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Abstract

Knowing how to select, organize, and use information in order to solve problems, handle new situations, and continue learning are key issues in the teaching and learning scenario in contemporary society. Teaching these skills is particularly critical for European universities and is currently recognized as vital in the context of the European Higher Education Area (EHEA). 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 content and extend their investigations, become more self-directed, and assume greater control over their own learning. In the face of this need for an information literate society, diverse approaches, especially involving e-learning resources and portals, have been developed and put forward. The aim of this paper is, first, to offer an outline of the relevance of knowledge transfer and information skills in a context of student-centered learning and, second, to provide a succinct analysis of some recent Spanish academic experiences in this area.

Introduction

Today, mobility, innovation, and lifelong learning play important roles in modern higher education environments. The creation of a knowledge-based European society that is more

competitive, dynamic, and flexible has created opportunities and challenges for higher education. The development of the European Higher Education Area (EHEA), which is discussed below, is designed to confront the challenge of gaining generic competencies that all university students should have. These competencies often straddle different subject areas; they are interdisciplinary elements that are either not approached adequately or are ignored altogether. Thus, the concept of information literacy (INFOLIT) is part of this recent effort being made in Europe. The development of skills for locating, evaluating, and managing information, which are basic to the process of "learning to learn," plays a key role in promoting the autonomy of the graduate and future professional. This article will highlight some crucial information literacy initiatives that are being developed in Spain, although certainly there is still much work to be done.

The European Higher Education Area in the Context of the Knowledge Society

Higher education is responding to the challenge of a new social configuration that is based on information and communication technologies and diverse forms of globalization. The wide implementation of e-learning is perhaps the most visible aspect of this process. In this environment, it is necessary to coordinate our educational efforts so that students can take best advantage of these technologies and improve their learning outcomes and, most importantly, become life-long learners.

Higher education institutions are making significant efforts to equip all students with the training necessary to deal critically with information—to analyze it, to select appropriate content, and to incorporate information that is relevant into a personal knowledge base. In the present

knowledge society, all of us will have to learn to move smoothly in the midst of this flood of information and to develop the necessary cognitive abilities to differentiate what is useful and pertinent from the irrelevant. Higher education is adopting strategies that are now more focused on student-centered learning. This is a method of "learning by doing" and has as one of its goals the management of the glut of information offered by suppliers of online content, which sometimes impoverishes the development of analytical and critical skills.¹

In recent years, the profile of the students who come to our universities has been changing. These students have an increasingly detailed knowledge of technologies, they use new habits of communication, and they are interested in new forms of education and autonomous online learning. However, they have serious difficulties when it comes to dealing with the abundance of information. Therefore, they need training in information skills in order to confront the challenges of the knowledge society.²

Knowing how to look for information, how to analyze it, how to represent it, how to evaluate it, and how to use it will certainly be competencies necessary for any graduate who wants to compete in the new knowledge economy. Therefore, university systems should adapt to this important challenge by redesigning curricular content and the learning methodologies for problem solving, and, thereby, enhance the capacity of students for lifelong learning. It is critical that students develop an autonomy of thought, which allows them to acquire, to share, and to transfer knowledge. It is also important that they learn how to reflect on the characteristics of the different forms of knowledge and be able to distinguish among descriptive knowledge (facts and information), procedural knowledge (how to do things), explanatory knowledge (how to answer questions), and behavior-related knowledge.

The role that universities have to play in the current information and knowledge society— as producers, transmitters, and disseminators of scientific knowledge and professional know-how—makes them vital in the development of twenty-first century citizens. In this regard, European universities have a great responsibility in order to meet the changes and challenges brought about the implementation of the European Higher Education Area (EHEA). The EHEA, which was put forward in successive declarations by the European Conference of Ministers of Higher Education, outlined the main priorities and positions of institutions of higher education (Sorbonne, 1998; Bologna, 1999; Salamanca, 2001; Prague, 2001; Berlin, 2003; Graz, 2003; Bergen, 2005, and, forthcoming, London, 2007; see more information at <http://www.eua.be/eua/index.jsp>). These declarations, as a whole, present an analysis and a model to direct the evolution of European higher education in this new environment.

The European Higher Education Area recognizes the value of coordinated reforms, compatible systems, and common action. The action program is based on a clearly defined common goal, a deadline, and a set of specific objectives:

- A clearly defined common goal: to create a European higher education area in order to enhance the employability and mobility of citizens and to increase the international competitiveness of European higher education
- A deadline: to complete by 2010 the European higher education
- A set of specific objectives:
 1. The adoption of a common framework of readable and comparable degrees, also through the implementation of the Diploma Supplement. The Diploma Supplement is an instrument developed jointly by the European Commission, the Council of Europe and UNESCO that aims to

describe the qualification in an easily understandable way and relating it to the higher education system within which it was issued.

2. The introduction of undergraduate and postgraduate levels in all countries, with first degrees no shorter than 3 years and relevant to the labor market

3. The adoption of ECTS (European Credit Transfer System)-compatible credit systems also covering lifelong learning activities, bringing in its wake changes in both teaching and learning methods that will also affect information provision centers, libraries, and resource centers for learning and research.³

4. The adoption of a European dimension in quality assurance, with comparable criteria and methods

5. The elimination of remaining obstacles to the free international mobility of students (as well as trainees and graduates) and teachers (as well as researchers and higher education administrators)

In order to meet these requirements, Spanish universities have to face major changes. The EHEA brings about a paradigm shift for university-level learning, with new scenarios and new services centered on a meaningful student-centered learning process and with the teacher in a tutoring role, encouraging the use of information and technological resources. As is stressed by Starr Roxanne Hiltz and Murray Turoff, cooperative learning calls for active participation and learning from both students and teachers.⁴ Knowledge is seen as a social construct with the

educational process being facilitated by social interaction in an environment that promotes such interaction, with evaluation and cooperation among peers.

In this context, university students need to be sufficiently instructed in developing information skills and competencies in order to foster the process of independent and aware learning. The student needs to be familiarized with all aspects of information and knowledge—from its generation, organization, analysis, and synthesis to its evaluation, management, and use—so that it can be integrated and utilized to generate further knowledge.

Building an EHEA that conforms to the principles of quality, mobility, diversity, and competitiveness, and that remains fully cognizant of higher education's position at the crossroads between research, education, and innovation is the only way that it will be possible to move toward achieving two of Europe's strategic objectives. These two objectives are increasing the employment levels in the Union and making the European higher education system attractive to students and academics from other parts of the world.⁵ The great challenge facing the university system is to facilitate the EHEA becoming a reality in 2010, as planned, within the context of a more ambitious plan for developing lifelong learning. The university system must understand the changes in terms of what they really mean—as both "opportunities" or improvement and as "threats" to the status quo.

The Competency Training Model for Student-Centered Learning Management

Apart from the intended effects of building more compatible degree structures and commonly understood instruments such as the ECTS and the Diploma Supplement, far-reaching changes are

taking place in approaches to learning itself. Many traditionally teacher-centered systems are now reflecting upon ways to place the students' needs at the center of their attention. Such a change of focus is also making itself felt in the heightened attention to teaching performance and the role of students in providing feedback on teaching and the learning processes.

As we have outlined in the previous section, the increased requirements on higher education call for a competitive European university, which is able to adapt to new demands. Active learning techniques are student-centered. In these activities the emphasis is on what the student does rather than on what the teacher does. Students can search for information in databases and books, analyze problems, discuss ways of doing things, solve problems (including finding novel ways of doing so) individually or in groups, and make presentations on their findings. Being engaged in activities such as these leaves little time and space for passive learning. The teacher's role is to guide the students toward the learning activities, organize the resources so that they are accessible when required, guide discussions and investigations, and provide feedback on the results.

In the conventional classroom model, students may be passive learners, with the teacher controlling the activities and dispensing knowledge. A student-centered environment encompasses quite different characteristics, such as students having a responsible and active role in planning their learning, interacting with teachers and other students, researching, assessing, and making choices about what and how to learn. Emphasis is on integrating learning across the curriculum, with focus on enquiry-type activities. Teachers act as guides, mentors and facilitators of learning. Student-centered learning focuses on intrinsic motivation (interest, curiosity, responsibility) and on cooperative learning. There is greater flexibility in learning and teaching

and greater flexibility in assessment, with self- and peer-assessment becoming more common. Finally, there is a long-term perspective with emphasis on lifelong learning.

In this context, one of the essential contributions made by the, so-called, Bologna process⁶ has been to place the concept of *competence* at the center of university student instruction and higher education in general. The concept of competence appeared more than 20 years ago and relates to the requirements (knowledge, attitudes, and skills) that support any professional, personal, or lifestyle success.⁷ Competence is a multidimensional concept, which, all in all, refers to a combination of personal components (knowledge, cognitive skills, motivation, attitudes, feelings), social components (context knowledge), and attitudes (actions, behaviors, initiatives). The definition and selection of competencies and the usefulness of the competence-training model was put forward by the pioneering DeSeCo Project, <http://www.portal-stat.admin.ch/deseeco/index.htm>, and supported by the Organization for Economic Cooperation and Development, an international organisation helping governments tackle the economic, social, and governance challenges of a globalised economy.⁸

In order to help young people develop as morally and intellectually mature persons, capable of thinking for themselves, DeSeCo places the concept of reflectiveness at the center of the basic competencies and identifies three groups of such competencies:

- Using tools or resources in an interactive way. This first competency refers to the use of language, symbols, texts, knowledge, information, and technology to carry out one's own activities and actively communicate with the world.
- Functioning in socially heterogeneous groups: This applies to being able to relate well to other people, to collaborate and work in a group, and to manage and solve

conflicts, owing to the need to be able to cope in ever more diverse and plural societies, and to empathize and put oneself in another's shoes, to manage one's own emotions, and to promote social capital.

- Acting autonomously: This is the ability to have a view of the whole situation and to understand one's own environment and how it works, to make life plans and set personal objectives, and to defend and communicate one's rights, interests, limits, and needs.

Above all, a competency is more than knowledge or skills. Mainly, it is defined as the capacity to face complex demands in any specific context:⁹ Competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills, as well as social and behavioral components such as attitudes, emotions, values, and motivations. A competency—a holistic notion—is therefore not reducible simply to its cognitive dimension; and, thus, the terms competence and skill are not synonymous.¹⁰

According to this definition, learning by competencies is, thus, not a mere educational strategy oriented toward the immediate performance of skills. Instead, learning by competencies considers the integral education of students. It takes into consideration both theoretical knowledge and skills or practical/applied knowledge as well as personal attitudes and commitments, which range from "knowing" to "knowing how to be" to "knowing how to act." In short, competencies include attitudes and values (being), knowledge (knowing), instrumental skills (doing), and meta-cognitive skills (learning), all within a context of a life and work in common—coexisting and working together.

In order to develop educational programs, it is advisable to differentiate between two types of desired competencies: *general* basic ones —necessary for all the professions, to a greater or lesser extent—and *specific* ones—proper to each professional profile with its core and specializations. Basic competencies are also called generic or transferable; they are transferable to a great variety of functions and tasks; and they prepare and equip the student to successfully become a part of work and social life. They are not exclusive to any particular professional specialty but can be applied to a variety of areas, subjects, and situations. These are, for instance, the competencies related to reading, writing, arithmetic, information technologies and technological culture, foreign languages, communication, problem solving, reasoning, leadership, creativity, motivation, ethics, teamwork, and—especially—the capacity to learn. The acquisition of generic skills and abilities forms the basis that will enable the student to confront specific competencies in his or her area of knowledge.

With this objective, the teacher/lecturer becomes, above all, an advisor, a coach, and a trainer. Although the acquisition of information is important, it should be subordinate to the desired results—the attainment of general and specific competencies that students need for their professional future. It is evident that one of the key and basic competencies is ~~that which fosters~~ the information literacy. The success of the educational process will be evaluated by its ability to develop life-long learners.

The Culture and Practice of Information Literacy

Information literacy has been gaining in importance in academia since the 1970s, and a review of the literature available reveals a wealth of articles defining it and designing methods for teaching

it and assessing student achievement.¹¹

The term information literacy (INFOLIT) was coined by Paul Zurkowski in 1974, and it has been defined many times since then. The most-cited definition is probably that of the American Library Association, an institution that has also played a pioneering role in proposing standards for information literacy. This definition reads: "Information literacy is an understanding and set of abilities enabling individuals to recognize when information is needed and have a capacity to locate, evaluate, and use effectively the needed information."¹² It highlights the interaction between the individual, society, library and information services, information and communication technologies, research, information and evaluation, and critical reasoning.

All in all, 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 content and extend their investigations, become more self-directed, and assume greater control over their own learning. An information-literate individual is able to determine the extent of information needed, access the needed information effectively and efficiently, evaluate the information and its sources critically, incorporate selected information into one's knowledge base, use information effectively to accomplish a specific purpose, and understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally (ALA, 1989).

Information literacy was the focus in the Prague Declaration (2003), in which a proposal was made to include it in the Literacy Decade of the United Nations (2003–2012). In this declaration, several basic principles were enumerated. Information literacy is a prerequisite for

effectively participating in the information society and forms part of the basic human right to lifelong learning. Information literacy, together with universal access to information and the effective use of information and communication technologies, plays an important role in reducing the digital gap within and between countries and promotes tolerance and mutual understanding through the use of information in multicultural and multilingual contexts.¹³

Recently, in the Alexandria Proclamation on Information Literacy and Lifelong Learning (2005), it was stated that information literacy and lifelong learning are key elements in the development of generic competencies and a requirement for the accreditation of all educational and training programs.¹⁴ UNESCO speaks of the need to consider lifelong learning as a key theme for the 21st century, going beyond traditional education.¹⁵ If the individual is to be capable of lifelong learning, it is essential to learn how to learn.

In sum, information literacy gives students the ability to critically confront contents, to become more self-sufficient, and to take more control over their own learning process. In order to handle the complexities of today's information environment, a broadly based and complex concept of literacy is needed. Definitions of information literacy primarily have been provided by experts from the fields of education and library and information science. These definitions offer a simplified view of information literacy, which do not provide a comprehensive understanding from the student's perspective, as Mandy Lupton's 2004 study put forward.¹⁶ It should include all skills-based forms of literacy but should not limit itself to them or to any particular technology or set of technologies. Understanding meaning and context must be the central theme.

In the United States and Australia, information literacy has been integrated into national education plans, establishing through legislation a strong link between it and the overall

objective of lifelong learning.¹⁷ At the same time, associations of information professionals in those countries—the Association of College and Research Libraries (ACRL) of the American Library Association (ALA), the Council of Australian University Librarians (CAUL), the Australian and New Zealand Institute for Information Literacy (ANZIIL)—have all played active roles in its promotion and have contributed to the integration of information literacy in the practices of higher education.¹⁸ In the United Kingdom, the perspective is more technological, with digital literacy skills being given priority.

Also, in countries such as the United Kingdom, Australia, New Zealand, and the United States, various approaches have been developed and implemented in order to provide information literacy training. Among these are training programs developed by university libraries or embedded in academic curricula, mostly by means of online tutorials and digital libraries, which offer tutorials and didactic resources in order to learn to search and use information. Different models have emerged for the implementation of information literacy training. Among these is The Big Six Skills Approach, which dissects the information problem-solving process into six steps: task definition, information seeking strategies, location of and access to resources, use of information, synthesis, and evaluation.¹⁹

Information literacy is much more than a step forward in bibliographic instruction. Its aim is to help users to become lifelong learners who are able to solve their information needs in any context. INFOLIT is an indispensable aspect of student-centered education that is now demanded in the European higher education context. It is an issue for every university as a campus-wide necessity. However, in the Spanish academic context, this is, on the whole, still an absent dimension and only present in the programs specifically devoted to information skills training.

Our recommendation is that information literacy should be part of all course planning; it is a basic competency that is always needed. We propose, in accord with Edward Owusu-Ansah, a gradual but ultimately complete integration of information literacy instruction into the general higher education curriculum.²⁰

Within this framework, as we have already noted, university students need to acquire sufficient training in the development of information skills and competencies so as to foster an autonomous, reflexive learning process. They need to become familiar with every aspect of information and knowledge, as we have outlined earlier, in order to be capable of integrating and using it to create new knowledge. As Christine Bruce points out, "Information literacy is important to higher education curricula both in terms of the *what* and the *how* of learning."²¹

The recent work of James Elmborg the importance of critical thinking in the context of information literacy. He enhances the need to enable conceptual thinking and offers proposals for action in this field. He notes a need to move beyond an instrumental conception, based on practical skills and competencies, to complement this with a rigorous understanding of information literacy as a phenomenon central to culture and society and grounded in the ways in which communities construct meaning and the activities they carry out.²²

Likewise, Kimmo Tuominen, Reijo Savolainen, and Sanna Talja argue most convincingly that information skills cannot be developed independently of fields of knowledge since they are integral to the learning process. Their work suggests that, if rigorous and productive progress is to be made by initiatives for information literacy, it is necessary to analyze and understand the interaction between information and communications technologies, the professional learning context, and the instruction (requisite for specific subject areas).²³

Following the line of thinking of the above authors, we would like to discuss the concept of "communities of practice." This concept helps us explain how the process of seeking, using, and evaluating information is not a purely personal one but may be understood in the context of a social organization or professional activity, as applied and specialized skills-

In other words, the different forms of literacy cannot be separated from the socio-instrumental practices that are specific to each domain of knowledge. Information literacy is a generic need for all who are part of today's information society, but it is framed by the activities of specific groups and communities. As Tuominen, Savolainen, and Taljia state:

If we see the learners of information skills as belonging to information-literate communities, we need to understand the practices of these communities before we can effectively teach IL. In essence, the sociotechnical practice approach calls for empirical research efforts to analyze how specific communities use various conceptual, cultural, and technical tools to access printed and digital documents and to evaluate and create knowledge.²⁴

The study of information literacy and, therefore, the bibliography on the subject are growing at an exponential rate in international information and documentation studies. Despite this large emerging bibliography, there is still a lack of in-depth applied proposals in specific subject areas and communities of practice. This is the challenge and the real need for the future of information literacy instruction. The advices of Tuominen, Savolainen, and Talja should be heeded. In a similar vein, a recent study by Clarence Maybee argues that if training proposals in information literacy are to be truly targeted to users' needs, the first step has to be a tailored

analysis of those information needs, concepts, and behaviors prevailing among those particular users with regard to seeking and using information.²⁵

In other words, although there is growing advocacy for information literacy in higher education, comparatively little is known about how it is experienced by those who use information. The pioneering "seven faces" study by Bruce outlines higher education practitioners' experiences with information literacy, whereas Mandy Lupton's contribution provides the view of students. Bruce's and Lupton's research provide a rich description of information literacy from the users' perspective, whereas the information literacy standards of various professional organizations (ALA, CAUL, ANZIIL; see a comparative summary of these standards in Andretta) offer a framework from the expert's standpoint.

Bruce and Lupton also stress that information literacy is a holistic educational paradigm, which involves all information formats, includes evaluation, analysis, and synthesis, is learner-centered, and involves the learners in all aspects of their lives and of the education process.

Although, in comparison with the state of the art in other countries, there is still much to do regarding information literacy proposals in the Spanish academic context, we describe some pioneering initiatives in what follows. Finally, we will provide some reflections on the didactic implementation of these initiatives, taking account of the guidelines provided in such studies as those by Bruce; Lupton; Tuominen, Savolainen, and Talja.

Information Literacy Initiatives in Spanish Universities

The following are some information literacy programs and initiatives developed in Spanish universities, whether undertaken exclusively by the library, as advocated by Owusu-Ansah, or in collaboration with academic staff, or by interdisciplinary teaching teams.

Information Literacy Services from the University Library

Today, in spite of the fact that university libraries offer access to a great amount of information, users are still not really conscious either of its amount or of its full utility and value. This limited use of information resources, especially the electronic ones, is due to several things: the current pedagogical model, which is more teacher-focused than student-centered; the lack of awareness of the possibilities that libraries offer as centers of resources for learning and research; and the lack of training in documentation, which limits the development of information skills necessary for lifelong learning. The digital library provides models, services, and support for the development of e-learning. The importance of information literacy in the context of online training is evident since it is increasingly necessary to select, organize, evaluate, and consult electronic resources in the context of e-learning.²⁶

In university libraries in Spain, there are two important fronts for action: education in information use and information service and product initiatives centered on the preparation of electronic dossiers and thematic guides, as well as the development of tutorials.

Education in Information Use

Librarians have conducted courses aimed at teaching how to manage information in an isolated fashion and not connected to actual curricula. From a collaborative attitude between institutions and libraries, these activities are now centering on information literacy with a clear objective—to learn how to learn. For this purpose, a number of types of activity have been developed. Most of them are general instruction initiatives and not course-related, such as:

- *Orientation* for first-year students, with the aim of making them acquainted, via guided or virtual visits, videos, photos, and so forth, with the library's holdings and the services it provides to assist in their class assignments. Examples are the work that has been done in this area for some years now by the libraries of the Universidad Autónoma de Barcelona and the Universidad Carlos III de Madrid (with user guide).
- *Instruction Programs*, offered to students, young researchers, and teachers who wish to acquire skills in accessing and using information. By means of personalized courses, whose nature depends on the groups and needs involved, those participating are familiarized with the use of tools for information retrieval, such as databases, search engines, search strategies, and so on. These activities are designed to advance the students' capacity to undertake the task of self-education and adaptation to the new advances and requirements of the knowledge society and to enable them to resolve their own information needs. Examples include the activities of the Universidad Politécnica de Cataluña (UPC), which has introduced an "intelligent instruction" system in its libraries (FIBU, Formación Inteligente en las Bibliotecas Universitarias; Intelligent Training in University Libraries) and has developed simple tutorials for using its catalog. The FIBU Project aims at

developing a personalized training, by means of which the student is helped and orientated according to his or her specific needs, in the context of online and self-centered learning.

INFOLIT Initiatives

There are a number of interesting information literacy initiatives being carried out in Spanish university libraries. These have included projects for the production of tutorials, electronic dossiers, Web tools, among other things, in order to provide ongoing instruction in information literacy for the members of the university community. Several examples are highlighted below.

The library of the Universidad de Barcelona (UB) has created, for purposes of cooperation in e-learning, the Centro de Recursos para el Aprendizaje y la Investigación (Resource Centre for Learning and Research, CRAI) and has designed resources of a pioneering nature in the form of electronic dossiers, thematic guides, and Internet resources guides.

The library of the Universidad Oberta de Catalunya (Open University of Catalonia, UOC) has organized a digital library of teaching materials and services available on the Internet. Its project Estantería Virtual (Virtual Bookshelf) aims to bring the library into the classroom, thus strengthening the link between teaching and information resources. Thanks to the digital resources manager, it has been possible to implement new versions of the virtual bookshelves (currently known as classroom resources) in XML format, thereby facilitating their administration and use in the different classrooms. This space is now available for 70 percent of the course modules taught at the UOC, opening up access to over 8,000 electronic information resources.

One of the most interesting information literacy services provided by a Spanish university library is the Factoria de Recursos Docentes (Teaching Resources Factory) of the Universidad Politécnic de Catalunya (UPC), set up in collaboration with the Instituto de Ciencias de la Educación (Institute for Educational Sciences, <http://www-ice.upc.es/factoria/index.htm>), which offers a suitable environment for teaching innovation by academic staff and provides the support needed for the preparation of teaching materials and the ability to take full advantage of the potential of the new technologies. It offers students specialized training in the use of information tools and resources. In addition, it has an area with technological resources for autonomous learning, providing resources, software, technology, and so on. A sample tutorial may be found at http://biblioteca.upc.es/fullsacces/fulls/Serie5_2_Castella.pdf.

The Teaching Resources Factory provides access to a recommended bibliography, with links, guides produced by the teachers, and access to the library with its catalog and databases and to other Web resources. Among the specific resources of the Factory are sample exam papers with answers, collections of problems with solutions, full texts of complementary articles, legal texts, self-assessment exercises, as well as dossiers, outlines, and theoretical and practical programs.

Another important initiative is that of the library of the Universidad Carlos III de Madrid, <http://www.uc3m.es/biblioteca>, which offers thematic guides with different information resources in the various subject areas (geography, history, mathematics, law, physics, and so on), resource use guides (such as to databases), and literacy tutorials with detailed explanations of the various locations of information (on the shelves, on the Internet, in databases, and in the opac), in addition to providing access to the tutorials for each of the thematic areas.

The library of the Universidad de Sevilla, <http://bib.us.es/>, offers students a series of INFOLIT initiatives, such as guides and tutorials, which serve as learning aids. Below are a few examples of guides and/or tutorials, <http://bib.us.es/guias/menu.asp>:

- How to search for information on the Internet
- How to search for and locate articles in periodicals
- How to interpret citations in a bibliography
- General dynamics of database searching
- How to evaluate scientific journals
- How to compile bibliographical references for electronic documents
- How to compile online references: electronic documents
- A scientific drafting manual
- A discussion of “what is information culture?”
- A tutorial on information searching

Information Literacy Initiatives from the Teaching Angle

Facilitating the development of information skills needs to be a basic goal of any academic institution and starts with the teaching and research staff and continues with the librarians and information professionals. In all courses of study, and especially those in which documentation, general or applied, is a core component, there is a need for INFOLIT programs to instruct students in the development of basic information skills.

All in all, there are only a small number of initiatives in Spain that have been established by teaching staff for instruction in information skills. Those that are most used in the university environment, both by teaching staff wishing to encourage students' autonomous learning and by librarians, are the portals e-COMS, Alfin-EEES, ALFAMEDIA, and IMATEC. These have been financed from national public funds and linked to the Department of Library Science and Documentation of the Universidad de Granada and draw on the participation of teaching and information personnel from other Spanish universities.

These quality-controlled portals represent a unique and pioneering initiative in line with the international INFOLIT standards and are spearheaded by academic staff from Spanish universities. Apart from conceptual information, they contain the following: interactive on-line tutorials, resource guides, practice laboratories, teaching materials, evaluated quality resources, experiences, and case solutions. A succinct presentation of these portals may be found at e-COMS, <http://www.mariapinto.es/e-coms>.

e-COMS is the most important e-learning educational portal in Spain for instruction in information literacy, especially regarding digital resources, aimed at university students, staff, and young researchers. Its objective is to encourage autonomous learning in the areas of the management, analysis, organization, and dissemination of electronic content, with stress on the mastery of skills and competencies of a technological, documentary, procedural, and research-oriented nature. It also offers a carefully selected range of up-to-date electronic resources.

The e-COMS portal is generic and transferable across disciplines and is helpful for all university students who need to acquire skills and training in information literacy, particularly in regard to the management of e-learning content. This initiative is a pioneer project in the field of library science and documentation in Spain and is aligned with the commitment of the Spanish

University Library Network (Red Española de Bibliotecas Universitarias, REBIUN) to promote the creation and integration of useful teaching materials, to promote student information literacy, and to participate in autonomous learning.²⁷

The general aim of the portal is to provide a conceptual and procedural tutorial, focusing on the knowledge and handling of tools for electronic content management and on providing information literacy instruction for students, equipping them with a set of skills and abilities that will prepare them to face the changes of the information and knowledge society. The general aims of the portal are to provide instruction in the following key competencies:

- Cognitive competency: the development of strategies to analyze, synthesize, interpret, and process information
- Technological competency: based on autonomous learning about computer tools
- Documental competency: based on managing information by determining needs, planning searches, using strategies to locate and obtain information, discriminating and evaluating information to make decisions
- Research competency: initiation in basic research techniques and methods for problem solving
- Communicative competency: the development of skills for the communication, participation, and diffusion of information, using synchronous communication tools, forums, and other resources, and incorporating values such as innovation, creativity, quality awareness, and so on

The following objectives are targeted to meet the above goals:

1. To construct an interactive portal for "learning to learn" and to instruct students in information literacy
2. To be a training and information reference portal for students of library science and documentation and of educational psychology, even though the portal was piloted in other specialist areas
3. To train students to develop their analytical and summarizing capacities
4. To provide basic techniques in searching for, retrieving, and evaluating information—learning how to do
5. To teach how to organize and represent information
6. To teach how to use synchronous and asynchronous communication systems in the process of creating and exchanging knowledge

Alfin-EEES, <http://www.mariapinto.es/alfineees/AlfinEEES.htm>

Alfin-EEES is a pilot initiative for the development of the main generic skills linked to information literacy and to train all university students to seek, manage, organize, and evaluate information gathered from a wide range of sources. The aim of Alfin-EEES is to boost the information literacy of those who consult it, multiplying the opportunities for self-directed electronic learning and stimulating such values as innovation, creativity, ethical behavior, and teamwork.

Alfin-EEES is an educational portal targeted to students' global learning process, and it is centered on the reinforcement and acquisition of skills, competencies, and know-how of a

generic nature, relating to all key aspects of the management, access, and use of information. It aims to equip students with autonomy in information handling and the acquisition of new cognitive skills necessary in today's knowledge economy.

The competencies set out in Alfin-EEES are meant to be assimilated by the students using the possibilities offered by the new technologies for e-learning and teaching, specifically hyperlinks, schemes and maps, interactive examples with problem-solving, frequently asked questions that will give solutions to the most problematic questions, e-mail that will facilitate permanent and personalized tutoring, and forums that will provide a space for virtually debating specific subjects and sharing knowledge.

Because of their relation to information management, six blocks of transferable contents have been created in the configuration of the portal's content:

- *Learning to learn*: an explanation of the concept of learning to learn, how to learn to learn, how to be autonomous and in charge of our own learning process
- *Learning to seek and assess information*
- *Learning to analyze, synthesize, and communicate*: how to read better, how to segment the information in order to subsequently reorganize it using the techniques of outlining, graphic representation, and summary, and how to communicate the new knowledge in writing, using graphic presentations while respecting the contribution of the authors whose ideas have been used
- *Learning to generate knowledge*: in-depth study of the processes of creation and innovation, of the principles of scientific thought and of the techniques for organizing

projects in order to familiarize the student with the principal phases of knowledge creation—creation, research, and development

- *Learning to work with others*: the ethical bases for co-existence and teamwork, how to recognize and approach conflict using negotiation techniques
- *Using technology to learn*: introduction to operating systems, office computer applications, communication tools, and the e-learning environments most often used in universities

Each competency and sub-competency uses the same structure for presenting the information. For each competency, a general chart presents the contents and the procedures for learning. The chart for sub-competencies, which is more specific, is very detailed and includes the development of knowledge and specific skills for the training in question, facilitating many activities, recommendations, and resources. The basic chart is based on the theory of meaningful learning and, in general, on the constructivist paradigm as well as on the more general consensus on efficacy and efficiency in learning processes.

It is assumed that the learning process also starts with a correct motivation and meshes the new concepts, skills, and attitudes with previous ones. For this reason, each chart begins with a section on motivation, which, within the context of the materials offered on the Internet and in printed publications, is expressed simply with the subtitle or label "What for?" It is a simple way of showing what the competency is useful for and why the student should develop it; in short, it is a way of explaining its use. The motivation section uses a selected quote from a famous author or a popular saying, by way of a slogan, to introduce the section. Next, clear and concise language is used to indicate the principal reasons why the student should work through the

module in a section entitled "Values." Finally, the objectives sought by studying the unit are stated in a simple way.

Knowledge is divided into declarative and procedural knowledge. Because of this, different sections are included for conceptual or declarative knowledge (knowing how to say) and procedural knowledge (knowing how to do). The material is offered to the students simply with the labels "What" and "How." The aim is to treat both aspects equally and to clearly communicate to the student the importance of balancing both types of knowledge. That is why it was decided to distinguish them graphically and clearly by including them in different tabs. Knowledge is not only expressed in words but also shown graphically in the section "Conceptual Maps." Here the aim is to express the information in another language, to map the concepts, and to provide instruments for visual argumentation.

The "Activities" section always contains a sample problem with the solution and a range of activities proposed to the student in order to develop the competency, sub-competency, or specific aspect in question. The examples and activities are meant to be general in nature or to approach different areas of knowledge in order to show the students models close to their field of experience that they can generalize or specify according to their needs. At least one of the activities is already solved.

Following this, there is a section entitled "Resources," which is aimed at giving the students the possibility to broaden their knowledge of the course contents by offering complementary material, a very select bibliography, electronic documents—tutorials, educational portals, and so on—and other useful resources, particularly computer applications. Finally, an "Advice" section is offered, both for lecturers and students, to help them avoid some

of the most important pitfalls that the authors experienced when dealing with instruction in these topics.

ALFAMEDIA, <http://www.mariapinto.es/alfamedia/index.htm>

ALFAMEDIA is a portal for instruction in multimedia literacy, encompassing the different forms of literacy and the different types of content (conceptual, procedural, and attitudinal) that have been considered to be fundamental and essential for the communication and representation of messages using different languages and media. The portal's content, both conceptual and procedural, is targeted to instruction in generic skills that are vital for all students for the management of information and electronic content:

- *Learning how to learn*: explanation of the concept of learning how to learn and how to learn how to learn—how to be autonomous and to achieve the mastery of one's own learning process
- *Learning how to seek information*: explanation of the nature of an information need, how to express it, how to define the search criteria, and formulate the correct strategies (as in e-COMS and Alfin-EEES)
- Learning how to seek information is the skill most closely related to the individual capacity to express and communicate an information need. Students putting this skill into practice will be able to:

1. Organize their ideas clearly and formulate questions on the subject of search
 2. Associate the object of search with hierarchically structured words and concepts corresponding to the subject of the research
 3. Specify the search objectives in order to decide what resources to use and how much time to invest
 4. Be aware of the logic and structure of the main information sources in the area concerned, such as indexes, library catalogs, digital portals, institutional archives, and so on
 5. Use appropriate language, knowledge, and skills in order to consult resources and retrieve information correctly
- *Learning analytic, synthetic, and communicative skills*: explanation of how to read more effectively, how to segment information with a view to its subsequent reorganization using the techniques of schematizing, graphic representation, and abstracting, and how to communicate new knowledge in writing and via graphic representations, respecting the contributions of the authors whose ideas have been used (as in e-COMS and Alfin-EEES).

Under this rubric, students should be able to acquire the following skills:

1. Incorporate the information obtained into previously existing knowledge in such a way as to relate it to the scientific and social context of the various subject fields

2. Master a technique for the organized handling of the ideas and positions acquired from their reading, integrating them with their own ideas
 3. Summarize selected information so as to present it in integrated fashion and be able to communicate it
 4. Identify the generally used writing style in their area of knowledge and know how to apply the appropriate conventions for the presentation of information
- *Learning how to evaluate information:* explanation of the ease and freedom with which users can publish content on the Internet and of the need for students to have criteria that can help them filter electronic content and gauge the veracity, credibility, reliability, and, all in all, the quality of the information found

Under this rubric, students should be able to develop, among other things, the following skills:

1. Recognize the degree of authoritativeness, veracity, and objectivity of the information found
2. Distinguish information based on evidence and objective data from mere opinions
3. Be aware that the elements that confer value on a resource are related primarily to its content and not necessarily to the format in which it appears; learn how to generate knowledge, acquiring skills to comprehend the information cycle,

including the generation, processing, organization, dissemination, and use of information

4. Learn how to work together regarding the ethical basis of collective living and work, the principles and techniques of group work, and respect for intellectual property and copyright

5. Use technology to learn, which involves an introduction to operating systems, office applications, communications tools, and the e-learning environments most used in Spanish universities

IMATEC, <http://www.mariapinto.es/imatec/>

IMATEC is an e-learning portal for autonomous learning by students and all who wish to go deeper into the issues raised by the documentary analysis of images. This portal acknowledges the crucial role played by images around us and especially on the Internet, as well as the difficulties surrounding their proper systematization and use. The plethora of content and the diverse nature of the sources necessitate professional mediation based on the careful selection of representative material via the use of indexing terms and content summaries.

IMATEC is, at its present pilot stage, centered on the documentary analysis of the content of photographs, offering a set of descriptions based on content attributes for the representation and retrieval of information. This e-learning resource is based on organized and systematic autonomous learning, with the aim of developing an independent and progressive process of lifelong acquisition of skills, in both declarative and procedural terms. What is proposed is a

documentary methodology, which has been very little explored in the working environment of librarians and documentalists, that is grounded in the expressive power of conceptual maps as a visual graphic resource for the representation of the significant content of new documents, especially in the Web environment.

The portal is divided into four sections:

- About IMATEC: philosophy, mission, work team, conditions of use, and users
- Content, which is organized into six categories:
 1. *Multimedia culture*: characteristics of multimedia culture and specificities of its communication paradigm
 2. *New documents*: classification of new documents, specifying their properties and the main elements for their analysis; study of images and audiovisual, digital, and multimedia documents
 3. *Analysis of new documents*: characteristics and elements of analysis specific to each document, with specific types of formal and content analysis
 4. *Methodology for the analysis of still images*: the different phases for analyzing still images, stressing denotative analysis and visualizing Web examples for a number of significant aspects that need considering
 5. *Techniques of analysis*: study of the main analytic operations, such as indexing and summarizing of new documents, with respect to both still images and audiovisual documents (television, cinema, and electronic resources)
 6. *Retrieval of new documents*: identification of procedures for retrieving images and presentation of a selection of image search engines

For each category, information is offered concerning: a) objectives: that is, the main elements for learning, especially regarding competencies and skills; b) concepts: schematic expression of the principal learning objects; c) maps: visual and graphic representation of the main learning concepts and their semantic relations; and d) resources: complementary and support elements for curricular learning and bibliographical and electronic resources for each category of study, with important links and a brief content note, a glossary defining the fundamental concepts, and a section for FAQs.

The portal also includes a practical section labelled "Laboratory," consisting of guidelines regarding methodology, a Web form for image analysis with an information section on how to go about it and defining the different fields, and an "image bank" that is a careful selection of images with cases handled by expert analysts and particular stress on content analysis.

Using INFOLIT e-Learning Portals in the Classroom: Implications and Further Views

The goal of an e-learning portal for information literacy is to provide training and instruction in the skills and competencies needed to use, manage, and take full advantage of information by any member of the university community, including teaching staff, librarians, students, graduates, and young researchers and, thereby, contributing to lifelong learning. An INFOLIT e-learning portal, such as e-COMS, Alfin-EEES, ALFAMEDIA and IMATEC, may be a useful and powerful tool if it is indeed integrated into meaningful learning experiences. Meaningful learning is:

- *Active:* As we interact with the environment, we manipulate the objects within it and observe the effects of our manipulations.
- *Constructive:* Activity is essential but insufficient for meaningful learning. We must reflect on the activity and our observations and interpret them in order to have a meaningful learning experience.
- *Intentional:* Human behavior is naturally goal-directed. When students actively try to achieve a learning goal, which they have articulated, they think and learn more. Articulating one's learning goals and monitoring one's progress are critical components for experiencing meaningful learning.
- *Authentic:* Thoughts and ideas rely on the contexts in which they occur in order to have meaning. Presenting facts that are stripped from their contextual clues divorces knowledge from reality. Learning is meaningful, better understood, and more likely to transfer to new situations when it occurs by engaging with real-life, complex problems.
- *Cooperative:* We live, work, and learn in communities, naturally seeking ideas and assistance from each other and negotiating about problems and how to solve them. It is in this context that we learn there are numerous ways to view the world and a variety of solutions to most problems. Meaningful learning, therefore, requires debates and group experiences.²⁸

The recent implementation of the portals that we have described as pioneering initiatives (indeed, to date they are the only ones) with respect to information literacy in the Spanish university context is such that it is still too early to evaluate their impact and results. They have

already been used as teaching resources for stimulating the learning of information skills in a number of degree courses offered in Spain. Specifically, e-COMS and Alfin-EEES, which are useful for the development of information competencies and skills of a generic nature, have been applied in classes in the areas of library science and documentation, education sciences, business administration, and translation and interpretation.

Certainly, it would be useful to have statistics or other types of qualitative data on the level of use and the measured impact of the portals described in order to evaluate their effectiveness and as a tool for improvement. Regrettably, it is still early and such results are not available yet, highlighting that there is still much to do regarding how information literacy is currently being approached in Spain.

ALFAMEDIA and IMATEC are resources of a more specific nature, conceived in an applied context for specific communities of practice, namely students of audiovisual communication, advertising, and public relations (information sciences). They reflect the need to develop INFOLIT proposals that apply to specific needs of communities of practice, as advocated by Tuominen, Savolainen and Talja and by Maybee and as we have noted.

The use of these portals will allow for review, evaluation, and continuous improvement. At the present preliminary stage of the classroom use of these information literacy portals, we would observe that:

- INFOLIT e-learning portals allow students to learn important information skills at their own pace, both inside and outside of traditional class time. Online tools provide a common basis for students and allow teachers to make classroom instruction sessions more student-centered and advanced.

- The use of these kinds of INFOLIT portals provide many benefits such as:
 1. More instruction opportunities (more content and more applied reinforcement)
 2. Multimode sessions: online and offline or blended mode, both group and individual
 3. More emphasis on advanced, transferable information skills
 4. Higher-level critical thinking on the evaluation of resources and refining search strategies on the part of the students

Conclusion

Information literacy clearly forms part of the effort to develop the generic competencies of university students related to the cycle of the production, communication, retrieval, and use of knowledge in a context of social commitment and teamwork with the help of the new technologies. As diverse institutions and declarations have stressed, information literacy lies at the very core of lifelong learning, essentially because it empowers people in all circumstances to seek, evaluate, use, and create information effectively in order to achieve their personal, societal, occupational, and educational goals. It is a basic human right in a digital world and promotes the social inclusion of all communities. Also, it is essential to remember that INFOLIT extends beyond current technologies to encompass learning, critical thinking, and interpretative skills across professional boundaries and empowers individuals and communities.

Given its enormous relevance, information literacy should preferably be embedded in any curriculum design, allowing students ongoing interaction with and reflection on information competences, skills, and values. In this context, the role of libraries, both academic and public, is paramount. Their development as resource centers for learning and research is a vital tour de force. An essential strategic element is the integration of libraries into information, media, and information literacy programs. Libraries provide resources and services in an environment that fosters free and open inquiry and serve as a catalyst for the interpretation, integration, and application of knowledge in all fields of learning. At the same time, in an academic context, the use of INFOLIT e-learning portals in higher education, such as those we have described in this paper as initiatives developed in Spain, should be taken into account since these are a positive contribution for the progressive reinforcement of information literacy skills. Despite the generic need for information literacy, it is also part of the specific competencies of any community of practice; and, in this, sense we believe that much effort still needs to be made in order to help to promote real user-centered information literacy instruction.

Notes

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