Information Literacy and Reflective Learning

An action research experience at the University of Parma

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Declaration

This dissertation is the sole work of the author, and is developed from a research proposal submitted by the author in Semester Two as part of the Independent Study Unit for Information Studies 2 of the MA/MSc Information Studies course.

The author has used part of the literature review submitted in May 2004 for the module Independent Study 1.

The opinions expressed in this dissertation are solely those of the author and acceptance of the dissertation as a contribution to the award of a degree cannot be regarded as constituting approval of all of its contents by the Division of Information & Communication Studies.

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Date:.....

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I certify that all material in this dissertation which is not my own work has been identified and properly attributed.

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Abstract

Information literacy and reflective learning
An action research experience at the University of Parma

By Monica Vezzosi

Information literacy is a "catalyst" that can empower students' learning and is therefore becoming an important focus of academic libraries. Action research is being increasingly adopted in the field of LIS, due to its characteristics of bringing together enquiry, practice and reflection.

This dissertation describes a piece of action research carried out at the University of Parma. A homogeneous group of 25 students are offered an Information Literacy activity grounded on the principles of reflective learning. Students' experience of the information seeking and research process is investigated before, during and after the learning activity. The experience of action research itself is evaluated from the point of view of the teaching librarian, with the goal of reflecting on the research process as well as on the findings.

Two parallel cycles of action research are developed, with different investigating techniques: focus groups, analysis of students' tasks, observation and individual interviews are adopted to analyse students' learning and the variations occurred in their experience, while reflective journal and peer observation are related to the analysis of researcher's experience of action research.

The outcomes defined for the learning activity have been attained by most participating students, who have started to perceive information seeking and bibliographic research as recursive processes requiring reflective thinking skills. Among positive changes occurred in students' experience, there is an awareness of their own personal development, a feeling of empowerment and a sense of independence. The learning activity itself has been positively evaluated both by students and by peer observers.

Action research revealed to be a valuable, even if highly demanding approach, suitable for librarians aiming to connect their teaching activity to educational research and to improve their own practice through reflection. It appeared also an effective way to promote change in Information Literacy activities in an academic context.

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List of abbreviations

ACRL	Association of College and Research Libraries
DD	Document Delivery
ERIC	Education Resources Information Center
IL	Information Literacy
ILL	Inter Library Loan
LIS	Library and Information Science
LISA	Library and Information Science Abstracts
MIUR	Ministero Istruzione Università Ricerca
OPAC	Online Public Access Catalogue
SCONUL	Society of College National and University Libraries

I Introduction

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I. 1. Synopsis

This dissertation describes an experience of educational action research, carried out at the University of Parma in the field of Information Literacy.

A group of 25 students attending the Environmental Sciences degree course are offered an information literacy educational activity grounded in the principle of reflective learning. Students' knowledge, skills and attitudes towards information resources as well as their experience of the research process are investigated before, during and after the learning activity. The impact of this experience on students and the changes occurred in their perceptions and attitudes are described and discussed. The experience of action research itself is evaluated from the point of view of the teaching librarian, with the goal of reflecting on the research process as well as on the findings.

Information literacy education (IL) is a "catalyst" (Bruce, 2002) that can empower students' learning. The cyclical, recursive nature of the research process promotes the development of higher order thinking skills, encourages critical reflection and fosters personal awareness, supporting individuals to engage themselves in self-directed learning (Snavely and Cooper, 1997).

In the field of information literacy, librarians have the opportunity to assume a more educational role and to demonstrate their actual and potential contribution to students' learning and personal development. An integral involvement in the teaching functions of the University is becoming a strong imperative for academic librarians (Rader, 1997).

Action research offers a systematic approach for introducing innovations in teaching, providing librarians with opportunities to gather evidence about their own practice and to reflect on this evidence, with a view to changing future activities. Action research in fact is a type of qualitative research that puts *action* at the core of the research project. It is both a way of producing knowledge about educational processes and a powerful way of improving teaching practice. McNiff (1988) defines AR

> an approach to improving education through change, by encouraging teachers to be aware of their own practice, to be critical of that practice and to be prepared to change.

In educational action research the teacher is put in the dual role of producer of educational theory and user of that theory. There is no separation between the design and the delivery of teaching and the process of evaluating these activities: theory and practice are brought together (Argyris and Schon, 1978).

A variety of models of action research have been designed: their common feature is the recursive, iterative loop connecting problem identification, action planning, implementation, evaluation and reflection. Each cycle produces new insights into the situation and stimulates further observation, planning and action (Elliot, 1991).

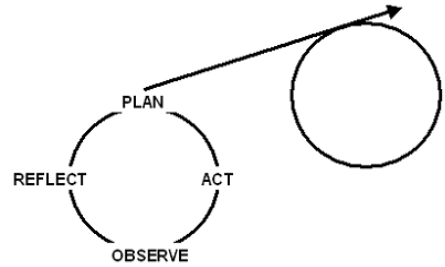

Fig. 1. Action research cycle

Action research, in fact, requires researchers to continually come back to their previous steps, to analyse and evaluate emerging findings and to modify strategies accordingly. The final reflection stage relates what the experience means, what can be learned from it, how can theory and practice match and which further improvements to practice are to be planned.

Therefore, the cyclical nature of action research, as well as its purpose, transcends mere knowledge generation to include professional growth and organizational empowerment (Herr and Anderson, 2005).

Since action researchers are often "insiders" to their professional settings, they play at once both the role of researcher and the role of practitioners, who seek to study their contexts because they want the research to make a difference in their own setting.

> Action research takes its cues (its questions, puzzles and problems) from the perceptions of practitioners within particular local practice contexts […]. It builds descriptions and theories within the practice context itself and tests them there through intervention experiments, that is through experiments that bear the double burden of testing hypotheses and affect some changes in the situation (Argyris and Schon, 1991).

Action research is being increasingly adopted as an approach to enquiry and practice in the field of LIS, both in the form of "emancipatory action research", aiming to foster organisational change and development (Rowley, Ray et al., 2004), in the form of educational action research in information literacy activities (Edwards and Bruce, 2002; Webber and Johnston, 2000) and as an application of the concept of reflective practitioner (Schon, 1993)

In this dissertation an experience of educational action research is described and evaluated with the following goals

- to create a link between enquiry and practice in the field of information literacy: research is a means for developing a reflective information literacy programme at the University of Parma, thus promoting change in an existing practice. The outcomes of the learning activity are evaluated and the consequent reflections, rooted in practice, will produce new knowledge.
- to reflect on the action research method itself, describing and evaluating its impact on the experience of a teaching librarian .

I. 2. Problem statement

Information literacy is becoming an important focus of academic libraries. In most Universities all over the world, librarians are in charge of organising and delivering IL learning activities. These activities aim to support students in becoming able to recognise and identify their information needs, select and use appropriate information sources, locate documents, understand and interpret contents, evaluate and communicate findings (Association of College and Research Libraries, 2000)

Since 2001, students attending several degree courses at the University of Parma have been offered an Information Literacy Seminar named "Dalla biblioteca alla rete" (From the Library to the Net).

Despite the commitment of teaching librarians, students participating in the seminar did not appear as taking full advantage of such a learning opportunity. Though at the end of the activity students demonstrated to have acquired some basic skills in the use of single search tools (on-line library catalogues and indexing databases), anecdotal evidence showed that they approached information in a rather uncritical way and seldom became

able to apply their new knowledge in different contexts. Furthermore, as librarians' unstructured observation revealed, most students apparently did not use the acquired skills after the activity had been completed and rapidly forgot what they had learned.

A critical reflection about this activity needed to be started, which could lead

- to a better understanding of students' learning needs,
- to an improvement of the current educational activity, which could encourage a deep learning approach and the development of reflective thinking,
- to the adoption of a working method in which research on students' learning and self evaluation could empower librarians' teaching practice

Action research appears as a suitable approach to this problem, owing to its characteristic of bringing together enquiry, practice and reflection.

I. 3. Aims

The aims of the present research are therefore the following:

- To support students in developing a critical information competence through an information literacy reflective activity.
- To improve information literacy teaching practice at the University of Parma on the basis of the findings of an action research project.
- To provide evidence of the value of action research and critical reflection for the improvement of teaching practice.

I. 4. Objectives

- To explore experiences and attitudes of a group of students at the University of Parma in relation to the information seeking and research process.
- To plan, design and delivery a reflective information literacy activity tailored on students' learning needs.
- To assess the impact of the activity on students' learning.
- To verify the changes occurred in students' experience of information seeking and research process after the learning activity.
- To describe, analyse and evaluate an action research experience in the field of information literacy from the point of view of a teaching librarian.

I. 5. Research questions

The present research addresses the following questions

- How does a group of undergraduate students experience the information seeking and research process?
- Which is the impact of an information literacy reflective activity on students' learning?
- How do students perceive the changes promoted by the learning activity in their experience of information seeking and research process?
- Which is the impact of an action research project on a teaching librarian at the University of Parma?

I. 6. Researcher's Positionality.

In action research, the researcher's positionality in relation to the setting is important as it determines how epistemological, methodological and ethical issues are framed in the enquiry (Herr and Anderson, 2005). This study is conducted as a form of teacher research using qualitative methods, where the researcher, who is insider to the setting, plays a multiple role:

- *the role of researcher*, aiming to better understand students' experience of information seeking and research process as well as the impact of one particular learning activity on their perceptions and attitudes.
- *the role of teaching librarian,* engaged in designing and delivering a reflective learning activity.
- *the role of reflective practitioner*, committed to better understand, through reflection on action, the dynamic and complex role of teaching librarians.

The approach to this action research project is a strongly qualitative one. The researcher being the main instrument of the enquiry, the report on this experience will be written in first person. A narrative style is suitable for action research projects, which put reflection on action at the core of the enquiry activity (Elliot, 1991; Yllijoki, 2001; Tenni, Smyth et al., 2003). Narrative writing is considered a "medium" for encouraging critical and personal reflexivity and it effectively conveys the idea of a continuous self-assessment (McNiff, 1988; Atkinson, 2000; Bleakley, 2000).

I. 7. Structure of the dissertation

> Because of the ongoing nature of action research, it may not be possible to write up the whole undertaking, but rather just a piece of the understanding or intervention that has come about through the enquiry […]. Because of the link in action research between the generation of knowledge and social and educational change many researchers turned to alternative ways for the dissemination of knowledge (Herr and Anderson, 2005)

The need to negotiate between action research features and the patterns required for a Master thesis led me to arrange the structure of this dissertation in a way that could mirror the development of the action research project, while keeping a traditional organisation of contents.

This dissertation is therefore organised as follows.

Section One: The background provides a framework of the academic context at a national and local level, and describes the information literacy activities carried out until 2003 at the University of Parma.

Section Two: The need for change provides anecdotal evidence suggesting that the IL programme offered to students thus far has not provided satisfactory learning outcomes. From unstructured observation and informal conversations emerged the need to start an action research project.

Section Three: The Literature review puts in perspective the research problem. The value of information literacy, the debate around the role of librarians and the relationship between IL and reflective thinking are critically analysed. The most valuable approaches to IL are described and compared. References to the literature are provided also in the following sections, as to justify the adoption of investigating techniques and in relation to emerging findings.

Section Four: Methods and research plan. This section aims to justify the choice of action research as an approach and to describe the plan for the research spiral. It also introduces the techniques chosen both for the enquiry (focus groups, interviews, document analysis, observation) and for the reflective activity (peer observation, research reflective journal). These methods are more deeply described, discussed and justified in the following sections.

Section Five: The action research spiral: Observe. This section describes the starting phase of the actual action research. The phase of observation has two main goals: to analyse students' starting opinions and attitudes towards information seeking and the

research process to be eventually compared with their experience after the learning activity; to collect students' expectations and learning needs in order to design a tailored educational activity. The investigating technique adopted in this phase is focus group**.**

Section Six: The action research spiral: Plan. In this section I define the educational paradigms on which the design of the learning activity was founded, connecting my choices both to educational literature and to the findings from the previous phase. Aims, objectives, learning outcomes, activities and methods for the learning activity are presented.

Section Seven: The action research spiral: Act. The actual learning activity is described, adopting a narrative style. The focus is on students' participation and their reaction to the learning experience.

Section Eight: The action research spiral: Evaluate. This section includes:

1- **Assessment of students' learning outcomes** through the analysis of their individual and group tasks as well as structured observation

2- **IL activity evaluation:** the learning activity itself is critically evaluated following students' and critical friends' opinions, gathered through individual interviews.

3- **Variation in students' conceptions**: the impact of the learning activity on students' experience is described and discussed. Individual in-depth interview is the method adopted to verify the changes occurring in students' conceptions of information seeking and research process.

Section Nine : The action research spiral: Reflect. This section analyses the impact of this experience on the researcher and represents the researcher's meta-cognitive activity and self evaluation. The reflective phase of the action research project is rooted in the research journal

Section Ten : Conclusions.

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Section 1. Background

1.1. University in Italy. New opportunities from the curriculum reform

1.2. The University of Parma and its Library System

1.3. Information Literacy activities at the University of Parma

1.4. References

This section seeks to provide a context for the action research project. The features of Italian higher education reform put in perspective the information literacy activity in the light of the competencies required by new curricula. A brief snapshot of the University of Parma and its library system is followed by a summary of the information literacy activities carried out at the University before the starting of this research.

1.1. University in Italy. New opportunities from the curriculum reform.

The national reform of Italian Higher Education System aimed to promote change and development in Italian Universities, making them more respondent to the rapidly changing political, economical and social scenario. The reform took in account the new European context, requiring to overcome the cultural national boundaries, to face the challenges of a difficult job market and to respond to the need for supporting individuals in lifelong learning. The main goals of the reform (Italia. MIUR, 2000) are in fact:

- to improve teaching autonomy, allowing each University the right to regulate the teaching system through the University Academic Regulations (RDA) which aimed to overcome the rigidity of a single national regulation system. The academic regulation system defines the name and the learning outcomes of a course, the general outline and the number of credits for each subject
- to organise a study system according to the 3+2 formula, bringing the Italian education system closer to the European model
- to favour the mobility of students at a national and international level.
- to shorten the time needed to achieve the qualification and to reduce withdrawal rates
- to combine a cultural-methodological preparation, that has always been a prerogative of University teaching activities, with a vocational training.

The University reform led to an increased competition among Universities, to a growing interest in quality and accountability and to a massive enrolment of students, attracted by the perspective of a short-term study course and by the wider curriculum offer. Different types of students started to enter higher education, which shifted from education for a few, to mass education.

However, the increasing number of students enrolled did not correspond to adequate investments in terms of teaching and support staff, building and equipment. As a result, every component of the University community had to cope with a heavier workload, without corresponding financial and structural resources and the quality of offer did not always respond to students' demand.

Although Italian teaching tradition is based mainly on lecture, submission of papers and oral examination, resource based learning and distance learning are being adopted as a possible response to the lack of teaching staff, mainly in post-graduate courses.

In order to foster self-directed learning, the curriculum reform offers Universities the opportunity to design, together with institutional courses, learning activities that encourage the acquisition of interdisciplinary skills.

Italian academic libraries are being asked to play a different, more complex role, in a hybrid context of traditional structures, multiple tasks and diversified groups of users (Tammaro, 1999). Since students are required to become autonomous in accessing and using learning resources, academic libraries are becoming a learning environment, which supports students not only in specific, temporary situations, but as a continuous presence all along the study course (Basili, 2003).

The diffusion of distance learning and the higher number of part-time and working students who do not attend traditional courses and lectures, put the library in a strategic role for intermediation. Reference librarians are even more required to help students not only in performing bibliographic searches, but also in organising and managing a research process, also at a distance.

The flexibility of new curricula allows students to insert in their study plan optional activities such as IT laboratories, foreign language courses and IL seminars. Most of times the contents of these IL activities are limited to the use of bibliographic search tools and the expected outcomes consist mainly in accessing information sources and locating documents.

1.2. The University of Parma and its Library system

The University of Parma is a medium-sized University, with about 30.000 students enrolled, 1000 teachers and 900 technical, administrative and library staff. The research activity is developed by 19 Departments, grouped in 10 Faculties: Agriculture, Architecture, Economics, Engineering, Law, Humanities, Medicine, Pharmacy, Science and Veterinary. The didactic activity is organised by the Faculties, through the Committees of Degree Courses, post Degree Courses and Master Courses, who have a high level of autonomy in the definition of curricula. Some Degree Courses, mainly belonging to the Faculty of Humanities, Economics, Engineering and Law are attended by a high number of students, who are usually offered a traditional type of teaching activities, mainly based on traditional lecture, while in scientific courses such as Environmental Sciences, the lower number of students allows teachers to adopt more active and involving teaching methods, with a large use of laboratory sessions, seminars, tutorials, group work.

The Library System at the University of Parma consists of a Central Library Office, and a number of libraries, either Faculty or Department. Each library is directed by a librarian with responsibility for the good running of the structure.

The Central Library Office is in charge of co-ordinating and monitoring the library activities, and of promoting the use of library services. However, since libraries at the University of Parma had been working without any co-ordination until the 80s, and because of the fragmentation of the system, with the libraries physically dispersed in different parts of the town, each structure has a certain degree of autonomy. The most visible characteristic of the library system is just the complex integration between specific tasks and tailored services of the single libraries and the role of the Central Library Office, seeking to identify common goals and to co-ordinate activities. Among these, there is the promotion of library instruction initiatives.

1.3. Information Literacy activities at the University of Parma

At the University of Parma librarians have always been in charge of supporting students in the use of information research tools. The need to organise specific bibliographic instruction activities appeared to be urgent with the introduction of the online library

catalogue and with the acquisition of some important online subject databases, such us Current contents and Medline. The use of these research tools was initially limited to a small percentage of researchers, mainly in scientific departments, while students usually preferred not to access them directly, but rather to ask librarians for help.

A survey conducted in 1999 (Mamoli, 2000) revealed that only 28% of a sample of students were used to search the online library catalogue, while 58% of users stated they were able to access electronic journals. In order to promote the use of online search tools, which required each year a huge financial investment, in 2000 the Central Library Office started a project involving all reference librarians at the University (Appendix 1. Information literacy activities at the University of Parma – Timetable).

The main goals were the development of librarians' competence as trainers of their users and the design of a learning activity to be addressed to all students at the University. The training activity for librarians lasted six months and involved literature review, lectures, group work, presentations, and the planning of an experimental course, to be proposed to a sample of students (Mamoli and Gorreri, 2003).

The experimental course, named "L'Utente indipendente" (The Independent User) started in Autumn 2001 and involved 45 students from different Faculties. The learning activities consisted of five lectures with demonstrations on the use of online catalogues, e-journals databases, Internet and the Web, citing rules. At the end of the course, students were offered a practical session of individual exercises. They were also asked to answer a questionnaire and to express their opinions and suggestions. According to the results, the course was mostly appreciated.

In April 2002 a revised program was submitted to the Rector and to the University Senate. It was approved with the name "Dalla Biblioteca alla Rete" (From the Library to the Net) and it was included into the *curricula studiorum*, as an optional activity proposed among the innovations of the recent Italian University reform.

In Autumn 2002 several courses started to deliver the learning activity. Among them there was the Environmental Sciences degree course and, together with other colleagues, I was involved in teaching activities (Sora and Vezzosi, in press).

The course, lasting 15 hours, was divided into 5 lessons (3 hours each). Students were grouped in small classes (20-25 people) and the lessons took place in the IT laboratory, so that students could have a networked PC at their immediate disposal to test the research tools presented during the lesson.

The contents of the course were similar to those chosen for the experimental phase:

- Online catalogues
- Bibliographic electronic databases
- Electronic journals
- Internet and the Web
- Citation rules

Each content was presented by a different librarian. The lessons always started with a lecture, followed by some demonstrations. Students were also involved in individual hands-on activities: they were supposed to answer some questions and to locate documents.

An informal feedback was given following a final test. Students were asked to work individually for about one hour of time and to perform a simple piece of research about a stated subject, using all the information sources presented during the course. The Seminar did not provide a formal assessment of students' learning.

A questionnaire was administrated to all students who participated in the course. They were asked questions about :

- Time: lesson hours and relation between lectures and practical activities.
- Place: equipment of the IT laboratory
- Contents and activity: interest towards contents and level of involvement
- Learning outcomes: students' perception of their own competence before and after the course

Students' learning outcomes, findings from the questionnaire, and librarians' evaluation of this activity are discussed below, since from these emerged the "need for change", which represents the starting point of the action research project.

In fact, though the Seminar "From the library to the Net" is to be considered a good beginning for the introduction of an Information literacy activity into the official curricula at the University of Parma, both students and librarians identified spaces for improvement, as I will show in the following section.

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Section 2. The need for change

2.1. Outcomes of the Seminar “From the Library to the Net”

2.2. The point of view of students

2.3. The point of view of teaching librarians

2.4. The point of view of faculty teachers

2.5. Preliminary questions and starting of the enquiry

2.6. The Environmental Sciences Degree Course

2.7. References

In this chapter I report anecdotal evidence on the outcomes of the Seminar "From the library to the Net". From non-systematic observation and informal conversations I drew the impression that students' positive learning outcomes verified at the end of the Seminar did not correspond to a real change in their attitudes and behaviour nor led to a visible development in their ability to manage a research process.

2.1. Outcomes of the Seminar "From the Library to the Net"

The Seminar "From the library to the Net" did not provide a formal assessment of students' learning. Some individual exercises at the end of each lesson and a final small piece of research on a pre-defined topic were required instead, and only an informal feedback was provided by teaching librarians.

Although students' tasks were not analysed and compared in depth, at the end of the activity it was possible to draw up a list of positive outcomes, as well as a number of critical aspects related to students' learning.

❖ Positive outcomes

- Students seemed to understand the main purpose and characteristics of different search tools.
- They appeared able to independently access and use the University of Parma online library catalogue, some indexes and some full-text databases.
- They apparently had learned how to use Boolean operators and how to broaden and narrow their search.

❖ Critical aspects

While the use of single information tools seemed being mastered, students appeared to find much more difficult:

- To manage their research process, especially:
    - to focus on the research topic,
    - to identify adequate keywords,

- to select suitable information search tools
- to plan a search strategy
- to connect results from different search tools

- To evaluate their findings, especially :
  - to determine the extent and purpose of different sources of information
  - to compare results from different sources
  - to relate the information found with their needs and goals
  - to discriminate between information sources according to their reliability

- To manage their time effectively, especially:
  - to calculate the time needed to complete a task
  - to plan and schedule their work

- To learn from their own mistakes and modify their strategy accordingly, in particular:
  - to recognise when a search process did not lead to expected results
  - to analyse their own research process
  - to match actions taken with results
  - to identify mistakes
  - to imagine alternative strategies and solutions

- To evaluate their learning and identify space for improvement
  - to assess their level of knowledge and skills both before and after the learning activity
  - to recognise their lack of competence
  - to be disposable to extend and improve their ability

Students were also administered a questionnaire, regarding their opinions and impressions on the learning activity. Most students expressed their appreciation for the Seminar as a whole, and observed a development in their own knowledge and skills.

However, they didn't seem completely aware of their level of competence before and after the activity. Some students stated that they just had a good level of search skills *before* the seminar started. This was not consistent with librarians' evaluation, who had previously

observed that students were used to adopt Google as the unique search tool, performing only one basic type of search (sticking one word) and browsing results in a hurried and uncritical way.
Moreover, also those skills, related to the use of online library catalogue and journals databases, that seemed mastered by students at the end of the learning activity, were rapidly lost, as I noticed, with disappointment, a few weeks later.

2.2. The point of view of students

While working at the reference desk, I observed that often the same students who had participated in the seminar came and asked questions about the availability of documents in University libraries. Since I was convinced that students had acquired, once and for all, at least the skills needed to check the availability of documents through online catalogues, I started to ask :

Why do you ask me for this information? I remember you were at the seminar, don't you remember how to do this?

The answer sometimes was:

Yes, but I'd like to be sure, I cannot remember exactly ….. or
I am sorry, I'm afraid I've forgotten…

The same happened with the use of other online search tools and with the research process as a whole. Whichever was their information need, students chose Google as the first and often unique source of information. When they started their dissertation, they asked librarians for help, demonstrating that knowledge and skills acquired during the seminar, in most cases had been completely lost. I started to wonder if the seminar was really helpful for students: actually, there was not a real difference between students who participated in the seminar and those who did not attend it. Their approach and attitude were quite the same.

I also had the opportunity to have a talk with two participating students a couple of months after the seminar had ended. This cannot be considered an actual interview, but rather an informal conversation. I hadn't planned it, nor I recorded anything, but I took notes at the end, since I had the intention to discuss what was emerging with some colleagues of mine.

Silvio and Lara were starting their dissertation and asked me for help in order to begin a first, general literature review. While we proceeded in the analysis of the topic of their dissertation, I perceived that they did not remembered quite anything they had learned during the seminar, so I started an informal interview, asking them:

- A general opinion on the course
- Which contents and activities they had found interesting and useful
- What could be done better
- Why, in their opinion, the searching skills acquired during the Seminar had been so rapidly forgotten

These are evidently "tentative questions". In fact, I hadn't started my research yet, I was simply trying to understand what was happening. However, action research usually starts from a kind of dissatisfaction about the outcomes of one's own current practice and the first steps are often informal and unplanned (Elliot, 1991).

The issues emerging from the talk with Silvio and Lara are the following:

- They stated that the learning activity, as a whole, was "useful" and "interesting"
- They believed they had learned a lot during the seminar
- The reasons why they forgot what they had learned were, in their opinion:
    - During the seminar they had no time enough to practice the use of information search tools.
    - They did not use these tools after the seminar anymore.
- They would prefer some more hands-on activities
- They had learned how to use each single search tool, the problem was how to do a real piece of research. They did not know how to start.
- When students need some information, they usually prefer using Google, which is much more appealing than other information sources. It is simple, easy to use, "*there is nothing to understand, you only have to stick one word and go*" (this is the only phrase I transcribed in a notebook, as it seemed emblematic).
- The time chosen for the seminar was not adequate. Students were involved in the exam session, therefore they did not manage to concentrate on the learning activity.

- Students usually don't have a lot of time, they want quick answers to their questions.

Some provisional conclusion drawn from this conversation were:

1- This was not a simple problem, but a complex, multi-faceted one. I had to approach it in a holistic way.
2- What students wrote in the questionnaire submitted at the end of the activity was not so meaningful in relation to their learning and their real attitudes.
3- There was a need to better investigate students' experience, also because of the contradiction between what they say (the activity was interesting and useful) and what they do (they do not use their new skills anymore and forget what they have learned).

2.3. The point of view of teaching librarians

I also had a number of informal conversations with some colleagues of mine, who were offering their students the same Seminar "From the library to the Net". We compared our impressions and I realised that we were experiencing the same problem.

A colleague told me :

It seems that only 5% of what we taught has been really learned.

Another colleague, during a meeting of teaching librarians, complained about the "lazyness" of students, who did not take the most of so many available information sources and in spite of being offered so many instructions on "how to do by themselves". Students didn't seem interested in using these resources nor in improving their searching skills. They appeared overloaded by information and, at the same time, uninterested to it. They believed that Google was enough for their needs.

Students enter the library only for having a free access to the Internet and for accessing their e-mail, another librarian stated.

In librarians' opinion:

- Students are not really interested in information tools. Google is enough for them.
- Students do not engage themselves neither in doing bibliographic search, nor in learning how to do it
- Anyway, our seminar is not leading to visible changes in students' behaviour.

2.4. The point of view of faculty teachers

At the Department of Environmental Sciences, librarians' teaching and tutoring activity has always been encouraged and supported. It was not difficult to share my doubts with some teachers and to collect their point of view about the problems we were facing with our IL activity. Here I report what I gathered through informal conversations.

According to some lecturers and young researchers, the problem with students is not about information tools or the research process. Students lack both study skills and the curiosity needed to start an enquiry, or, simply, to ask questions.

It is difficult to involve students, sometimes they appear rather passive, disinterested. An inexplicable aspect, according to one teacher, is that they often seem to prefer very traditional teaching methods (such as lectures) while in the past students were keen on active learning experiences, such as group work and laboratory activity.

The main problem, stated a senior teacher, is the lack of working method. Students are not able to manage their time and never respect their deadline. They always feel overwhelmed, tired, they always complain about an overcharge of work to do.

Another widespread opinion is related to the general level of students' knowledge and skills. These are considered quite low and, in any case, lower than those of students some years ago. It is difficult to maintain a good level of teaching, since learning outcomes, contents, methods have to be adapted to this new type of students. Students are not inclined to use the library or online search tools, because they don't have patience enough for that. They are used to immediate responses to their "inputs", their working time being synchronised with SMS, online chat and play station.

In general, according to teachers and researchers, librarians are simply experiencing the same problems as academic teachers are, that is a "new" type of students, some contents that perhaps are too difficult for them, a teaching method that seems inadequate for students' learning style.

2.5. Preliminary questions and starting of the enquiry

I had been gathering different opinions around the current learning activity, from students, from librarians and from academic teachers. A first, preliminary problem statement was developed starting from the following synthesis of what was emerging.

- Students participating in the Seminar "From the library to the Net" frequently acquired a short-term competence, limited to the use of single research tools.
- The searching skills learned during the seminar did not appear adequate when students were required to start an actual research process.
- The learning activity apparently did not originate an interest towards information resources nor encouraged students to apply their new competence in different contexts.
- The IL activity did not appear as fostering students' critical thinking skills.
- Students were hardly involved in self assessment of their own learning and did not appear able to evaluate their competence.
- Most students did not change their attitudes and behaviour after the learning activity and did not show interest in deepening their learning.
- The IL activity did not have a visible impact on students' learning skills nor encouraged self-learning.

This is not to be considered a diagnosis nor a straightforward definition of the problem. The feedback we got from students through the final questionnaire had proved to be inadequate for understanding the impact of the activity on their learning and to identify possible improvements.

Furthermore, the problem was not simply "how to re-design the seminar". I considered that a different approach was to be adopted, which took in account the problem of improving students' learning, together with our need, as teaching librarians, to change our approach to teaching, to reflect on our practice and to learn from experience.

The questions I was asking myself, in fact, were not simply related to a better organisation of this particular learning activity, but involved a number of different factors, strictly interlinked each other.

- How can I understand and interpret what is happening?
- How do students experience their competence and their learning in the field of IL?
- What kind of educational activity can empower students learning?
- How can I develop myself, as a teaching librarian, in order to make my activity more fruitful both for students, for myself and for my colleagues?
- How can I put together:
    - The need to understand,
    - The need to better support students' learning,
    - The need to change and develop our practice as teaching librarians?

My interest towards information literacy and its relationship with critical thinking and reflective practice, as well as my commitment to contribute to the development of this experience, drove my decision to start a research project on this topic.

Moreover, I believed that my working situation, as librarian at the Department of Environmental Sciences, put me in a favourable condition because of the particularly positive attitude of teaching faculty towards the issue of information literacy and their strong commitment to students' learning.

2.6. The Environmental Sciences Degree Course

The Degree Course in Environmental Sciences at the University of Parma is committed to form "environmental professionals who have both a solid systemic culture and excellent scientific competencies. The integration of disciplinary knowledge (physical, chemical, biological) with the ecological and evaluative ones (legal and economical) in an "ecosystemic" way, is at the core of environmental professionals' competence" (Dipartimento di Scienze ambientali. Piano di Studi, 2004).

Among the Italian degree courses in Environmental sciences, the one at the University of Parma was the first to be started, in 1994. Just before the national reform, the curriculum

included a course on basic IT skills and an optional seminar on "library skills" was proposed to final year's students. The academic staff at the Department of Environmental Sciences have always demonstrated to be aware of the importance of information literacy competencies for the improvement of students' studying and thinking skills.

Environmental sciences students in fact are prospective environmental managers: they will have to face some of the most complex and crucial problems of our time. They are therefore required to master the information competence needed to collect, analyse, evaluate, use and communicate to other people different kinds of information: statistical data, national and international legislation, reports from industries and private companies, papers and relations from governments and from environmental associations, local press reflecting the opinions of people on environmental matters.

It has been said that the most important quality of an environmental professional is the "ecosystemic" view of problems (Odum, 2001), that is the ability of relating each other a number of factors that acquire a meaning only when considered all together, with all their mutual relationships. Students attending the degree course in Environmental Sciences need to be helped to acquire the analytical skills, the reflective attitude and the information competence requested for their future profession (Hager, Sleet et al. 2003). They need to be highly skilled not only in the access to information, but also in its use and critical evaluation (Bailin, 2002; Cunningham et al., 2004).

In 2002, following the approval of the Academic Senate, the Environmental Sciences Course committee inserted the Seminar "From the library to the Net" among the optional activities for 2. year students and the learning activity was delivered in October 2002 and in October 2003.

During the summer 2004 I submitted the proposal for the present research, together with a provisional learning plan, both to the Environmental Sciences Course Committee and to the Head of the Central Library Office. I was allowed to involve 2. year students in this research project and to design and delivery an experimental learning activity tailored on Environmental Sciences students' learning needs.

The Environmental Sciences degree course is to be considered a valuable "prototypical" situation, characterised by particularly favourable conditions:

- The course is a small one: about 25-30 students enrol each year. The groups of students for each course are therefore very manageable.
- Thanks to the small dimensions of groups, students usually develop positive and friendly relationship from the first year of study: this has a positive impact on their learning, since it favours communication and co-operation.
- Teachers are very much committed to provide a supportive learning environment and to organise meaningful experiences that equip students with thinking skills and develop an "inquiring mind". They are collaborative and open to change.
- The informal and friendly environment at the Environmental Sciences Department is the best condition to experiment, share, discuss and learn, both for students and for teachers themselves.

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Section 3. Literature review

3.1. Information literacy in the knowledge-based society

3.2. Information Literacy. Historical overview

3.3. Words and meanings. A debate around ideas

3.4. Information literacy, critical thinking and meta-cognition

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3.7.1. Behaviourist approach

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3.8. Conclusions

3.9. References

In action research the literature is always in dialogue with the data

> We see a dialogue of sorts taking place between the researcher's growing observations and data and what others have written and understood about similar questions or contexts. The end results should be that the data analysis is pushed by relevant literature and the literature should be extended through the contribution of this action research (Herr and Anderson, 2005) .

The first step of my research was to carry out a literature review both on Information literacy and on teaching methods in higher education. The literature search followed the whole research project and was continually alternated with action and reflection. Therefore, while a general review on information literacy is placed in this section as an introduction to the enquiry, I will continually refer to the literature also in the next chapters, in relation both to methodological choices and to emerging findings.

3.1. Information literacy in the knowledge-based society

In recent years Information Literacy has become a major focus of public and academic libraries. The interest around this issue is due to the recognition that we are living in an age where the quality and quantity of information needed to act effectively in society and the workplace continue to increase.

The mobility of people, the globalisation of economy, the shifting markets and the consequent need to be more skilled and competitive in a rapidly changing environment, represent critical and worrying features of our society, but also represent, for individuals, an opportunity to take responsibility for their education, all along their lives. To be information literate is becoming a strong imperative for people living in the 21. century.

> Individuals must be able to master rapidly changing information technology and possess the information literacy skills to act independently in this information rich environment. (Association of College and Research Libraries, 2000)

In fact "building an information society" has been identified as a global challenge for the New Millennium. At the World Summit on the Information Society, held in Geneva in 2003, the representatives of many nations declared their common goal 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 (World Summit on the Information Society, 2003)

At the earth of individual and social growth, Education 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. The "Necessary Utopia" for our time (Delors, 1996) is to consider education as one of the principal and powerful means to foster a more harmonious and fair type of human development, reducing exclusion, ignorance, oppression and poverty.

The formal education system, introducing each individual to different forms of knowledge, maintains its crucial role, but it is linked today with the widespread idea 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 with two equally important aims: promoting employability and promoting active citizenship (Commission of the European Communities, 2000).

Becoming lifelong learners in fact, is not only one answer to the economical problem of job market, but also involves the concept of citizenship and the active participation in democracy. Just from 1959 John Dewey stated that

> A society with changes occurring anywhere must see that its members are educated for personal initiative and adaptability, otherwise they will be overwhelmed by the changes in which they are caught and whose significance and connections they do not perceive (Dewey, 1959; 2001).

A more flexible educational system is therefore required, which 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.

Individual active involvement in learning, in fact, is crucial to understand different people and cultures that everyday interact each other, to form a personal opinion on new scientific and technological issues that require ethical choices and to participate in political decisions in an aware and responsible way (UNESCO, 1996).

In this context, information literacy is becoming a priority for the twenty-first century (Rockman 2003). Becoming able to recognise the need for information, to select suitable information sources, access and use them effectively are

> an essential commodity for survival and should be offered to each individual (Society of College National and University Libraries, 1999).

However, once information has been acquired, it is crucial to be able to critically evaluate it, in order to re-elaborate and transform it in new knowledge (Mutch, 1997; Line, 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).

3.2. Information Literacy. Historical overview

The history of information literacy as a concept, and the still lively debate around its meaning and value are strictly related with both its deep relationship with the concept of critical thinking and with the role of librarians in the information society.

More than 5000 publications related to bibliographic instruction, information literacy, user education have been published in the last thirty years (Rader, 2002; Johnson, 2003).
Paul Zurkowski is believed to be the first to use the term Information Literacy (Beherens, 1994). As President of the Information Industry Association he coined the phrase "Information literate" in the early '70:

> People trained in the application of information resources to their work can be called information literate. They have learned techniques and skills for utilizing the wide range of information tools as well as primary sources in moulding information-solutions to their problems (Zurkowski, 1974).

In Zurkowski's definition we can find some basic ideas: the importance of information resources in work situations, the need of acquiring techniques and skills to use information resources, the link between information literacy and problem solving.

Some authors (Spitzer, Eisenberg and Lower, 1998, cited by Rader, 2002) underline the linkage of information literacy to democratic ideals in the Seventies. In 1976, Hamelink (1976), a specialist in mass communication, complained about

> […] pollution of information with meaningless messages

and expressed the idea that people needed to be "liberated" from the oppressive effects of institutionalised public media, which were controlled and restrained. In this interpretation, information literacy was intended as a means to learn an alternative and critical use of information, that is a

> […] wholistic, individual and independent perspective on events

While in the Seventies the emphasis was put on the social role of information literacy, during the Eighties the relationship between information literacy and the application of new technologies to the manipulation of information was at the core of the professional debate. In 1982 Time magazine chose the computer as "machine of the year" and Horton (1983) considered the potential role of computers as a crucial resource in an information age. However, he creates a distinction between computer literacy and information literacy:

> Information literacy, then, as opposed to computer literacy means raising the level of awareness of individuals, and enterprises to the knowledge explosion….

An important milestone in the information literacy debate was a contribution provided in 1985 by Martin Tessmer (quoted by Breivik, 1989). He underlined the need to evaluate information and to apply critical reflection to the research strategy. In his view, information literacy goes beyond locating and accessing information, to include understanding and evaluating skills, and therefore it requires particular attitudes related to critical thinking and reflection.

At the end of the decade, most of the programs of library instructions in academic libraries reassessed their goals: information literacy took the place of bibliographic instruction, considered too small a concept for the needs of education in an information society .
In 1989 Patricia Breivik and Gordon Gee published "Information literacy: revolution in the library." The basic idea in this book is the link between lifelong learning and information literacy: in an information society, the real measurement of the quality of education is whether students become independent, self-direct learners.

> Libraries 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 librarians can help students master critical information literacy skills.

In the same year, the American Library Association presented a report where the idea of information literacy was linked to the need of a new model of learning. Incorporating resource-based learning into the curriculum should lead to an active involvement of students in their own learning process and to an enhancement of their critical thinking skills.

> 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 (American Library Association, 1989)

Information literacy and educational change became two concepts strictly interwoven: a number of IL learning plans, activities and online tutorials appeared during the Nineties. The publication of Association College and Research Libraries Standards in 2000 represented a synthesis of the reflection about IL during the past three decades. The standards rapidly became a necessary point of reference for any debate on this topic and provided a widely adopted definition of information literacy.

> Information literacy is a set of abilities requiring individuals to recognize when information is needed, and have the ability to locate, evaluate and use effectively the needed information. (Association of College and Research Libraries, 2000)

The Standards also emphasise the role of information literacy to promote lifelong learning:

> Information literacy forms the basis for lifelong learning. It is common to all disciplines, to all learning environments and to all levels of education: it enables learners to master contents and extend their investigations, become more self-directed and assume control over their own learning

The debate around information literacy developed during the Nineties, and still lively in these starting years of the New Millennium, focuses on three main topics:

- Information literacy definition and its relationship with other literacies and competencies
- The role of information literacy as a means for promoting critical thinking
- The teaching role of librarians

Each of these issues is discussed below.

3.3. Words and meanings. A debate around ideas

As Langford (1998) states, the label "information literacy" is becoming "fuzzy". Is it a concept or a process? Is it an embodiement of essential skills that have changed their meaning over the decades? Or is it a new literacy that has been transformed from existing literacies, to complement the emerging technologies? She argues that the needs of society at any time determine how a society interprets a concepts. Literacy as a concept is therefore in a changing status, that "mirrors the expanding information needs of society", thus becoming a dynamic concept.

Indeed, the debate around the adoption and definition of terms (in literature but also in everyday professional debate) usually reflects the effort to design a conceptual framework which explains the difference between a word and its synonyms and expresses new concepts through the adoption of new terms.

Moving from the phrase "bibliographic instruction" to "information literacy" at the end of the Eighties was an important change in perspective (Snavely and Cooper, 1997). 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

However, some authors consider "literacy" an unsuitable word to be adopted in library context, as it expresses the idea that users/learners are "illiterate" (Bawden, 2001). "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" could suggest).

Carbo (1997) proposes "mediacy", thus emphasising the role of new visual communication tools, while Marcum (2002) creates a neologism, "infocommunication", which focuses on the active, communicative role that information users assume in a digital environment.

However, 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,2002), in German "Informationkompetenz" (Hamburg Universitatsbibliothek, no date).

One of the main controversies nourishing the debate is about the relationship between information literacy and other literacies, in particular computer literacy (Smolin and Lawless, 2003). While Brouwer (1997) considers information literacy a component of the broader concept of computer literacy, some 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 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....(emphasis added)

Furthermore, the ACRL Standards (2000) clearly define the relationship between these 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*" (emphasis added)

3.4. Information Literacy, critical thinking and meta-cognition.

It seems therefore that the main characteristic of information literacy, and what differentiates it from other literacies and competencies is a deep relationship with the concept of critical thinking.

Critical thinking in fact is listed among the information competency standards (ACRL, 2000) and it is often cited as one of the most important 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.

What is the exact meaning of the phrase "critical thinking"? And which kind of relationships exists, between IL and critical thinking?

The concept of critical thinking finds its origin in the Socratic teaching practice of "deep questioning". Adopting questioning as a teaching method, Socrates encouraged his pupils to look for evidence, examine assumptions and analyse concepts. Socrates was the first to discover two of the main principles on which modern theories of learning are founded: the dialogic, interactive nature of the teaching process and the critical and independent evaluation capability as the main goal of reasoning skills.

In fact, 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 both the starting point and 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

The definition of critical thinking more frequently adopted is due to Robert Ennis (2001) :

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

In one of his widely cited essays, critical thinking is defined as a combination of abilities (interpretation, analysis, inference and evaluation) and dispositions (explanation and self-regulation).

Dispositions are basically two cognitive attitudes, in which the thinking appears as a recursive function that applies the critical power to itself, allowing good critical thinkers to improve their own thinking. This kind of "meta-cognitive activity" is called "higher order thinking" (Morin, 1993; Lewis and Smith, 2001) and it represents the power that critical thinking is capable to apply to the thinking process itself.

> […] 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 arrived at that judgement. And, they can apply their powers of critical thinking to themselves and improve their previous opinions (Facione, 1998).

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 it requires, for being 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)

To do such thinking means also to handle 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)

The definition of critical thinking provided by the US National Council for Excellence in Critical Thinking in fact, is not so different from the concept of information literacy

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

In the context of higher education, both critical thinking and information literacy are considered crucial competencies. Candy (1995) identifies five attributes that a graduate should acquire in order to effectively cope with the challenge of a knowledge based society: an inquiring mind, an "helicopter vision", information literacy, a sense of personal

agency and a repertoire of learning skills. Whithead (1967) on the other hand, states that the proper function of a University is the "imaginative acquisition of knowledge". Ability to look at problems from different perspectives, to analyse, to gather evidence, to synthesise and to be flexible, creative thinkers are the main aims of University teaching.

What is the role of information literacy in this context?

Hinchliffe (2001) believes that information literacy is "a way of life". She considers information literacy as a "habit", following Mezirow's (1991) meaning, that is

> A behaviour that requires a discipline of mind that is practiced so it becomes a habitual way of working towards more thoughtful, intelligent action

Students with information literacy habit are disposed to lifelong engagement in an information literate community and in general in information society.

According to Bruce (2002), information literacy is a "catalyst" that can empower students' learning:

> 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 [….].

3.5. A new role for information professionals

A great part of the debate around information literacy is related to librarians' role as teachers. Nobody ever puts in discussion librarians' competence when this is limited to bibliographic instruction: providing that their instructional activity is kept inside the library boundaries, librarians have always been recognised the role of students' "trainers" (McCutcheon and Lambert, 2001).

The debate started just when the concept of library instruction was replaced by the idea of information literacy. If becoming information literate means acquiring the ability of assessing information, critically reflecting on the research process itself and learning how to learn, whose is the teaching competence? Which kind of relation is there among information literacy educational activities and subject teaching? Do librarians have the necessary competencies for engaging themselves in educational practice? (Amstutz and Wilson, 1997).

Just from 1979 Taylor had 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 (Taylor, 1979).

Twenty years later, in one of her most frequently cited papers Rader (1997) stated that the constant changes caused by technology and electronic information environments were representing a challenging job for both teachers and librarians. New opportunities to bring about changes in education were available for librarians and educators. She concluded:

> Librarians are especially well positioned through their information expertise to prepare and train others, particularly students for effective performance in the information age (Rader, 1997)

However, this position is not universally shared by librarians themselves. In a "backtalk" published in the Library Journal, Isaacson (2003) expresses, a polemic attitude towards information literacy and the librarian's role in the information age.

> I don't think our business is information literacy […] 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.

It is not surprising that the discussion about librarians' role in academic educational context goes together with the issue of the need to create a partnership with faculty. This is in fact the subject of many papers published from the 90s and, according to Rader (1995) and Farber (1999) the issue is "at the hearth of successful library instruction and information literacy ".

However, managing academic and research libraries partnership is not an easy task. There is an evident resistance to the recognition of librarians' educational role. Faculty members often believe that students will learn library research skill on their own (as faculty members themselves did) and therefore they feel little or no responsibility for students' lack of information competence (Leckie and Fullerton, 1999; Hardesty, 1999).

To foster faculty-librarians partnership different strategies are proposed: Dennis (2001) suggests to avoid the typical "library centred show-and-tell" method of teaching and to act as "coaches", teaching information skills at pivotal moments in problem solving process.

Librarians should tailor instruction on individual students' needs, rather than presenting a generic information literacy course to the whole class. There is a need to re-locate librarians' role in the information process from that of information providers to active participation

> at the critical centre of the free enquiry process (Dennis, 2001)

On the other hand, Owusu-Ansah (2004) argues that what distinguishes information literacy from library instruction is its recognition of the need to go beyond retrieval skills and to address a broader research environment. Academic librarians should therefore avoid insistence on popular solutions driven by inadequacy of resources and offer independent credit courses in information literacy

> […] one that offers in-depth engagement with issue inherent in and skills attendant to IL

Other authors however (Lombardo and Miree, 2003; Zabel, 2004) think that the mandated credit course is not the only possible delivering method for information literacy and suggest to be flexible, adopting different solutions (instruction at the reference desk, course integrated instruction, online tutorials) according to changing situations and students' needs.

Many contributions focus on the need to demonstrate librarians' competence and commitment to teaching practice (Winner, 1998; Flashpoler, 2003). Doskatsch (2003) explores the issue of professional credibility and identity: starting from the recognition that there are many opportunities for librarians to assume an educative role and demonstrate their contribution to the innovation of teaching and learning environment, she argues that effectiveness in this role requires the convergence of pedagogical knowledge together with information expertise. Librarians must recognise the importance of understanding the language of pedagogy and to engage with curriculum issues, ensuring that they have educational credibility. For this reason, librarians must produce research evidence of their teaching activity, proving that information literacy benefits both teaching practice and learning outcomes.

> They need to engage critically with pedagogical paradigms dominating in higher education and demonstrate competence in course design and delivery (Doskatsch, 2003).

In order to document the valued added of librarians' teaching activity three strategies are believed to be particularly effective.

The first one is the adoption of *reflective practice* as a working method. Starting from Donald Schon's work, Sheridan (1990) states that professionals who practice reflection in action become more aware of cognitive, affective and group dynamics and are open to new ways of describing or structuring their current practice. He suggests collaborative learning as a teaching methods of mutual enquiry, in which students are self-directed and knowledge is generated by co-operative efforts between teachers and learners. Larrivee (2000) argues that unless teachers develop the practice of critical reflection they stay trapped in unexamined judgements, interpretations assumptions and expectations.

The second strategy is to *communicate librarians' teaching experience*. This should be done, not only through the publication in LIS professional journals, but also in pedagogical context. Still (1998) found that over 13.000 citations in the ERIC database from discipline-specific pedagogical journal, only 53 citations included the word "library" and Doskatsch (2003) encourages librarians to share their successes in teaching activities not just with each other, but with faculty colleagues.

> We need to publish in discipline-specific pedagogic journals and present papers at conference other than librarianship conferences

The third strategy is the *adoption of action research,* as a method that librarians should adopt for better knowing their users and for assessing their own teaching abilities.

> Action research and publishing should be linked to the task specifications of librarians. We should assess what we are doing, how we can learn from our mistakes and what changes have taken place (Fourie, 2004).

The issue of Action research as a method, its suitability for LIS, as well as the practice of reflection for teaching librarians are discussed in the next section .

3.6. The "Google generation", information literacy and the research process

If librarians want their teaching activity to be recognised as effective and valuable, they have to start any plan from the learning needs of their students. A deep knowledge and understanding of learners is crucial in educational activities aimed to produce positive changes. Teaching librarians must tune into students' culture, interests and experiences, and adapt programs and methods to their changing needs and skills. Students enrolled in 2004 in fact, are considerably different from students enrolled just five years before.

In the last few years, a huge amount of research on the generation of students born in the Eighties has been produced. The Generation Y (Litten and Lindsay, 2001) or Net Generation (Lorenzen, 2002) or "Google Generation", is sketched as a community of people susceptible to what can be defined a "post-modern conditions" (Harley, Dreger et al., 2001; Wallis, 2001). Consumerism, knowledge fragmentation and a disposition to superficiality are the main characteristics of those students, who usually favour short term convenience and often seem reluctant to lecture, memorisation, "busy work".

They are in general IT literate and usually master basic information technology skills, commonly use electronic mail and chat to communicate and are heavy users of the Web as information source (Censis, 2004). Net generation, says Dupuis (1998) don't see technology at all. They are so used to technology that this has become completely transparent to them.

Students born in the Eighties are convinced that the Web is the most valuable, complete and updated source of information (Wallis, 2003), generally use it as the first and often unique research tool, whichever is their information problem (Harley, 2001) and show a clear preference for "simple and neat" search engines as Google (Lorenzen, 2001).

Reading instruction and checking "search tips" are not considered by students useful activities, so they usually carry out very simple and primitive searches, sticking one or two words in a search engine (Roth, 1999; Tolar Burton and Chadwick, 2000; Calvert ,2001). When search results are listed, they limit the browsing to the first ten or twelve web sites.

However, students are confident in the capability of search engines to find the "right" answer to their questions and when they don't find the information they were looking for, they think that "there isn't anything" and rarely try another kind of search or another information source (Ray and Day, 1998; Brown, Murphy et al., 2003).

Students of the "Google generation" usually perceive themselves to be very proficient in locating information online and don't ask librarians for help during their search (D'Esposito and Gardner, 1999; Conteh-Morgan, 2002).

At the same time, they appear feeling anxiety and lack of self-confidence when required to do assignments needing information seeking skills. The most critical steps in their enquiry process are the "initiation" and the "formulation" (Kuhlthau, 1993; Leckie, 1996). They find it difficult to recognise and express their need for information and to define the focus of their research process.

The library is generally considered as a place where to stay and study and where books can be borrowed. Library tours and short instruction sessions seem to be appreciated, but they don't have a real impact on the way students approach information problems. Most of students' information and learning needs remain unexpressed and can be perceived and interpreted only putting attention to those signs of anxiety, uncertainty, impatience that they show, when involved in research activities, without asking for help (Whitmore, 1998; Hager and Sleet, 2003; Gatten, 2004).

3.7. Paradigms, models and practice of IL in the 21. Century

Information literacy programs and activities mirror different approaches rooted in current educational paradigms. In educational context it is not correct to draw generalisations, classifying teaching practice, because of the substantial contribution of individual teachers and learners to each single educational experience. However, I will adopt here a convenience scheme to identify main perspectives and practice of information literacy in academic contexts, grouping them in three main categories: behaviourist approach, constructivist approach and phenomenographic/relational approach.

3.7.1. Behaviourist 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 in terms of process.

On a behaviourist approach are founded the ACRL standards (2000) as well as many learning programs. Such approach is being 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 complaint 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 information skills have been mastered once each unit of information literacy learning programs has been completed.

This type of learning activities not only encourages learners to adopt a "surface learning" approach with short term focus, but also does not help students reflect on what they are learning (Harley, Dreger et al., 2001).

Eisenberg and Berkowitz's Big Six Skills (1990) is an example of a well known and widespread model of Information Problem Solving founded on a behaviourist approach. It proposes a series of following "steps" that students need to negotiate when an information problem is to be solved.

1. defining task,
2. creating information seeking strategies,
3. locating and accessing information,
4. using information,
5. synthesising information
6. evaluating information.

In this model, information literacy can be described as a systematic and linear information seeking behaviour. The main critique to the Big Six Skills is just that it presents the research process as a linear path instead of a circular, iterative one, thus proposing a simplified model of research (Webber and Johnston, 2000).
Following the behavioural model, students could perceive the research process not as a complex and challenging task, but as a "step-by step" activity, requiring nothing more than an orderly and disciplined series of actions. The anxiety and uncertainty affecting everybody in the first phases of each research process, could be experienced by students as inexplicable events in an easy and linear intellectual process, being interpreted either as the result of a lack of ability to do the task or a lack of available resources.

A high 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, skill-based online instructions and tutorials, virtual library tours and the widespread "50 minutes one-shot sessions" are nowadays showing their limits among information professionals involved in teaching activities (Sheridan, 1990; Boff and Johnson, 2002; Brown, Murphy et al., 2003). The instructions on how to identify and search information resources have only a temporary positive effect on learners, and do not 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 both because of the changing nature of technology contents and because it does not provide the intellectual tools on which lifelong learning is founded

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

3.7.2. Constructivist approach

The constructivist approach is rooted in the educational theories of Jerome Bruner and George Kelly.

Learning is viewed as a process of construction, in which each student is actively involved for building a new understanding on the basis of what is just known. 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.

Bruner's work emphasises 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 upon the constructs built from individual's past experience. Each individual, gathering and interpreting information, creates something new and unique that Bruner calls a "product of mind". The process of construction, however, is not ordered and systematic, but confusing and uncertain, producing anxiety and conflicts.

Also in Kelly's 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. Individuals have to reflect critically on their hypotheses, assess their constructs, and re-construct them in order to better "match the world".

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 "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 (Kuhlthau,1993).

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

The Kuhlthau model is a six-stage process which has the important qualities of emphasising the recursive nature of the research process and of paying particular attention to the emotional aspect of learning

1. Introduction: this is the moment when a problem is first introduced. In this phase, students seem puzzled by the task and feel uncertainty as to how they need to proceed.
2. Selection: in this phase students must identify a general area for investigation and generally perceive a sense of optimism.
3. Exploration: this phase requires varied and complex tasks and is the most difficult of the entire process. Students need to read and reflect in order to form a personal focus for their work.
4. Formulation: in this phase the central cognitive task of the process is accomplished. Students must form a sense of meaning and construct a personal perspectives of what they are doing. They are asked to think critically, reflect, interpret, connect.
5. Collection: during this phase, students gather information and, while doing this, further shape and clarify their focus. Connections and extensions are made.
6. Presentation: students are asked to describe the focused perspective and to prepare and present their new learning.

The feelings of anxiety and uncertainty occurring at the initial stage of the research process, represent the "zone of intervention" (Vygotsky, 2000) in which the instructor can provide guidance and assistance to learners.

As a "coach", the librarian can help students in constructing their own understanding, through the design and implementation of learning situations. To do this, particular strategies are required: 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. In fact, what Bruner (1982) calls "products of mind" 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.

In Kuhlthau's vision, librarians play a crucial educational role, as they create environments that foster deep learning. They guide students to critically evaluate their work, encouraging reflective approaches to learning and help them understand the "holistic" experience of the information search process .

A number of learning programs are founded 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 (Lorenzen, 2001). Students are just in the process of becoming independent learners and when they identify what they need to know, the sources they will use, and the way they apply what they have learned, they take important steps towards mastering information competence (Cooperstein and Kocevar-Weidinger, 2004).

3.7.3. Relational approach

In "The Seven faces of information literacy" (1997) Bruce proposes a relational approach to Information Literacy.

She offers 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).

We could define the phenomenographic approach as a complex, "ecosystemic" and holistic way to understand the world (Morin, 1993; Mayer, 2003). In fact, a "phenomenon" is the combination of different ways in which an aspect of the world is conceived or experienced by people. "Experience" is described as the relation between each individual and each external "object" with which he or she interacts. 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, 1997; 1999; 2002):

1. information technology conception: IL is seen as using IT for information retrieval and communication
2. information sources conception: IL is seen as finding information located in information sources
3. information process conception: IL is seen as executing a process
4. information control conception: IL is seen as controlling, mastering information
5. knowledge construction conception: IL is seen as building a personal "knowledge base"
6. knowledge extension conception: IL is seen as a way to gain a new insight through the acquisition of new knowledge and the construction of a personal perspective
7. wisdom conception: IL is seen as an ethical wisdom: using information for the benefit of other people and communities.

Bruce's experiential model of information literacy interprets learning as a process which brings individuals to understand the world differently, rather than a way to retain information about the object of study. The relational approach in fact, aims to support

students in recognising how they are experiencing information literacy and to present them with new ways of seeing it. 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 represents 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 teaching methods which encourage reflection and involve participants in reviewing their learning, 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. In these plans teaching strategies always include a period in which students experiment and experience, and the assessment phase is one important part of the learning process (Limberg, 1999).

The SCONUL model of Seven Pillar developed in United Kingdom is founded on a relational approach to information literacy and 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). As a method, action research seems particularly suitable for a relational approach, since it is grounded in the principles of reflection, sharing of different point of views, purposeful change and continual development.

3.8. Conclusions

The literature review helped me to interpret what I was observing in my context, at the University of Parma, in the light of both educational theory and other experiences of librarians involved in teaching activity. I found particularly interesting and close to my values the relational approach to Information Literacy as well as the idea of reflective practice as an educational strategy. In general the review of the literature brought me to the belief that a different approach to teaching was required and that action research could be the right way to put together action-oriented enquiry and reflection.

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Section 4. Approach and Methods

4.1 Action research

4.1.1. Action research. Enquiry and practice

> Action research integrates teaching and teachers' development, curriculum development and evaluation, research and philosophical reflection into a unified conception of a reflective educational practice (Elliot, 1991)

Educational action research proposes an enquiry-based approach to innovation in teaching, which puts the researcher in a dual role of both producer of educational theory and user of that theory. No separation is made between the design and delivery of teaching and the process of researching these activities.

> Action research is an approach to improving education through change, by encouraging teachers to be aware of their own practice, to be critical of that practice, and to be prepared to change it (McNiff, 1988).

Action research therefore embraces change, and, while other research methods seek to study and understand existing organisational structures and situations, action research puts *action* at its core and seeks to create change and study the results. It is an interventionist approach, whose goal is the improvement in three areas: the improvement of a practice, the improvement of understanding of the practice and the improvement of the situation in which the practice takes place (Carr and Kemmis, 1986).

4.1.2. Action research as critical emancipatory research

Action research draws on the work of philosophers of the Frankfurt School in Germany, who articulated a view of "critical theory", whose central task was to emancipate people from a positivistic view of science through their own understanding and actions (Webb, 1996). The "critical social science" is a process that puts together collaboration in the process of critique and the political determination to act in order to build a fair and rational society. Habermas (1991) refuses the claim of "objectivity" as unique pathway to valid knowledge and states that knowledge and human interest are inseparable. He also refuses the idea that valid knowledge can be generated only through methodologies that are empirical and analytical in nature and that it is possible to separate the "bias" of researchers from the subject being investigated. Because knowledge is generated through the interest of the mind, knowledge and interest cannot be separated. There are three different "interests" in pursuing the generation of knowledge. Technical interest follows human desire to control the natural and social world: knowledge generated through this

interest has the form of causal explanation. Practical interest refers to "gaining understanding through interpretation": the researcher employs interpretive methodologies (as hermeneutics) as an effort to provide understanding of a given situation. This type of interest seeks to generate knowledge that guides practical judgement. Emancipatory interest has the goal of emancipating participants from the dictates or compulsions of tradition, habit, coercion or self-deception (Carr and Kemmis, 1986)

Kurt Lewin, who is often cited as the originator of action research, believed that knowledge is originated from problem solving in real-life situations and adopted action research in his work on human dynamics with people affected by post-war social problems. Carr and Kemmis (1986) created the concept of "emancipatory action research", a process of empowerment in which participants are engaged in pursuing a more democratic and fulfilling form of education. The main feature of emancipatory action research is that it aims to involve participants in all aspects of the research process,

> As an evolving approach to enquiry, action research envisages a collaborative approach to investigation, that seeks to engage "subjects" as equal and full participants in the research process (Stringer 1999)

"Participatory research", originated during the 70s following the work of Paul Freire, challenges academic research, emphasising equity, self reliance and oppression problems. In participatory research the community and the researcher together produce critical knowledge aimed at social transformation and the results of research are immediately applied to a concrete situation.

4.1.3. Educational action research

In the field of education, action research has had a great success, both as an individual route to professional development and as a collaborative route to institutional and organisational change.

Action research approach to educational research was adopted in the 70s by the "teacher-researcher" movement that aimed to bring the practising teacher into the research process as the most effective person to identify problems and to find solutions. Teachers were encouraged to become involved in their own practice and to view themselves as researchers, which should lead to professional development, improvement of educational practice and construction of an educational theory grounded on practice.

> A research tradition that encourages teachers to investigate their own practice on the job will by definition be educational, in that it attempts to make sense of the reality of immediate situations and enables enquirers to account for their own educational development (McNiff, 1988)

During the Eighties and Nineties there was a lively debate around action research, considered at risk of losing its potential if controlled by state agencies and forced to adopt more quantitative approaches, in order to become more methodologically sophisticated and technically proficient. In "Becoming critical" Carr and Kemmis (1986) challenged older models of action research as conservative and positivistic and stated that this method is valuable only if it revives

> those forms of democratic dialogue and reflective theorizing, which under the impact of positivism, have been rendered marginal.

4.1.4. Action research as reflective practice and auto-ethnography

As a method, action research is not a linear one, but rather a dialectical interplay between practice, reflection and learning, whose main feature is the cyclical, recursive nature.

Elliot (1991) states that reflective practice and action research can be considered the same thing.

> Improving practice, when viewed as the realisation of the values which define its ends into concrete forms of action, necessarily involves a continuing process of reflection on the part of practitioners. […] This process is a central characteristic of what Schon has called reflective practice and others, including myself, have termed action research

Whitehead (1989) promotes action research as a self reflective process focused on individuals

> I experience problems or concerns when some of my values are denied in my practice; I imagine ways of improving my practice and choose a course of action; I gather evidence which will enable me to make a judgement on the effectiveness of my actions; I evaluate the outcomes of my actions; I modify my concerns ideas and actions in the light of my evaluation

Reflection, according to Boud et al. (1985) is a human activity in which people purposefully "recapture" their experience, think about it and evaluate it. This is synonymous with meta-cognitive activity and higher order thinking, and therefore includes making inferences, generalizations, analogies, discriminations and evaluations as well as feeling, remembering and solving problems.

Kolb (1984) proposes a cycle of action research as a learning process: people learn and create knowledge by critically reflecting upon their own actions and experiences, while Schon (1993) states that practitioners can create their own knowledge and understanding of a situation and act upon it, thereby improving practice and advancing knowledge in the field.

Mezirow (1991) believes that individual's reflections lead to transformative learning. For this to occur, individuals must go beyond the questions of "how" and "how-to" of actions to questions of "why ", that is the reasons for and the consequences of what we do. Reflection is also the awareness of the preconceptions that we hold about people events and ourselves. Only thorough consciously questioning our beliefs we become able to re-consider our preconceptions and to transform our practice. However, it is not easy to engage in self-critical reflection, since we are

> trapped by our own meaning perspectives and we can never make interpretations of our experience free of bias (Mezirow, 1991)

A common feature of all models of action research, is the iterative approach, that embrace:

- Problem identification
- Action planning
- Implementation
- Evaluation
- Reflection

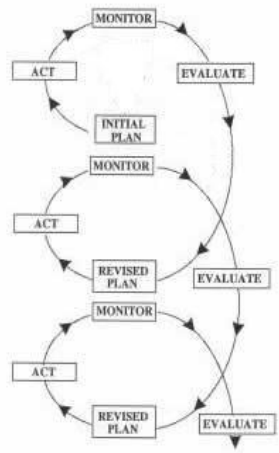

Fig.2. Action research spiral

The insight gained from the initial cycle lead to the planning of the second cycle for which the action plan is modified and the research process is repeated.

Zuber Skerrit (1996) lists a number of features of action research as a method (the CRASP model).

Action research is *critical*, because researchers not only seek ways to improve their practice, but also to improve themselves.
It is *reflective*, because both researchers and participants analyse and develop ideas about their own experience.
It is *accountable*, because they make public the findings of their research and the process of their learning.
It is *self-evaluative*, because the developmental process is grounded in analytical and reflective insights gained from experience.
It is *participative*, in that it involves participants, who contribute to the enquiry as partners.

Educational action research is sometimes subjected to a certain criticism: the stages that we define action research, according to some critics, are simply what good teachers should be doing, they are really elements of good teaching rather than research.
However, McNiff (1988) states that:

> Action research is not just teaching. It is being aware and critical of that teaching and using this self-critical awareness to be open to a process of change and improvement of practice.

While Carr and Kemmis (1986) argue that

> Action research is a *deliberate* process for emancipating practitioners from the often unseen constraints of assumptions, habit, precedent, coercion and ideology (emphasis added)

Action research has been adopted as an enquiry method in many research projects in the field of LIS, both in the form of "emancipatory action research", aiming to foster organizational change and development (Rowley, Ray et al., 2004) and in the form of educational action research in information literacy activities (Brown, Rich et al., 2003; Edwards and Bruce, 2002). In fact, action research seems particularly suitable for teaching librarians, as it allows them to experience the role of teacher, researcher and reflective practitioner all together, thus favouring reflection on the complex, "multitask" role that they are playing nowadays. Furthermore, having the opportunity to observe students in the

library, librarians are in a favourable position for assessing their own teaching activity. Librarians' research becomes an "evidence-based", reflective research, grounded in teaching practice and in everyday library work.

4.2. Research plan and enquiry methods

4.2.1. General research plan

Action research is considered a type of qualitative, inductive research, grounded in the principles of naturalistic enquiry.

Naturalistic enquiry does not permit to design a detailed plan before the research starts, as it requires researchers to explore events and actions held by participants, test emerging interpretations and modify the data collection strategy on the basis of what has been learned in the field.

> Research design must therefore be played by ear: it must unfold, cascade, roll, emerge (Lincoln and Guba, 1985).

In action research the problems themselves tend to drive the research which is seen as data-driven rather than theory driven.

However, I designed a provisional, flexible plan, which represented a general framework for my action and reflection and that was to be modified in the light of what would emerge from findings.

This study is both an enquiry on students' experience of information seeking and research process before and after an IL reflective activity and an enquiry, founded on self reflection and evaluation, on myself as a teaching librarian. For this reason, the research plan is organised around two parallel cycles of action research

One cycle is related to the enquiry about students learning and the impact on their experience of a new type of IL activity, grounded in the principle of reflective learning. **IL and students' reflective learning.**	This cycle is illustrated in Section Five Section Six Section Seven Section Eight

Table 1. Action research . Cycle 1

The other, parallel cycle, is a reflection cycle, related to the impact of action research on the researcher/teacher **Action research for a teaching librarian.**	This cycle is illustrated in Section Nine

Table 2 Action research. Cycle 2

4.2.2. Cycle 1. Information Literacy and reflective learning.

Since action research puts together practice and enquiry, I had to define both a research design and a learning activity, which not only were related as parts of a single fieldwork, but also drew their value and meaning from each other. The broad plan of this cycle, following Rowley (2004) is:

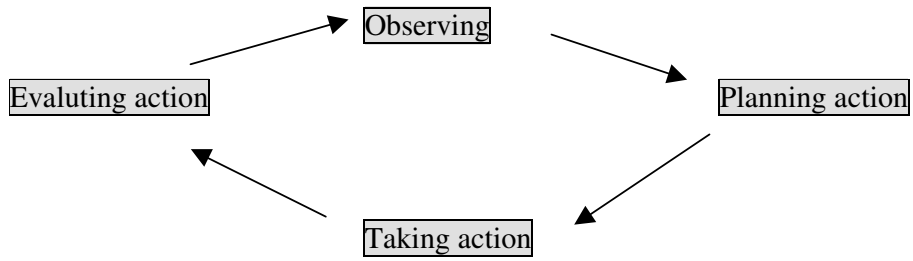

Fig. 3. Cycle one

This cycle of action research is divided into four phases.

Phase 1: OBSERVE	• To analyse the attitudes of a group of students towards information seeking and the research process • To understand their learning needs.
Phase 2: PLAN	• To design and plan an educational IL activity
Phase 3: ACT	• To carry out the learning activity.
Phase 4: EVALUATE	• To evaluate the impact of the learning activity on students learning and on their perceptions and attitudes.

Table 3. Phases of cycle one

4.2.2.1. Phase one. Observe

The main goal of the first phase is to investigate students' learning needs, existing competencies and attitudes, in order to design an Information Literacy educational activity tailored on learners. In this phase I adopt focus groups as investigating techniques, in order to acquire a broad understanding of my context and to define a teaching plan accordingly. Focus groups have also the objective of introducing the researcher to the students and to present the following learning activity, fostering students' involvement.

4.2.2.2. Phase two. Plan

In the phase of planning I combine

- the findings from observation and focus groups
- the outcomes of previous teaching activities with related reflection
- the teaching approach and methods drawn from the literature review.

The educational activity plan in fact starts from the provisional diagnosis and interpretation of previous unsatisfactory learning outcomes, compare the current practice with educational theory and professional LIS literature and identifies possible changes and improvements to be experimented in relation with students' needs.

4.2.2.3. Phase three. Act

The phase of acting includes the actual learning activity offered to students. Observation and document analysis are adopted as enquiry methods. Students are required to produce both written tasks and oral presentations. These, together with their behaviour and attitude towards the activity, provide the data to be analysed and compared with the findings from the phase 1 and the following evaluation phase

4.2.2.4. Phase four. Evaluate

The final phase of this cycle consists of

- the analysis of students tasks (both group and individual)
- structured observation of students
- in-depth interviews of all students participating in the learning activity.

The interviews will investigate both the opinions of students with regard to the learning activity and their perception of their own improvement in competence. In this phase also the opinions of critical friends are collected, in order to validate my own evaluation on students' learning and to acquire a feedback on my teaching.

4.2.3. Cycle 2. Action research for a teaching librarian. Phase five. Reflect

The second cycle of action research, which develops in parallel with the first one, is related to the reflection on the action research method, to my experience of this method and its impact on myself as teaching librarian. It also represents the reflective stage of this action research experience. I aimed not only at improving one particular learning activity at the University of Parma, but also at experiencing and evaluating a new approach to teaching, that could value librarians' practice, treasuring the knowledge originated by experience (Herr and Anderson, 2005).

As a way of thinking and working, critical reflection accepts uncertainty and acknowledges dilemmas, critiques current conclusions and generates new hypotheses. A reflective teacher puts herself in a "stance and dance" attitude, the stance being the attitude of enquiry, of constant learning and openness to further investigation, the dance being the experimentation and the development of current practice (Brookfield, 1995 quoted by Larrivee, 2000).

The "reflexive loop" is the model describing a circular process of selecting data, adding personal meaning, making assumptions grounded on interpretation of data, drawing conclusions and taking action. The methods adopted to start the reflexive loop are the research journal and the peer observation.

4.2.3.1. Research journal

> Action research is characterised by the use of autobiographical data (Herr and Anderson, 2005)

Keeping a research journal is a vital piece of any action research project : I started to write my journal from the beginning of this study. This was not simply a way of recording the progress of my enquiry, including successful and unsuccessful actions and reporting experiences, questions, ideas and conclusions, but mainly a way of making reflection an integral part of my enquiry and of becoming aware of the impact of both teaching and

enquiry on myself as teaching librarian. This meant also negotiating frustration, negative feelings, and insecurity. In fact, keeping the reflective journal revealed to be a painful task, as I will report later.

4.2.3.2. Peer observation

One of the features of AR is that this is a "participatory" method. Two "critical friends" are involved to observe students' participation in a detached way and to validate the assessment of learning outcomes (McNiff , 1988; Paisey and Paisey, 2003).

Their role is important also in stimulating individual reflection, since the process of analysing and evaluating is strengthened through the dialogue and confrontation with peers. Critical friends are to debrief with the researcher and collaboratively make meaning; they often push researchers to another level of understanding because they ask to make explicit what is understood at a tacit level.

My critical friends are two colleagues teaching in the seminar "From the library to the Net" and particularly involved in this experience. They shared with me the dissatisfaction for the previous learning outcomes, and appeared interested in adopting action research as a method.

4.3. Population for this study

The population for this research is a group of 25 students attending the Degree Course of environmental Sciences at the University of Parma (2 year). It is a homogeneous group; all students, apart from two, are full time students, 20 or 21 years old. They are all Italian, some from Parma (10) some from towns located in near districts (12) , only three coming from other Regions. Two of them are part-time, working students. No one is disadvantaged or disabled. In the following pages, all students are named by pseudonyms, to protect their privacy.

4.4. Reliability, validity, transferability

A common challenge to action research, according to Elliot (1991) is that it is subjective and therefore unreliable. Action research in fact, requires different criteria for reliability and validity, in comparison with more conventional research approaches. It does not

attempt to produce results that are immediately transferable to other teaching situations: the findings of an action research are not "true" in all contexts and situations .

According to McNiff (1988), action researchers do not claim for a definite answer to a question; their aim is to improve educational practice and to communicate their results and reflections, following what Stenhouse (1975) defines "systematic enquiry made public".

Three criteria for the validation of action research are :

- **self validation** which is founded on
    - intentional critical reflection
    - disciplined enquiry
    - keeping of records and documents
- **peer validation** which is founded on
    - peer observation
    - use of discussion and validation groups
- **learner validation** which is founded on
    - students' feedback on the learning activity
    - students' perception of their own learning

Herr and Anderson (2005) define five validity criteria linking them to the goals of action research: outcomes validity, process validity, democratic validity, catalytic validity, dialogic validity.

Outcomes validity is the action research equivalent to credibility for naturalistic enquiry or validity for positivist research. Outcome validity is synonymous with the "successful" outcome of the research process and is founded on "the quality of action which emerges from it and the quality of data on which the action is based": outcomes validity also acknowledges the fact that rigorous action research more than solving a problem forces the researcher to reframe the problem in a more complex way, often leading to a new set of questions or problems.

Process validity is related to the ongoing learning of the individual or system. Some criteria for process validity are borrowed from naturalistic enquiry (triangulation or the inclusion of multiple perspectives – peer observation)

Democratic validity refers to the extent in which research is done in collaboration with all parties and it is the constructs or products of the research that are relevant to the participating group.

Catalytic validity is the degree to which the research process reorients, focuses and energises participants toward knowing reality in order to transform it. According to Anderson and Herr the most powerful action research studies are those in which the researcher recount a "spiralling" change in their own and in their participants understanding.

Dialogic validity is related to peer review and peer validation. While some authors (Carr and Kemmis, 1986) state that action research should only be collaborative enquiry, others simply suggest that action researchers work with one or more critical friends who is familiar with the setting and look for alternative explanations of research data.

As regards transferability, this is a small-scale project, specific to one group at one University, with no attempt to generalise its findings. However, action research can provides an insight into the complexities of a particular situations and the recognition of different ways in which events and situations can be interpreted and understood. In this sense it can be considered transferable to other situations (Bergendhal, 2003).

4.5. Ethics

Ethical concerns in action research are related to

- Informed consent
- Right to privacy
- Protection to harm

In this study, I put particular attention to the ethical aspects of the enquiry, also because of the multiple role I have been playing as "insider" researcher and teacher.

Students' participation has been negotiated just from the starting of the study: firstly the course committee has been informed and asked permission to develop the action research project. The Ecology teacher has been involved in the designing of the activity, as to ensure that the seminar would be respondent to the Degree course learning objectives, finally students themselves have been required to participate individually.

They have been ensured that their decision about the participation in the research would not have affected the assessment of their learning and that both positive and negative opinions would be appreciated and valued. However, as I will discuss in the reflective section, the relationship between teacher and learner is hardly perceived as a non-hierarchical one and therefore the attitude of students, when interviewed by a teacher, is to be considered at least in part affected by this type of interpersonal dynamic.

The identity of participating students and critical friends is protected through the adoption of pseudonyms.

I also tried to take in account my multiple role of librarian participating in the IL official learning activity at the University of Parma and of action researcher, seeking to change and improve the activity itself.

The Head of the Library System has been submitted the research proposal of this project and has been kept informed of the research development. The findings form this enquiry will be put at disposal of all stakeholders both at the Environmental Sciences Department and at the University Library System (teachers, students, librarians).

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Section 5. Information literacy and reflective learning

The action research spiral - Observe

5.1. Starting from students' experience. A phenomenographic approach

5.2. Focus groups

5.2.1. Goals

5.2.2. Characteristics of focus groups, suitability for this research and limits

5.2.3. Recruitment of students

5.2.4. Design and organisation

5.2.5. The meetings

5.2.6. Analysis

5.3. Emerging findings

5.3.1. Studying and learning at the University

5.3.2. The problem of time

5.3.3. Seeking meaning

5.3.4. Information seeking and research process. University context

5.3.5. Information seeking in daily live

5.3.6. Facing failure

5.3.7. The invisible library

5.3.8. Expectations towards the Seminar

5.4. Preliminary analysis and interpretation

5.5. References

This chapter describes the first step of the action research spiral: OBSERVE.

This stage has two main goals:

- To analyse students' opinions and attitudes before the educational activity.
- To collect students' expectations and learning needs in order to design a tailored educational activity.

I aimed to understand how students' were experiencing information seeking and the research process in relation not only to their knowledge and skills, but also to their attitudes and feelings. Focus groups were adopted as the most suitable technique for this stage of the enquiry.

5.1. Starting from students' experience. A phenomenographic approach

> Teaching is essentially a rhetorical activity, seeking to persuade students to change the way they experience the world (Laurillard, 1993).

In the first stage of the action research spiral I aimed to understand students' ways of thinking and their experience of the information seeking and research process. This was crucial if the IL activity was to produce positive changes in students' learning. In fact, as Ramsden (1992) states, we can improve our teaching only by studying our students' learning, and by understanding their experience of the subject we teach. According to this perspective, teaching and learning are constantly interchanging activities, and

> One learns by teaching: one cannot teach except by constantly learning (Ramsden, 1992)

Phenomenography is a valid approach for investigating students' experience of information seeking and research process, and to discover changes occurring to this experience after a learning activity.

Phenomenography is both a set of assumptions and a methodology widely adopted in higher education. It is founded on Ferenc Marton's research work and its object is to explore different ways of experiencing or understanding the world. "Conception" and "way of experiencing" are the way people are aware of something: they are not mental representation or cognitive structures, they are a way of experiencing, that is

> relations between people and the world, reflecting one as much as the other (Marton, 1994)

It is possible to identify various ways of how people experience or understand phenomena and to group them in a limited number of categories. Marton also distinguishes between the *content* of a phenomenon, that is *what* people experience and the *structure* of the same phenomenon, that is *how* people think and feel about it.

The phenomenographic approach has been used in LIS research, both with regard to users' information seeking behaviour and in educational information literacy context.

Just from 1993, Kuhlthau defined information literacy "a way of learning", while Bruce (1997) investigated the ways of experiencing information literacy identifying seven different "Faces of IL" (see page 49). Limberg (1999) examined the relationship between information seeking and learning outcomes adopting a phenomenographic approach to study variations in user's ways of experiencing the contents of information. McDowell (2002) adopted the same approach in order to draw a map of ways in which lecturers describe and conceptualise electronic information resources in relation to learning and teaching activity. Linder and Marshall (2003) explored the existing links between the phenomenographic research approach and the Schon's idea of "reflection in action", defining reflective learning from the perspective of phenomenography. According to them, if learning is about developing a more complex understanding and experience of a phenomenon, introducing variation is a necessary, but not sufficient condition.

> What is also needed is reflection on, or mindfulness of, this variation, in order to develop explicit, contextual appreciation.

Schon's work and phenomenography both see the learner and the object of learning as a whole: Marton and Booth (1997) define "a way of experiencing" an internal relationship between a person and the world

> A characterization that avoids separating the learner from what needs to be learned

In the same way, Schon (1983) joins the learner with what needs to be learned through "reflection in action" .

Even if in this study I did not identify and group categories of different ways of understanding the phenomenon of research process, I was very much influenced by the phenomenographic approach to educational research and by the relational idea of students' approach to learning.

5.2. Focus groups

5.2.1. Goals

Focus groups represent the first, exploratory step of this action research spiral. The "observing" phase is crucial both for the "enquiry" and the "practice" side of action research.

In fact, this "observing" phase aims to

- investigate students' "way of experiencing" information seeking and the research process, which is to be compared with their perceptions and understanding at the end of the learning activity, thus identifying occurring variations;
- analyse students' knowledge, skills and attitudes in order to design a seminar tailored on students' needs.

Focus groups are adopted as the most suitable technique to attain the following objectives:

- To gather information on students experience of information seeking and the research process.
- To identify students' learning needs and their expectations towards the following activity.
- To observe group dynamics and identify strengths and weaknesses of this particular group of students.
- To establish positive relationship with students
- To explain the action research goals and involve students as active participants, according to the principles of this method.

5.2.2. Characteristics of focus group, suitability for this research and limits

Focus groups are often adopted for the exploratory phase of a research project, in order to gain a first understanding of the context.

This is considered a good technique when a variety of perspectives and explanations need to be gathered in a limited amount of time and it is particularly suitable for homogeneous groups of participants, sharing the same experiences and problems (Moore, 2000)

The synergy of groups, especially if these are homogeneous, can facilitate the expression of criticism and the exploration of possible solutions to problems, which has a big value when the research aim is to improve a service, as it is the case in action research. In fact, active participation is encouraged by group interaction, since people often need to listen to others' opinions and feelings in order to express their own (Morgan, 1997). Students in particular are more confident and disposable to express their opinion to a teacher/researcher in a group situation.

The most important limitation of this method is that it requires particular skills in conducting the meetings. In fact, the researcher must encourage interaction and ensure that everybody participates in the discussion. Furthermore, it is important that participants feel free to express their opinions without feeling intimidated by dominating personality. Therefore, good skills in interpersonal communication, self confidence, self-control and calm are required to put participants at their ease, so that they can express their views in a spontaneous manner (Patton, 1990).

5.2.3. Recruitment of students

The IL seminar was planned for the first week of October, and the observing stage was to be started the first week of September, in order to have time enough for designing and planning the learning activity according to what would emerge from focus groups.
(Appendix 2. Action research plan. Timetable).

The recruitment of students revealed to be particularly difficult, because of the holiday period. A first e-mail, containing the invitation letter as attachment was sent to students on July, the 23rd (Appendix 3. Invitation letter).

Since after a week only three students had answered, the invitation letter was sent again by surface mail and, the last week of August, all students were contacted by phone.

The invitation letter aimed at arousing students' interest in the problem of information seeking and therefore in the following IL learning activity. I also explained that, while the participation in the seminar was compulsory, since it was part of the official curriculum, the participation in the research and therefore in focus groups, was voluntary and everyone was allowed to decline my invitation .

The first week of September all students called me by phone or e-mailed me and accepted to participate in the focus groups. It was therefore possible to plan four meetings that were to take place on 7-9-14-16 September. Two students, who were not available in these dates, accepted to be individually interviewed on 10 September.

Talking to students and arranging the meeting dates I perceived that they were disoriented and a bit suspicious about the focus group; they did not understand exactly *why* I was asking them to talk and discuss about a subject *before* it was taught by me.
This isn't a sort of exam, is it? Asked a worried student

5.2.4. Design and organisation

I was aware of the fact that this first phase of my work was crucial, both for the research and for the success of the learning activity. I therefore put the greatest possible care in organising the meetings, also taking in account my limited experience in conducting group discussions and the anxiety that probably would have affected my action.

I had previously planned to ask one of my "critical friends" to support me during the focus groups, observing students behaviour and taking notes of non verbal signs of uncertainty, anxiety or boredom. This is recommended in literature (Moore, 2000), especially if the researcher is not a very expert one. However, I considered that students were just disoriented and uncertain about what they were expected to do during the meetings. The presence of two persons, one of them completely unexpected and unknown, would have intimidated students, who were likely to be restrained in their disposition to share thoughts and feelings. I therefore decided to conduct the focus groups without any help.

I also chose to organise meetings in a very open and flexible way. I defined a questioning route, but I also decided to let students talk, even about issues that were not strictly linked with pre-defined topics. In fact, I was trying to capture their experience; this exploratory phase did not permit me to know in advance which were, in students' perception, the most important issues, in relation to the information seeking and research process. Furthermore, I needed to understand their experience of learning, to discover which approaches they preferred and which were, in their opinion, the major hindrances to their learning.

I divided my students into four groups of 5 people each, according to their availability in the dates planned for the meetings. Two students were interviewed individually, while two other students (full-time working students) were not available before the starting of the Seminar and it was not possible to interview them.

The meetings took place in a room near the Environmental Sciences library, which offers an adequate setting for group discussions, since it is furnished with a big oval table surrounded by a dozen of chairs. This room was chosen just because it is perceived by students as a "meeting" place, not as a classroom or a space devoted to examination. I booked the room in advance and checked the availability of electrical outlet needed for tape recording. The focus groups were planned to last about one hour and a half.

Two days before each meeting I sent students an e-mail containing general information about the meetings (Appendix 4. Reminder e-mail). I also defined the open ended questions that were to start the discussion, and checked the recording equipment.

5.2.5. The meetings

Each meeting started with a brief presentation of myself and of students, then I briefly explained the reasons for the enquiry and the importance of the research exploratory phase.

In particular, I presented myself as a teacher who was trying to improve her activity through a deeper understanding of students learning needs, and also as a Master student, involved in a piece of research. In fact, it was important that students perceived my interest towards them and towards their learning, not only as something related to my enquiry, but mainly as a responsibility that I felt as their teacher.

I tried to clearly explain the aims and objectives of my enquiry and presented action research as a method seeking to involve students in an active and participative way, valuing their opinions and feelings.

I listed the reasons why it seemed necessary to change and develop the Seminar "From the library to the Net", and underlined that students' co-operation in this research was likely to offer valuable suggestions to design a more effective learning activity.

Then I asked the permission to record the session, ensured anonymity and offered students to inform them about research findings. I also underlined that the participation in focus groups was absolutely voluntary and was not going to have any impact on student assessment.

I tried to adopt an invitational style and more than once I reminded students that there were not right and wrong answers to my questions: I was interested in knowing their opinions and expectations in order to find a better way to help them learn.

Since I had to balance the openness of questions with the need to focus on the research topic, I defined a limited number of questions, scaled from the more general to the more specific, leaving space for unexpected issues to emerge and to be discussed if they appeared to be pertinent and meaningful.

The first question was related to students' way of experiencing learning at a University level. This was an introductory question, aiming to involve students and facilitate their participation. It also had the objective of identifying most relevant issues in relation to students' learning.

> *You are starting your second year at University. How are you experiencing your studying and learning?*

The main topic, related to students' experience of information seeking and research process was divided into two questions:

> *Can you tell me how do you proceed when you are asked to carry out a piece of research related to your study?*
>
> *And what do you usually do when you need to find some information for you daily life? Give me some examples….*

I also aimed to understand students' perception of the role of the library in their study and so I asked

> *How do you use the library, both here at the University and your local library?*

Students' expectations towards the following learning activity were the object of the final question

> *What do you expect from the learning activity that is starting on 4 October?*

I finally asked for some more information without defining a particular topic

> *Is there anything else you believe it is important and that I omitted to ask you?*

While at the beginning of the meetings students seemed a bit ashamed and disoriented, they showed their interest during my brief presentation and gradually became more relaxed and spontaneous while the discussion went on.

In the first group, I had to face a problem related to the dominating personality of one student, perceived by others as a leader. I therefore had to make an effort to allow all students express their opinion, while in the second group all students appeared quite shy and not inclined to share their thoughts. The third group was a very balanced one and the discussion went on in a fluent and pleasant way, without any particular problem. The fourth group required to be more strictly conducted. Students were lively and enthusiastic,

they seemed to have lots of things to tell and more than once I had to limit their exuberance.

I also interviewed two students individually, asking them the same questions. Interview did not appear a suitable method for the starting of the enquiry: students tended to provide very short answers, even to open-ended and general questions, and seemed much more uncomfortable and uncertain than students interviewed in a group situation. However, I considered important to have collected also their views, even if in a more difficult way.

5.2.6. Analysis

The tapes recorded during focus groups were immediately transcribed and analysed. I reported the questions and wrote a brief summary for each answer and for the following discussions. Then I grouped similar issues and defined topics and categories. I also put attention to the words used by students and reported exactly some phrases that seemed to me particularly meaningful for my enquiry. However, this analysis was only provisional, since I had the intention to compare my findings with what was going to emerge from the learning activity and from individual in-depth interviews.

5.3. Emerging findings

In this chapter I report what emerged from focus groups both as answers to pre-defined questions and as spontaneous and unforeseen statements of students, who often emphasised some topics and added new elements to the discussion route. I present findings grouping them in themes and quoting students statements when this can enlighten their perceptions and feelings. Pseudonyms are used to identify students.

5.3.1. Studying and learning at the University

Most students started expressing their appreciation and positive feelings for studying at University and stated that they were satisfied with their choice to enrol at Environmental Sciences.

As a positive aspect most students listed the autonomy and responsibility of studying at the University in relation to secondary school, where time and pace of study were determined by teachers.

Mario: I like to be at University. I needed it. At the secondary school I felt constrained. We didn't have control on our study, teachers were the ones who decided for us.

Many students expressed similar opinions, valuing as a positive feature of studying at University the greater autonomy, but also emphasised the need to take responsibility for their own learning. Responsibility was considered the other side of autonomy.

Caterina: Being autonomous means taking responsibility, you have to impose to yourself a discipline, to fix time and deadlines; if you want to pass your exams you have to work hard and to organise yourself. And this also means that if you fail you cannot ascribe that to everybody else but you…

Being organised and methodical was considered by most students one of the winning strategy to succeed at University:

Agata: We are not forced to attend lessons and seminars. This is good. However, if you go to lessons, you are much more likely to succeed in your exams.

Rinaldo: I think that this is what you are required to do, to become organised, otherwise you cannot face all this. We have 11 exams to sit the first year. You cannot deal with that if you don't have a good method of working

None of students listed critical thinking, creativity, individual reflective activity as qualities needed to succeed at University.

All students, without any exception, complained about the excessive amount of exams to sit and written tasks to complete each year. Together with the number of exams, they were not satisfied with the excessive amount of lesson hours. They seemed feeling overwhelmed and stressed by excessive workloads, which is consistent with what their teachers stated (see page 23).

Many students expressed the need for more time to employ in individual study.

Federico: We usually attend lessons from nine to half past four each day. I have a train to catch and I arrive at home at half past six. When should I find the time for studying?

Yasmine: I usually study during week ends, and during exam sessions. We have only two weeks without lessons each term. I need more time to study by myself. I always feel pressed and hurried.

Between students' initial statement (University allows students to enjoy a high level of autonomy) and the complaints about the excessive amount of lesson and exams there is a

visible contradiction. Probably students started describing an ideal University, as it was in their wishing, then, from their words, the real situation emerged, together with the expression of disappointment and frustration.

5.3.2. The problem of time

The problem of time is the most important of unexpected themes emerged from group discussions. No questions were planned about this topic, but it appeared as a relevant and urgent issue and stimulated a lively debate in all groups. The relationship between studying, learning and time appeared the main source of trouble for students, experienced as a frustrating, unsolvable problem.

The lack of time for individual study was caused, according to students, by the excessive number of lesson hours to attend each day and of exams to sit each year. The reason is to be found in the University reform which transformed the five years degree course in Environmental sciences, into a three years course. Since the curriculum has to cover the same subjects as the previous five years curriculum (as they appear necessary to prepare students for their profession) all learning contents were compressed to fit in a shorter study period. Teachers try to support and facilitate students' learning offering a great number of lessons and seminars, but this leads to a lack of time for individual study.

The problem of time is perceived by students as a negative aspect of their learning experience for three main reasons:

1- The pressure caused by lack of time makes it difficult to deeply understand and master learning contents.

Fedro: [….] you arrive at the winter session with four exams to sit. You study hard one subject, sit the exam and then you pass to something else. Everything is overlapping and, at the end, you cannot remember anything.

Fabrizio: It is not teachers' responsibility. They are doing all the possible to make things work better. […] Actually, we study everything in a hurried way. I don't know if I have really understood and learned some subjects, I am likely to forget everything..

2- The second face of the lack of time is that this hinders the opportunity to deepen some topics that students find interesting. This is perceived by students as a source of frustration.

Caterina: While presenting a topic, sometimes a teacher says: "You see, this is a very interesting topic, I wish we had time to deepen this" […] Teachers usually postpone the discussion, there is no time, perhaps at the end of the term. I hate it, we are not working at an assembly line…..

Silvio: This is what I feel really disappointed about. When I enrolled at the University, I believed we were going to have at our disposal the knowledge…..I mean the opportunity and also the time to access it. I didn't expect that we were going to deal only with lessons, exams, deadlines, this is a "exam-machine" that is crushing us.

3- Students also expressed their regret for losing the opportunity of *enjoyment* in studying

Diana: We are so pressed that we cannot "enjoy" the subjects. I love chemistry, I studied it, but there was no time enough to deepen what I was interested in. The teacher was helpful and even suggested some further readings. I had three exams to sit, I had to define my priorities and I did not read those papers. Actually, this was not a choice of mine, I was not given the opportunity to study what I was interested in.

The same feeling of regret and disappointment was expressed by different students, who adopted meaningful terms to define the sense of being deprived of a study that should be, also, a pleasure (*delight, enjoyment, some pleasant topics).*

5.3.3. Seeking meaning

Students were also puzzled by different assessment methods and expressed their difficulty in understanding the level of learning they were required to reach.

Federico: I failed two exams. The problem is that I was not able to understand what I was expected to do. It is not always easy to guess what the teacher wants you to learn.

The lack of clear goals appeared a problem for students, who related it to a sense of general disorientation. Some of them expressed their need to understand "why" some topics had to be learned, to discover the "meaning" of their learning.

Paolo: I cannot find where is the meaning of all this. Okay, we are learning all that stuff, what is its meaning, why there is a need to know this ?

5.3.4 Information seeking and research process. University context.

Lack of time and curriculum constraints seem just the main reasons why students are not often required to carry out a piece of research in a study context. During their first year at University only in one occasion students were required to access and use information resources in addition to textbooks and notes taken during the lessons.

This opportunity (the Ecology laboratory activity) was evaluated by students in different ways

Flavia: We had to find some information about a polluted site and to make an analysis of environmental problems as well as economic activities and human impact on this site. This was exciting. We found lots of information, then we had to collect everything and write a paper.

Yasmine: The problem was that we found lots of stuff. It was not easy to make a synthesis. As usual, some people worked a lot, while others didn't do anything at all.

The group work seemed to be perceived as a difficult experience

Caio: Is was such a mess. Everyone did a piece of the work and then I had to put everything together. I didn't like the final product. It had no sense. It was basically a cut-and-paste paper.

Viviana: We weren't able to organise our work and we postponed everything until the last minute….as usual. Then we did a bad work. I felt ashamed, I want to forget it.

When asked to list the search tools they had adopted for these activities, most students named Google as the unique source of information, in addition to documents provided by the teacher.

We searched Google. It is the most rich. If you need some images, you always find something….

It is also easy to use; I enter a word and go….

Some students also cited Italian portals like Virgilio, Arianna and SuperEva and a debate arouse about the different performances of most common search engines.

Google is the most effective and it's quick to use .
You can always find something, I always use it

However, some students appeared critical towards this search engine.

Mario: I don't believe it's so good. I mean it is not "always" good, when you need something for the University, for the study, as an example….

When I asked "how" they used Google and other search engines, students appeared quite puzzled, as if I were asking a superfluous question: everybody is able to use Google.

Well, there is not so much to do, you stick one word and then click on "Search"
This is not difficult at all, you must write your word and then click and go….

Nobody named the advanced search nor field limitation.

Among information resources, two students listed the Encyclopaedia Encarta on CD Rom and three students printed encyclopaedia and books, but only referring to their own books at home, without indicating the library as the obvious place where printed documents can be found.

Moreover, students appeared convinced that teachers are in charge of providing students with information sources as well as learning materials. In their experience, doing research means to synthesise and produce something new, starting from documents selected and provided by teachers.

Agata: The teacher gave us some photocopies; we had to read, elaborate and present them to the class.

Diana: The professor told us which chapters [of one book] were to be read. He also lent us another book, and we made some photocopies. Then we prepared our report

Students did not appear used to choose and directly access information sources, they apparently had only a mediated access to knowledge. However, students seemed perceiving this as something obvious: teachers have to provide the learning material. Students' task is not searching, it is studying what teachers have previously selected for them.

5.3.5. Information seeking in daily live

Also talking about their daily live, students demonstrated that search engines are the favourite tool for seeking information. I asked them to make some examples of their recent searches.

Giacinto: Well, just a few minutes ago I searched Google for a rock concert. I wrote the name of the group and then I found their official site. Here there are dates and places of concerts…..

Fabrizio: There is really everything, you can find the trains, films, concerts, sport news... you know, a friend of mine buys and sells things on the Internet.

I also tried to understand if students really found it easy to use effectively the Web as an information source and their answers appeared less uncritical than I expected.

Caio: It is simple if you know exactly what you are looking for.

Two students in the same group reported an example of a searching experience. The other students appeared interested and asked explications.

Mario: *I was looking for something about the Cecenia trouble. I searched Cecenia in Google. I did not find what I was interested in….*
Teacher: So, what did you do?
Mario: I had only found something about the geography, you know, information about the place. I was interested in the problem with the terrorism and the relationships with Russia. I browsed two or three pages, but I did not succeed. Then I wrote Cecenia terrorism and finally I found some Websites. However, this was not what I was looking for, I needed something different, I mean, an explanation…. I was trying to understand why all that had started….I did not find that.

The second student told a similar experience about the problem of Chernobyl

Caio: This was at the secondary school. I needed something about the Chernobyl disaster, I mean the sequence of events. I used Google, but I found only something about current initiatives of solidarity or other information about the problem of Chernobyl today. I was seeking for the history. Perhaps there was something, but I did not find it, perhaps because I usually browse only the first one or two pages……

Most students expressed the same opinion; sometimes Google does not provide the expected results. It may be helpful, but not in all cases. However, students often attributed their failure to the lack of "patience". Perhaps, if they had browsed more than one or two pages of Google results, they would have found what was needed.

Another lively discussion emerged just on this topic: what is it needed, to succeed in searching Google?

Students' answers were absolutely unexpected to me:

You need to be patient and browse much more pages of results.
You need to be luck, it is a matter of luck
The problem is that you need more time, while I usually lose my temper and give up

Nobody expressed the concepts of skills, experience, thinking, reasoning, learning and similar.

5.3.6. Facing failure

From the debate around Google, another interesting topic emerged. Students started to compare their reactions to failure when searching the Internet and to discuss possible ways to cope with this.

Caterina: When you cannot find what you are looking for, this is really disappointing. I feel angry, I cannot accept that. I know somewhere there is what I am looking for ….why is it so difficult to find it?

Paolo: I try again and again….
Teacher: What do you mean when you say that you try again and again? What do you do?
Paolo: I change the word….I try some other words…..

None named instructions, help pages or the advanced search, nor anybody stated they changed information source. "Asking somebody for help" seemed the privileged strategy.

I ask some friends of mine
My boyfriend usually helps me in searching.
I ask my mates: Where did you find that?

During an individual interview, a students told me that when she cannot find what she is searching, she asks for help a friend of hers, who is studying information technology engineering:

Teacher : And what does your "IT friend" usually do to succeed?
Flavia: Well, you know, he usually finds the right word…
Teacher: Do you think this requires IT skills?
Flavia: Actually, it doesn't, this isn't a problem of technology …probably it depends from something else …..uhm, perhaps experience?

Some students also expressed their frustration towards Internet searching

Viviana: I try and try again and if I don't manage to find what I need, I get mad and I lose my temper. Why isn't this working? Where is the problem?

Agata: I get angry and give up everything…then, after a few hours I try again, I don't accept that I can fail, so I try again…it is so frustrating….

5.3.7. The invisible library

Students' use of the library appears as a basic, very traditional one. The library is perceived as a quite place, where to study and borrow textbooks. Only three students stated to be able to use the on-line library catalogue, while the availability of electronic journals and databases appeared totally unknown.

Rinaldo: I am used to borrow textbooks. If I need to find books I ask the librarian. I don't know how to use the catalogue. I usually browse the shelves or ask the librarian

Only two students stated they were used to go to the public library, mainly for having a quite place to study. The library is not considered as a gateway to information. Students did not connect their information problems with library resources, and they did not name the librarian as a person whom they usually ask for help.

It seems that students perceive the library and on-line available information as two different, separated worlds. Library is for books to be borrowed. The Internet, with its incredible amount of information is something completely different, which has nothing to do with the library and that requires, to be effectively used: patience, luck, perhaps experience.

5.3.8. Expectations towards the Seminar

All students stated they were absolutely unaware of what was going to happen at the seminar

This seems quite a strange thing. What do you mean when you say "information resource"?

I don't know, perhaps this seminar is something similar to the IT laboratory, we are going to learn a new software, aren't we?

In all focus groups and in both interviews, I was asked questions about assessment and marks. Students were interested in knowing what they were expected to do in order to pass the exam, more than in discovering contents and activities.

Some of them seemed intrigued by the idea of being involved in focus groups and asked me why I had required them to participate in a discussion about these topics *before* they are taught during the course.

I did not expect all that, I mean to be interviewed. It seems so different from usual….

It happens sometimes that teachers ask for our opinion about their course, but this is afterwards, when the course is finished.

Two students also asked me something more about this dissertation. They were quite surprised by my interest towards them and their learning.

Are you really writing your dissertation about this seminar and about us? You must consider this something very important.

5.4. Preliminary analysis and interpretation.

The focus groups provided me with meaningful information about students' attitude towards the information seeking and research process, together with the identification of their experience of learning and the problems they were facing in studying at University.

I tried to interpret what emerged in the light of what I had found in the literature and of previous teaching experience. I drew a provisional synthesis, upon which the design of the following learning activity was to be set up.

- Students are experiencing their learning at University as a "hurdle race", where they are required to attend lessons, learn lots of contents and sit exams. They feel the lack of time as their main problem, causing anxiety, stress and frustration.
- The lack of time is the reason why students are not often required by their teachers to do research and to deepen what they are interested in. This is also a source of frustration for students, who would like to be involved in this type of activity. This is not consistent with what some teachers and librarians stated (students do not want to be engaged in research activities, they are lazy).
- Students need to understand the goals and to perceive the relevance of what they do. They want to find a "meaning" in what they are required to learn.
- From one point of view this group of students is a typical "Google generation" class (see page 43). They know only Google and use only Google. These students, born in the Eighties, started to do their first small pieces of research using the Web, rather than books. The library and its resources, both printed and digitised, are not

considered an information gateway, nor librarians are perceived as information professional, willing to help students face their information problems.

- However, there is an important difference from what is described in the literature, that is students' perception of their own inadequacy. While the "Google generation" students, as sketched in the literature, are convinced of being able to find whatever information, my students were perfectly aware of the fact that Google does not have the right answer to any question. Moreover, students apparently perceived the need to acquire a higher level of competence, even if they were not able to define which type of competence was needed to succeed in seeking information. This seems a good starting point, since the learning activity can be founded on a feeling of "conscious incompetence".
- Despite these students did not name "thinking" or "reflection" during the discussions, they appeared disposed to reasoning and to self assessment. They were keen on discussing about their learning, their problems, their expectation. They were not passive nor uninterested, they participated in the discussion, asked questions, made comparisons and tried to identify problems. They also appeared intrigued, even if unaware of what was going to happen during the seminar.

Bearing in mind what emerged from focus groups and referring to educational and LIS professional literature I designed the learning plan for the following IL activity.

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Section 6. Information literacy and reflective learning

The action research spiral – Plan

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In this chapter the second phase of the action research spiral is described: PLAN.
I built the design of the IL activity on what emerged from the observation stage, connecting my findings and my interpretation to educational literature.

6.1. The deep learning approach

The design of the IL activity was founded on the concept of "deep learning approach", which is strictly connected with the phenomenographic view of students' learning.

According to this view, learning is a process of change in the way we conceptualise the world around us, while teaching, that is the other side of learning, is an attempt to help students develop their thinking and their understanding. The concept of "approach" is related to the qualitative aspect of learning and it describes the way people experience and organise the contents of their study.

> It is about what and how they learn, rather than how much they remember
> (Ramsden, 1992)

The outcomes of a surface approach are essentially quantitative and accumulative: once the material learned in this way has been reproduced, it is rapidly forgotten. Deep approaches, on the contrary, not only lead to the acquisition of imaginative, flexible and adaptive skills, that are the main features of learning at an academic level, but also represent for students a more satisfying approach to study.

However, the approach to learning is not a learning style, related to individual attitudes, but it represents a way of experiencing a learning task. As Marton (1994) argues, approach to learning is not something one student *has*, but rather it is what a learning task *is* for a student. This is an important difference because, as Ramsden (1992) states,

> In trying to change students' approach to learning, we are not trying to change students, but to change students' experiences, perceptions or conceptions of something. [….] Each student is using deep and surface approaches in responding to different circumstances. We can see that one cannot be a deep or surface learner; one can only learn the content in a deep or surface way.

Deep and surface approaches are responses to an educational environment and to learning activities proposed to students. An important teacher's responsibility is therefore to engage students in learning experiences that are appropriate to the deployment of deep approaches.

I tried to design an activity plan which offered students a supportive environment and encouraged them to adopt a deep learning approach. The deep approach should generate high quality, well-structured, complex learning outcomes. It should favour long term learning and produce a sense of enjoyment in learning and commitment to the subject.

6.2. Conditions for a deep learning approach.

6.2.1. Intrinsic motivation

Intrinsic motivation is considered one of the most important factors stimulating deep learning. Students need to perceive a learning task as something meaningful for themselves and to feel personally involved in it (Ramsden, 1992; Laurillard, 2002). During group discussions this emerged very clearly from my students, who expressed their need to understand the "meaning" of what they were required to learn.

According to many authors (Orr, 2001; Fosmire and Macklin, 2002; Grafstein, 2002; Raquepeau and Richards, 2002; Carder, 2003) IL educational activities appear more meaningful and effective if connected to subject learning, rather than when developed as separated. Integrating IL and subject contents facilitates students' engagement in active learning (Bowden and DiBenedetto, 2001). Following Orr (2001) IL does not have a life of its own, rather it is a way of thinking and reflecting about aspects of subject matter.
IL skills therefore, cannot be developed in isolation, and learning activities should be structured in such a way that

> Enquiry is the norm, problem solving become the focus and critical thinking is part of the process (Orr, 2001)

Also Bruce (2001) states that IL cannot take place "in a vacuum" since it develops within the context of an understanding of the research concerns in particular disciplines.

I therefore chose to "embed" the contents of the learning activity into the Ecology course, which is one of the most important subjects for Environmental Sciences students. From group discussions appeared that students were enthusiastic with this subject, perceived as

the core of the degree curriculum and the most strictly related to their future profession. Moreover, students had just sat the first part of the exam and were going to start the second part of the course. Relating the IL activity with this important part of student curriculum was likely to have the following advantages:

- students just mastered a basic knowledge of the subject contents, which is crucial to put the activity in a meaningful context, fostering the application of critical thinking (Webber and Johnston, 2000);
- through the IL activity students were offered the opportunity to deepen one of their favourite subjects, which was expressed as a need during focus groups; this opportunity should stimulate their interest and favour their commitment.
- the IL activity was likely to appear functional to Ecological research and therefore "meaningful", favouring students' involvement and active participation.

The learning plan was developed in co-operation with the Ecology teacher. Contents, activities and assessment methods were defined in relation to the Ecology course. Moreover, the time and length of the seminar (one full-immersion week from 4 to 8 October, 20 hours of class activity and about 15 hours of group and individual activity) were defined together with the faculty staff, as to allow students concentrate themselves on this activity before the first term started (15 October). The IL Seminar appears therefore as an introductory activity to the second part of the Ecology course.

6.2.2. Lack of anxiety

Lack of anxiety is another important factor favouring a deep learning approach. The importance of emotional aspects of learning has been underlined by Bruner (1989), Kelly (1955) and Vygotski (2000).

Factors that can increase students' anxiety in educational contexts are

- the excessive amount of contents to be learned,
- the lack of clear goals
- uncertainty about assessment methods.

During the observing stage of this enquiry, the problem of anxiety had emerged as a crucial element in students' experience of learning. It appeared strictly related to the lack

of time and the overwhelming amount of learning contents. I felt a particular responsibility for this aspect, since, reflecting on the previous IL activity, I identified just in the excessive amount of contents one of the possible cause for students' unsatisfactory learning outcomes. The goal of providing students with a great amount of instructions about the use of all available search tools, had probably led librarians to overload students with too many contents, causing anxiety and confusion.

The importance of the emotional aspect of the instructional process is that it addresses students' motivations, their involvement in learning process, their experience of discovery and their feelings. Learning depends in part upon teachers' ability to establish a receptive attitude and an emotional response within students (Volet, 1997; Vidmar, 1998). It is therefore teacher's responsibility to take in account students' feelings since they affect in a decisive way their learning (Conteh-Morgan, 2002).

In the field of IL, Kuhlthau has put particular attention to this aspect: in her six–stages model of the research process, the stages of task initiation and pre-focus exploration are those generating anxiety and uncertainty in students, who do not know enough about their research topic to formulate a thesis and to define a focus. These phases are the "zones of intervention", following Vygotsky educational theory, where the teacher/librarian must support students in their arduous and sometimes frustrating process of research. Librarians usually tend to ignore the uncertainty affecting students during the starting phases of the research, since

> The bibliographic paradigm is based on certainty and order, whereas the users' process of constructing meaning is characterised by uncertainty and confusion (Kuhlthau, 1993).

Such initial uncertainty is an integral part of the research process and, according to Kuhlthau, students should be helped to recognise and accept it, as

> to acknowledge common experiences of uncertainty in the early steps of the research process helps students become aware of their own process of learning (Kuhlthau, 1993).

In designing the learning activity I tried to ensure that students would not be affected by the anxiety produced by excessive amount of contents, or uncertainty about goals and assessment methods, but, at the same time, I took in account that the anxiety originated by uncertainty in the first research stages would be unavoidable, and that it should be presented to students as a feeling shared by everybody involved in a research process. I

therefore tried to create a blame-safe learning environment, where students could deal with this kind of anxiety in an aware and confident way (Mann, 2001).

6.2.3. Perception of relevance

Deep learning approaches are also encouraged by the perception of the relevance of the subject being taught, in relation to one's own existing competence. Passing from a stage of "unconscious incompetence" to a stage of "conscious incompetence" is a needed, even if sometimes painful step towards personal commitment and responsibility in a study context. Students must recognise their lack of competence and, overcoming their frustration and feeling of inadequacy, they must decide to engage themselves in learning, as a response to a recognised and accepted learning need.

One of the problems emerged from the previous IL teaching experience was just the unawareness of students about their level of competence before and after the activity. This could have hindered students' disposition to learning. Also in the literature the problem of students' perception of skills and self assessment is treated as a crucial one in relation to deep learning. Holman (1995) states that there is much that is tacit about the process of skills development, and Lucas et al. (2004), in a study focusing on the meaning of skills for students, concluded that students need to be provided with activities stimulating them to reflect on how new skills have been developed and on how students themselves experience their own learning.

Self awareness and self assessment require that students are engaged in reflection as part of their learning activity. I was convinced that one of the most important success factors for the seminar was encouraging students to reflect on their existing knowledge and skills and therefore to assess and recognise their learning needs, thus facing new tasks in a conscious and proactive way.

6.3. Reflective learning

Reflection is an essential condition for the adoption of a deep approach to learning. It is connected with both intrinsic motivation, lack of anxiety and perception of relevance. The perception of the importance of what is being learned and of one's own learning needs are

fostered by reflective thinking, that is also a powerful tool to recognise and master feelings of anxiety and uncertainty.

Reflection as meta-cognition, that is thinking about one's own thinking and learning, is an important aspect of critical thinking, as it requires learners to direct thinking efforts towards the learning experience itself. This leads to the monitoring of our own learning process, to the identification of appropriate learning strategies, and to self evaluation. According to Phelps et al. (2001) meta-cognition facilitates the strategic performance of learners and reflection provides the critical link between knowledge and the control of the learning process.

Reflection is a therefore a means to move beyond a knowledge base of educational skills to a stage where these skills are integrated and modified to fit specific contexts: it helps to internalise personal skills, creating a sense of personal agency and inventing new strategies and personal solutions to problems.

Furthermore, reflective learning is a strategy for dealing with complexities, challenges and uncertainties existing in personal and professional development. In reflective learning education it becomes important not only to find the "right" solution to a problem, but to know what kind of questions to ask (Gatten, 2004; Bodi, 2002). The failure itself becomes a valuable tool for examination, reflection and focused efforts (Bicknell-Holmes and Hoffmann, 2000). Self-awareness exercises can be used to encourage students to articulate their experience, and to think through their research process. This is what Mezirow (1991) defines "premise reflection", that involves people becoming aware of why they perceive, think, feel or act as they do (Kember and Leung, 2000). By posing questions and reflecting upon their own learning activity, students become aware of the complexity of knowledge, developing a new way of thinking (Isbell and Kammerlocher, 1998; Mayer, 2003; Stefani, Clarke et al., 2000).

6.3.1. Information literacy and reflective learning

Information literacy and reflective learning are in a mutual relationship of reciprocal enrichment.

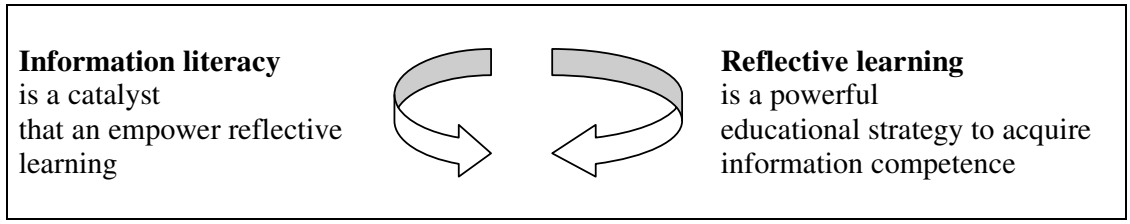

Fig. 4. Information Literacy and Reflective learning

- Information literacy is a "catalyst" that can empower students' learning. The cyclical, recursive nature of the research process encourages students to adopt a reflective attitude, fostering critical thinking skills and the development of an "inquiring mind".
- On the other side, reflective learning as an educational approach and a set of strategies, encourages the adoption of a deep learning approach and therefore favours the attainment of IL literacy learning outcomes. By reflecting on their information seeking strategies and evaluating both the outcomes of their research process and the process itself, students develop the evaluative attitude needed to critically access, evaluate and use information (Jacobson, 1998; Thorpe, 2000; Heylings and Tariq, 2001).

6.4. Activity plan

In the light of what emerged from the observing stage of my enquiry and referring to the literature, I decided to build the teaching activity on the principles of reflective learning.

6.4.1. Aims

I defined as main aims of the reflective information literacy activity the following ones:

- To encourage students to adopt a reflective attitude towards information problems and towards their own learning.
- To favour a positive change in students' experience of information seeking and research process.
- To help students develop competence in accessing, using, evaluating information.

6.4.2. Objectives

The objectives of the learning activity are :

- To involve students in a research task embedded into the contents of the Ecology course.
- To develop students' abilities in the use of some information research tools (library printed resources, online catalogues, bibliographic databases and the Web).
- To provide students with searching skills transferable in different situations and contexts.
- To favour cooperation and foster communication skills.
- To empower students' critical thinking skills through a self-evaluative, reflective activity.

6.4.3. Learning outcomes

Students' expected learning outcomes are:

1. To become independent and competent in the information seeking and research process, being able to:

- Identify an information need.
- Articulate and express it.
- Choose the most suitable information sources and the tools available to access them.
- Use effectively some information tools (OPAC, Databases, Search engines and directories) .
- Synthesise the search results .
- Effectively communicate research findings.

2 . To improve critical thinking skills and develop a reflective attitude, becoming able to

- Analyse and assess, in a critical way, the outcomes of a research task.
- Recognise and experiment different ways of working demonstrating flexibility and open-mindness.
- Identify strengths and weaknesses of one's own working style.
- Evaluate one's own learning process

3. To improve students' ability to work in group, becoming able to

- Analyse an information problem in co-operation with other people.
- Plan together search activities.
- Define roles and strategies.
- Manage time.
- Understand and appreciate different approaches to problems.
- Synthesise different opinions.
- Manage conflicts and negotiate solutions.

6.4.4. Contents

Following what emerged from focus groups, I identified as particularly crucial avoiding to overload students with an excessive amount of contents. This could lead students to adopt "minimising strategies", completing the activity with some skills acquired in a mechanic and uncritical way and with confused and sketchy knowledge, which is likely to be forgotten in a few weeks. Another factor to be considered is students' own perception of their workload, which is often different from what is perceived by teachers (Kember, 2004).

Moreover, trying to cover too much content, I would have replicated those learning situations that students experienced as frustrating and stressing (according to what emerged from focus groups), hindering the possibility to allow them "enjoy" the research process (Doherty, 1999). The absence of anxiety being one of the needed conditions to favour deep learning, I was seeking to offer students a pleasant, enjoyable learning experience, which could help them change, in a positive way, their experience of information seeking and research process.

I therefore decided to include into the list of contents only a few topics, leaving space for students' research activity.

1- Know-item search: University online library catalogue and electronic journals database
2- Subject search in a scientific context: the databases Current Contents and PubMed
3- Searching the Web and evaluating findings

I also intended to present only the main features of each information tool, focusing more on the research process than on information tools, offering students the time needed to test and try those tools in an active and creative way during their research process.

6.4.5. Activities and methods

The activity was designed in such a way that students could feel themselves in the position of direct users of information resources; students would discover and learn them as a response to their own information needs (Lea, Stephernson et al., 2003).

The whole activity is build around a group work, that is a "research task" in the field of ecology, that students are required to do during the seminar. This is to be introduced by the Ecology teacher, as to underline the link between information seeking, research process and scientific and professional work. Students, in group of five-six people, are required to choose a topic to deepen through a research task and to present their findings to the class at the end of the seminar.

This task requires that each group of students :

- produce a list of meaningful information resources, identified and located through the use of the search tools presented during the seminar.
- describe their research process, evaluate their own findings, justify and defend their choices, present in a clear and effective way the product of their common work.
- assess their own group work, showing problems faced and strategies adopted, as well as group dynamics and strengths and weaknesses of their work.

Students' works is assessed by peers and by the teacher. The assessment takes in account both the product of the research and the reflective/evaluating activity.

The team-working with peers is one of the most powerful means of educational and cultural growth. Analysing and presenting one's own ideas in a way that can be understood by others helps in clarifying them and the exchange of different viewpoints stimulates critical thinking and enhances evaluation capability. Co-operation allows the expression of different approaches to problems, developing a reflective and flexible attitude (Sheridan, 1990; Pintrich, 2002).

Presentation is another important means to foster students awareness of their competence and to stimulate reflection on different ways to deal with a problem. Students have to communicate, motivate and defend their work, strategies and decisions. This helps to develop objectivity through the analysis of own and others' work and the comparison/assessment of different results (Tsui, 1999; Magin, 2001). Sharing not only the results of the group work, but also the process that brought to these results is an important meta-cognitive activity that enhances critical thinking skills, puts the basis of future learning improvements and promotes intellectual growth.

At the starting of each lesson students are rapidly introduced to function and use of single search tools. Then they are invited to read the "help" pages and to identify main search features by themselves. Some hands-on activities, to carry out in pairs, offer students the opportunity to try each tool in a "safe" environment, without being assessed and with the support of the teacher and of their peers. At the end of the class activity, students are allowed to work in group, applying their new knowledge to their research task.

While designing this activity, I was seeking to make students perceive the enquiry as part of the learning activity, and not as something added, as external and additional to lecture and memorisation. Students are required to do a task adequate for their competence, do-able in the available time and meaningful for their curriculum. At the same time, this task must appear challenging, requiring effort and hard work.

> Students should always feel that they are doing something useful, something they find stimulating (Ramsden, 1992)

Students are placed in a challenging situation, a situation where they become accountable to their peers and to their teacher for the quality of their work, but they are given the time and the means to deal with it in a successful way.

6.4.6. Learning materials

Providing students with valuable learning materials seemed another important factor for the success of this activity. In the previous Seminar "From the library to the Net" we had offered students only a printed copy of the slides we adopted to present the different search tools. I considered that providing students with booklets offering also search "tips" and examples, and suggesting different possible search strategies would have advantaged both myself and my students. During class activities I could have the opportunity to leave out some topics, referring students to the learning materials and leaving space for group activity, while students could have at their disposal some reference material for their team work.

I therefore prepared some booklets about the main topics: OPACs, Databases, E-journals, Searching the Web, Good starting points. I tried to write them in an attractive way, offering meaningful examples and referring students also to online tutorials (Vezzosi, 2004).

6.4.7. Assessment and feedback

From my literature review I had realised that assessment methods are one of the most critical of all influences on students' learning. Assessment is not only a matter of grading, but it is also a means for evaluating teaching, for encouraging students' interest, and for enhancing students' independence and responsibility.

> The process of assessment influences the quality of student learning in two crucial ways: it affects their approaches and, if it fails to test understanding, it simultaneously permits them to pass courses while retaining the conceptions of subject matter that teacher wished to change (Ramsden, 1992)

Ramsden also writes about the "hidden curriculum", that is what students perceive of assessment and teaching procedures: students will study what they think will be assessed, and a good deal of their learning is not about understanding, but about adapting to the requirements of teachers (Sander, Stevenson et al., 2000)

I found evidence of that, since one of the questions students had asked me during the focus groups was just:

What kind of exam are we going to sit? Is it a "multiple choices" or an oral examination?

The issue of assessment in IL and in educational activities aiming to promote critical thinking has been widely debated and a great amount of research has been recently developed (Ennis, 2001; Blattner and Frazier, 2002; Knight, 2002; Dunn, 2002). Knight (2002) compared different types of assessment methods in IL activities, showing that it is helpful to compare the results of tests and exercises with the perception of students about their own progress in learning, while Iannuzzi (1999) underlines the need to share the challenging task of assessing students' learning with teaching faculty. D'Angelo (2001) adopted a pre-post test to measure students' improvement in knowledge, and some self-assessment and group assessment techniques to evaluate students' attitude towards the research process. Qualitative methods of assessment appear to be fruitful to verify students' improvements in learning and to evaluate the effectiveness of instruction. Pausch and Pagliero Popp (1997) suggest concept maps and reflective journals as valuable qualitative assessment methods in a library context and Warner (2003) reports on a project, founded on the ACRL standards, adopting reflective journals both for students and for teaching librarians. Bourner (2003) tries to identify the main problems in assessing reflective learning: the most visible impediment is that a significant proportion of the learning outcomes of reflection is subjective, rather than objective knowledge, the second problem is related just to the difficulty of deciding and planning specific learning outcomes. As possible solution he proposes a "questioning approach to learning", that is the interrogation of experience with searching questions. Parker (2003) states that the nature of assessment is very much around reflection and documenting the process of searching for information. She proposes a type of assessment that requires students to produce a bibliography, annotated with the reasons behind their selection of items and the record of the experience of using the resources that produced the results.

I chose to adopt multiple assessment methods: self assessment, peer assessment and teacher assessment. As Ramsden (1992) states,

> There will rarely be one method which satisfies all educational objectives […] a greater variety of methods offers more latitude for students to display their knowledge and it has the potential to provide a more accurate – though more complex depiction of each student's achievement

6.4.7.1. Self assessment

Self assessment is increasingly seen as an important part of learning, as it helps students understand learning as an iterative process rather than a single event (Baldwin, 2000; MacLellan, 2004). Students are invited to keep a "Learning journal", recording and analysing their experience of ongoing learning, related both to class and group activity. According to Author (2003), writing a learning journal represents

> A learning process in which you are both the learner and the one who teaches

Following Fund (2002) and Heylings and Tariq (2001) I invited students to write their journal referring both to the contents (the "what), the didactic aspects (the "how) and their experience of their learning (the "I") .

6.4.7.2. Peer assessment

Peer assessment requires students to use their knowledge and skills to review, clarify and correct others. These are very demanding tasks as they actively engage students with new knowledge and have the potential of reinforcing and deepening understanding (Ballantyne, Hughes et al., 2002).

Peer assessment is an effective method to foster critical reflective thinking, and students can often learn a lot from assessment by their peers. In fact, giving feedback on another student's work increases sense of responsibility and control over the subject contents. Furthermore, cooperative approach to learning is enhanced when the process involves group assessment (Leach, Neutze et al., 2001). The peer assessment at the end of the group work should make students feel responsible not only towards their own work, but also towards others' commitment .

6.4.7.3. Teacher's assessment

Together with the assessment of group works, the teacher must assess students individually. Students are required to draw a concept map of what they have learned and to explain and discuss it. Students are also involved in a practical test, being required to locate some books and journal papers using online catalogues and database and to perform

a simple subject search using the database Current Contents. Also the individual learning journal is assessed by the teacher.

6.4.7.4. Feedback

Giving feedback is an important component of supporting students in the adoption of deep learning approaches. Not only the teacher demonstrates to be interested in what students learn, but seeks evidence or encourage students to think and experience the issue in a different way, thus encouraging reflection and meta-cognitive efforts. Taras (2002) considers that feedback provides consolidation of learning, the deepening of understanding and realignment of concepts within each individual student's conceptual framework.

Informal feedback is given to students during the hands-on activities while a more formal feedback is offered at the end of group presentations and is related to

- the group research task,
- the group research journal,
- the quality of presentation
- the assessment provided by students themselves to their mates' group works.

The final feedback is given to students in relation to group work and individual tasks.

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Section 7 – Information literacy and reflective learning

The action research spiral – Act

7.1. Participants and setting

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7.6. Peer assessment

This chapter describes the learning activity in a narrative way. The focus is on students, their participation, their attitudes and reactions, while the evaluation of students' works is reported in the following section.

7.1. Participants and setting

Twenty-three students participated in all activities, while two students were present only two days.

The Seminar took place from Monday 4 October to Friday 8 October 2004, with class activities starting each day at 9 a.m. and lasting four hours. In the afternoons the groups worked independently in the library. The setting for class activities was established in different IT laboratories at the University, due to the unexpected unavailability of the Department IT laboratory. Each student had at his/her disposal one PC connected to the Internet. The Laboratories were also equipped with blackboard and overhead projectors. Together with me, my critical friends were present at the lessons (the first two days one of them and the final day of the seminar the second one). They played the role of silent witnesses, observing and taking notes on both students' behaviour and reactions on my own work. The organisation of peer observation, together with the description and discussion of this experience is reported later.

7.2. Starting of the activity

One of the crucial factors for the success of a learning activity is to provide students with straightforward information about objectives, learning outcomes and assessment methods just from the starting of the work. If expectations are made explicit to students at the beginning of the course, students are motivated to be active in their learning.

I therefore started the activity introducing the Seminar and offering students an explanation of what the activity was about, what they would be expected to do and how their work would be assessed. A printed outline was handed around, leaving students the time to read and to ask any questions (Appendix 5. Seminar Outline). The outline, which was not

adopted in the previous seminars, seemed to be appreciated by students, who checked it more than once the following days.

According to my plan, after the general presentation of the activity, the Ecology teacher was expected to introduce the group work. Since he was not able to participate in the first lesson, I had to present students the team activity, illustrating the reasons why the ability to access and use information was crucial for prospective environmental managers. I also asked students to list some possible situations in which an environmental professional could be required to solve information problems. Students appeared interested and participated in the discussion in a lively way: they seemed actively engaged in searching the "meaning" for their learning.

Among other issues, students listed some of the topics that had been chosen for the group activity (the impact of tourism on a protected area, the preservation of biodiversity), and this represented an easy and natural way to introduce students into the group activity.

The topics chosen for group works, together with the Ecology teacher, were connected with the 2. year Ecology program

1- The ecosystem

2- Management of protected areas

3- Biodiversity conservation

After a brief presentation of each of these issues, students grouped themselves in five teams (four-five people each) and chose one of the topics. Two groups chose the ecosystem, one group chose the biodiversity conservation and two groups the management of protected areas.

The task that students had to fulfil was to prepare a list of about twenty documents on the topic chosen, starting from a few general resources and adding some more specific ones about a particular aspect of the topic. The list had to be critically annotated and presented to the class, together with a critical report on the research process and the group work. In order to record the phases of the research process, students were invited to keep a group research journal.

7.3. Class activity

The class activities always started with a discussion, which aimed to help students identify their information needs.

7.3.1. Starting from problems and needs

In particular, the first class activity began asking students *which kind of information were needed*, in their opinion, to start a general search about the topic chosen for team work. While they listed them (a definition of ecosystem, the national law about protected areas, maps of protected areas, when the concept of biodiversity was born and which was its exact meaning and so on….) a student wrote on the blackboard a first list.

Then I invited students to think about *"where" these information could be found*, and the student wrote a second list on the blackboard (students listed the Internet, books, papers from meetings, journals, newspapers, television, conferences).

The third step consisted in identifying the *information tools* that could help students in accessing the sources of information. Also this list was reported on the blackboard (students named Google and, in a generic way "the library" without indicating catalogues and databases).

Then I completed the table, connecting the three lists and highlighting the topics that were to be covered during the Seminar.

Students were also invited to draw up a list of the different *phases of the research process,* and another *list of "skills needed*" to perform a bibliographic search working in group.

Many students participated in this first discussion and appeared reassured by the opportunity to start from their current knowledge.

Each class activity started in a similar way, connecting the contents I was going to introduce to problems emerged during the previous lesson or during students' group work. As an example, bibliographic databases were presented following a request from a group, who, after the activity on library catalogues, asked:

Is there a catalogue which lists all journal papers in the field of Ecology?

The Document Delivery service was introduced answering another question, emerged during the activity on electronic journals:

What can we do, if we don't find either an electronic nor a printed version of a journal paper?

The “invisible Web” was presented when a student tried to locate books in University libraries using Google instead of the online catalogue.
In this way each content was introduced as an answer to a question, as well as an opportunity to empower students’ search. Learning how search tools work appeared to students as an activity “embedded” in their research task: they seemed interested and did not demonstrate to feel bored or overwhelmed.

7.3.2. Few contents and time to learn.

While presenting each content, I adopted the strategy of offering the least possible instructions, leaving students the time needed to test and try resources and information tools.

I presented only the main features of each search tool, then I invited students to read the “help” pages and “search tips”. Some hands-on activities, that students were required to do in pairs, offered the opportunity to explore each tool in an independent way, with the co-operation of classmates.

Working in pairs invited students to support each other and to try and overcome difficulties without asking the teacher for help. I observed two students who, searching ScienceDirect, discovered that the truncation character was not “*”, as in the University Library catalogue, but “!”. They felt the need to share with their mates what they had found and asked me the permission to write it on the blackboard.

Giving students the time and opportunity to explore the features and potential of each tool allowed them to adopt the learning strategies more suitable for their own learning style. Moreover, working in small groups helped them to face the anxiety occurring when dealing with a new subject. Observing students during hands-on activity I noticed a good level of interest and engagement. They appeared keen on experimenting and eager both to learn and to share with their mates what was being discovered. This impression was confirmed by my critical friends and by students themselves during individual interviews.

7.3.3. Putting pieces together and revising

Since the learning contents were presented following students' questions and interests, there was a need to complete, revise and put them in a broader context, to avoid the risk that students acquired only some fragmented knowledge and separated skills. At the end of the first class activity I therefore started to list and summarise the main issues treated during the lesson. While doing this I perceived that students were less involved, as if they did not perceive the need to "put the pieces together". They seemed fairly bored and showed signs of impatience. I took note of that, resolving to deepen such attitudes through the following interviews, and looked for another way to help students complete and arrange what they were learning.

I therefore introduced a new activity, without having planned it: the review of previous contents was committed to students themselves. At the starting of each lesson, the five groups in turn were in charge of revising what had been learned the day before, connecting new contents to previous knowledge. This revealed to be the right choice. Students appeared much more involved and engaged themselves in this activity, trying to present learning contents in a logical sequence and offering examples from their own research work. Also the class paid more attention and asked questions. Furthermore, this activity had the result of offering students the opportunity to test and practice their presentation skills.

In general, students appeared more inclined and disposable to learn when interacting with their peers than when listening to the teacher. In fact I also noticed that, before asking me for instructions or help, thy tried to find themselves a solution for their problems or, more frequently, asked their friends.

7.4. Group activity

The group activity took place mainly during the afternoons from Monday 4 October to Thursday 7 October, while the final presentation of group works was to be offered to the class the final day of the course, Friday 8 October from 9 to 13.

The first impact of the team work on students was not a positive one. Most of them showed an initial attitude of resistance and seemed a bit worried and uncertain about what they were required to do: they appeared troubled by the idea of being actively engaged in something that needed to be planned and organised. Some other students showed an attitude of resignation, as if the group work was something to do in order to please the teacher, possibly without too much trouble. Only a few students appeared enthusiastic. This is consistent with what is reported in the section "The need for change" (see page 23). Some teachers had stated that today's students usually prefer more traditional teaching methods, which do not require active engagement and similar opinions were found also in the literature about the "Google generation" students.
However, during focus groups students had expressed their wish to deepen some topics of their interest and had complained about the lack of time for research within the traditional courses and seminars. Moreover, I considered that this seminar could represent a good opportunity to help students experience not only a research process but also the positive aspects of working in team.

For this reason it was crucial that students:

- could feel supported and encouraged by the teacher in their team work
- could have the opportunity to reflect and elaborate their experience of group work

I therefore stressed the importance of the group research journal, and ensured students that not only the outcomes of their research process were going to be assessed, but also their ability to reflect, evaluate their own work and identify spaces for improvement.

I also decided to be present in the library during the afternoons, when students were engaged in their tasks. I did not offered solutions to their problems, but rather support and suggestions on how to deal with them. I mainly tried to encourage students to reflect on what they were doing.

The first afternoon the five groups were engaged in organising their work: two groups divided themselves into two subgroups and proceeded working in parallel. Three groups decided to write the research journal while they proceeded, charging one students of

recording each stage of the work, while two groups compiled it all together at the end of each day.

Two groups of students started their research process browsing the shelves in the library, while three groups decided to begin searching the online library catalogue. However, all students seemed interested in finding printed documents, even if they showed a clear preference for online information resources.

Only one group appeared experiencing leadership problems. In another group a conflict arose about the correct interpretation of the task.

In general, students appeared engaged and actively involved in their work. They also seemed enjoying their task, even if the problem of managing time appeared causing anxiety. Only two groups had scheduled their work, and, at the end of the group activity, most students were quite stressed. However, they demonstrated to be able to keep their anxiety under control and appeared eager to present their work to the class.

7.5. Final presentation

The final day of the seminar students presented their work. All students appeared really involved in the presentation and committed to do their best. They also demonstrated to appreciate and enjoy this activity, as they also confirmed during in-depth interviews.

A brief summary of the five group presentations is reported below, as to illustrate students' approach to the group task and to show how they dealt with the research process. All groups adopted Power point slides as a visual aid. While one student each group played the role of speaker, another one handled the presentation. A printed version of all students' presentations is in Appendix 7.

7.5.1. Group 1. Management of protected areas

The first group chose the management of protected areas as research topic. They started with one introductory slide, which summarised the following contents.

Each slide described an information resource, listing:

- Author, title, publisher and publication year.

Clicking on the title another slide appeared, which reported:

- a note on document's availability, for instance: book available in the library, journal paper available in electronic version…
- characteristics of the information source: language, presence of maps, tables, statistics
- a critical comment related to: author reliability, updating, level of specificity, language, type of approach.

Fifteen information resources were presented, including books, journal papers, conference papers, Web sites. All search tools presented during the seminar had been used to locate documents (OPACs, Databases, Search engines and Directories). While the output of the slides was very simple and neat, the work showed a high level of complexity; students critically evaluated each source and appeared able to motivate and defend their choices.

They also described their group work in a diachronic way naming it "ship's log" and summarising, for each research tool they used, the type of search adopted, the keywords chosen, the number of results, the availability of documents.

The evaluation of their work showed a good level of critical reflection: they assessed in a positive way their own work and explained which were, in their opinion, the reasons why they had succeeded in their task: good co-operation, the choice of working together on the same research tools and comparing search results, a methodical and ordered approach to the work including the scheduling of time.

Students also considered, as a strength of their group, a shared vision on how to do the work and similar opinions on the validity of each source. They identified some spaces for improvement in relation to presentation skills, both regarding the use of Power point and the oral presentation.

7.5.2. Group 2. Management of protected areas

Also the second group chose the management of protected areas, focusing on one particular site (Cinque Terre - Liguria) .
The first slide reported a list of contents scaled from the general to the specific:

- General overview: Management of protected areas
- Case study: Le Cinque Terre
- Environmental problems
- Possible solutions
- Group research report

Each of these topics was briefly introduced, then the documents selected were presented, reporting

- Author, title, publisher, publication year.

A comment related to the contents was followed by a note describing

- how the resource had been found,
- which information search tool had been used
- which kind of search had been carried out.

Also this group adopted all tools tested during the seminar, and the documents chosen were critically evaluated.

The research journal described in a diachronic way the phases of the research process:

- planning,
- research methods and tools adopted,
- criteria adopted to select and discard,
- critical issues
- strengths
- weaknesses
- conclusions.

This group often used references and keywords found in documents they considered reliable to find other information resources. Students appeared aware of the advantage of this approach: the speaker said that the main problem for the group was to focus the topic and to find the first few valuable resources, then, starting from these, good documents were identified through the use of references and keywords.

We did two different type of search. In the first phase we were just exploring, without a clear idea of what was to be found. Then, after we had found some good papers, we used again the same tools, that is the OPAC and the databases. This second search was easier: we had good keywords to use and a few good references.

This group also identified the problem of finding specific information about an Italian protected area using databases and full text journals mainly published abroad.

As a strengths of their group they listed the great motivation and involvement in their topic: the area chosen as a case study (Cinque Terre) is well known by students living in Parma, and there is a shared concern about its protection form excessive tourist pressure.

Students concluded their presentation stating that they had acquired important skills during this group work and that an activity on research skills should be proposed also to secondary school students.

7.5.3. Group 3. The Ecosystem

The third group chose the Ecosystem and then focused on the impact of human activity on aquatic ecosystems.

This was the only group who had to face interpersonal and leadership problems. I observed students during their work in the library and they had to discuss and negotiate their methods more than once.

They started with a long introduction and then listed some documents, reporting

- Title, author, publisher, publication year, availability

However, this group listed only some books and a few articles, located through the online catalogue, ignoring indexes, full text databases and the Web. The logic development of the research process was not evident and the whole work gave the impression of different pieces of research put together.

This presentation, though showed a good level of student commitment, appeared less effective in comparison with other group works. An introduction too long and specific around the concept of ecosystem (this introduction was one of the reasons for students' disagreement) forced the speaker to present the contents in a hurried way and to interrupt the presentation without completing it.

Though this task appeared not completely successful, students demonstrated to have critically evaluated their work. In fact, their "research journal" showed awareness of weaknesses and difficulties.

Our problem was that we did not agree on the task, on what we were required to do. Two of us believed that a good introduction was required, to demonstrate that we mastered the content of our work, while the others intended to concentrate on the outcomes of the research. As we weren't able to find a common solution we divided into two subgroups and proceeded in a parallel way. This was not a good choice. When we put the pieces together our works did not show a common line. However, we did not have time enough to start again….

The group research report showed also how the relational and leadership problem had been experienced in a painful way, which eventually emerged also from individual interviews.

7.5.4. Fourth group. The Ecoystem.

Also the fourth group had to face some problems, related to the withdrawal of two students who had to sit an examination. Therefore, the whole research was carried out by only two students. Moreover, they concentrated many efforts on the graphical aspects of the presentation, overlooking the actual research and presentation. They had chosen the ecosystem as a topic and decided to focus on wetlands.

The presentation started with the statement of their purpose:

- to provide a reference guide for people interested in wetlands.

Then the resources selected were presented in relation to the tools adopted to find them. Firstly students cited some books, located through the online library catalogue, then some journal papers and abstracts from databases, and a few websites. The documents were not correctly cited, only author and title were indicated.

Each resource was considered in its strengths and weaknesses (for instance, the high level of specificity of journal papers was underlined). However, the resources were enumerated and listed more than described and evaluated.

The research journal highlighted the great number of resources available and the difficulty encountered to select or discard them according to a defined goal. The speaker also emphasised the endless nature of the research, since each good resource linked to other important documents.

The main problem acknowledged by this group was the lack of a clear focus:

We did not define what level of deepening we wanted to attain, so we passed from very general to very specific resources. This led to a sort of inconsistency and to the lack of a logical framework.

7.5.5. Group 5. Biodiversity and Food

The fifth group presented a very good work. This was a really satisfying and delightful moment both for the class and for myself .

Students had chosen the topic of biodiversity and focused their work on the relationship between biodiversity and food. The student playing the role of speaker was clearly involved and enthusiastic and managed to convey his interest to the class.

After an introduction to the topic of biodiversity and food, the resources selected were introduced, listing for each of them:

- title, author, publisher, year, the tool used to locate it and its "meaning", that is *why* the information was considered important for the research topic.

The work was articulated scaling resources from more general to more specific ones.

A clear distinction was made between more objective resources (as statistical reports) and subjective opinions expressed in journal papers or in books.

This group was able to identify the most important authors in the field and to compare different trends in research. Students critically presented contrasting opinions and data, and also stressed the ethical implication of the problems related to food, genetically modified organisms and developing countries.

The sequence of topics appeared effective, starting from a general book on biodiversity and food, students gradually moved to more specific problems and situations, arriving to a "news" appeared on newspapers some days before, about a genetically modified type of beetroot. Each resource and topic was approached in a critical way, showing both positive and negative sides.

The research report highlighted strengths and weaknesses of the research process. Students were able to assess their work and to find in their interest for the topic one important strength. They also identified some critical aspects of their work: an initial misunderstanding of the task, the difficulty to identify keywords at the initial stage of research, some problems with locating books in libraries. According to students, what helped them to overcome such difficulties was the choice of "sharing competence and being realistic".

7.6. Peer assessment

The peer assessment was highly appreciated by students. Though at the beginning they appeared a bit uncertain, students showed a good level of commitment and most of them participated in the discussion. Students expressed mainly positive opinions on their mates' work, trying to put in evidence the strengths of each group presentation. When they noticed some faults in other groups' work, this was commented as "how this could be done differently".

Many students underlined how each group had worked in a different way, observing that there was not only one right method to do the task.

Each work is good in a different way. Even if some groups had done a better work, there is something to learn from each of the group tasks..

When the fifth group presented their work, I thought "We should have done this way", however, I feel satisfied, I believe we did a good work too.

This is really surprising, how some groups did the same task and also chose the same topic, but the final products were so different.

This is very interesting, I mean, to see how other students did the work, this is really helpful, it helps in doing better next time.

At the end of each presentation I commented both the work of the group and the assessment of their peers, providing an informal feedback. I tried to put in evidence the positive aspects of each work and to highlight the outcomes of the reflective activity presented through the research report.

The final presentation and the peer assessment were meaningful activities both for students and for myself. There was a shared feeling of satisfaction, connected with the positive conclusion of a demanding activity, which had challenged students but also had offered them the opportunity to succeed and to have their efforts acknowledged.

Section 8 – Information literacy and reflective learning

The action research spiral – Evaluate

8.1. Assessing students' learning and change in experience. Methods, analysis and validation

8.1.1. Team work tasks

8.1.2. Individual tasks

8.1.3. Structured observation

8.1.4. Individual in-depth interviews

8.1.5. Analysis

8.1.6. Validation

8.1.6.1. Peer validation

8.1.6.2. Learner validation

8.2. Evidence of students' learning outcomes

8.2.1. Progress towards information competence

8.2.2. Critical thinking and reflective learning

8.2.3. Working in group and learning together

8.3. Evaluation of the learning activity. Feedback from students and critical friends

8.4. Changes in students' experience of information seeking and research process

8.5. Reflective discussion of findings and outcomes

8.5.1. Students' awareness

8.5.2. Information literacy and subject learning

8.5.3. Time to learn

8.5.4. Approach and teaching methods

8.5.4.1. Taking responsibility and finding meaning

8.5.4.2. A process-based approach

8.5.4.3. Group work and empowerment

8.5.4.4. Reflective learning

8.5.4.5. Feeling supported

8.5.4.6. Assessment methods

8.6. Mid-term results

8.7. References

In the evaluating phase of the research spiral, findings and outcomes are presented and discussed. The terms "findings" and "outcomes", are purposefully adopted: this project intended to connect research and practice and its results are therefore both the outcomes of the learning activity and the findings from the enquiry.

8.1. Assessing students' learning and change in experience. Methods, analysis and validation

The possibility to provide evidence of students' learning is one of the most debated issues in educational action research and some authors even wonder whether it is possible to talk about "findings"

> Some have asked whether action research studies have findings, since reports of action research often tend to focus more on process (Herr and Anderson, 2005)

Because of the cyclical nature of action research, the learning activity itself can be considered an outcome of the enquiry, since its design is rooted in the first phase of the fieldwork and in consequent reflections.

Moreover, connecting improvement in students' performance and learning activity is not an easy task. McNiff (1988) arguing about evidence in educational action research, simulates an imaginary dialogue between an action researcher and a teacher challenging this method:

> *Teacher*: I am still stuck on one crucial point. All these developments you point to have happened, but they may well have happened without you. They might have been in the pipeline already and all your intervention may well have had nothing at all to do with it.
> *Action researcher*: True, but the point is that they ARE happening WITH me, further, I can show you evidence on written records by pupils and participating colleagues and by validation groups…..[emphasis original]

In this action research project, the assessment of students' development in information competence and the evidence of changes occurred in their experience of the research process are founded on:

- team work tasks
- individual written tasks
- structured observation

- individual in-depth interviews

8.1.1. Team work tasks

The group tasks have been evaluated by the teacher and by one critical friend. Power point files adopted by students to present their work are attached, as appendices, to the present dissertation. Though they have not been translated, it is possible to verify the structure and organisation of each work and to check which documents had been selected, assessing their relevance for the research subject.

8.1.2. Individual tasks

- Concept map: each student drew a concept map of the contents presented during class activities. The maps were delivered to the teacher a week after the end of the activity, and were assessed following pre-defined criteria: structure, complexity, accuracy.

- Individual learning journals: during the activity each student had to keep a journal recording what was learned, as well impressions, doubts and difficulties, also in relation to group work. The journals were assessed in relation to complexity and reflective attitude

8.1.3. Structured observation

A month after the activity all students were observed individually while carrying out their practical test for the final assessment. Students were asked to locate books and journals on a stated subject both in printed and in electronic version, using Online catalogues and databases.

Observation was chosen as an investigating technique suitable to compare students' perception of their own competence and their actual information seeking ability. Even if the presence of the teacher has surely affected students' behaviour (Patton 1990), this method appeared the most suitable one to verify students' knowledge, skills and attitude in a limited amount of time (Gorman and Clayton, 1997; McNiff, 1988).

The practical test took place a month after the end of the learning activity in order to check the mid-term persistence of students' abilities, in a room near the Environmental Sciences library equipped with two computers.

Students were required to locate two books, one through the University of Parma Library catalogue and another one through the National Italian Catalogue.
Then students were asked to locate one journal paper both in print and in electronic version. They had to access and use the University online catalogue and electronic journals database.
Finally they were required to perform a subject search using the database Current Contents.
The observation took in account students' use of Boolean operators and limitation fields.
Students were required to "think aloud" while working and I took notes of both their search process and of the search outcomes. All students participating in the Seminar were observed. Each observation lasted about 20 minutes.

8.1.4. Individual in-depth interviews

The goal of exploring students' experience and the choice to adopt a phenomenographic approach led to the adoption of individual in-depth interviews as privileged investigation technique. The phenomenographic approach in fact favour in depth interviews and Marton (1994) argues that only by posing questions to students it is possible to understand their conceptions about learning, studying and study tasks (Ashworth and Lucas, 2000). Though in educational context interviews are being challenged by some authors, who state that students are usually unable to articulate their learning experience (Robotham, 2004), in educational action research this is considered the best way to understand the way students experience the learning activity and, together with observation, interviews represent a crucial stage of the "evaluation stage" (McNiff, 1988; Elliot, 1991).

I decided to adopt an unstructured type of interview in order to leave space also to unexpected insights and to allow students deepen what they perceived as most important issues (Patton, 1990; Fontana and Frey, 1995).

I therefore defined a number of topics that were to be covered, but I did not define the order in which the questions had to be answered and allowed students the freedom to digress and raise their own topics as the interview progressed. I also answered to their

questions, so that interviews sometimes became “informal conversational interviews”, following Patton (1980) definition.
The questions, often formulated with different words, were

- I’ d like to know your opinion about this seminar. How did you experience it?
- What about your learning? How do you consider your improvement?
- How did you experience the team work?
- How do you approach an information problem now?

  (If students expressed the concept of “change”)
- Why do you think this change has occurred ?
- What do you think you will remember about this experience?
- Is there something that could be done better?

The questions had been purposefully built as the most possible open-ended and this revealed to be the right choice, as from students’ answers emerged some unexpected issues.
The interviews took place in my office during the weeks after the seminar, from 15 October to 30 November. All students participating in the Seminar were interviewed. I planned this phase in such a way that the learning activity was recent enough and students’ experience was fresh in their mind.

According to Fontana and Frey (1995) it is crucial to develop a close relation between interviewer and respondent ,

> attempting to minimise status differences and doing away with the traditional hierarchical situation in interviewing

In this phase of the fieldwork, personal relationships had just been established, since students and I had passed five days together during the learning activity. The hierarchical situation in which I represented the teacher, as well as the interviewer, apparently did not affect students’ attitude. Anyway, I tried to be as much as possible unobtrusive and to encourage students talk adopting an attitude of “reflective listening” (Gorman and Clayton, 1997).

> In this, you reflect or repeat back to an interviewee your own understanding of what has been said in order to check out that you have understood it correctly and to address any ambiguity

Each interview lasted about one hour and was tape-recorded. The tapes were transcribed immediately after the interviews and then analysed.

8.1.5 Analysis

The data analysis started immediately after the first interview, in order to have the opportunity to

> cycle back and forth between thinking about the existing data and generating strategies for collecting new – often better quality – data […]. It makes the analysis an ongoing, lively enterprise that is linked to the energizing effects of the fieldwork (Miles and Hubermann, 1984)

Data collected during the fieldwork have been analysed using the constant comparative method of analysis (Strauss and Corbin, 1998) which involves three types of coding: open coding, axial coding and selective coding. For this study the first and second level of coding were used.

The transcripts were examined and reduced in categories. Then the categories were coded and clustered. I also tried to identify intersections, patterns, consistencies and topics emerged as I worked with the data.

Firstly I compared the findings from interviews with what had emerged form the focus groups and with my field-notes and reflective journal. This provided a first, general overview of the richness and complexity of my data.

Then I compared, for each student, written tasks, individual interviews and their statements when participating in focus groups, drawing a personal profile for each of them.

Finally, I compared all group presentations, all concept maps and all learning journals, with the goal of evaluating the suitability of each method.

The analysis, including the transcription of interviews took about 50 days of work and was the most complex and tiring phase of the whole research project.

8.1.6. Validation

In order to avoid viewing events in a simplistic or self-serving way, action research often borrows the notion of triangulation and the inclusion of multiple perspectives from

naturalistic enquiry (Herr and Anderson, 2005). Triangulation refers to using a variety of methods (in this case observation, interviews, students' tasks analysis) so that the evaluation is not limited to one kind of data sources, while the inclusion of multiple perspectives refers to the extent to which research is done in collaboration with all parties involved, in this case students and critical friends.

8.1.6.1. Peer validation

Peer validation responds to the principle of dialogical validity and is considered a means by which the quality of the teaching and learning process in higher education is both accounted for and improved (Bruce, 1997; Hammersley-Fletcher and Orsmond, 2004).

Two critical friends participated in the activity, observing students' work, co-operating in the assessment of the group work and providing feedback on my own teaching. They are familiar with the context since they are involved in IL teaching activities at the University of Parma and had participated in previous seminars, one of them also in Environmental sciences degree course.

The peer observation was organised in co-operation with the critical friends. We had an informal meeting before the starting of the activity, during which I explained aims, objectives and methods of the present study and described the findings of focus groups. We also discussed the learning plan and the assessment methods, and defined the methodology for the peer observation. This was only partially structured, following a checklist (University of Nottingham, no date). I also asked my colleagues to take note of any other aspect they considered relevant and that appeared meaningful during the development of the activity (Appendix 6. Peer Observation checklist)

An individual meeting took place with each critical friend a week after the Seminar. This de-briefing followed in part the checklist and in part went on as an informal conversation. I recorded also these meetings and transcribed the tapes.

8.1.6.2. Learner validation

Learner validation is founded on the principle of democratic validity and is adopted to determine the relevance of findings to the needs of the problem context (Elliot, 1991).

Some authors also use the term "ecological validity" to underline the interaction between outcomes of the research process and the relevance to the participating group (Herr and Anderson, 2005). The learner validation is built upon :

- Students' assessment of group tasks, which was expressed at the end of each presentation.
- Students own perception of their learning described both in learning journals and during the peer assessment.
- Students' feedback on the learning activity gathered through individual interviews.

8.2. Evidence of students' learning outcomes

8.2.1. Progress towards information competence

In the following chapters some evidence of students' learning is reported, in relation to expected outcomes as listed in the learning plan. This is founded on students' tasks, structured observation, critical friends' peer evaluation, student' individual interviews and my own reflection.

The first group of learning outcomes was related mainly to knowledge and skills, to "what" students had to learn and which abilities they were required to gain.

1. To become independent and competent in the information seeking and research process, being able to:
Identify an information need.
Articulate and express it.
Choose the most suitable information sources and the tools available to access them.
Use effectively some information tools (OPAC, Databases, Search engines and directories)
Synthesise the search results .
Effectively communicate research findings .

Most students demonstrated to master an adequate level of competence in the use of information search tools.

During the practical test they appeared able to locate both books and journal papers through the use of online catalogues and databases. Only one students showed uncertainty and failed to locate the article.

A subject search in the Database Current Contents was carried out in the same successful way by most students, who remembered how to limit their search by date and how to use Boolean operators. Three students had forgot how to access Current Contents and needed to be helped in locating the link in the Web page of the Library system, but they succeeded in their search. Two students asked the permission to use the "help" function to verify which fields could be selected for limiting the search. All students were able to list the main characteristics of the database.

Just from the presentation of group research tasks it appeared evident that basic knowledge and searching skills were mastered by most students. Apart from one, all groups had used all the search tools presented during the seminar, also adopting Boolean operators, truncation characters and selecting documents by date. Students also appeared able to identify and articulate an information need:

Group 4: *Our goal is to prepare a reference list on the concept of ecosystem: therefore we started searching a definition of Ecosystem in Ecology textbooks. To locate them we used the online library catalogue, searching by title the word "ecology" and limiting our search to "books" in the field "document type".*

Group 5: We found that combining "alimentazione" and "biodiversità" only a few documents were located. Therefore we truncated aliment and also searched different terms using OR : that is food OR nutrition and biological diversity OR biodiversity…..*

From group research reports and individual learning journals emerged students' ability to connect and compare different search tools.

Paolo: Sciencedirect and other commercial databases offer the advantage of providing a link to full text documents, while databases such as Current Contents only provide the abstract. However, ScienceDirect lists a limited number of important Ecology journals. Moreover, the full text is available only for the last few years.

Caio: The problem with the library catalogue is that you can search by keyword only into the bibliographic record.

Diana: It would be really helpful if the library catalogue allowed us to access at least the content list of books.

Most students identified in "finding the right keyword" the crucial step for a successful search and also underlined the problems related to the lack of homogeneity and consistency in indexing lists. Some of them expressed their frustration during the first stage of the research process,

Viviana: At the beginning we did not find anything….we were quite discouraged…

while other students put in evidence the effectiveness of using a thesaurus:

Mario: In this way you are helped when you are searching something that is not well-known […] Current Contents don't have any thesaurus.

Both my critical friends and I noticed that most of students had started to perceive the recursive nature of the research process. In fact three groups of students stated that they "reran" their search, adopting keywords found in "good" papers that had been previously located .

Group 2: We had found this good paper about tourism in protected areas. We realised that this was not helpful just for itself, but it also provided a good list of references. We tried another search, using these keywords (the ones attributed to this paper) and we discovered lots of references that hadn't been found beforehand using other keywords.

One student compared different types of search, a "serendipitous" and a more focused one

Caterina: (Learning journal): (she is talking about the first day of the group work: students were in the library, looking for books). The first search through the Opac led us to the shelves where the books on parks and protected areas are. We found that browsing the shelves was helpful as well; we found some more books related to this subject. However, we came back to the catalogue again, as to search if some books listed in the references were available in University libraries.

Both the first and the fifth groups, demonstrated to approach information with a rather critical attitude:

Group 2: We had this possibility, to list results by date (in the online library catalogue . We thought that this could be useful to identify most recent and therefore most updated books. However, we found that one book was published in 2002 but it did not refer to the most recent legislation. We finally discovered that it was a translation, the original edition was published in 1998.

Group 5: Here we have a debated topic, about GMO in developing countries. It is a really complex issue, we have found different opinions: we found lots of websites about this topic and also many contribution, both in scientific and in "popular" journals…we tried to identify the most debated issues…..

This critical attitude was noticed also by one of my critical friends, who appeared impressed by students' evaluative approach to the research task.

Lucia: Even if there is a different level in group works, I have noticed this critical approach in all research tasks. Students did not simply list and describe the documents selected, they always added their evaluation and some personal element to their research.

This attitude to reasoning and evaluating appeared in a more evident way from group works, while emerged rarely and only partially from the concept maps drawn by students.

About half students designed their map starting from an information need, relating information sources and search tools to an information problem or simply to a question. They highlighted the process of searching and their maps appeared as a representation of "steps" starting from a question (I need to know…..) and proceeding towards the identification of search terms, the definition of a search strategy, the choice of information tools, until the location of documents. Half students, on the contrary, simply built a diagram connecting search tools and listing main features of them.

Students in fact stated that they had found the map very difficult to draw, because of the multiple level of their knowledge

Diana: I have found it difficult to synthesise everything, because we had different levels of skills: how to use the search tools, but also "when and why" they are to be used, and something related to the method. It is really hard to put everything into a piece of paper.

Despite the different level of final outcomes, all students demonstrated a progress towards information competence and also appeared aware of their progress and development.

In one learning journal, the aspect of the research process as knowledge construction was represented in a clear way. Caterina's description of her own progress towards competence is a quite typical definition of learning from the constructivist point of view

Caterina: I have learned how to put together different sources of information: while I was proceeding, I felt that I was lacking of some competence, then, the following day, I integrated what I just knew with my new knowledge, and I was able to proceed…..

8.2.2. Critical thinking and reflective learning

My interest however, was not limited to "what" students learned but mainly to "how" they achieved their competence.

The second group of learning outcomes was related just to the development of critical thinking skills and meta-cognitive attitudes.

2 . To improve critical thinking skills and develop a reflective attitude, becoming able to
Analyse and asses in a critical way the outcomes of a research task
Recognise and experiment different ways of working demonstrating flexibility and open-mindness.
Identify strengths and weaknesses of one's own working behaviour.
Evaluate one's own learning process

The achievement of this group of learning outcomes, related to critical thinking and reflective attitude was verified mainly through students' learning journals and the "reflective" part of the group work, that is the research report. Also the peer assessment at the end of group presentations was a fruitful opportunity to share opinions and to critically analyse different approaches and working methods.

Students demonstrated their disposition to critical reflection in relation both to their work and to themselves. They often put in evidence the problems faced during their work and tried to analyse and interpret them.

Diana: This was the first time we had to start a work by ourselves, we were used to have a "starting point" from our teachers, a journal paper to present or some documents to synthesise. In this case, we had to organise everything by ourselves, I mean, deciding how to start and everything else, this was the first problem to face.

Among major hindrances, most students listed the problem of language. Though Environmental Sciences students are required to pass a basic-level English examination, they are not used to read books and journal papers in English. However, they appeared aware of the need to develop this competence.

Eleonora: I know we have to improve our English, all our teachers say that. However we usually prefer Italian documents. We have to make an effort and try to develop this aspect, you see, the most valuable documents we found were published in international journals and therefore were written in English.

Diana: Actually I believed my English was quite good, but now I see we have to reach a far higher level….

The fourth group underlined the problem of information overload and related it to the need to define a clear focus for the research task.

Giacomo: In any case we won't be able to collect any possible information about a topic. It is a matter of getting a bit closer to what you need. Each information source is also a link to other sources…This is why there is a need for the definition of a focus.

One student from this group stressed this aspect in his learning journal

Rinaldo: One thing I have learned is that dealing with information is a matter of discarding: you have to eliminate lots of stuff that are not useful and to identify what is really needed

One of the most interesting aspect of students' reasoning is the comparison they made between Google, their favourite source of information, and the new information resources they had started to use

Federico (during peer assessment): …..I agree with you, I have verified that there is a great difference between information found through a Google search and a deeper search, using also library sources. However, I 'm not going to stop using Google, in some cases it is helpful. I will try and discriminate according to what I am looking for.

Mario (learning journal): I could not imagine that such a great part of online information was not accessible through Google. Actually, I did not know exactly "how"does Google work.

Working in group encouraged students to approach their task in a critical way; they appeared able to apply their thinking skills also to their own working style and to compare their approach with their mates' ones.

Flavia: I am quite a bullying one, if I am sure of being right I cannot accept to change my mind.

Giacomo: I tend to postpone everything, therefore I did not co-operate enough, actually I felt a bit guilty

Yasmine: I find it difficult to accept other people's criticisms…..

Caio: Each student had in his mind a different imagine on how the work should appear at the presentation. We had to move beyond other people's ideas…

Some students in particular showed a high level of self-criticism:

Yasmine: We had different opinions: I wanted to insert many things, many ideas…..It is not easy for me to discard something, everything seems important in some way….However, when I compared our work with the work of other groups, I realised that the best ones were just the more synthetic ones. This is a fault of mine, I need to experience my mistakes and then I am disposable to admit that I was wrong.

Most students also expressed their difficulties to communicate effectively, both each other within their group and to the class during the final presentation: more than once, both in learning journals and during the peer assessment they underlined this aspect.

Giacinto (During group presentation - He is describing the first stage of the group work): The problem was that we adopted the same words with different meanings, we felt the need to "define" what we were speaking about, because we intended different things while using the same word.

Silvio: I find that it wasn't so easy to convey effectively the way we proceeded (here the student is referring to the "research report") One would imagine that this is simply a matter of describing your work. It was not easy indeed. How is it possible to explain how we arrived to settle our work? There isn't even a precise moment when we had defined it, it was such a mess….

8.2.3 Working in group and learning together

The third groups of learning outcomes was related just to the ability to co-operate and to manage team work

3. To improve ability of working in group, becoming able to
Analyse an information problem in co-operation with other people.
Plan together search activities.
Define roles and strategies.
Manage time.
Understand and appreciate different approaches to problems.
Synthesise different opinions.
Manage conflicts and negotiate solutions.

The group work appeared a highly stimulating activity. A relevant part of students' comments about the Seminar as a whole, was just about the research task and the presentation. Students appeared involved in their work and showed their appreciation. I

felt particularly satisfied with this aspect, since students, during focus groups, had expressed their negative attitude towards team work and their frustration for previous unsuccessful experiences.

In fact, though most students underlined the problems faced working in group, none judged in a negative way this experience. Rather, many of them compared their negative attitude at the starting of the activity with the satisfaction of succeeding in their tasks and of having their efforts acknowledged.

Caio: I had some negative experiences at the secondary school and I was not enthusiastic about starting this activity. However, everything went right and I felt really satisfied at the end. We did a good work.

Most students described their work as a "journey" from uncertainty and confusion towards a clear goal and the fulfilment of a shared task

Giacomo: I experienced this in a positive way. The starting was really hard. There was such a confusion, we did not know what we were going to do. We had to define, together, our goal.

Eleonora: The most satisfying moment was the final presentation. It is not usual to complete a course in such a way. The final day we were excited and everybody was satisfied, it has been a really nice experience

The group work, according to students, helped them to acquire new competencies and to "empower" the existing ones.

Agata: I believe that this has helped us to learn how to do a real piece of research. We learned the actual process.

Mario: I found it interesting to have the opportunity to chose the subject for the team work. I was interested and therefore I engaged myself …..

Some students clearly expressed the opinion that the research task had had an impact on their attitude towards team working. They also recognised the existence of different approaches to the same problem and the need to share knowledge and competence.

Paolo: I found it interesting to see different ways to approach a problem. I am a very practical one, I need to put my hand on everything , while Caio is a methodical one and he is good at managing and scheduling. Mario is the reflective one, he was in charge of writing the journal. Each of us had his role to play. However, there was something to learn from other people .

Flavia: The group work has been a painful experience, but, from another side it has been important for me, I mean, it has helped me to recognise my limits. I am used to study alone, I don't like to work with other people. I've seen that I am much more bullying than how I expected to be. I agree to listen to other but….when it comes to take decisions…. I want to be the one who decide…

Actually, just those groups who had to face the most difficult problems in managing personal relationships (the third and the fourth ones) expressed, in an even stronger, way the idea that the team work itself had been stimulating, though the final presentation was not completely satisfying. This is consistent with what I found in literature: even if the group climate is unsupportive or threatening, the reflection about group processes stimulate learners to take specific actions to improve their team effectiveness (Loo and Thorpe, 2002).

I am satisfied, even if we could have done better

Gemma: We had lots of contrasts. At the end we had to divide in two subgroups, otherwise it was not possible to go on. None of us wanted to have a conflict, so we divided our group. This has, in some way, spoiled our work. However, even if I found painful to work with others, I think it is important to learn… I mean, being able to work in team is crucial in workplaces…

Students clearly identified in the starting and in the final steps of the research task the most critical aspects of their assignment , which is described in Kuhlthau's work.

Fabrizio: The most difficult moments were the starting stage and the final synthesis. Here it is frequent to have contrasts: when you start to work you have to define a common goal, at the end you must set up the final product. Everyone has a different idea of how this should appear and it is difficult to abandon it.

The problem of managing time, in particular when working in team provided another opportunity to adopt reflective thinking.

Fedro: The fact that we had to present our work helped us to manage our time: we had a deadline, we were forced to synthesise, to define a limit, and some priorities. We probably had better scheduling our work but we didn't do that. This was a mistake.

In general, the importance of team work as an opportunity to reflect as well as an educational chance has been acknowledged by most students:

Gerardo: While working in group you must be disposable to give up something. You have to know that the final product will be different from what would be if you had worked alone. In some way it will be better, in some way it will be worse. Anyway, it will be different as it is not "your" work.

Diana: I think the reason why we enjoyed this work is that we felt we had a common goal

Caterina: Working in group is in some way easier, in some way more difficult; you have to take in account different opinions, but you feel supported, you are not alone. Moreover, you have the opportunity to learn more, to learn from other people in your group.

8.3. Evaluation of the learning activity. Feedback from students and from critical friends.

Both during individual interviews and in their learning journals, students expressed their appreciation for the learning activity as a whole.

Caio: I think I have learned a lot. It is surprising if you think that the course has lasted only one week.

Fedro: I never felt bored, I enjoyed this, it was a nice experience

However, students also stressed the level of engagement and effort required by the activity, which in my opinion was not particularly demanding. This confirms the different perception of workload from the point of view of students and teachers (Kember, 2004).

Agata: It was really demanding. At the end I felt really tired, it required so many efforts…. However, I think it was worth.

Yasmine: During the whole Seminar, it wasn't possible to limit yourself to listening and taking notes, you had to participate and work.

However, this is also the aspect mostly appreciated by students, who emphasised the positive effect of hands-on activities, particularly because these were proposed immediately after demonstrations and sometimes as alternatives to lectures.

Caterina: The most peculiar aspect (of this seminar) was that we had the opportunity to test immediately what we were learning. We usually have a practical session at the end of each seminar, while here we were allowed to test and try each tool immediately.

Agata: Actually the contents could have been presented in a couple of days. It is the research task that required the main part of the time, but it is just from it that we have learned.

Paolo: I learn only if am allowed to put my hands on something. I don't like listening to the teacher and waiting…. Sometimes when I am at a laboratory session I think "Ok, now let me try by myself……"

Both students and critical friends underlined the proportion between lecturing and students' activity, which privileged interaction and self-learning

Silvio: The teacher did not explain everything, there was something we had to discover by ourselves, we were much more independent than usual

Francesca (critical friend): Some aspects were not treated during the lesson, but emerged while students were working, students discovered them by themselves. This is positive, since it encourages an active participation. In fact students appeared much more involved than usual. They asked questions and related contents each other.

Two students stressed the fact that they usually remember what they did by themselves, rather than examples and demonstrations offered by the teacher. This provides evidence that learning through independent experience and practice is vital for students, who perceive how to be self –directed leads to a more successful learning.

Arnaldo: You remember better when you try and do something by yourself

Mario: I remember my attempts and mistakes…. and how I finally succeeded.

As just mentioned, the group work had a great success among students. This is considered one of the most valuable outcomes of this learning activity. Many students expressed their appreciation for working in group, even if it appeared sometimes stressing and painful. There is a visible change in students' opinion about team working in comparison with what students stated before this activity: many of their words illustrate a shift from individual effort to group work (Gamble, Davey and Chan, 1999).

Viviana: I did not appreciate the group work before this seminar. However, now I wouldn't have done the research by myself, I enjoyed working in group.

Giacomo: Working in group in the afternoon was helpful to verify if we had really understood.

Caterina: I was really satisfied at the end. It has been stimulating.

The presentation itself appeared as a challenging and enjoyable activity. Students also felt that peer assessment encouraged them to compare and reflect on their own work, which is an important stimulus for self-directed learning .

Cesare: The presentation is different from the usual exam. You must defend your work, you must explain the meaning of what you did.

Caterina: I think I am likely to remember the final presentation: we were excited at the idea of sharing our work . The atmosphere was a bit tense, but it was a positive feeling

Reflective learning was perceived by students as a positive, even if unusual characteristic of this seminar.

Silvio: Some teachers had required us to do some thinking and evaluate our learning process. However, it was something different, it was something added on to the course. The difference here is that we were required to do this as a task.

The requirement of writing a learning journal produced different reactions in students. Some of them found it a difficult task and apparently did not engage themselves very much, writing their journals in a quite hurried way, while many students expressed their appreciation for this assignment.

Federico: It was a means of learning. You know that you have learned if you are able to write what you have learned.

Caterina: It was helpful for clarifying what I was learning. Sometimes you think you have understood, but if you have to write it , this forces you to put your ideas in order. You need to concentrate yourself. Anyway, I am used to write…..

Diana: This was quite a surprising aspect of this activity, we were requested to express our opinions but also our feelings, this is not usual. You usually have lots of things to learn and very few time to reflect.

Some students expressed their difficulty in writing the journal, because "this is not usual anymore, nobody asks you to do such a thing". They also stated that it was much easier to write the group research journal, related to the development of the team work, which is consistent with similar experiences described in literature (Thorpe, 2000).

Viviana: You know, when you are working with other people you have to express and defend your opinions and so you are forced to think….

Also according to one of my critical friends, the individual learning journal is a "difficult" task for today's students.

Lucia: I agree that sharing opinions and feelings with other people helps in expressing one's own thoughts. Moreover, it is typical of students aged around twenty feeling the need to communicate each other in any occasions. Their life is a kind of permanent social event. They trust their peer much more than their teachers, they live their lives in group. This is why I think that working in team has taken the most of them.

As regards the problem of managing time, which, according to the findings from focus groups, was considered the main negative factor in learning at the University, students expressed different opinions, but mainly agreed on the satisfactory scheduling of the activity and on the availability of the time needed to complete the research task.

Giacinto: This seminar has been very demanding, we had no time to waste, however, the time was enough to complete the work. We had been forced to use it in a fruitful way.

Caterina: We had time enough to finish our work…. but no more than enough!
We had to be accurate but also quick…

The learning material was generally appreciated both by students and by my critical friends. Most students found it clear and complete, while my colleagues recognised that having a printed support is helpful, not only for students, but also for the teacher, who can omit to illustrate every topic during the lessons, sparing time for more involving activities. One student complained about the fact that I had provided printed copies of all booklets, while, in his opinion, it would be better to provide a digital version. Another student criticised the fact that the booklets were printed only on one side of the sheets. *This is a waste of paper*, he said.

Some students also expressed their appreciation for the serene atmosphere during the activity and underlined that this had favoured their learning.

Diana: The activity has been really involving, we have been challenged, both as individuals and as groups. However, we always felt encouraged and supported, we were not stressed. I think this has helped a lot..

Viviana: We had to work a lot, it was tiring, we also had to face problems, but it was exciting as well. Moreover, we felt free to express ourselves. I remember you told us that there was not only one way to do the work (the research task). This is the most positive characteristic of this course: we were not worried at the idea of making mistakes.

Caterina: It was a really exciting experience. We saw that there was a study, there was an effort so that we could really learn. It is the first time I feel this in such a strong way, I mean, that for the teacher it is so important that I learn.

Gemma: I didn't expect that you remembered our names, all our names. That really impressed me. Your interest towards us was stimulating, I felt that you cared a lot of us.

8.4. Changes in students' experience of information seeking and research process

The change in students' experience of the information seeking and research process appears as a consequence of their learning. What students learned and the way they learned led to a different perception of their own competence and to a different attitude towards research.

Students conceptions of the research process emerged in a very clear way during individual in-depth interviews. Probably requiring students to reflect on their learning as part of the assignment, helped them to acquire a good level of self-awareness, which was appreciated also by my critical friends: *this really made the difference* stated one of them.

Here are summarised some of the most visible changes in students' experience

- ✓ **Awareness of learning needs**

Most students stressed their "unconscious incompetence" before the seminar, which appears an important outcome of reflective learning (Ramsden, 1992). In fact, students' awareness of their learning needs is the first step for an active involvement in studying and for developing a self-assessing attitude. This is also the first important difference I perceived in relation to the outcomes of previous IL activities, when students appeared unable to evaluate their level of competence (see pages 19 and 21).

Rinaldo: I have to admit that I was really puzzled when I started this seminar. I could not imagine what all that was about. I truly believed everybody was able to find information on the Internet.

Gemma: Before the seminar I was a bit suspicious, I was in doubt whether it was worth participating. I thought I wouldn't be going to miss anything important….

Gerardo: It was one limit of mine. I didn't even know that all these information tools existed and therefore I didn't imagine that I was not skilled enough……

One student appeared annoyed and a bit irritated while considering his previous lack of awareness

Paolo: I don't know how I could have been completely unaware of all that….we should have been presented this matter beforehand…

Also during group presentation students had stressed the need to acquire this type of information competence before enrolling at the University:

Group 2: We think that these competencies should be acquired during the secondary school.

✓ **The library as a gateway to information**

Most students compared the information tools they were used to adopt before the seminar with the new competence recently acquired.

Caio: Actually I was used to adopt the Web only to search specific information on everyday matters. I did not know we had at our disposal all this amount of scientific knowledge.

Students' previous idea of the research process was related to books and in general printed documents, while the Web was considered something completely different, that had nothing to do with the library and in general with valuable scientific information.

Viviana: I have discovered something completely new. I believed that doing research meant being surrounded by lots of books and browsing here and there….

Mario: I was convinced that the library had only books to be borrowed, I did not know that we could access electronic journals and databases, I was completely unaware of the existence of so many sources of information.

This is to be considered another important change in students' perception and a visible difference from learning outcomes of the previous type of Seminar. Students seem starting to perceive the library as a gateway to information and to compare difference types of information sources.

✓ **Approaching information problems**

However, the most important change perceived by students was related to their way of approaching an information problem.

Diana: Not only did I learn how to use catalogues and database, I understood the principles, I learned the process.

While interviewing students, I was surprised by the fact that they did not need to be asked about the changes in their experience, they spontaneously made comparisons between their way of searching before the seminar and their new attitude.

Caterina: Beforehand I tried to find "something", I mean, I felt easily satisfied…(the expression in Italian is difficult to translate. "Mi accontentavo" is something like "I tried to feel satisfied, but I knew that I did not succeed").

Mario: I only did some tentative searches, then I gave up.

Viviana: I was able to use Google and also the Opac, but only a bit, actually I wasn't really able, I simply believed I was: I used to lose a lot of time in doing some absolutely ineffective searches.

✓ **Perception of the research process**

Some students underlined the recursive nature of the research process as a kind of endless challenge.

Rinaldo: The most important thing I learned, I believe, is how to use a source of information as a link to other sources. You told us, and now I agree, that doing research is a kind of loop, you always have to come back and do another search, but it is a different search, because now you know something more…and so you can do something better ….and then again….

✓ **Reflection as a strategy**

The experience of perceiving change in their way to approach an information problem encouraged students to apply reflective thinking to themselves, as problem solvers and as learners.

Gemma: There has been a great change in my way of approaching a research task. Beforehand I was a remissive one. I was not convinced that I would be able to find what I needed, and so I easily gave up. I tried to be content with what I had found and I did not look for other ways….now I feel I have some new competence, I feel able to master my search.

Mario: If I try and imagine how I would have dealt with such a research task before the Seminar I truly believe it is ridiculous: I would have stuck a couple of words into Google and go…

Many students attributed the change in their information seeking experience to the reflective activities, which confirms what was demonstrated in some works founded on a phenomenographic approach (Edwards and Bruce, 2004; Gamble, Davey and Chan, 1999).

Flavia: The research journal forced us to think to what we were doing, and how and why, so we had to verify in some way our work and then change our way….I mean our method….

✓ **Empowerment and independence**

The feelings perceived by students thanks to their new competence appear as positive ones. Students stated they felt "empowered", which is a positive outcome, if we compare this attitude with the feelings of anxiety and frustration expressed during group discussions (see page 91).

Giacinto: Now I feel independent. I don't have to ask someone else to help me.

Some students also underlined that their new way of approaching an information problem is founded on a higher level of knowledge and awareness.

Paolo: I'm still using Google, but now I know how it works and I know that there are also other search engines, directories….What I have learned about other search tools helps me to use Google in a different way.

- ✓ **The world of knowledge**

The competence recently acquired also led to a new perceptions of the world of scientific communication which is an important outcome if we consider that students are prospective researchers.

Caio: The sources of knowledge seemed to me something very far, now I see that I can access them.

8.5. Reflective discussion of outcomes and findings

8.5.1. Students' awareness

One of the most important outcomes of this Seminar is learners' positive experience of the whole activity. Most students have stated that their experience of the learning activity was enjoyable and fruitful, which is a first important result. Furthermore, students' positive evaluation of this experience is not related only to learning contents and methods, but rather it is founded on the perception of a development in their own learning.

At the end of the Seminar students appeared aware of their progress and of the changes occurring in their way to approach an information problem. Students aware of their own process of learning and confident in their ability to access and use information, are likely to adopt a more critical approach to knowledge and a responsible attitude towards their education, which are the roots of lifelong learning.

8.5.2 Information literacy and subject learning

The choice to embed the Seminar into a subject course, and in particular into the Ecology course has revealed to be a strategic decision, which contributed to transforming the activity into a "meaningful" one from the point of view of students.

In fact, just from the first lesson, students felt involved in their tasks and found them interesting and stimulating. New knowledge in the field of information retrieval was

perceived by students as something needed to acquire valuable information in the field of ecology and environmental problems. As information literacy was presented to students as something related to their study and their interests, the learning activity has been experienced as linked to their choices, their goals and their future professional life.

The co-operation with the Ecology teacher was helpful for identifying three meaningful topics for the research task which, together with the possibility to chose the most interesting one, has stimulated students' commitment. They have perceived the relevance of what they were required to do and have enjoyed this activity, because it appeared as one part of their favourite subject.

Moreover, the topics suggested by the Ecology teacher, were just known by students, at least in part, and this basic level of competence helped them during their work, both in identifying suitable keywords and in evaluating sources and documents.

8.5.3 Time to learn

Also the scheduling of the activity, and the choice to reduce lectures and demonstrations, leaving space for group works and self-directed learning, had a positive impact on students' motivation. They enjoyed the opportunity to deepen a topic of their interest, without feeling stressed and frustrated by the lack of time which, according to the findings from group discussions, had affected their previous experience of learning.

Probably also the time chosen for the Seminar (a full-immersion week at the beginning of the academic year) had a positive effect on students' experience of this activity. Students were not engaged in exams and did not have other lessons to attend and this allowed them to concentrate on the class and group activity.

8.5.4 Approach and teaching methods

From the point of view of the methodological approach, the winning strategies were mainly the team work and the reflective activity.

8.5.4.1 Taking responsibility and finding meaning

Working in team, and starting a piece of research without any help or "starting point" provided by the teacher (this aspect was stressed by many students) offered learners a high level of autonomy.

Autonomy and responsibility towards their learning had appeared as one of students' expectations in relation to studying at University, but, according to what emerged from focus groups, this expectation was being disappointed (see page 84-85). The Seminar offered students the opportunity to deal with a learning activity in an independent way and to take responsibility for their work. The research task also provided students with a learning situation in which they were required to find "the meaning" of what they were studying, and to find it working with their friends.

8.5.4.2. A process-based approach

Devoting time to the research process rather than to the use of single search tools allowed students to experience and discover the recursive nature of research. This required students to apply to their work not only searching skills, but critical thinking and reflective skills. Even if some characteristics of single search tools will be forgotten, students have experienced how to focus a topic, how to compare information sources, how to deepen and broaden a search according to their objective, which is likely to change the way students deal with information problems.

8.5.4.3. Group work and empowerment

The initial resistance to the group work has probably emphasised the final sense of satisfaction for the success of the activity. These students, who were reluctant to start a team work, both demonstrated their ability to co-operate and to fulfil their goal and experienced how working in group could empower their learning. In fact, also those groups who did not produce a good performance in the final presentation, underlined the formative value of the team activity.

The group work had offered students a supportive, blame-safe environment, where they found the opportunity to share their doubts and to find common solutions to problems. I

had evidence of this aspect, since students asked me for help only after having tried to find solutions to their problems by themselves, with the support of their colleagues. This demonstrates that classmates are a valuable learning resources and that sometimes students learn more from each others than from their teachers.

8.5.4.4. Reflective learning

Also the reflective activity had a positive impact on students' learning. While my critical friends stressed the role of the team work on positive learning outcomes, I am very much inclined to consider the reflective activity the most important factor for the success of the Seminar, since reflection is linked to the change perceived by students in their own experience.

As Ramsden (1992) states, learning is a constant process of changes in understanding and experiencing the world. Teaching therefore involves attempts to help students develop their understanding of phenomena and ideas, so that they begin to conceptualise them in a more aware, critical and expert way.

This group of students during group discussions had listed as important qualities needed for finding information "luck" and "patience". During peer assessment and individual interviews they underlined their feeling of being "empowered" by their new competence, and stressed their satisfaction for being independent and able to master a whole research process. This is a result of the reflective activity, which has encouraged students to think, not only about the research process, but also about themselves and their way of learning. Such change occurred in students' experience of the information seeking and research process, together with the awareness of the existence of different ways to deal with an information problem, is an important learning outcome that goes beyond the acquisition of information skills.

8.5.4.5. Feeling supported

Probably also the serene atmosphere and the friendly relationship established from the starting of the Seminar, put students in a favourable attitude, favouring their commitment. According to my critical friends, a positive influence on students' open and disposable attitude to learning derived from the group discussions that preceded the Seminar. In their opinion, during group discussions students started to perceive this activity as something

different from usual, organised with particular attention to their learning, and this fostered their interest and commitment. The interest and commitment of teachers are mirrored by the same attitudes in students, who perceive and respond to teachers' concern with active engagement and enthusiasm (Laurillard, 2002).

8.5.4.6 Assessment methods

The analysis of students' learning outcomes showed that, apart from a small number of students who showed good results in all types of tasks and a few ones who always offered a poor performance, most students expressed themselves in the best way in only one task. As an example, some students, who wrote very rich and reflective learning journals drew poor concept maps, while some other students, who led their groups during the team work, found it difficult to express their thoughts in learning journals. From one point of view, requiring students to complete different individual tasks offered them the opportunity to find at least one task suitable for his/her learning style. However, probably it would be better leaving students the choice to complete only one of them, as I will argue in the following section.

8.6. Mid-term results

The learning outcomes for the IL activity, validated by peer observer and by students themselves, have been in large part attained. The activity itself was positively evaluated by critical friends and highly appreciated by students.

However, one crucial aspect of students learning is related to the persistence of acquired competence, which demonstrates that a deep approach to learning has been adopted.
Though at the moment it appears impossible to evaluate the long-term effects of the learning activity, some evidence is provided about the persistence of knowledge and skills acquired during the seminar and, more important, about the active and reflective attitude towards the research process.

Firstly, students appear inclined to improve, by themselves, the competence acquired during the seminar.
A few weeks after the seminar, two students who had participated in the seminar came and asked me some questions about Google, who was presenting the new search engine Google Scholar. They were interested in knowing if this new search tool was likely to replace

commercial full text databases. Not only did they remember the previous discussions about the different performance of various search engines and the comparison we had made between search results from Google and bibliographic databases, but they appeared still sensitive and interested in deepening this issue.

About one month later, I observed two other students, who were trying a new database recently acquired by the University. They were working together in the IT laboratory near the library and told me they were searching information on a subject that interested them for personal reasons. They added that, since they whished to find reliable information, they had decided to search both PubMed and Embase, that they had found browsing the Library System Web page. These students therefore not only were still able to apply their search skills using a database presented during the Seminar, but also felt confident and interested enough to try and test another similar database.

Another meaningful aspect of mid-term persistence of learning outcomes is related to students' wish to share their competence with other people. From individuals interviews had emerged that students wished to communicate what had been learned during the seminar to their mates and friends.
In particular, I was informed by one colleague working at the reference desk that some students of the group participating in the Seminar were particularly pleased to show other students how to locate books through the online library catalogue. Some of them explicitly told me something similar:

I have showed the catalogue to my flatmate

I taught my sister how to locate books

I have presented my friends Teoma. None of them had never heard about it

This attitude may be interpreted both as a persistence of interest towards some issues, still perceived as "meaningful", and as direct evidence of the relevance that they attribute to this kind of competence.

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Section 9 – Information literacy for a teaching librarian

The action research spiral – Reflect

The practice of reflection has followed the development of the enquiry and is considered the most valuable, even if highly demanding aspect of this experience. This section presents the reflective part of the action research spiral. I discuss the action research approach from the point of view of a librarian involved in IL activities and analyse the impact of this study on my experience of teaching.

9.1. Research and action. A complex relationship

> Action research is characterised by the use of autobiographical data. If, for example, the research question is about their own professional practice or personal experience researchers are clearly required to study themselves or, if a researcher is the facilitator of a change process, part of the research documentation is the researcher's roles, actions and decisions (Herr and Anderson, 2005).

This experience of action research started from a sense of dissatisfaction towards the outcomes of an IL activity in which I was involved as teaching librarian at the University of Parma. The need to improve the learning activity was coupled with the desire to try a new approach to teaching, in which experience, knowledge, communication and reflection could co-operate to the development of both teaching practice and teacher's professional growth.

However, the dynamic relationship between research and action appeared a rather complex one and more than once I had to negotiate between two different perspectives and responsibilities, taking in account what was required to me as a Master student carrying out a piece of research and as a librarian involved in teaching activities. From one side I was seeking to collect and analyse meaningful data, that could help me understand students' experience of learning, from the other side I was aiming to offer students a fruitful and enjoyable learning activity. These two goals were not always easily harmonised.

9.1.1. Observing and planning

Just from the starting phase of my work I had to reconcile the requirements of a research project and the demands of the teaching activity. According to my research proposal, my teaching plan had to be built on emerging findings from the focus groups with students. The observation phase in fact aimed not only to analyse students' experience of information seeking and research process before the starting of the activity, but also to

identify their information needs, upon which the educational activity had to be grounded. Following the principles of action research I should have started my work without a program for the seminar: this was to emerge as an answer to students' expressed needs. However, I also needed the permission to start my piece of research and therefore I had to submit a teaching plan both to the Environmental Sciences Committee and to the Head of the Library System. In fact I was going to bring some changes to an existing Information Literacy activity, approved by the University Senate and being currently delivered at University: my proposal and alternative learning plan had therefore to be detailed enough to justify the experimentation of a different, prototypical activity.

In the light of anecdotal evidence from previous teaching experience, and following findings from educational literature, I decided to design and submit a provisional activity plan grounded on the principles of reflective learning. Contents and activities were defined in co-operation with the Ecology teacher.

Once the "observing" phase of the research spiral had been completed and I had analysed the findings from focus groups, I only brought some small changes to my initial plan, both because I believed that this provisional programme was adequate for my students, and because the learning activity was going to start and there was not time enough to modify and to submit the plan again for approval.

Which was the impact of such existing provisional plan on my availability to take in account students' emerging needs? Was the final learning plan really tailored on what had emerged from focus groups?
In the light of the following satisfying learning outcomes I can state that the choice to build the IL activity on the principle of reflective learning was the right one, but I also have to say that, from the point of view of the action research approach, my process was not completely correct. I should have designed my learning plan *after* the analysis of focus groups findings, on the basis of learning needs and expectations expressed by this particular group of students.

9.1.2. Data gathering and assessment methods

Another contradictory aspect is related to the need of collecting a variety of data in order to improve the validity and reliability of my enquiry. In order to do this, I planned a number

of different assessment methods, which could help me to analyse students' learning from a variety of points of view. However, this choice followed more the requirements of my enquiry than a real assessment need.

Though the adoption of a variety of assessment methods is considered a valuable choice from an educational perspective, since students' different learning styles are more likely to be met and appreciated, probably for this particular activity, the assessment methods were a bit redundant. The requirements of my research had prevailed on my commitment to avoid overworking students. While I managed to prevent myself from overloading students with an excessive amount of learning contents (and this was appreciated by students themselves) I probably required them a disproportionate effort in the assessment phase.

9.2. Ethical considerations on students' participation

My approach to the ethical aspects of the enquiry took in account the issues of informed consent, right to privacy and protection from harm. Students were informed that the participation in the research activity (focus groups and individual interviews) was absolutely voluntary and would not have any effect on the assessment of their learning.

However, I wonder whether students felt really free to refuse their co-operation. The relationship between a teacher/researcher and a learner cannot be a truly democratic and not hierarchical one, because the teacher is in charge of assessing students' learning. None of students refused to participate in my research, on the contrary, some of them appeared interested and, until recently, asked me some questions about my work, but I am still reflecting on this aspect. Can educational action research be considered a participatory and democratic method, from the point of view of students? Whether teacher is working with children, young people or adults, he/she is in a power position towards students, even if open-minded and committed to their development as independent lifelong learners.

9.3. The problem of time

The most critical aspect of action research is that it requires a great effort and a huge amount of time in comparison with other types of research. Even if action research is to be considered a particularly stimulating approach from the point of view of a reflective practitioner, it is highly demanding from the point of view of a Master student, in particular for a part-time student. In addition to time and efforts related to the enquiry, the learning activity requires to be planned, delivered, evaluated. Moreover, if the

teacher/librarian/student is trying to provide some evidence that can inform future improvement of practice in her own setting, she has a multiple responsibility: towards her students, who deserve to be offered a valuable, well organised and fruitful learning activity; towards the organisation, which has authorised the piece of research and which is waiting for the results of the prototypical activity; towards her own piece of research and dissertation, with its requirements, rules and deadlines.

Trying to deal with the problem of time I felt a sort of empathy with my students. In fact, I realised that, in some way, my experience as a Master student was mirroring their one as undergraduates. We were coping with our study, being pressed by the huge amount of work to do and frustrated by the lack of time. As my students did, I sometimes whished I had the opportunity to deepen some topics, that appeared important to me, to read something else about an interesting issue and also to have some more time to reflect on what I was doing. Both my students and I, because of the time limitation, had to develop the same "survival strategies" .

9.4. Reflecting as part of my work

Another situation in which I observed myself replicating students' experience is related just to the issue of reflection and the writing of the research journal which most students defined stimulating but also trying.

This task, that I expected would be easy to accomplish, providing that I was diligent and constant in writing every day my reflections, revealed to be the most painful part of the whole research project. Writing simple logs, in which I described what was happening during the fieldwork was not difficult at all, the crucial point was how to extract clear and rational reflections from a messy amount of thoughts, perceptions and doubts.

My attempt to "distill" experience into words was tiring, painful and frustrating. Even when I stopped writing in English and went on using my own language I found it very difficult to interpret my own experience of what was happening. Some moments of inspiration, that usually occurred in the most unsuitable occasions (when I was driving to work, for instance) and that appeared decisive and illuminating in that moment, became the most obvious and trivial observations when translated in written words.

When the fieldwork had been completed and piles of papers covered my table, including interview transcripts, students' concepts maps and learning journals, books, journal papers, student group works, then my notes started to acquire a meaning. There was a need to gain a "helicopter" view of what had happened during the previous months and to analyse students' experience of learning in order to understand my own experience.

My notes became meaningful to me when compared with students' learning journals and transcripts from interviews, and with my critical friends' observations. At the same time, while discovering my own difficulty to learn from this experience, I managed to better understand my students and their process towards self-awareness and development in learning.

9.5. Critical friends, peer observation and the contribution of the literature

I shared with most students also the appreciation and the positive feelings towards working with peers. The most fruitful part of my learning came from my critical friends observations.

Though when I decided to adopt peer observation as a validation method I felt afraid of my possible reaction to the presence of some colleagues during the class activity, I found that their presence was, rather than threatening, really encouraging and supporting.

Peer observers' presence helped me to deal with the teaching activity in a more confident way, offering the opportunity to check and compare my observations related to students' work and participation with other people sharing a similar experience.

Another important support to my work was the literature review, which represented a kind of dialogue at a distance with other teaching librarians and reflective professionals. The literature review helped me to interpret my data and understand my experience in the light of other people's work and reflections.

9.6. Data analysis: fear of understanding?

13/01/05 Entry in my reflective journal:

I feel frightened by the idea of analysing my findings.
I am worried by the possibility that all this messy amount of data and these piles of paper are not meaningful at all. This has been an exciting experience, but now I have to interpret it and understand its "meaning".

This entry in my reflective journal sketches the experience of interpreting findings. This was a complex and sometimes painful activity. The phase of initial transcribing, coding and categorising data required mainly patience and an orderly working method, and I dealt with it without any particular problem. Moreover, I felt satisfied because both the learning activity and the fieldwork had been completed and my scheduling was being respected.

On the contrary, synthesising and interpreting findings was absolutely distressing and sometimes led to a different categorizing of the same data. The process of gaining understanding in fact requires to take "personal risk". Being able to really engage with data also depends on understanding one's own defences and sources of resistance to difficult, unexpected and sometimes contradictory findings.

I was really able to start a process of understanding when I began to write. The writing in fact became a form of research itself. While I was developing my thoughts in writing, I identified inconsistencies and contradictions both in findings and in the research process itself. This sort of "critical dialogue" with myself drove my work forward.

In this sense this dissertation represents not only a report on the process on understanding, but the research process itself.

9.7. Action research as a difference way to experience teaching

> Action research illuminates a teacher's practice and thus enriches understanding which can in turn provide some evidence to inform future changes (Paisey and Paysey, 2003)

Which insight have I gained from this action research project?

I had a confirmation of the educational value of IL activity, that really appears as a "catalyst" that can empower students' learning. Doing a research task encourages students

to revise their actions, loop back to previous steps and critically assess their own work. At the same time I verified the suitability of a reflective approach to IL learning activities. Students' learning is empowered when they are required to reflect on the process, beside on the contents of their learning.

This experience also led me to a deeper understanding of educational issues. In particular I experienced how teaching and learning are two sides of the same coin. Only being disposable to tune into students' experience and therefore to *learn* from students, it is possible to identify aims, objectives, outcomes, contents and methods that are adequate to students' changing needs and skills. Teachers' availability to recognise failure and mistakes is the necessary starting point for improving teaching practice as students' availability to recognise a lack of competence is the starting point for learning. My activity as teacher in fact has mirrored, more than once, the learning process of my students

Action research is a highly demanding approach to educational practice, but also is a highly valuable approach, as it puts the teacher in an attitude of learning from the educational context in which she/he is working. In fact the "research" side of action research has represented, in my experience, an attempt to learn something from my students, in order to become a better teacher.

This availability to learn also stimulates sharing and communication. The peer observation, that in a different situation would appear to me as something embarrassing and stressing, was perceived as a further opportunity for professional development and personal growth, as it was carried out in a context in which I aimed to learn.

Adopting a reflective attitude, which is at the core of the action research approach, appeared sometimes difficult and painful, but was crucial to keep an attitude disposable to change and to learn, both from other people (students and colleagues), and from my own experience.

9.8. Further developments of this experience

This experience of action research has encouraged some librarians involved in IL activities at the University of Parma to rethink contents and activities of the Seminar "From the Library to the Net.

Two different courses, being currently carried out at the Faculty of Pharmacy and at the Faculty of Humanities (Communication Sciences Course) are adopting the group research task as a learning activity.

The learning material prepared for the Seminar has been put at disposal of other colleagues involved in IL activities through a digital repository system being experimented at the University of Parma (DSpace) and is being arranged in order to fit for the needs of students attending different degree courses (Vezzosi, 2004)

A revision of contents and methodology of the Seminar is being designed by a group of librarians at the Faculty of Science, with the aim of submitting a new plan to the Academic Senate.

The dissemination of the present research among librarians at the University of Parma could hopefully promote the adoption of collaborative action research and peer observation as a working method.

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Section 10 – Conclusions

10.1. Conclusions

10.2. Limitations

10.3. Recommendations

10.4. References

10.1. Conclusions

Action research is different from other types of research. As Carr and Kemmis (1986) note, it rejects the positivist notions of rationality, objectivity and truth. It recognises that the enquiry takes place within an environment in which the teacher's educational practice and understandings are unique and that interpretive research methods are therefore appropriate. Action researchers do not claim for a definite answer to a question; their aim is to improve educational practice and to communicate their results and reflections.

Moreover, the nature of action research, which is always represented as a spiral, makes it difficult to define both the starting point and the end of the process. Here some conclusions related to one part of the spiral are drawn, which can represent a stimulus for further development of practice and reflection.

Aims and objectives of the present work have been attained, both from the side of "action" that is the designing and delivering of the learning activity and from the side of "research", that is the enquiry on students' experience of information seeking and research process.

The evidence of changes occurring in the way students experience information seeking and research process and some validated learning outcomes suggest that the approach to student learning was adequate.

Founding the IL activity on the principles of reflective learning and "embedding" the Seminar into the Ecology course has encouraged students' active participation, providing them not only new contents and skills but also an opportunity to reflect on the research process and on their own learning.

The adoption of reflection as an educational paradigm is fruitful from the point of view both of teachers and of students. By being reflective ourselves, as teachers, we encourage reflection and critical evaluation in our students.

From the point of view of the methodological approach, this study appears responding to the most typical features of action research, following the CRASP model: critical, reflective, accountable, self-evaluative, participative (Zuber-Skerrit 1996).

- The experience is *critical*, because I sought to improve not only my practice, but also myself as a teaching librarian.
- It is *reflective*, since both students and myself analysed and developed reflections about our experience.
- It is founded on the principle of *accountability*, since colleagues and students were involved in the evaluation of the outcomes of the learning activity.
- It appears *self-evaluative*, because the research process is grounded in reflective insights grounded on experience.
- It is *participative*, in that it involves participants, students and peer observers, who contributes to the enquiry.

The learning activity has also started some developments in the IL practice at the University of Parma, demonstrating the value of action research as a "catalyst" promoting change in the library context.

This piece of action research has offered to me an opportunity to reflect on my teaching and to learn, from my colleagues, from my students and from my practice itself. It has been a challenging and enriching experience, that has changed my way to consider my teaching activity.

For this reason, the title of this dissertation was changed from the title attributed to the research proposal, which was "Information literacy and reflective learning. An action research *project* at the University of Parma".
The word *project* has been replaced by *experience*, with the goal of conveying the idea of a holistic process of gaining understanding, which has involved study, enquiry and interpretation, together with human relationships, feelings and personal growth.

10.2. Limitations

The IL learning activity has been designed as a prototype, in a context that is to be considered particularly favourable.

- The group of students attending the Seminar is small and homogeneous. This has favoured the development of friendly relationships, affecting students' learning in a positive way.
- The supportive attitude of teaching faculty towards IL initiatives and the availability of the Ecology teacher to co-operate in designing the Seminar have provided the best possible conditions to connect the IL teaching activity with subject learning.
- The involvement of students in group discussions before the Seminar had a positive impact on their perception of the learning activity and on their attitudes towards this experience.

These factors are not easily replicable in different situations and the positive outcomes of this learning experience are to be attributed, at least in part, to the context in which the activity has taken place.

10.3. Recommendations

Some recommendations can be developed for a different approach to the educational role of teaching librarians at the University of Parma and in similar contexts.

- When designing IL activities, librarians should start from students' experience, learning needs and attitudes towards information.
- IL activities should be strictly connected with subject contents, to help students find the "meaning" of their learning. This requires a strong co-operation with faculty teachers, both for the definition of contents and for designing and scheduling the learning activities

- The teaching activity should focus on the research process rather than on information search tools, offering students an opportunity to discover the recursive nature of enquiry and to learn from their own experience.
- To favour deep learning approaches and generate high-quality learning outcomes, librarians should create a supportive environment, where questioning, experimentation and failure itself are valued as tools for learning.
- Team work and reflective learning should be adopted as valuable educational methods favouring students' commitment.
- Librarians should also put attention to the emotional aspects of learning, which affect in a decisive way students' motivation.
- Peer observation should be adopted as a way to share both difficulties and successes of teaching activities and as a way to assess and validate learning outcomes.
- In order to evaluate the teaching activity there is a need to acquire students' feedback on different aspects of the learning experience. Interviews and group discussions appear as valuable techniques for gaining understanding of students' opinions and perceptions.
- Action research as an approach to enquiry and practice should be adopted by teaching librarians as a way to investigate their context, reflect on their actions and promote change, fostering professional growth and organisational development.

10.4. References

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Reflective review

R.1. Reflective review

R.2. Literature review

R.3. Research proposal

R.4. Learning Plan

R.5. Fieldwork

R.5.1. Focus groups

R.5.2. Analysis of students' tasks

R.5.2. Observation

R.5.3. In-depth interviews

R.5.4. Peer observation

R.5.6. Reflective journal

R.6. Analysis of findings

R.7. Writing the dissertation

R.1. Reflective review

The present dissertation is grounded on the principle of reflective practice. The choice of action research as an approach is related just to the idea of the research process as a spiral in which the enquiry development is driven by continuous ongoing reflection. Because reflection is part of the enquiry itself many evaluative remarks and considerations on methodological choices have been inserted in the previous sections of this dissertation.

The reflective part of the action research spiral (Section 9) is related to the impact of the experience of action research on myself as a teaching librarian and therefore a substantial part of my critical considerations has been expressed above.

In this chapter I go along the whole research process, critically discuss methods and techniques adopted and evaluate the adequacies/inadequacies of the research process undertaken.

The research process began in July 2004, when I decided to start an action research project related to the IL activity being carried out at the University of Parma. A seminar for Environmental Sciences students was just planned for the following Autumn and this appeared too good an opportunity to apply to my own working setting the concept of reflective practitioner, that I felt as very close to my values.

During the summer I had to carry out a literature review, to design a provisional learning plan, to write the research proposal and to organise the recruitment of students for the first stage of my research. These activities had to be conducted in parallel, which is quite unusual and appeared very complex and tiring.

R.2. Literature review

Since a general literature review on IL had just been carried out for the module "Independent study 1", I firstly concentrated myself on the action research approach and on teaching methods in higher education.

Some basic books on action research and in particular on educational action research, were located through the online library catalogue at the University of Parma and at Northumbria University. These were crucial to understand the essential characteristics of this approach and to identify themes and patterns to follow in order to focus my research. In particular I found a "link", connecting action research with phenomenography and with Bruce's relational approach to IL.

From these starting points the literature search went on, both following references and footnotes in books and journal papers, and searching indexes and databases. The database LISA, which had appeared useful for a general analysis of issues related to IL, was not helpful for aspects related to action research and teaching methods. On the contrary, the database ERIC and some specific journals on action research appeared very rich of suggestions, related to contents, activity and assessment methods. Some electronic books on educational issues, available at Northumbria University also appeared very helpful.

While some journal papers were found in electronic version, older papers and books have been obtained through ILL and DD. I also found valuable resources on action research, reflective practice and peer observation in educational Web sites of British and Australian Universities, where some examples of action research dissertations , even if not in the field of IL, were available.

The literature review followed the whole development of the enquiry, since it was frequently needed for an analysis of emerging topics. Also the methodology had to be continually checked and deepened. In February 2005, when this work was being written, a book about the action research dissertation was published (Herr and Anderson, 2005) and it revealed to be rich of important suggestions.

In general, the characteristics of this work, that puts together both an enquiry and a learning activity required a huge amount of reading and the "reference manager" EndNote was very helpful to deal with it.

R.3. Research proposal

The research proposal for this dissertation was submitted in September 2004, only two weeks before the starting of the fieldwork. As a consequence, the actual research process appears very similar to what was planned in the proposal. However, I had to limit the "observe" phase, which, according to my plan, should have included both observation and focus groups. Instead, arranging structured observation before the starting of the activity was not possible, due to the holiday period and the absence of most students.

R.4. Learning plan

The first version of the learning plan had to be detailed enough, since it was to be submitted for approval before the learning activity started. At the same time it had to be a provisional one, since contents, activity and assessment methods were to be defined according to focus groups findings. As just mentioned in the reflective section, it was not easy to design a detailed, even if provisional plan. Contents and activities were defined together with the Ecology teacher, as well as the topics for students' group works. After the analysis of focus groups some changes were defined: some contents were discarded, in order to avoid overworking students, and the individual learning journal was added as an assessment method. Reflections related to this aspect are reported in Section 9. Furthermore, the plan was modified while the activity was being carried out. The "revising" moment, in charge of the teacher according to the initial design, became a learning opportunity for students themselves.

R.5. Fieldwork

This study being an enquiry both on students' experience of the information seeking and research process and on my experience of action research, two parallel cycles of action research were developed, adopting different methods: focus groups, analysis of students' tasks, observation and individual interviews were the investigating techniques chosen to analyse students' learning and the variation occurred in their experience, while reflective journal and peer observation were related to my experience of action research. Peer observation was used also as a validation method for the assessment of students' learning.

R.5.1. Focus groups

Focus groups were adopted for the initial stage of the enquiry, in order to gain understanding of students' experience before the learning activity and also to identify students' expectations and needs.

Focus groups provided rich and meaningful data in a limited amount of time. Moreover, this technique appeared a valuable approach for encouraging students to express their doubts, difficulties and expectation The only problem related to focus groups was the recruitment of students, who were on holiday and therefore were not easily contacted.

The lack of time was the reason why a pilot test was not carried out, which could be probably helpful to practice group interviewing skills.

R.5.2. Analysis of students' tasks

The analysis of students' tasks was conducted in order to assess students' learning. Concept maps, learning journals and group work were analysed according to predefined criteria. The assessment of students' learning was validated by peer observers and this revealed to be an effective way to analyse and compare evaluation criteria and to assess the same teacher's assessment skills.

However, the analysis of students' task wouldn't been enough to understand their level of learning and the progress they made, if considered without the findings from individual in-depth interviews. The analysis of tasks was in some way enlightened by what students themselves stated, during interviews, about their own learning.

R.5.3. Observation

Observation of students was helpful to verify if searching skills, acquired during the learning activity were still mastered some weeks later. However, even if students were required to "think aloud", this technique did not provide particularly interesting results.

Probably students perceived this activity mainly as an examination and therefore simply tried to perform well, without offering comments or personal opinions. Students'

observation was probably the only stage of the learning activity when students felt the presence of the teacher as slightly intimidating.

R.5.4. In depth interviews

Individual interview was the most effective and fruitful technique to gain understanding of students' learning and to verify changes occurred in their experience of the information seeking and research process. Interviewing students' was also a way of acquiring a feedback on the learning activity itself and an interesting opportunity to deepen my own understanding of this experience.

Adopting an unstructured type of interview revealed to be the right choice, since a number of unexpected topics emerged from students. Moreover, the friendly relationships established during the learning activity took the most of this technique. The negative side of interviews is the fact that they are highly time-consuming. Twenty five interviews with students and two interviews with critical friends took about 40 hours of meetings and about 100 hours of tape transcription. The same tape transcribing, however, was an enlightening stage of the enquiry, as it allowed to in-depth analyse students' statements, connecting them with reflections recorded in the learning journals and with the way each students represented learning contents in the concept map. This provided a very rich picture of each student's learning and experience.

R.5.5. Peer observation

Peer observation was crucial both for validating the assessment of students' learning and for enhancing researcher's understanding.

Though a checklist had been prepared in order to support critical friends' observation, the most interesting and meaningful remarks came from spontaneous comments during interviews.

In this experience, the presence of critical friends was much more encouraging and supporting than threatening, probably because of existing friendly relationships. For action researchers, peer observation represents an important step towards communication and

dissemination of findings that are shared and discussed with others, even before the piece of research has been completed. While in this study the availability of colleagues made it easy to adopt peer observation, probably such method is to be considered very demanding in terms of time and efforts in a library context. In fact, information literacy activities are often something added on to daily library workload and librarians usually find it difficult devoting time to teaching activities, let alone to peer observation.

R.5.6. Reflective journal

The reflective journal was important to record events as well as questions and doubts arising while the action research was being carried out. This appeared particularly helpful to recall the development of some phases of the work, which was needed for reporting on the research. However, during the fieldwork the reflective journal became something very similar to a logbook. Using the journal as a tool for encouraging reflection was much more difficult than expected, as it is described in the reflective section. This was caused perhaps by the pressure of time, particularly during the learning activity and the evaluating phase. The need to interview students, to transcribe tapes and analyse them, to examine written tasks and provide students with feedback, allowed a very limited time for reflection. The actual reflection started when the fieldwork had been completed and the final data analysis started.

R.6. Analysis of findings

The data analysis has been an ongoing activity, starting from the first stage of the research spiral and following all the phases of the study. For this reason, the analysis was strictly linked to the literature review, since from emerging findings often arose the need to check the literature and to deepen new topics.

The most complex and difficult stage was the final one, when all gathered data had to be connected in order to built a global interpretation of findings. While the phases of coding, categorizing and clustering are described in many books and therefore the researcher is supported in her work, the final phase, related to making sense of the whole enquiry is entirely committed to the researcher.

Moreover, this final stage is something endless, as the process of recalling and thinking about the research experience continues also while the dissertation is being written and perhaps afterward. The need, perceived by the researcher, to come back and interpret in a different way what emerged during the fieldwork, provides evidence of the recursive nature of the research process.

R.7. Writing the dissertation

Reporting on an action research experience is not an easy task. Action research is such a complex and "holistic" approach to enquiry and practice that the researcher's experience often appears beyond the reach of words.

For the same reason it is difficult to divide the contents into chapters and sections, since each stage is not only strictly connected with the previous and following ones, but also takes sense and offers understanding of the whole process. While in journal papers I found examples of action research reports following a strongly qualitative approach, in which narration and reflection represented the main part of the contribution, I considered necessary and appropriate for a Master dissertation, to follow, at least in part, the requirements of a traditional dissertation. Therefore, I tried to isolate the literature review and the most important part of the methodology discussion from the description of the actual action research spiral. However, I also made an effort to alternate the diachronic description of the project with a justification of my choices and the related references to the literature. From one side this has fostered my own reflective thinking, since I was forced to ask myself whether my decisions were justified enough. From the other side this has probably caused some repetitions and redundancies.

I also found it very difficult to translate in an effective way students' statements, conveying their enthusiasm, liveliness and wit as well as communicating the dynamism of the learning activity and my own feelings of personal growth during the whole action research experience. In a different context, I probably would adopt an even more subjective writing style, "telling" the research, as well my own experience, in the form of auto-ethnography, organising contents in a less traditional way and embedding my reflections into the narration of the research experience.

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Appendices

Appendix 1. Information Literacy activity at the University of Parma 1999-2003. Timetable

1999	Survey on the use of academic libraries at the University of Parma
March 2000	Starting of the project "L'utente indipendente"/ The Independent User
May/October 2000	Training activity for teaching librarians
November 2000	Design of the experimental course L'Utente Indipendente
December 2000	Submission of the learning plan to the Academic Senate
July 2001	Learning plan approved by the Academic Senate
September 2001	Delivery of the experimental Seminar L'Utente Indipendente
October/December 2001	Analysis of Seminar outcomes Design of Learning Plan "Dalla biblioteca alla rete" /"From the Library to the Net"
February 2002	Submission of the learning Plan to the Academic Senate
April 2002	Learning Plan approved by the Academic Senate
September/October 2002	Delivery of the Seminar "Dalla biblioteca alla rete" to 130 students attending different degree courses (among which Environmental Sciences)
October 2003	The Environmental Sciences Course Committee insert the Seminar "Dalla biblioteca alla rete" into the official curriculum attributing two credits to this learning activity

Appendix 2. Action research time-scaling

		July 1-30	Aug. 1-31	Sept. 1-30	Oct. 1-31	Nov. 1-30	Dec 1-30	Jan. 1-3	Febr. 1-28	March 1-31	Apr. 1-30	May 1-16
Literature review Reflective journal												
Research proposal Provisional learning plan												
OBSERVE												
Focus groups												
Analysis												
PLAN												
Design learning activity												
Organise peer observation												
ACT												
Delivery learning activity 4-8 October												
Peer observation												
EVALUATE												
Analysis students' tasks												
Individual interviews												
Observation												
Interviews critical friends												
FINAL ANALYSIS												
WRITING REPORT												

Appendix 3. Invitation letter

University of Parma
Environmental Sciences Degree course

Monica Vezzosi
Environmental Sciences Library
Teacher at the Seminar
"From the library to the Net"

To 2. year Students

Dear Students,

As you know, during the first week of October, the Seminar "From the library to the Net" will take place. I am writing to you in order to provide some preliminary information.

What are we going to do and Why?

The Seminar "From the library to the Net" is a learning activity included into the official curriculum at Environmental Sciences. The main goal of this activity is to help you achieve a good level of information competence.

What does "information competence" mean?

It means becoming able to identify an information need, to choose and access suitable information sources, to find and evaluate information, synthesise it and present it to other people.

During the Seminar, you will be presented some important information tools (On line catalogues, databases, electronic journals and the Web) and you will be involved in a group work related to the 2. year Ecology course. The team work and the research task you will be required to carry out represent an important part of the Ecology program and will add two credits to your curriculum.

Your Ecology teacher, Professor Pierluigi Viaroli will be present during the first lesson, to introduce you to Ecological research. He will suggest you some interesting topics around which we will develop our learning activity.

When, where and how

You have to attend class activities from Monday 4 October to Friday 8 October from 9 a.m. to 1 p.m. We will meet at the Centro di calcolo, IT laboratory. We will work together, starting your research task and, at the same time, you will learn how to access valuable scientific information through online catalogues, indexing databases and electronic journals. You will have at your disposal at least one hour each morning to work on you

research task with the support of the teacher, but you will need to dedicate to your piece of research also some hours during the afternoons.
All the teams will present their tasks to the class on Friday 8 October. The presentation will be assessed both by the teacher and by the class and will constitute one part of your exam.

One important thing….

….I would like you to know, and for which I am requiring your co-operation is that this year the Seminar is going to be developed in a different way from usual. The whole learning activity is organised around a piece of research in the field of Ecology and an important part of the assignment is represented by students' reflection and self evaluation on their own research process.

The Seminar you are going to attend is the object of a piece of research I am carrying out for the final Dissertation of the Master in Library and Information Sciences (University of Parma/ Northumbria University at Newcastle). I am trying to understand the impact of a learning activity founded on reflective practice on students' way of experiencing information seeking and research process. The ultimate goal is to improve the learning activity being currently carried out at the University of Parma.

In order to collect information about your own opinions and attitudes towards information seeking **I will be grateful if you could participate in some group discussions before the learning activity and if you would accept to be individually interviewed after the activity. The meetings and the interviews will last about one hour each. We will arrange dates and hours according to your availability.**

You are prospective researchers and so I hope you will be disposable to help me in my piece of research!

However, your co-operation is not compulsory at all. Your decision will not affect in any way the final assessment and the attribution of the two credits.

I would be grateful if you **could contact me before the end of August** telling me if you are available, and when, for the group discussions.
I will be happy of providing you with any further information about this piece of research. I am working in the library during the whole summer and you can call me (0521 905651) or, if you prefer, you can e-mail me : monica@unipr.it

I am looking forward to hearing from you .
Have a nice holiday.

Monica Vezzosi

Appendix 4. Reminder E-mail

Dear……..,

Thank you for accepting to participate in the group discussion on

….. September
h. 10,30.

This is to remind you that we will meet in the **Seminar room close to the library at the Department of Environmental Sciences.**
Your group is composed by

……..
……..
…….
……..
……..

During this meeting we will talk about your study here at the University, your experience of information seeking and research process, your expectations towards the Seminar "From the Library to the Net". Your opinions are important to design a learning activity tailored on your needs and expectations. I am looking forward to meeting you. If you are not available anymore, please let me know in advance

Tel. 0521 905651
Mail: monica@unipr.it

Thank you very much for your kind co-operation

Monica Vezzosi

Appendix 5. Seminar Outline

University of Parma

Environmental Sciences Degree Course

Seminar From the Library to the Net

Academic year 2004/2005

The Seminar "From the Library to the Net" has the goal of supporting students in the acquisition of the information competence needed for their study and in their future professional life.

Information competence is related to the ability to identify an information need, to formulate it, to choose suitable information sources, to access and use information, to critically evaluate it, to synthesise information and to communicate it to other people. Becoming information competent means acquiring self-directed and lifelong learning skills.

The Seminar is part of a project on Information Literacy proposed by the University Library System and approved by the Academic Senate.

The teacher in charge of the Seminar is Dr. Monica Vezzosi
0521 90565 mail: monica@unipr.it

The seminar will take place from 4 to 8 October 2004 at the IT laboratory.
(Centro di Calcolo)
The class activity is from 9 a.m to 1 p.m

Students are required to attend at least 15 hours of lessons and to sit a final examination
This learning activity attributes two credits.

1. Learning outcomes

1. To become independent and competent in the information seeking and research process, being able to:

- Identify an information need.
- Articulate and express it.
- Choose the most suitable information sources and the tools available to access them.
- Use effectively some information tools (OPAC, Databases, Search engines and directories) .
- Synthesise the search results .
- Effectively communicate research findings

2 . To improve critical thinking skills and develop a reflective attitude, becoming able to

- Analyse and asses in a critical way the outcomes of a research task
- Recognise and experiment different ways of working demonstrating flexibility and open-mindness.
- Identify strengths and weaknesses of one's own working behaviour.
- Evaluate one's own learning process

3. To improve students' ability to work in group, becoming able to

- Analyse an information problem in co-operation with other people.
- Plan together search activities.
- Define roles and strategies.
- Manage time.
- Understand and appreciate different approaches to problems.
- Synthesise different opinions.
- Manage conflicts and negotiate solutions.

2. Contents

The world of information
The research process
Sources of scientific information
Information tools: on-line library catalogues
indexing databases
the Web

3. Activity

3. 1. Group activity

Students will group themselves in teams of five/six people.
Each team will chose one topic among those proposed by the Ecology teacher and will use knowledge and skills acquired during the activity to carry out a piece of research.
At the end of the Seminar students will present their piece of research which must consist of:

1) **One list (15-25 items) of information sources related to the chosen topic**
This list has to be critically annotated, reporting
Characteristics of information sources
Information about availability and access methods
Critical evaluation

2) **One report on the research process and on team work**
In order to prepare this report students will write a group research journal annotating
Phases of the work
Choices made and related motivation
Problems emerged and ways of dealing with them

A self-evaluation of their own work: (strengths, weaknesses, what could be done differently)

Students will start to work on their piece of research each day from 12 to 1 p.m. with the support of the teacher; during the afternoon the teams will organise their work in an autonomous way. The teacher will be available in the library for further support.

The final day of the Seminar the groups will present their work, which will be assessed by the teacher and by other students. Each group will have 30 minutes at their disposal and will be allowed to adopt visual aids as Power point slides, Web Site, overheads….

3. 2. Individual activity

Students are required to reflect on their learning process and to elaborate knowledge and skills acquired during the activity. Each student will:

1) **Write a learning journal**, reporting, each day his/her reflection on what has been learning and his/her experience of the research task and of the group work.
2) **Draw a concept map**, connecting contents, tools, skills acquired during the activity

Both the learning journal and the concept map will be submitted to the teacher during the final examination.

4. Assessment and feedback

The assessment is related both to group work (40%) and to individual tasks (60%).
The final examination will take place in November. Students will submit their individual tasks and will be required to demonstrate their searching skills and in particular they should be able to

- locate two books through on-line library catalogues
- locate two journal papers, both in electronic and printed version
- perform a simple subject search using the database Current Contents

The feedback will be offered at the end of the final examination

For any further information

monica@unipr.it

tel.905651

Appendix 6. Peer Observation Checklist
(University of Nottingham, no date)

- ❖ General aspects to be observed/evaluated

1. **Venue**
   Was the venue adequate in terms of seating, lighting, heating, audio-visual aids, etc? If not, could the teacher have done more to help make the venue congenial?
2. **Context**
   Was adequate information available to students about the course as a whole? Were sufficient links drawn between this learning session and previous ones/other parts of the course/supporting materials?
3. **Structure**
   Was the teaching material well-organised, so that students could follow the structure or sequence adopted? Were key points clearly signposted?
4. **Level**
   Was the session pitched at a level the students could cope with? Was any provision made for those who experienced difficulties?
5. **Clarity**
   Was the material clearly presented? Were the explanations given readily understood by students?
6. **Use of Examples**
   If illustrations or examples were used did they help to underline key points? Were examples related to students' knowledge and interests?
7. **Handouts and Other Materials**
   Did the lecturer make use of handouts or other study materials? If so, were these helpful in summarising, amplifying or reinforcing the lecture material?
8. **Audio-visual Aids**
   Was appropriate use made of audio/visual aids? Were the aids successful in conveying the subjects matter and developing understanding?
9. **Audibility**
   Could the lecturer be clearly heard by all students?
10. **Pace and Timing**
    Was the teaching material presented at an appropriate speed? Did the lecturer keep to time?
11. **Enthusiasm and Interest**
    Did the lecturer present the material in a lively and enthusiastic way? Was students' apparent interest in the subject matter sustained or enhanced?
12. **Interaction**
    Did the lecturer facilitate interaction? For example, were 'buzz' groups used? Were there opportunities for questions or comments and for students' interests, concerns or experience to be drawn upon?
13. **Innovation**
    Did the lecturer attempt any innovations? In what ways were they successful? How could they be improved?

- ❖ Further aspects related to my research project
  (Information literacy and reflective learning)

Main research questions

- What impact this information literacy learning activity has on student's approach to their learning?
- Does the IL learning activity produce changes in the way they approach information, knowledge, research, study?

To be observed:

Students

- How are students responding to what is being said and asked?
- Are they engaged with the contents and issues?
- Are they showing a feeling of ownership of the learning activity?
- Are they critical and reflective ?
  - Do they ask questions?
  - Do they challenge the teacher?
  - Do they compare and contrast things?
  - Do they relate what they are learning with their previous knowledge?
  - Do they express their opinions and values?
  - Are they available to try new methods?
  - Are they involved in discussion?

Teacher

Do I manage to encourage critical reflective thinking?

- Do I involve students in self-assessment?
- Do I ask questions?
- Do I leave enough space to students' questions?
- Do I adopt an "invitational" style?
- Do I demonstrate to appreciate students' opinions and values?
- Do I encourage students to share their doubts and difficulties?
- Do I manage to create a supportive, "blame-safe" environment?
- Do I create a meaningful context for my teaching?
- Do I relate subject matter to students' previous knowledge and experience?
- Do I convey the idea that mistakes and failure can become learning resources?

Appendix 7. Students' team tasks