it can prove more effective over time.

6. Constructivism is especially relevant to IL skills sessions where the trainer needs to engage the students and build upon what they already understand. New learning needs to have relevance to their needs.

3.4 Information literacy assessment

Assessment is a hot topic in higher education today (Pausch & Popp, 1997). Changing educational environment demands accountability and proof that higher education is spending public funds appropriately. (Colborn & R., 1998); (Pausch & Popp, 1997); (Grassian & Kaplowitz, 2001); (Thomas, 1999), (Catts, 2000). Dunn (Dunn, 2002) observes that, “Assessment is a necessary by-product of the current emphasis in higher education on accountability and learning outcomes”.

There are various definitions of assessment, but is the process of determining how well an educational system functions and improving parts of it as necessary. It is also referred to as “outcomes assessment,” (Astin, 1991). Assessment is an ongoing process aimed at understanding and improving student learning. Assessment is essential for the following reasons:

- Monitor effectiveness for accountability
- Better identify instructional practices
- Evaluate the effectiveness of instructional practices (Astin, 1991)
- Measure student achievement, how much they know (Lopez, 2002)
- measuring institutional effectiveness and quality of education. (Maki, 2002)

Library instruction programs are also using assessment as librarians have to justify the establishment or continuation of information literacy programs. They also need to
demonstrate impact of their instructional activities on student learning and long term benefits of IL (Pausch & Popp, 1997) (Schroeder & Zarinnia, 2006).

Types of assessment
A firm understanding of assessment issues is necessary for teachers in higher education (Van Deventer quoted in Fourie and Van Niekerk, 1999) (Fourie & Van Niekerk, 1999)
Assessment is categorised as being diagnostic, judgemental or developmental. Diagnostic assessment diagnoses the learner’s current ability or knowledge and identifies potential problem areas. Judgemental assessment gives license to proceed or to graduate (Rowntree, 1987). According to International Federation of Library Association there are three types of learning assessment which are as follows

**Prescriptive or Diagnostic** – assesses the knowledge and skill of participants before the instruction is designed. It helps in knowing students’ strengths and weaknesses which can help in better planning what to teach and how to teach. E.g. Pre-tests, Self-assessments, Discussion board responses and Interviews.

**Formative** – provides feedback about student learning while the instruction is ongoing. It serves a dual purpose of measuring student progress as well as progress of instructor. E.g. Observations during in-class activities; of student’s non-verbal feedback during lecture, Homework exercises as review for exams and class discussions) . Reflections journals that are reviewed periodically during the semester etc.

**Summative** – a final evaluation of the criteria for assessment, occurs at the end of instruction. E.g. Examinations, Final examination, Term papers, Projects, Portfolios Performances, Student evaluation of the course, and Instructor self-evaluation (Stec, 2004)

**Performance Assessment**: it is also known as authentic or alternative assessment. According to Nitko and Brookhart (2007) a performance assessment “(a) presents a task requiring students to do an activity that requires applying their knowledge and skills from several learning targets and (b) uses clearly defined criteria to evaluate how well the student has achieved this application” (Nitko & Brookhart, 2007). E.g. Portfolios, Student journals and learning logs (Thomas, 1999) and Rubrics, concept mapping, minute writing (Jacobson & Xu, 2004)
Assessment of information literacy

Assessment of IL is complicated by the broad variation in how IL is conceptualized and understood by individuals. Foster (1993), argues, however, that it is this fluidity in the semantic meaning of the term that ultimately renders it unworkable in a practical sense; in particular, he observes that it is impossible to recognize a person who is “information illiterate”, when there has been no consensus as to what constitutes a person who is recognised as “information literate”: “Since ultimately ‘information literate people are those who have learned how to learn’ (Foster, 1993).

Despite semantic disagreements that have beset the IL movement, there have been consistent attempts to develop a concrete pedagogical structure for IL and to facilitate the development of IL programs from a practical perspective. The high-profile ACRL “Information Literacy Competency Standards for Higher Education” (ACRL, 2000) represent a comprehensive attempt to offer a legitimate framework for assessing IL at post-secondary level, by providing educators with a pre-determined list of desirable IL standards, and including a range of indicative “performance indicators” and learning outcomes in order to enable the construction of valid assessment tools in multiple subject contexts.

Measurement tools for information literacy assessment

Measurement tools for information literacy assessment can be grouped into direct measures and indirect measures. Direct measures assess the skills, competencies, behaviours, and attitudes faculty expect their graduates to have attained. Indirect measures of student learning rely on self-report data that ascertains the perceived extent or value of the learning experience. Indirect measures can consist of alumni, employer, and student surveys, persistence, retention, and graduation studies, exit interviews, and job placement data. They are often used to supplement direct measures. (Lopez C. L., 2002).

Different tools which are available are mentioned below:

1. Standardized tests

These tests assess student performance on tasks that demonstrates a student’s mastery of the underlying information literacy concept. The advantages of these assessments are validity across populations, correlation of results with Association of College and Research Libraries Information Literacy Competency Standards for Higher Education (ACRL) and the ability to compare local results to national and regional cohorts (Lyn
The disadvantage of tests is unable to track changes in skill levels of individual students, immediate feedback is not possible due to time lag and it comes with a price tag. For e.g.

**iSkills**: iSkills is an outcomes assessment that measures applied information and communication technology (ICT) literacy skills.

**Project SAILS (Standardized Assessment of Information Literacy Skills)**: Project SAILS was developed in 2001 by a team of experts in librarianship, test design and measurement, data analysis, and programming at Kent State University. The team developed a standardized test of information literacy skills that allowed libraries to document skill levels of groups of students and identify areas for improvement. (Blevens, 2012)

2. **Tests**

Tests, which measure what students know, rather than what they can do. The major advantage of tests is that they provide baseline information about students’ IL skills and if they are given as pre-test and post-test they measure improvement of those skills. They are easy to score, have high reliability and help to compare the results of different groups (Oakleaf, 2008).

She further identified the following limitation of these tests

- Tests are mostly focused on individual parts of a concept and not on the complete complex construct.
- Tests create “an artificial situation that does not really test how the learner would react in a real world situation”. There is, in other words, a lack of authenticity. Tests tend to over-assess ‘knowing what’ and under-assess ‘knowing how’ and create a situation in which students decide to ‘learn for the test’.

3. **Questionnaire**

It is one of the most popular methods used for assessment. In the context of information literacy assessment, questionnaires are often used for the measurement of students’ confidence in solving information problems, which is part of the effective dimension of information literacy (Cochrane, 2006) (Kurbanoglu, 2006) (Monoi, 2005). As Gross and Latham (2007) remark, the data collected through questionnaire
depends on “honesty, openness, and motivation of respondents”. The main advantage of the questionnaire is its ease of use, speed and convenience and re use of similar tools (Gross & Latham, 2007).

4. Performance Assessment

According to Knight (2002) the concept of “authentic assessment” refers to the same instruments as the performance-based instruments (Knight, 2002) which are distinguished by Gratch- Lindauer (Gratch-Lindauer B. , 2003) and Oakleaf, (Oakleaf M. , 2009) namely writing assignments, complex tasks, or performances. Performance assessments are based on constructivist educational theory and so they are not just instruments for evaluation but also tools for learning. These are appropriate instruments for the learning and evaluation of complex and higher order skills such as information literacy (Scharf, 2007) (Oakleaf M. , 2008)

5. Portfolio

Portfolio assessment constitutes an increasingly popular approach for IL (Andretta S. , 2005) (Fourie & Van Niekerk, 1999) (Fourie I. , 2001) and fits well with the desire for performance-based modes. Thomas 1999 describes two types of authentic portfolios used by instructors: firstly, portfolios containing individual pieces of student work, which have been selected by the students themselves to demonstrate the attainment of particular goals; secondly, portfolios which convey the “thinking and activity involved in the creation of major projects, and may contain records of original brainstorming sessions, early and current drafts [. . .] and student self assessments, instructor evaluation, and student thoughts on further projects” (Thomas, 1999). Both types of portfolio offer excellent possibilities for IL instructors to assess the impact of their instruction.

6. Rubrics

A scoring rubric may be defined as “a scoring tool for qualitative rating of authentic or complex student work (Jonsson & Svingby, 2007). Mertler, (2001)) claims that there are two types of rubrics: holistic and analytic. A holistic rubric is used for grading the overall process or product, without judging the component parts (‘dimensions’ or ‘traits’) separately (Mertler, 2001). He contrasts this with an analytic rubric where “the teacher scores separate individual parts of the product or performance first, then sums the individual scores to obtain a total score”. Information science literature on the use of information literacy scoring rubrics mentions the following advantages:
- Reduced subjectivity with the grading of student assignments thanks to detailed descriptions of the levels of attainment (Oakleaf, 2008)
- The development of a scoring rubric by teaching staff stimulates the creation of shared information competency beliefs (Knight L., 2006) (Scharf, 2007) (Oakleaf, 2008) notice that reliability may be understood as a consequence of these interactions.
- Students can use the rubrics for self evaluation during their assignments (Oakleaf, 2008)
- Standardized rubrics make it possible to evaluate student learning across time or multiple programs (Oakleaf, 2008)

The disadvantage that is most often mentioned in the literature is the fact that the development of the rubric or (in the case of a standardized rubric) learning to work with it is very time consuming (Knight L., 2006) (Diller & Phelps, 2008).

7. Self Assessment
The final phase of the information literacy process is to appraise the completed task or to evaluate the final product to determine if any part is incomplete or needs improvement. Unsatisfactory products imply that not enough knowledge was gained, that information skills were insignificant and that no solution to an information problem was found (Behrens, Olen, & Machet, 1999). Self-assessment forms a secondary, subjective method of assessing skills to compare with other more objective tools.

8. Essays
Different types of essays are used for assessing information literacy skills. These include reflective essay and concept mapping of students’ essay.

9. Observation
Students can be observed while they are performing a task like retrieving and selecting information for an assignment. Observation will supply information on nonverbal behaviours (Dunn, 2002)

10. Simulation
Along with observation, this method has the potential to dig deeper into actual behaviour rather than theoretical (and potentially never applied) knowledge.
11. Informal Assessments
Class assessment techniques is one of the methods of information assessment which measures what students know and also how they feel about what they know (Radcliff, Jensen, Salem, Burhanna, & Gedeon, 2007) and some involve higher-order thinking skills (Angelo & Cross, 1993). CATs provide quick snapshots of whether students learned the information literacy concepts that had just been presented. They are easy to use anytime during a class to get feedback and to encourage students to reflect on what they are learning.

12. Learning Journal
According to Moon (1999), a learning journal is “an accumulation of material that is mainly based on the writer’s process of reflection”, and which is written over a period of time (Moon, 1999). Harada (2002) describes journal writing as “a method that encourages reflection and metacognitive practice” (Harada, 2002). Learning journals, though viewed equally as a personal, introspective activity, differ from traditional descriptive-type journals or diaries to the extent that they are geared specifically towards the enhancement of the learning experience for the individual.

13. Worksheets
It can be expected of students to complete worksheet, logs or diaries during training sessions or while they are performing a certain task. The notes will indicate how students apply the skills they have learned (Knight L., 2006)

14. Think-aloud protocol
According to Hernon and Dugan (2002) think-aloud protocol is an assessment method where students articulate their thought processes and opinions while they are directly interacting with library resources to accomplish a task (Hernon & Dugan, 2002). The protocol indicates how each part of the task was interpreted and accomplished. It has been employed to evaluating search strategies and information seeking behaviour. (Davis, 2004)

Evaluation
Evaluation in education is a broader concept than assessment as it deals with all aspects of a programme including resources, staffing, organizations, operations and efficiency (Goldschmid, 1978) (Knapper & Cranton, 2001). Evaluation here means to determine the significance or the effectiveness of IL integration into the curriculum.
Bober, Poulin, and Vileno (1995) point out several compelling reasons for evaluating library instruction. One of these is to use the results for improving the quality of the program.

A second reason is for professional development of teaching staff. A third reason is more strategic; proving the value of such instruction furthers the larger educational goals of the various disciplines and the institution as a whole (Bob, Poulin, & Luigina, 1995). According to Wang (2010) some of the commonly used assessment methods are as follows

- Pre test post test (Gross & Latham, 2007); (Emmett & Emde, 2007), (Moniz, 2007)
- IL Survey (Cannon, 2007)
- Focus group study and interview (Dunn, 2002), (Serotkin, P. B., 2006)
- Analyzing students work (Dunn, 2002) (Serotkin, P. B., 2006)

3.5 Research studies done on different aspects of Information Literacy from 2010 to 2012

Following researches have been conducted on different aspects of information literacy from year 2010 to 2012

1. Secker (2011) study provided an overview of a six-week information literacy course for research students that was redesigned following the librarians undertaking the Postgraduate Certificate in Teaching in Higher Education. The paper provides a model programme, other librarians can adapt for use at their own institution. (Secker & Rowena, 2011)

2. Macmillan and Mackenzie (2012) study describes challenges faced by undergraduate students in using scholarly articles. It also describes about a workshop on reading which was designed to address those challenges. (Macmillan & Mackenzie, 2012)

3. Holler (2011) study presents perceptions and valuations of research skills that members of one student consulting group reported based on their coursework and participation in experiential consulting projects. (Carissa & Holler, 2011)

5. Hodgens (2012) study examines post-graduate health promotion students' self-perceptions of information literacy skills prior to, and after completing PILOT, an online information literacy tutorial. (Hodgens, Sendall, & Evans, 2012)

6. This paper determines the essential features of information literacy; what role it plays in university library user education; and how programs can be best implemented. (Kuan-nien & Pei-chun, 2011)

7. This study by Judy, Xiao (2010) describes a creative library orientation program utilizing Blackboard to help nursing students develop information literacy and successfully complete a cultural research paper. (Xiao, 2012)

8. This article describes the standards-based approach used to build the International Studies Research Methods (INS250) course, a discipline-specific, credit-based class taught by librarians. This writing-intensive course emphasizes information literacy and critical thinking skills, which were developed using written assignments, class presentations, multiple assessment methods, and web-based applications (Gauder & Jenkins, 2012).

9. This paper reports on the evaluation of a curriculum development project that took place in the Department of Psychology at the University of Sheffield. The project, was funded by a Centre for Excellence in Teaching and Learning (CILASS), which sought to embed information literacy development in a Level One module using an inquiry-based learning pedagogical approach. Students worked collaboratively to find news stories that were purportedly based on real psychological research and then searched for the related research paper. They reflected on this task and the differences between the two sources as part of the assessed work for the module. (Mckinney, Myles, & Turkington, 2011)

10. The purpose of this study is to assess basic information literacy (IL) competency and the perception of IL behaviour of freshman undergraduate business students of Independent University, Bangladesh (IUB) (Md. Zahid, 2011).

11. This paper aims to report on how a close collaboration between librarian and instructor made it possible for an existing course assignment to organically evolve into an information literacy assessment, overcoming some of the
impediments educators confront in assessing student learning. In addition, the paper seeks to discuss how assessment with realistic scenarios requiring actual research helped to highlight deficiencies in skills and critical thinking, a method known as “authentic assessment”. Results from a pilot and the formal assessment are included (Brown & Wilson, 2010).

12. This paper aims to explore attitudes of instruction librarians' on teaching and how they identify themselves as teachers. Particular attention is paid to teaching librarians' views on the effectiveness of two types of instruction models: for-credit courses and course-integrated library instruction. (Davis, Lundstrom, & Martin, 2011)

3.6 Summary
This chapter has discussed the main points of the relevant literature on the topics relating to this thesis. The next chapter will explain and justify the methodology and methods used in the conducting of the investigation.