

Lessons on Information Literacy Research: A Portuguese Experience

Armando Malheiro da Silva¹, Viviana Fernández Marcial², and Fernanda Martins¹

¹ Faculdade de Letras, University of Porto, Portugal
armando.malheiro@gmail.com, mmartins@letras.up.pt

² University of Coruña, Spain
vivianafernandez@udc.es

Abstract. From 2007 to 2010 we conducted a project titled Information Literacy in the European Higher Education Area: Study of Information Skills in Portugal (eLit.pt) that was funded by the Portuguese Science and Technology Foundation and coordinated by the University of Porto. The aim of the project was to understand how the university students face the information competences required by the European Higher Education Area (EHEA). Another aim was to understand the connection between information literacy and information behavior. Thus, we designed a theoretical model (e-lit model) which was the base for planning a survey. The study was performed on a national scale, allowing to compare regions with different levels of development. The sample, approximately 2000 students from high school and university, allowed comparing their informational competences. Both qualitative and quantitative methods were used. In this paper we present our experience emphasizing the importance of developing effective methods for IL research.

Keywords: Information skills, Portugal, university, high school, survey.

1 Introduction

The eLit.pt is a research project developed in Portugal that has correlated two key factors that define the current European educational system: the European Higher Education Area (EHEA) and Information Literacy (IL). We can also see these aspects in projects such as Tuning, IL which is wholly part of the EHEA, nevertheless it is not entirely a result of the Information Era requirements. What it actually expresses is a reform process that encompasses educational structures and content, agents, roles, profiles and skills, in a dynamic context that combines knowledge, understanding, skills and abilities.

The project Information Literacy in the European Higher Education Area: Study of the Situation of Information Skills in Portugal (eLit.pt) was developed in Portugal between June 2007 and May 2010. The eLit.pt project was funded by the Science and Technology Foundation (Ministry of Science, Technology and Higher Education) with the coordination of Professor Armando Malheiro da Silva from the University of

Porto, Information Science area. The multidisciplinary project team included five researchers from Information Science, Cognitive Psychology, Sociology and Linguistics.

The major purpose of this research was to study the information competences levels in Portuguese university students. Our main intention was to find out how university students face the EHEA information skills requirements. We consider education as a system. Consequently, we decided to analyze also what happens in High Schools, the preceding educational level. Our understanding is that the information competences acquired at this level determine informational behavior of the university students. Some ideas, as follows, were in connection with our aims, namely:

- a. The importance of developing a specific study in Portugal in order to determine if several information literacy standards exist;
- b. The need of assessing higher education information literacy levels in order to determine the aptitude and attitude of the university students;
- c. The potential differences in the information background in distinct geographic areas of Portugal;
- d. The assumption that informational behavior is connected to expectations, needs and lifestyle;
- e. The importance of creating a strategic information literacy program that would allow Portugal to adapt to the EHEA and to the Information Era.

The purpose of this paper is to present our methodological experience when addressing the study of information literacy. Even though our research was conducted in Portugal it is possible to draw some lessons about the difficulties when developing a research of this nature where in fact you are evaluating people's cognitive, attitudinal and motivational aspects.

2 Theoretical Point of View

Our first step in developing the project was to base our research on theory. We rejected the idea of focusing our study only in practical research. These discussions allowed us to set up our point of view about concepts including information, information behavior and information literacy. As a result the project was based on a theoretical corpus from which we can point out some statements:

- a. information and explicit knowledge are synonyms, and both differ from cognition;
- b. information and communication are complementary and related concepts;
- c. information (or explicit knowledge) comes from a binomial, which we can characterize referring to Reuven Feuerstein, a Piagetian psychologist [1] to whom biological ontogeny continuously interacts with socio-cultural ontogeny;
- d. information substantially differs from documentation, although a document cannot exist without it;
- e. from the perspective of Information Science, information literacy means specifically the acquisition process of competences and skills of critical ability directly connected

with the creation, search, organization, storage, diffusion, transmission and transformation of information or knowledge. On the other hand, other expressions like digital inclusion refer to the fundamental learning process of a written and spoken language and to arithmetic principles as well as to the efficient use of electronic gadgets and digital platforms surfed through the info sphere;

- f. the Information Science approach to information literacy presupposes a natural and fertile interdisciplinary intersection with Education Sciences, Cognitive Psychology and Neurosciences.

These assumptions allowed us exploring the way the approach to information literacy is built in two complementary levels: (1) internal or inherent to Information Science; and (2) external to Information Science or interactive with other approaches. It is important to understand what can be considered to be specific to Information Science. “In Information Science it is convenient to work with the concept of information literacy referring to the competences and the selective and synthetic abilities to search and to use information. [...] to determine the category of learning skills, as well as the spontaneous or induced needs, during the learning process, in what concerns the search, reproduction/reference (citation), internalization and communication of information” [2]. It is also important to remember that a key mission of Information Science is the study of individuals in their various contexts, and also their need for information, their performance in terms of use and communication of information and also in terms of generating new information and creating new information needs. It is also important to understand their efficiency in considering the implications of their actions and of the knowledge generated, concerning ethical, political, social and economic aspects, when performing intelligent interventions [3]. Information Science must as well be concerned with people’s ability to autonomously learn throughout their lives ensuring the continuity of competences and skills that interact with social, professional and personal demands.

Research about the above mentioned aspects entails a dialogue between Information Science and other scientific disciplines. Among these scientific disciplines, Psychology and Pedagogy have a greater role, but Sociology of Education and Culture must also be considered.

In the information behavior area of knowledge, the contribution of Tom Wilson [4] is with no doubt very important. Nevertheless a new approach is required where the evaluation and communication of information should be integrated. This new approach should have a transversal dimension embracing every aspect and situation of social life and not only aspects where the subject/person interaction occurs, namely in conventional services and/or technological information systems.

One of the contributions of our project is that we have developed a model to represent information literacy – the elit model [5]. The main idea is that IL comes from and connects with information behavior. We think that information skills are co-determined, at first, by environmental conditions and by human action, focused on context and situation. This environment includes political, economic, legal, social and cultural factors. This situation cannot be changed by students but does influence them. For example, the creation of the EHEA has brought about changes in the lives of university students to which they must adapt.

In the model we distinguish environment from context. Environment refers to a generic framework within the reality of a country, broader international community or even a diffuse geographic and civilization sphere (such as the Western World), where human and social life is contextually and structurally being developed, including the even more intense and extensive activity carried out in cyberspace, or “space of flows” (using the very suggestive expression of Castells). On the other hand, the context is more personal, not only in terms of family, but also in academic, psychological, and educational terms. In general, it refers to all matters directly related with students. Environment determines the context, and the context is the way to understand the extension and characteristics of the environment, as well as of its specificities.

We also believe that motivation defines information needs. Motivation is determined by lifestyle, aspirations, familiar influence and other aspects that shape a student’s context. In other words, students’ context influences their information needs. This aspect was particularly important in our study. An IL program will never change the information behavior of students if they do not have an internal mechanism that facilitates behavior change.

Thus, information needs determine how students access information. If students have low aspirations the information resources used to satisfy their information needs will also be low as well as the access, the use and creation of information. We also consider that in the Information Era students can satisfy their information needs in different ways: not only in a formal way (using library and/or educational resources), but also in an informal way, using different media, undoubtedly the Internet, but also radio, television, videogames and people (teachers, friends, family), among others.

When students access information, a process of assessment and selection is automatically activated. Obviously this process is influenced by the situation, the context and the environment. If a student uses a restricted number of poor quality information resources, his/her perception about the need to evaluate information will be low. We can postulate that if the risk of the use of information is high, the need to evaluate either information or the diversity and quantity of indicators is also high.

This process results in either satisfaction or dissatisfaction with information by the student. When satisfied, the information will be used and communicated in any format and for any purpose. Hence, the use of information leads to a new reality and, thus, to new expectations and new questions, allowing new information needs to appear. In this process, the usual situation is that students use a formal channel to interpret and access information. This formal channel is represented by the education system, including teachers, and public, academic and school libraries. However when students are not satisfied with information they may not use it and the information cycle is subverted. A process of frustration leads to a weak perceived information need. In this case, students reject the formal channels and begin to use informal methods, such as Google.

3 Methods to Study Information Literacy

The eLit.pt project was developed in four phases: 1) theory discussion and interchange of ideas including the definition of our theoretical corpus; 2) design and plan of the experimental research; 3) conduct of experimental research, data collection

and results; and 4) analysis and discussion of results. It was intended to define a strategic plan to develop students' information skills so that Portuguese Universities could easily adapt to the EHEA Information Era, and to foster an increasing the awareness among political and academic authorities of IL.

In this section we describe the second phase and in the next one we will discuss some of the results. Sample, segments and stratification were established according to criteria. The final sample comprised: (1) 9 cities from the north to the south of the country (continental); it doesn't include the islands; (2) 11 secondary schools; (3) the areas of Sciences and Technologies, Socio-Economic Sciences, Social and Human Sciences and Visual Arts in the scope of the Secondary education; (4) the 8 public Universities of the country; 5 Polytechnic Institutes from north to south; (5) degrees in Architecture, Biochemistry, Civil Engineering, Management, Languages and Literatures and Psychology in the scope of the Universities; and the degrees of Civil Engineering, Management and Nursing in the scope of the Polytechnic Institutes.

The sample was composed of a total of 3,226 students. The mean age and standard deviation of students is summarized according to the educational institution (Secondary School, University and Polytechnic) in Table 1.

Table 1. Number, age and sex of students

Educational Institution	N	Age	Sex (female)
Secondary School	955	17.26 ± 0.70	542 (56.8%)
University	1379	20.26 ± 1.85	880 (63.9%)
Polytechnic	892	20.50 ± 1.97	567 (63.6%)

The method used involved two types of approaches: a qualitative and a quantitative approach. The qualitative approach consisted of interviews and focus groups. It provided us with valuable information about information behaviors, expectations, needs and uses of information. Indicators derived from the qualitative approach were later used to construct the questionnaires. During the first phase, interviews were administered to a small number of students from Secondary Schools and from the University of Porto. It consisted of 41 questions, divided into four main groups: Needs; Research (and research assessment); Use (including assessment of findings and respective application) and Ethics. Three focus groups with a total of 30 students were interviewed: two in the 12th year (from two Secondary Schools of Porto) and one with students from the Faculty of Arts of the University of Porto. The aim of the interviews was to capture the influence of (1) the different contexts (from school to Internet, group of friends, family, study centers or tutorial services), (2) their learned information seeking skills, (3) their ability to relate information from various contexts and typologies, (4) the influence of the Internet on the informational literacy of secondary school and university students, and (5) the active or passive role of the students in the learning context.

Results from this qualitative phase were used to prepare a preliminary questionnaire (corresponding to the quantitative phase) to be administered to 28 students from 12th year of a Secondary School and to 19 students in the 2nd year of a course at the Faculty of Arts of the University of Porto. The responses were processed using the SPSS 15.0 software. Based on these results, the final version of the questionnaire was prepared, which included 54 questions in four main groups:

- a. Basic Group: contained the school and family contexts. These are the places where students develop their information behavior structure, conveying a way of dealing with IL. Material, technological and symbolic elements were assessed. School context also included aspects of the school/university and of the roles and social status of the respective players.
- b. Functional Group: contained the mediating role of institutions such as the library and the school.
- c. Transversal Group: contained all the issues on how students correlate and use different information. For instance, the access to information and its use.
- d. Introspective Group: contained aspects of internal mechanisms (motivation) related to information requirements.

This questionnaire was administered to the selected cohort and results were processed using the SPSS 15.0 software. They were handed to all the students, in all segments, to obtain at least a minimum number of 50 respondents by situation.

As it was an Information Science project it should also include the traditional focus on the conventional information services – public libraries, university libraries and school libraries – an aspect integrated in the functional or mediation group of questions. These kind of questions that were applied to the university students included aspects like (i) if there was a school library in their secondary school and a public library in their residence area, (ii) what was their frequency of use, (iii) since when and under what circumstances they used it and (iv) what kind of sources/information they used (paper or digital); (v) and whether on their own initiative or according to teachers' requests. Since the daily use of technology resources has increased significantly, especially among children and youngsters, it was important to understand the impact of the growth of the Internet and of Google's popularity in almost every search performed and in the type of information used and stored.

These clues were followed and explored in the survey with the following objectives: (1) to find out if all or some scientific disciplines include the development of methodological competences, such as whether citation norms were taught and students required to make bibliographic references; (2) to determine the level of critical or reflexive exercise when reading texts; and (3) to describe the awareness students had about the criminal nature of plagiarism, from literature to art in general in the last year of the secondary school.

In the university context it was essential to study the frequency and the circumstances of use of the Library for accessing digital databases and to consider whether intensive access to the Internet coexists, and if so whether it is an advantage or substitutes for the traditional information sources, considering different scientific areas. The mentioned "clues" were also analyzed: (1) to know in which scientific disciplines the methodological fundamentals are being taught, and if so how they are being learned and put into practice (2) to determine the level of critical thinking exercises, in contrast to the memorization of notes and texts, and (3) to know if the consciousness acquired about plagiarism in the university is a relevant aspect.

4 Results

Several trends can be drawn from the general information on the social background of the respondents. The first category of question was related to the socioeconomic background of students. In our research it was not possible to conclude that the educational level of parents has a direct influence on the information skills of students. If we look at the general information provided about the existence of computers and Internet access, we see that about 99% of the respondents have a computer at home (61.3 % of Secondary Education (SecEdu) students and 62.8% of the Superior level (HiEdu) students have between 2 and 3 computers). The number of computers existent at home is greater for University than for Polytechnic students (33.4% in University have more than 2 computers, against 25.2% in Polytechnic Institutions). This suggests that university students use the computer more often.

When we compared in global terms, HiEdu shows a more frequent access to computers compared to secondary students (75.5% for high education students and 69.3% for secondary ones). In both cases, the first option is accessing the Internet at home (over 90%), whereas in the educational context 57.4% of HiEdu students say that they do so at the Faculty and only 20.1% of SecEdu students do it at their respective schools, although they know schools have the necessary resources.

Generally speaking and despite the good technological equipment, social asymmetries accessing the Internet, using information and communication technologies, as well as using information resources, shows an “information division” together with the already identified “digital division”. If we are to use the IL concept, these data suggest that something more substantial must be done within the school context with regard to cognitive skills, so that such a “division” decreases or even disappears. Nonetheless, the socioeconomic and family contexts are not enough to bear special relevance for informational behavior. Results show that variables from the school context have also great influence on it. Although schools offer SecEdu students the possibility of computer training and the access to services and resources, it is not their favorite place to use them. SecEdu students have chosen their home to do homework (96.6%), whether HiEdu students even preferring their home (81.1%), reveal an intensive use of both the Faculty space/resources (64.6%) and the Faculty Library (42.1%) It seems that HiEdu students have to prepare assignments for the various subjects in their course and therefore need to access the Internet. Faculty resources offered were seen as very important as they are normally more specific, either in quantity or quality.

With regard to choosing the Public Library, we realize that students from both groups hardly use it. We cannot disregard the investment made in the Public Reading Network since the second half of the 1980s, and the expected role of these libraries in terms of their relation with School Libraries. Furthermore, and contrary to HiEdu data, only 19.9% of SecEdu students mentioned the School Library as the place where they do their work. The percentage drops to 7.8% when we addressed Public Libraries. If it is true that Portugal is equipped with a good public library network, as well as with school and university libraries, results of this study show that the real situation does not meet the expectations for their intended use.

In terms of the regular use of the Library, only a few of those students who admitted having visited a library do it on a regular basis, and there is a clear

difference between the SecEdu student (47.7% hardly uses it) and the HiEdu student (26.7% admit visiting it several times a week). As to the use of available resources at the SL/FL one can see that reality in SecEdu, and with the exception of open access 25.3% have never used it. The percentage of non-use of available resources reached 50% and in SecEdu their use is minimal. Paradoxically, 90.2% of SecEdu students and 85% of HiEdu students mentioned they had no problems in using these resources. This perhaps means that students are not aware that these resources exist, and that they choose an easier and apparently friendlier way out with poor critical power. This behavior may be linked to undeveloped IL skills.

When we analyzed the use of search engines and Internet resources, Google is clearly the favorite search engine, with nearly 100% of respondents using it frequently or very frequently. As to the use of Internet resources, YouTube, Hi5 and Messenger dominate, as well as information downloads, so in short, the so called “leisure Internet” is widely used. The information resource Wikipedia is clearly preferred to library websites, to B-on (Online Reference Library) and to digital libraries which have had the lowest percentage of responses in the total group analyzed.

This draws our attention to the role of libraries and to the quality of resources and information retrieved by students. ICT training offered to SecEdu students did not cause a major impact, as only 25% were aware that user training was offered in both School and Faculty Libraries. Based on our study it seems that the role of libraries in the teaching/learning process is not significant in terms of IL.

5 Strengths and Limitations of the Research

We conclude with some general aspects of our research and a reflection about both the positive and the more critical issues we have identified.

We have taken care with our research which is based on a theoretical perspective that aims to give a new consciousness and a new capacity of analysis within Information Science through the introduction and exploration of the binomial Digital Inclusion versus Informational Literacy.

Our study also allowed strengthening the interdisciplinary dimension of this kind of study, valorizing the relationship between the approaches coming from the field of Education with Information Science. It also allowed dialoging through a convergent project about the use of digital technologies in the info communicational process.

We can refer also as a positive aspect to the fact that it was a study that has covered all the national territory with exclusion of the islands (Madeira and Açores).

The existing tension between Digital Inclusion and Informational Literacy in the scope of the SecEns may be applied to other realities. Our results have evidenced the existence of technological structures setting aside the idea of an existing digital gap what would allow students to attain high levels of digital inclusion although that doesn't mean high levels of effective information literacy.

With our study it was also possible to build a model based on empirical and analyzed data. We were moreover sensitive to some not so positive aspects. For instance, results were overall descriptive and did not allow review of some of the assumptions. Thus it was not possible to clearly understand the influence of the socio-demographic variables, namely the geographical differences which was one of the mainstays of the research.

We also have noted that some of the survey questions were not so well designed which resulted in some less than precise results. That is the case with the responses to the use of bibliographic norms of reference.

We also know that our research has put an emphasis on quantitative research and this kind of method seems not to be the best way alone to study the real nature of information literacy.

Nevertheless the balance is still positive and at this moment our aim is to contribute to a reflection about the methodological way of studying informational literacy. This retrospective analysis is not only important for future research projects but may also be useful for those who are planning to study information skills.

6 Recommendations

Some recommendations can be outlined from our experience, as follows:

- a. It is important to develop experimental research based on theoretical postulates and conceptual frameworks. This allows having a clear idea of the concepts to be used in research and is also a pillar to validate the obtained data.
- b. It is useful to insist on the importance of applying qualitative methods. Information literacy involves cognitive and behaviour aspects and quantitative methods are very restricted for this purpose.
- c. It is important to develop a holistic perspective about IL, considering it as a phenomenon that involves individuals but also their social and economic contexts. Research must be conducted comparing linked scenarios. In our case we have compared high school with university education.

Finally it is important to develop this kind of research on IL not only to describe a specific situation but also to obtain key information to design and plan IL strategies in order to increase people's information skills.

References

1. Varela, A.V.A.: Explosão Informacional e a Mediação na Construção do Conhecimento. In: Miranda, A., Simeão, E. (eds.) *Alfabetização e Acesso ao Conhecimento*. Universidade de Brasília, Departamento de Ciência da Informação e Documentação, Brasília (2006)
2. Silva, A.M.: *A Informação: da Compreensão do Fenómeno e Construção do Objecto Científico*. Edições Afrontamento, CETAC.COM, Porto (2006)
3. Dudziak, E.A.: *A Information Literacy e o Papel Educacional das Bibliotecas*. Dissertação de Mestrado em Ciência da Informação e Documentação. Escola de Comunicação e Artes da Universidade de São Paulo, São Paulo (2001)
4. Wilson, T.D.: Human Information Behavior. *Information Science Research* 3(2) (2000), <http://ptarpp2.uitm.edu.my/ptarpprack/silibus/is772/HumanInfoBehavior.pdf>
5. Fernández Marcial, V., Pinto, M., Silva, L.: Information Literacy in Portugal: a Perspective from European Higher Education Area. In: *BOBCATSSS 2009, An International Symposium for Students and Professionals of Information Science*, Porto (2009), <http://repositorio-aberto.up.pt/bitstream/10216/57286/2/000146089.pdf>