

Critical thinking and reflective practice

The role of information literacy

Literature review

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1. Summary

The purpose of this review is to present the relationship between information literacy, critical thinking and reflective practice, as currently debated in literature.

Critical thinking is listed among the information competency standards and is often cited as one of the most meaningful learning outcomes in many information literacy plans and activities. Moreover, the phrase “critical thinking” appears, with slightly different meanings, in most of educational programs at University level, since it involves the capability of approaching information in an active, evaluative and creative way. The concept of critical thinking is often related to the idea of lifelong learning, as one of the vital competencies required to live in a knowledge-based society. A fundamental aspect of critical thinking is the meta-cognitive activity which brings to reflect on the thinking itself, to evaluate one’s own thinking practice and to learn from the same learning experience. Information literacy is one of the most effective learning activities to promote critical thinking. The need to define a search strategy, to identify and access suitable sources, to locate and use information, to evaluate and synthesise findings, stimulates the development of a critical attitude. Moreover, the recursive nature of the research process requires learners to come back to their previous research steps, to assess their strategies, to change and try new methods, experiencing different approaches to knowledge. This also stimulates learners to reflect on their own learning style and working method, to feel responsible of their educational process and to acquire control on it.

2. Background

“Building the information society” has been defined as a global challenge for the new millennium. In the recent World Summit on the Information Society (Geneva 2003) the representatives of many Nations declared the common desire and commitment to build

[...] a people centred, inclusive and development-oriented Information Society, where everyone can create, access, utilise and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life.
(World Summit on the Information Society – Geneva 2003)

In order to help people to share information and knowledge, and each individual to make a personal contribution to public life, education has a fundamental role to play. Education is in fact at the hearth of individual and social development and has the mission of enabling people to develop their talents to the full, realising creative potential and taking responsibility for their own lives and achievement of personal aims.

This process must begin from self understanding, through an inner voyage whose milestone are knowledge, meditation and the practice of self-criticism (Delors 1996)

Although the role of the formal education system is not to be replaced, as it introduces each individual to different forms of knowledge, it is today linked with the concept of an education that follows individuals’ whole life. The issue of learning throughout life is not a new one, but the concept of Life Long Learning has recently emerged as a key of the twenty-first century. The globalisation and the speed with which people and ideas move around the world, the rapid expansion of new technologies, the rate of industrial, commercial and cultural change, imply that people are often forced to re-consider their careers and learn new skills in order to keep up with society even changing needs. A more flexible educational system is required, which support curricular diversity and bridge the existing gap between education, working life and further training. For these reasons the trend in education is today to focus on students’ abilities to learn and to be

lifelong learners and not just to get a degree and complete their education. This requires individuals' commitment, responsibility and engagement in their own education.

The final Report of the International Commission on Education for the Twenty First Century (UNESCO 1996) defined the four pillars of today's learning :

- *Learning to know*, which implies learning how to learn by developing concentration, memory and ability to think.
- *Learning to do*, which involves the concept of "personal competencies" and is closely associated with the issue of occupational training.
- *Learning to be*, which brings to the human development, starting at birth and continuing all through a person's life, and helps individuals to develop their own independent, critical way of thinking and judgement.
- *Learning to live together* which aims to develop an understanding of others and their history, traditions and spiritual values, in order to induce people to implement common projects and manage conflicts in an intelligent and peaceful way.

In this context, the information literacy education has recently been defined as the "catalyst" required to transform the information society of today into the learning society of tomorrow (Bruce 2002).

One of the most widespread definition of an information literate person is provided by the American Library Association (1989)

Information literate people are those who have learned how to learn. They know how to learn because they know how information is organised, how to find information, and how to use information in such a way that others can learn from them.

According to this view, information literacy forms the basis of lifelong learning as it enables learners

to master content and extend their investigations, become more self directed and assume greater control over their own learning (American Association of School Librarians and Association for Educational Communications and Technology, 1998).

In today's information and communication environment, information literacy education is inextricably associated with reflective practice and critical thinking. The need to apply analytical and evaluative skills to information in order to effectively use it, brings learners to become aware of what they have learnt and provide an opportunity to reflect on their learning process.

3. Critical thinking and reflective learning. Challenging educational models

The current debate around information literacy and the role of the library in the educational process, focuses on the deep relationship existing between information literacy and critical thinking.

In the Information Literacy Standards for Higher Education (Association of College and Research Libraries 2000) the critical information literacy is defined as

An intellectual framework for understanding, finding, evaluating and using information, activities which may be accomplished [...] *through critical discernment and reasoning.*

3.1. The concept of critical thinking

The concept of critical thinking, with its application in the educational discourse, finds its very roots in the Socratic teaching practice of “deep questioning”, which aimed at seeking evidence, closely examining reasons and assumptions, analysing concepts and investigating applications of ideas. Founding his teaching ideas on the action of questioning, Socrates provided two of the main principles of modern theories of learning: the dialogic, interactive nature of the teaching process and the critical and independent evaluation capability as the main goal of reasoning skills.

The definition of critical thinking provided by the US National Council for Excellence in Critical Thinking has more than one contact point with the concept of information literacy:

Critical thinking is the intellectual disciplined process of actively and skillfully conceptualising, applying, analysing, synthesising and evaluating information [...] as a guide to belief and action. (NCECT, no date)

The reasoning process always starts from a question, either implicit or expressed, and develops itself as tentative answers and evaluative, self-assessing activities. A “questioning mind” is therefore the starting point and, in the same time, the ultimate goal of the educational practice of critical thinking. Einstein is told to be said about himself

I have no particular talent. I am merely extremely inquisitive

A currently widespread definition of critical thinking is due to Robert Ennis (2001) :

reasonable reflective thinking that is focused on deciding what to believe or do

In his view, critical thinking is a combination of abilities and dispositions.

The mental *abilities* determining critical thinking are:

- *Interpretation*: to comprehend and express the meaning of a variety of experiences, data, events, judgement.
- *Analysis*: to identify the relationships among statements, questions, concepts.
- *Inference*: to form conjectures and hypotheses, consider relevant information and deduce consequences flowing from data, principles, statements...
- *Evaluation*: to assess the credibility of statements or other representations and to assess the logical strengths of the relationships among statements.

The power of critical thinking is applied also to thinking process itself

As Facione (1998) states,

[...] beyond being able to interpret, analyse, evaluate and infer, critical thinkers can do two more things. They can explain what they think and how they arrive at that judgement. And, they can apply their powers of critical thinking to themselves and improve their previous opinions.

The critical thinking *dispositions* are therefore:

Explanation: to justify one's reasoning in terms of the evidential, conceptual and methodological considerations upon which the reasons were based.

Self-regulation: self-consciously monitoring one's own cognitive activity and to evaluate one's own inferential judgement.

In these two cognitive attitudes, the thinking is a recursive function that applies the critical power to itself, allowing good critical thinkers to improve their own thinking. This kind of meta-cognition activity is called "higher order thinking" (Morin 1993; Lewis and Smith 2001) and is strictly related to information competence and problem-solving skills.

As Jacobson and Ignacio (1997) and Jacobson (1998) underline, meta-cognition is a conscious use of learning strategies. This is not an automatic process, but a result of a long-term development of the cognitive system and requires, to be developed, a meaningful context, which involves engagement in a task and increases the amount of contextual knowledge.

Critical thinking is not just thinking, but thinking which entails self-improvement [...] We think critically when we have at least one problem to solve (Jacobson 1998)

Furthermore, Halpern (1997) states that

[...] this thinking is purposeful, reasoned and goal-directed [...] the *critical part of critical thinking* (the meta-cognition) denotes an evaluation component. When we think critically, we are evaluating the outcomes of our thought processes.

To do such thinking means also to manipulate information in order to produce certain outcomes (Hullfish and Smith 1964; Facione 1998). Operations such as selecting, interrelating and organising information constitute procedures that are internalised and used as further ways of responding to situations. Higher order thinking therefore consists of ways of handling information and

To learn to think more effectively is to learn more effective ways of dealing with information (Underbakke, Borg and Peterson 1993)

As Adams (1993) states, critical thinking occurs when individuals *construct meaning* by interpreting, analysing, and manipulating information in response to a problem or question that requires more than a direct, one-right-answer application of previously learned knowledge. The list of applicable skills includes, but is not limited to: focusing, information gathering, referencing, organising, analysing, integrating, and evaluating.

A similar definition is provided by Whitmore (1998)

Critical thinking has been defined as the ability to identify central issues or assumptions in an argument, evaluate conflicting claims, eliminate useless information, evaluate evidence on authority, provide support for a conclusion, interpret whether conclusions are warranted on the basis of the data given, incorporate anomalous data into a coherent framework, and read with a high level of comprehension

In synthesis, critical thinking features are:

- it is a dialogical, interactive process
- it is a questioning activity
- it is problem-based
- it is a reflective, meta-cognitive activity

3.2. Critical thinking and reflective practice in current educational theories

In the Piaget's theory of cognitive development, thinking skills are considered as maturational, depending on physical development and consequent adaptation to the environment. The mental operations, including perception, memory, reasoning, reflection and insight, become increasingly formal and complex, bringing individuals, at the last stage, to consider their lives from the point of views of others, and to think and evaluate their own thinking (Piaget and Inhelder 1970).

Benjamin Bloom also proposes a taxonomy of mental activities, which puts the critical evaluation at the highest level of complexity. Analysis, synthesis and evaluation are the abilities which make possible for people to examine constituent parts of a whole, construct new knowledge and make judgements (Bloom 1981).

Starting from Piaget's theories, Kolb (1984) provides a model of learning process, consisting in a cyclic activity of: concrete experience, reflection on experience and abstract conceptualisation. The last one is the construction of general theories, models and methods and is followed by the active experimentation of these theories. The learner is not conceived as a passive recipient of knowledge, but as an active participant in learning. The constructivist theory of learning, in fact, emphasises the role of learners, who have intention, form plans and adopt particular strategies, according to their learning styles. In this context, critical thinking acquires a particular role as it helps learners to pass from the "how" type of knowledge, related to the description and construction of models (when learners integrate new conceptual contents into their existing knowledge) to the "why" type, related to the conceptual understanding, in which new methods are constructed and "tested" (Rescher 1973). In this cycle, from "how" to "why", the acquired knowledge is subjected to the reflective practice of learners. They adopt the acquired knowledge to modify their thinking and this one to revise, integrate and accommodate new knowledge. The operational learning ("how"), and the comprehensive learning ("why") are complementary aspects of the effective learning. Not only the constructivist theory emphasises the role of critical thinking in the learning process, but it identifies the key of learning in the dialogue, or "conversation" between teacher and learner. This aspect, that we can refer to the Socratic "questioning", is crucial, since the communication becomes the foundation of learning, and the learning a dialogical activity.

Another educational model founded on dialogue and communication is the one ideated by L.S. Vygotskij (2000). In his view, thinking and its constructs are not products of an individual activity, but originate in the social interaction. Knowledge starts from social and interpersonal activity and then become internalised as a personal understanding.

Starting from Peirce's and Dewey's theories, Lipman (1988) develops the concept of a "learning community" that stimulates interactive reflection. The community is the place for the comparison of individuals' own thinking models with others' ones, for the research of common solutions to shared problems and for the interpretation and construction of meanings. Lipman offers an interpretation of critical thinking (or "high complex thinking") that appears very structured and rich of epistemological implications. He says that critical thinking is

[...] skillful, responsible thinking that facilitates good judgment because it relies upon criteria, is self-correcting, and is sensitive to context

and states that

[...] a high complex thinking tends to complexity. It tries to avoid simplistic solutions, it feels the fascination of what is complex.

The complex thinking is an open, multilogical and multiperspectival thinking, including a number of different perspectives and points of view. Lipman creates a three-dimensional model of complex thinking, which is defined as “critical, creative and caring”. Critical is inquisitive and deliberative, oriented to problems’ solution, and involving evaluation and self assessment. Creative is related to interpretation and transcendency, since it goes beyond existing patterns and rules expressing itself in new and different dimensions. Caring is the experiential and affective dimension of thinking, which involves ethical values and responsibility. The complex thinking (with its three dimensions) and the social nature of learning together cooperate in “constructing” the meaning.

According to Kelly’s Personal Construct of learning theory (Kelly 1955), 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. This process begins with uncertainty and, through the formulation of different types of hypotheses, moves beyond uncertainty towards understanding. The hypotheses establish a frame of reference for the prediction of what is to follow and predictions lead to action, which can confirm or reject the stated hypotheses. Individuals have therefore to continually reflect critically on their hypotheses, assess their constructs, and re-construct them in order to better “match the world”.

Bruner’s research highlights the role of interpretation, which is central in the constructive process, and involves the concept of creation. The interpretative task of “going beyond the information given”, in fact, is highly personal and is based on the constructs built from the individual’s past experience. Each individual, gathering and interpreting information, creates something new and unique that Bruner calls a “product of mind”. Reflective thinking leads to prediction (which is an anticipation of an outcome) and to formulation of statements. The process of construction, however, is not ordered and systematic, but confusing and uncertain, producing anxiety and conflicts.

Emotion is not isolated from the knowledge of the situation that arouses it. Cognition is not a form of pure knowledge to which emotion is added, [...] but a cycle of acting and reflecting, feeling and formulating, predicting and choosing, and interpreting and creating (Bruner 1986).

4. The role of Information Literacy

4.1. From library skills to reflective information competence

More than 5000 publications related to the concept of library user instruction and information literacy have been issued and reviewed in the past thirty years, since Paul Zurkowski, President of the Information Industry Association coined the term “Information literate” in the early ‘70. (Rader 2002). The number of publications related to library user instruction and information literacy shows a phenomenal growth, from the 28 reviewed in 1973, to more than 300 which have been issued in 2003. Some authors (Spitzer, Eisenberg and Lower 1998, cited by Rader 2002) underline the linkage of information literacy to democratic ideals in the Seventies and the acceleration of interest during the Eighties, due to the communication means’ development. In the last decade, the interest on information literacy has grown, as a consequence of the rapid changes in information technology and the evolving information society with its related issues, such as information overload and digital divide.

In these three decades, different terms have been used to express the concept related to information literacy, with a lively debate on terminology and meanings (Bawden 2001). The numerous reviews on the concept of information literacy summarising the relating debate, show a shift of attention towards the topic of critical thinking and the role of library in promoting it. (Beherens 1994; Doyle 1994; Mutch 1997; Snavely and Cooper 1997; Bruce 1999; Webber and Johnston 2000; Owusu-Ansah 2003) .

The concept of bibliographic instruction has gone through three generations of meanings: during the Seventies it was viewed as library orientation, in the Eighties there was a concentration on teaching users to access and use search sources, while during the Nineties the emphasis was on the shift from print to electronic and multimedia sources (Murdock 1995). In the last few years, however, the attention has been directed to the need of an information literacy education aimed to foster critical and reflective attitudes. The “Google generation”, that is the generation of students born in the Eighties and used to adopt the Internet as a main (and sometimes unique) source of information, requires to be offered learning programs and activities focusing on reasoning and evaluative skills more than to technical ones (Roth 1999; Olson 2000; Nieuwenhuysen 2000; Lorenzen 2002; Wallis 2003; Smoolin and Lawless 2003).

Although White (1992) noted that some of the goals of “information literacy” programmes were similar to those of the previous “bibliographic and library instruction” activities, the phrase “bibliographic instruction” is dominated by its association with a library centred, print-bound instruction (Murdock 1995). Just from 1989 Breivik (Breivik and Gee 1989) stated that

[...] we must move beyond programs of library instruction toward information literacy

and Rader (1995) defines the difference of meaning between the two terms :

Bibliographic instruction is more often a situation-specific response, whereas Information literacy contributes towards life-long learning by educating individuals to effectively utilise and evaluate information

The debate around the adoption and definition of terms in literature usually reflects the effort to design a conceptual framework, explaining the difference between a word and its synonyms and expressing new concepts through the adoption of new terms. The term “literacy” is for some authors an unsuitable word, expressing the idea that learners are “illiterate”. “Information competence” and “information power” are proposed as alternatives, defining a set of knowledge, skills and attitude that goes beyond basic functional skills (as the term “literacy” suggests). In fact, if we examine the translation of “information literacy” in other languages, we can hardly find exact copies of the English term “literacy”. In Italian, this word has been translated as “competenze”,

competencies (Associazione Italiana Biblioteche 2003), in French “maitrise”, that is capability of mastering or “formation”, with the accent on the continuing aspect of such education (FORMIST no date), in Spanish “aptitudes” (Asociacion Andaluza de Bibliotecarios no date), in German “Informationkompetenz” (Hamburg Universitätsbibliothek no date). “Mediacy”, proposed by Carbo (1997) focuses on the role of new visual communication means, while “infocommunication” (Marcum 2002) creates a neologism which highlights the active, communicative role that information users can assume in a digital environment. Some controversies about the relationship between information literacy and computer literacy still nourish the debate. While Brouwer (1997) considers information literacy a component of the broader concept of computer literacy, other authors underline the difference between the computer “fluency”, which mainly requires practical skills, and the information competence, that involves critical and evaluative capability. Shapiro and Hughes (1996) for instance, define the information literacy as a “liberal art”, and state:

We are talking about a new curricular framework: one that equips people not only with a bunch of technical skills, but with a broad, integrated and *critical perspective* on the contemporary world of knowledge and information....

The ACRL Standards (2000) however, clearly define the relationship between the two different competencies:

Information technology fluency focuses on a deep understanding of technology and skilled use of it [...] Information literacy is an intellectual framework for understanding, finding, evaluating and using information, activities which may be accomplished in part by fluency with information technology [...] but most important, through *critical discernment and reasoning*”

In a recent contribution, Owusu-Ansah (2003) demonstrates that the concept has been adequately delineated in literature and suggests going beyond the debates on terminology. The problem, he says, is the one of determining the scope of the concept in the context of librarian’s role and to design executable programs for information literacy. The debate on words and meanings, however, often conceives different opinions just on the role of information literacy in the educational process. In fact, while the function of the teacher/librarian is not discussed when the contents of the teaching are limited to library searching tools, many controversies arise when the teaching involves something more related to the process of learning, to the promotion of students’ critical thinking and reflective practice. In an argumentative way Foster (1993) defines the phrase “Information literacy”

[...] an effort to deny the ancillary status of librarianship by inventing a social malady with which librarians as information professionals are uniquely qualified to deal

while Mc Crank (1992) observes that librarians

[...] have imitated the poorly conceived notion of computer literacy as an educational goal

Until recently, a “backtalk” published on the Library Journal (Isaacson 2003) expresses, towards information literacy, a polemic attitude strictly related to the librarian’s role in the information age.

I don’t think our business is information literacy

Isaacson says, and, after a discussion about the choice of alternative terms, he concludes

Let’s just say we want to teach people how to use libraries [...] I know that many librarians want to call themselves anything but librarians [...]. I do like to talk to people about using libraries, though.

The controversy surrounding the definition of Information literacy seems therefore first and foremost related to its relationship with the learning process and with the role of the librarian as a teacher.

4.2. Information literacy, learning and critical thinking. A developing relationship.

The phrase “Information literacy”, coined in 1974, rapidly changed its meaning. Just two years later, Burchinal (1976, quoted by Behrens 1994) linked the information literacy with both skills needed to locate and use information, and the use of information itself for problem solving and decision making. In the same period Hamelink (1976), a specialist in mass communication, expressed the idea that people needed to be “liberated” from the oppressive effects of institutionalised public media, which were controlled and restrained. People needed to acquire the ability to obtain a

[...] wholistic, individual and independent perspective on events

In this interpretation, information literacy was a means to learn an alternative and critical use of information. Also Owens (1976) suggested a strong connection between responsible citizenship and information literacy

Information literacy is needed to guarantee the survival of democratic institutions

Taylor (1979) was the first who linked the library profession to information literacy, underlying the need to adopt specific strategies for the acquisition of information. These strategies were, in his opinion, the peculiarity of librarians’ profession and so they appeared as the holders of an important social competence.

While in the Seventies the emphasis was on the social meaning of the information literacy, during the Eighties new information technologies begun to permeate the society and the relationship between information literacy and the application of computers to the manipulation of information was at the core of the professional debate. Some authors (Horton 1983; Demo 1986 cited by Bawden 2001) expressed the idea that a new intellectual skill was needed in order to master new technologies (microcomputers, electronic publishing, satellite communications, CD ROMs, online databases). Along with traditional literacy skills, information literacy represented a prerequisite for life-long learning.

An important milestone in the information literacy movement was the definition provided in 1985 by Martin Tessmer (quoted by Breivik 1989), who underlined the need to evaluate information and to apply critical reflection to the research strategy. In his view, information literacy extends beyond locating and access information, to include understanding and evaluating the information and this requires particular attitudes such as the awareness of a need of information, persistence, attention to details, caution in accepting single sources.

In a national symposium on “Libraries and the Search for academic excellence” organised by the Columbia University and the University of Colorado in 1987, Patricia Breivik (1989) gave some fundamental indications of the direction in which academic libraries were going. In order to improve undergraduate education, says Breivik, it would become vital, for libraries, to

[...] integrate fully with the learning process

Students should prepare for lifelong learning, and, to do this, they need to be information literate, which means:

- *Understand* processes for acquiring information
- *Evaluate* effectiveness of various information channels
- *Master* basic skills in acquiring and storing this information.

While the awareness of the importance of information literacy grew, the emphasis on its relationship with critical thinking skills increased. Lukenbill (1989) expressed the idea that

[...] information literacy involves going well beyond location skills [...] into educating users in abilities which build insight and promote the development of strategies which help structure successful approaches to solving information needs.

Two important documents published in 1989 stressed the importance of information literacy for the development of critical thinking. The first one, a book by Breivik and Gee (1989), represents a milestone in the debate. Their idea is that in an information-based society the measurement of the quality of undergraduate education is whether students are self directed and independent learners. Libraries play a fundamental role in education, since they are where the knowledge of all disciplines is related within a meaningful framework

Libraries are a natural environment for problem solving within the unlimited universe of information[...]. And finally, libraries and librarians can help students master critical information literacy skills.

Breivik and Gee also stated the importance of an active partnership between librarians, teachers and administrators. Their view interpreted information literacy as a joint responsibility of the library, the whole University and the community. Librarians started to play a role in the educational reform under way and this, as Behrens (1994) says,

[...] paved the way for the introduction of resource-based learning across the curriculum .

The second important document published in 1989 is the report from the American Library Association Presidential Committee on Information Literacy, which produced the definition of information literacy commonly adopted until today. The ALA report discussed the importance of information literacy for individuals, business and citizenship. A new model of learning was introduced, which reduced the gap between the classroom and the library

What is called for is not a new information studies curriculum but, rather, a restructuring of the learning process. Textbooks, workbooks and lectures must yield to a process based on the information resources available for learning and problem solving. This learning should actively involve students , enhancing not only the critical thinking skills of students, but will also empower them for lifelong learning and the effective performance of professional and civic responsibilities.

In 1993 Karol Kuhlthau published “Seeking meaning. A process approach to library and information services”. “The Seven faces of information literacy” by Christine Bruce was issued in Australia in 1997, and in 2000 the Association of College and Research Libraries published the final version of the “Information competency standards for higher education”.

These three “milestones” for information literacy well represent the different educational approaches being adopted today for programs and activities in academic libraries all around the world.

4.3. Information literacy promoting critical thinking. Models and experiences.

Information literacy programs and activities being developed in most Universities and Colleges all around the world can be grouped in three general categories, related to different educational approaches.

- Behaviourist approach
- Constructivist approach.
- Relational approach.

The *behaviourist approach* requires that learners, to be described as information literate, exhibit certain characteristics and demonstrate certain abilities. A strong attention is put on desirable user's behaviour and outcomes in terms of skills more than process. Eisenberg and Berkowitz's *Big Six Skills* (1990) is a well known model providing a series of steps that students need to negotiate when an information problem is to be solved (defining task, creating information seeking strategies, locating and accessing information, using information, synthesising information and evaluating information). In this model, information literacy can be described as a systematic information behaviour.

The behaviourist approach, adopted also in the ACRL standards (2000) and in many learning programs (in particular in the United States) is subjected to a certain criticism. One critique is related to the danger of a "thick a box" methodology, where a complex set of competencies is reduced to small discrete units. A complain about ACRL Standards (Webber and Johnston 2000) is in fact that they can encourage a kind of "fragmentation" of knowledge as well as the assumption that the skills have been mastered once each unit of information literacy learning programs has been completed. The "surface learning" approach (with short term focus) does not help learners reflect on what they are learning (Harley, Dreger et al. 2001).

A number of learning programs, both class activities and self directed activities (with a great spreading of online courses and tutorials) put the focus on research skills, and, despite critical thinking and evaluation are listed among expected outcomes, contents and activities are often limited to instructions on "how to do". However, online instructions and tutorials, virtual library tours and the widespread "50 minutes one-shot sessions" are now showing their limits among information professionals involved in teaching activities (Boff and Johnson 2002; Brown, Murphy et al. 2003). The instructions on how to identify and search information resources have only a temporary positive effects on learners, and don't offer them the added value of reflective practice on their research process. Edwards and Bruce (2002) think that the skill-based approach to teaching and learning, particularly in the electronic domain, lacks didactic power because of the changing nature of technology contents.

We need something that emphasises reflective competence and the ability to continue to learn.

Furthermore, as Petrowski notes (1999, quoted by Webber and Johnston 2000) in the same ALA Website on Information literacy, there is a statement expressing the limits of the ACRL standards!:

Information literacy is far more fluid and complex than American standards and guidelines might suggest.

The *constructivist approach* finds its roots in the educational theories of Bruner, Vygotsky, Kelly. Learning is viewed as a process of construction in which each student is actively involved in building a new understanding on the basis of what is just known. According to Kuhlthau (1993), who ideated a widely adopted model of information search process, constructivism is particularly well suited for the new environment of digital libraries. Students are taken out of the "predigested"

format of textbook 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 (Kuhlthau 1993).

In fact, students learn to identify what is important for them and construct their individual "new meaning". The Kuhlthau model is a six-stage process (introduction, selection, exploration, formulation, collection, presentation) which has the important quality of giving attention to the emotional aspect of learning. Learning is a "holistic experience", accompanied by deep feelings and emotions. The feeling of anxiety and uncertainty that occurs in the initial stage of the research process, is the "zone of intervention" (Vygotsky) in which the instructor can provide guidance and assistance to learners. As a "coach", the librarian can help students in constructing their understanding by designing and implementing learning situations with particular strategies: collaborating, conversing, charting, composing, acting and reflecting, feeling and formulating, predicting and choosing, interpreting and creating. Acting and reflecting are the activities more strictly linked to critical thinking, and librarians' role is to guide students to reflect on their action throughout the stages of the information search process. Also interpreting and creating involve reflective activity, since interpreting is based on personal construct built from past experience. The "products of mind" (Bruner 1982) are at least the product of the individual process in which students make connections between various information, extend their own ideas and create something new.

A number of learning programs are based on Kuhlthau's work. Her approach is the starting point of many problem-based, case-based information literacy learning activities. According to Brandt (1997), Dennis (2001), Macklin (2001) Brock Enger (2002), D'Angelo (2003), and many other authors, in order to make the information search process meaningful for students and to provide a "learning environment" stimulating a reflective approach, the Problem-Based Learning is a suitable methodology. PBL takes everyday situation and creates learning opportunities from them. The model is collaborative in nature and uses interactive applications to engage groups of students in problem-solving. Also the action research is considered a valuable methodology to promote "reflective searching". Using the action research cycle of planning, acting, recording and reflecting, not only research skills are learnt, but a reflective attitude on learning process is encouraged. This attitude, reflective and self-evaluative is at the core of the learning process (Snavey 2001, Kalman 2002, Hager, Sleet et al. 2003).

The *relational approach* proposed by Christine Bruce in her book "The Seven faces of information literacy" (1997) offers an alternative model to the behavioural and constructivist ones. The phenomenographic approach adopted by Bruce is widely used in higher education to explore qualitative variations in people's experience or understanding of important phenomenon. It 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. A "phenomenon" is the combination of different ways in which an aspect of the world is conceived or experienced, and each experience is described as a relation between individual and each external "object" with which they interact. We could define the phenomenographic approach as a complex, "ecosystemic" and holistic way to understand the world (Morin 1993).

Seven different ways of experiencing information literacy represent different ways in which individuals interact with information and, taken together, represent the "phenomenon" of information literacy: information technology for retrieval and communication, information sources, information control, knowledge construction, knowledge extension and wisdom (Bruce 1997; 1999; 2002).

The Bruce's experiential model of information literacy interprets learning as a process which brings individuals to understand the world differently, rather than a means aimed to retain information

about the object of study. It interprets competence as experiencing thinking and learning, rather than mastering skills or knowledge which may have a short life. Critical thinking is strictly interlaced with reflective practice, and the conceptualisation of one's own information needs represent the first step of the meta-cognitive activity (Webber and Johnston 2000)

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 (Bruce 1997).

Learning plans following Bruce's approach adopt methodologies which encourage reflection and involve participants in reviewing their learning methods, in analysing their development as literate people and in demonstrating progress over a period of time, exercising different aspects of information literacy in different contexts. The SCONUL model of Seven Pillar developed in United Kingdom, puts the emphasis on action research as a method to foster evaluation, comparison, reflection and exchange of views, both on the specific information problems and on the learning process itself (Society of College National and University Libraries 1999).

Both in the constructivist and in the relational models of information literacy, best practice is considered those learning activities that

- Interpret information literacy as integral to the learning process. (Daudelin Wood 1996; Rader 1997; Hardesty 1999; Simons, Young et al. 2000; Martin 2003).
- Create educational processes which are learner centred, experiential and reflective. (Carder, Willingham et al. 2001; Conteh-Morgan 2001; Bailin 2002; McDowell 2002; Brown and Murphy 2003).
- Create collaborative approaches and implement information literacy in academic curricula. (Rader 1995; Mac Donald, Rathemacher et al. 2000; Grafstein 2002; Rockman 2002; Parker 2003).
- Establish partnerships within and between organisations. (Williams and Zald 1997; Winner 1998; Raspa and Wards 2000; Bruce 2001; Hine, Gollin et al. 2002; Rader 2002; Bowden and DiBenedetto 2002).

5. Conclusions

In the current debate, information literacy is acknowledged as crucial in empowering individuals' critical thinking skills, providing them with the conceptual tools needed to face the challenges of an even more complex and rapidly changing information world.

Not only information literacy skills are an important means to promote critical thinking, but the information search process itself, given its recursive nature, is recognised as a privileged educational means stimulating and fostering reflective practice. In recognising an information need, in selecting suitable information sources and evaluating findings, in organising information and using it to construct new knowledge, the abilities of interpretation, analysis, synthesis and evaluation, that are the typical features of critical thinking, are tested and fostered. Moreover, the need to evaluate and re-plan one's own research process, in order to better meet information needs, produce a reflective "loop" in which each step is acted, evaluated and repeated. This requires an ongoing process of self-evaluation which stimulates individuals to examine and judge their own experience, improving their self-awareness.

To be aware of own cognitive processes is crucial today more than ever, in the perspective of lifelong learning. Only with an attitude of self-consciousness and with an active self-involvement in own learning process it is possible to recognise the need for further education and to effectively engage in the educational process. A positive and self-confident attitude towards both available knowledge and one's own capability of interpreting it, encourages the communication and sharing of ideas and favours an active and responsible citizenship.

This is why information literacy has been defined as a "catalyst" for educational change:

Information literacy education has the power to transform the learning process into one that empowers learners and give them the capacity to engage in self-directed lifelong learning, outside the walls of the formal educational process (Bruce 2002).

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