Monograph "Information and Digital Competencies in Higher Education"

ARTICLE

# Evaluation of Information Literacy Programmes in Higher Education: Strategies and Tools

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## Abstract
On the basis of transformations occurring in the educational model as a consequence of the shift from "producing" to "generating" knowledge, the impact of the digital divide threat, and the rise in "corporate social responsibility" and information literacy, this article analyses European Union policy actions aimed at fostering social inclusion. In the light of the digital divide, social inclusion is seen as a process that places primacy on information competencies. In the context of this competency phenomenon, evaluation has become an extremely important topic, both socially and educationally. Consequently, the article also analyses the concept, approach, design, types and tools of evaluation that can be effectively applied to information literacy programmes. Finally, a proposal is made for the incorporation of evaluation and its tools into an information literacy programme.

## Keywords
information literacy, information literacy evaluation, information literacy indicators, information literacy training programmes

## *La evaluación de los programas de alfabetización en información en la educación superior: estrategias e instrumentos*

### *Resumen*
*A partir de las transformaciones en el modelo educativo, por el cambio desde «producir» a «generar» conocimiento, así como por el impacto de la amenaza de la brecha digital, el auge de la «responsabilidad social corporativa» y la alfabetización en información, se analizan las acciones políticas de la Unión Europea para fomentar la inclusión social frente a la brecha digital, como proceso que otorga una función primordial a las competencias en información. Este fenómeno competencial provoca que la evaluación adquiera una relevancia social y educativa de primera magnitud, por lo que se analiza su concepto, modalidad, diseño, tipificación e instrumentos, como forma de realizar una aplicación eficaz en programas de alfabetización*

*en información. Se presenta, finalmente, una propuesta de integración de la evaluación y sus instrumentos en un programa de alfabetización en información.*

***Palabras clave***
*alfabetización en información, evaluación de alfabetización en información, indicadores de alfabetización en información, programas formativos de alfabetización en información*

# 1. Introduction

For observers, analysts and scientists, it is clear to see how the evolution of the information society towards the knowledge society has brought about a significant change in the educational model, at every stage and level, and this is particularly demonstrated by the European experience of the European Higher Education Area (EHEA). There is an extensive body of literature analysing the reasons, factors, elements and impact of an educational model that has become competency based. Such an educational model integrates information and communication technologies (ICTs) into learning management systems (LMSs) for effective and significant learning, tries to incorporate the potential benefits of Web 2.0 and even social networks in order to turn cyberspace into an educational space, and explores teaching methods that go beyond e-learning.

Perhaps the most important aspect of the educational model, for the purposes of this article at least, is the decisive transformation that has occurred in relation to the educational outcomes that students are expected to achieve. This comes as a consequence of the new inferential process in which information leads to know-how: the aim is not to "produce" knowledge (the acquisition of watertight know-how, ready to be copied), but to "generate" knowledge. This refers to a student's constant capacity to "be innovative" with knowledge already acquired and possibly expressed in a document that can be constantly updated. This is a reflection of lifelong learning (it allows progress to be assimilated and applied, turning knowledge into know-how) and of collaborative learning. Editing and publishing hypertext, which is transformed into a hyperdocument, allows content to be constantly re-edited and re-published, thus reflecting innovative know-how.

The criteria selected here to illustrate the resolute transformation of the educational model conform to the convergence of three important factors:

- The real and tangible threat for all societies represented by the widening of the digital divide; various States have initiated information policies to foster social inclusion and, very significantly, the European Union has made 2010 the European Year for Combating Poverty and Social Exclusion (*Official Journal of the European Union*, 2008). Education, with an effective and efficient integration of ICTs as a means of social cohesion, becomes part of the agenda for policy actions.
- The scope reached by what is commonly known as "corporate social responsibility" (CSR), described by the International Labour Organisation (ILO) as an approach taken by enterprises based on a comprehensive group of policies, practices and programmes guided by the respect to ethics, individuals, communities and the environment. The result has been the emergence of a culture of evaluation to encourage a system of sustainable socioeconomic progress and development through high-quality governance.
- The growing need to apply information literacy because of its essential programme-related requirements: information literacy for citizenship, information literacy for economic growth, and information literacy for employability (Johnston & Webber, 2007, p. 499) Reading, writing and learning via the Internet has become a tangible phenomenon of economic and social development.

# 2. The Challenge of Social Inclusion and Evaluation

The three factors enumerated above illustrate how the relevant political and academic authorities ought to approach education and its models from a different angle and consider them as tools for social inclusion. Information

literacy undeniably provides an appropriate viewpoint in this respect.

As far as the European Union is concerned, the relationships between information education and the digital divide have followed a very significant course since the Lisbon Strategy was defined in 2000. When the European Union became convinced of the fact that education of this type was a prerequisite for the development of an information society for all, the first development plan – the eEurope 2002 Action Plan – identified the digital divide risk for the infrastructure aspect of physical access to ICTs. The realisation that access alone was no guarantee of development led to the eEurope 2005 Action Plan, which focused on exploiting content and e-services. This objective made the need for an intelligent and effective use of digital content more pressing, particularly as such content could grow exponentially and lead to "infoxication" or content overload. This concern, together with an interest in designing qualitative indicators on the one hand, and a potentially destabilising impact of ICTs on social fabric on the other, led to the publication of the i2010 strategy, which began to pay attention to issues such as e-health, digital literacy, learning and potential divides.

The Lisbon Strategy and its subsequent plans have been very clear about the risks of a divide that information competencies, or a lack of them, could cause. The innovative application of ICTs to education causes the same divide that the application of any technology has caused throughout history (Albarello, 2008). The European Commission became aware of this and subsequently published the 2006 Riga Declaration. This declaration pointed out the inherent risks of ICT development and outlined the meta groups in which the gaps were most significant (and therefore a causal factor of the digital divide): the elderly, people with disabilities, women, lower education groups, the unemployed and "less-developed" regions, whose shortcomings had gradually been identified (Raya, 2007).

On the basis of these identified meta groups, the European Union began to approach the divide from a variety of programme-related angles. The aim of this was to ensure that each action would have an impact on more than one meta group as a way of optimising effort: guaranteeing universal, affordable access to the Internet by promoting the profitability of coverage for service providers, thus benefitting "less-developed" areas (rural areas), the unemployed and the elderly; implementing and strictly observing web accessibility standards in order to foster use by people with disabilities and the elderly; e-skills training to enable people to use the tools, involving extensive basic training for people with disabilities, the elderly and lower education groups; digital competency for a comprehensive, knowledge-generating use of Internet resources, which is a relevant educational action for all meta groups. Regarding women, the European Parliament had already received and approved the *Report on Women in the New Information Society* (European Parliament, 2003), which dealt with specific actions. These had a generic bias and did not focus solely on an analysis by gender.

Through Eurostat (2009), the European Commission has since developed tools to monitor this divide, and has promoted indicator models and benchmarking systems to measure the development of the information society. In terms of the digital divide and social cohesion, there is now another important "front", which is immigration and the ensuing multicultural nature of society. In this respect, very important intercultural actions are being carried out by public libraries.

The i2010 strategy and its actions have begun to be analysed by the i2010 High Level Group (i2010 High Level Group, 2009). The Group found that some progress had been made, though it highlighted the fact that a second digital and social divide was emerging: having searched for, retrieved and accessed Internet resources, people subsequently need to acquire valid information, knowledge and know-how depending on the purpose and extent to which Internet resources are used. Competencies had thus become visible, not only in formal education (EHEA), but also in non-formal and informal education. This meant that digital competencies first, and information competencies second, had also become visible, objectivisable and applicable as an ideal way to get know-how from information. There was an interesting academic and technical debate on the concept and application of competencies, both professionally and scientifically, which had an inevitable impact on the design of digital and information competencies.

Thus, progressively, skills and abilities (which draw on and take the form of aptitudes, attitudes and capacities) for information education were arranged in such a way as to arrive at competencies. These competencies are understood as being the assimilation of pieces of knowledge gained from using skills (integrated by the application of abilities capable of generating aptitudes and capacities in various fields) that are then put into action to resolve a specific problem in a specific context or situation in order to arrive at the most effective decision or action. Consequently, all of these together are evidence of know-how.

Digital competencies, therefore, refer to the effective use of ICTs for knowledge and know-how on the Internet. From a more cognitive aspect, the complement to these

are information competencies, which refer to an effective use of standards stemming from skills and abilities in the field of information and documentation. When these competencies are structured into standards, plans and programmes, they start to become known as "information literacy" (Marzal, 2009). This term, which is not widely accepted in all spheres, makes specific reference to the need for digital reading and writing in order to become an effective part of the Semantic Web or the Knowledge Web.

Evaluation is implicit in this new reading and writing competency for a number of reasons: The new reading and writing competency means that a student is competent at selecting and organising Internet content through a robust capacity to evaluate this content. When an information literacy programme is set up, it is crucial to establish an evaluation system, for which evaluation particular to knowledge areas is of no use because information literacy is a generic or competency-based subject. In this context, a qualification – albeit evaluative – means very little, because only a 100% attainment is valid (the competency has been attained). If an institution develops and applies an information literacy programme, it must possess the means to measure the impact and monitor the successful rollout of the programme, which is not warranted by the fact that it is part of the curricular design of a science or discipline. Political, academic and administrative authorities require evaluation tools for decision-making processes, to promote and maintain information literacy policies, and to provide evidence of their social-inclusion effectiveness (Marzal, 2008).

This clear tendency towards evaluation is becoming widely accepted socially. In the 2009 report of PISA (Programme for International Student Assessment) dedicated to reading, the questionnaire included questions to measure digital competencies. Moreover, governmental authorities and bodies have assumed the need to establish models to evaluate ICT and information competency policies. There is a whole range of bodies whose aim is to develop the information society and whose mission is to evaluate progress with appropriate tools in order to issue annual monitoring reports for progress and penetration among the population, paying special attention to pockets of digital divide. Due to their quality and topicality, the most important international documents issued in 2009 were the *Guide to Measuring the Information Society* (OECD, 2009), *Measuring the Information Society* (ITU, 2009) and the *Lisbon Manual* (RICYT, 2009). A number of Spanish reports stemming from these were produced by ONTSI (Spanish Observatory for Telecommunications and the Information Society), Red.es and Plan Avanza (Information Society Strategy for Spain). In addition, the Fundación Orange produced a report entitled *España 2009* (Fundación Orange, 2009) and Telefónica issued its annual reports. There is, therefore, an evident interest in measuring and evaluating the information society's progress, but what type of evaluation should be applied?

## 3. Evaluation and Tools for Competency Programmes

Evaluation as a process of improvement and betterment must be linked to quality. It must also have the necessary tools to measure the process of qualification. These tools need to be effective, objective, and useful for statistical processing purposes, enabling results to be effectively interpreted for decision-making processes. The problem arises when evaluation has to be transferred to an object like information literacy, which is generic and competency-based, and does not refer to a knowledge area. Further complication is caused by a number of other issues, such as not defining whether certification or accreditation is required for the attainment of competencies, and not clearly affiliating them to a department for curricular design (affiliated to the library, without any impact on the academic curriculum). As a consequence of the latter, there is no preparatory instruction or progression function in a student's degree curriculum, despite the imperative need for integrated cooperation between the subjects and educational goals of the organisation in which information literacy is offered.

However, more and more organisations should incorporate information literacy programmes. There is, therefore, a need to develop evaluation methods and tools to assess their positive impact. In Spain, this need is becoming peremptory in libraries in educational settings, such as university, school and public libraries. It is also becoming patently clear in recommendations and documents issued by international bodies like the IFLA (International Federation of Library Associations and Institutions) and UNESCO, as well as in the activities of other countries' associations like the IIL (Institute for Information Literacy) and the NFIL (National Forum on Information Literacy) in the United States, the ILCOPSU (Information Literacy Community of Practice at Staffordshire), the SCONUL (Society of College, National and University Libraries) and the JISC (Joint Information Systems Committee) in the United Kingdom, NordINFOLIT in Scandinavia and ANZIIL (Australian

and New Zealand Information Literacy). Many of these organisations have proposed evaluation models allowing questionnaires and surveys to be developed, which have been applied to information literacy actions in various areas and institutions. This is a logical trend, since evaluation is a constituent, essential part of information literacy (Warner, 2008, p. 13). Nevertheless, these initiatives fluctuate between proposals based on models and methods, and their immediate application in the form of questionnaires and surveys. However, this raises two questions: How can students on a literacy programme be evaluated? And how can the institution they are studying at be evaluated?

As has been pointed out, the referential element of evaluation is quality. This element is covered in ISO 9000:2000 and is identified by the degree to which goods and services offered to customers meet their expectations, in accordance with the appropriateness and conformity of such goods and services to stipulated standards. From this point of view (replacing customers with students), quality is not a new phenomenon in education. What is new is the fact that educational and training institutions are now interested in obtaining ISO certification and, in particular, ISO 9001 or ISO 9002 certification (standards grouped under ISO 9000). Although this has caused some controversy, many of them consider that these indicators can have a very positive impact on academic outcomes and bestow prestige on an institution (Pinto, Balagué & Anglada, 2007). Evidence of this is what has been termed the "managerial university". This type of university focuses on adopting business management values, techniques and approaches (Sánchez & Elena, 2007). This approach means that all the activities of public institutions, and educational institutions at all levels (including their libraries), should engage in a commitment to quality, for which the EFQM (European Foundation for Quality Management) model is followed. From this point of view, an information literacy programme, as a service, has an evaluation model.

Attaching quality and evaluative scope to an information literacy programme as a service raises the question as to whether or not accreditation or certification is worthwhile, even though it is a well-refined process in libraries, which have their own methods, ways and documents (Jorge, 2007). The creation of evaluation and accreditation agencies as part of this whole movement, such as ANECA in Spain and its counterparts in the regional context, have raised the stakes of the phenomenon. Accreditation seeks expert, public recognition of the fact that an institution possesses the necessary standards, through verifiable evidence, to provide a quality service through a standardised process. Certification aims to verify that the institution contemplates an evaluation and revision system to ensure that the services the institution provides are programmed; these services are the ones that its users demand, and the institution must assure both service quality and user satisfaction. The debate on the best system for evaluating information literacy has existed and been evidenced in IFLA's Information Literacy Section. Elsewhere, there are initiatives on best practices for information literacy programmes, such as those published by the IIL, the AASL (American Association of School Librarians), the ARL (Association of Research Libraries) and the ACRL (Association of College and Research Libraries), and accreditation agencies have not taken long to emerge. Among others, we find the Middle States Commission on Higher Education (Neely, 2006).

However, information literacy is a competency-based specialty for knowledge and know-how, meaning that an "interpretation" of both accreditation and certification is required. In its evaluative expression, it would seem very plausible that an information literacy programme should have accredited recognition by bodies and/or associations specialising in information literacy. The aim of such accredited recognition would be to ensure that the programme is capable of offering quality competency training. Evidence of this would come by way of a certificate for students, demonstrating that they have attained the competencies stipulated in the competency objectives of the programme's instructional design.

This accredited and/or certified competency-based expression should, however, respond to an evaluation design that is appropriate and particular to information literacy. In order to provide an appropriate response, it is necessary to make another conceptual clarification: evaluation is understood as a means to determine how effective an information literacy programme is in terms of developing students' knowledge and competencies in accordance with its objectives, and also as a means to improve the programme itself; assessment is an evaluation scheme that considers not only knowledge and competencies, but also attitudes, values, and skills acquired throughout the programme. In the same way as for evaluation documentation (accreditation or certification), an information literacy programme should not be selective about either design. Rather, it should incorporate both. Indeed, the tools for evaluating information literacy programmes should have a dual dimension: first, it should be programme-related evaluation for the institution (evaluation), using indicators; second, it should be educational evaluation for the students (assessment), using diagnostic questionnaires at the start of the programme, and competency questionnaires at the

end. Both evaluations should be incorporated into an evaluation of results.

Elements applicable to evaluation include parameters or categories. These serve as a framework for a more effective interpretation of the data supplied by the indicators. Evaluation also requires procedures, whose methods are consistent in terms of the way they are applied to categories and their indicators. It would seem clear that, in an information literacy programme, the categories should be structured on a scale that progressively articulates skills, abilities and competencies, each with their own indicators, to measure and evaluate a student's level of expertise in each of these categories. The procedure, based on a method, deserves some thought because, even though quantitative methods are very well developed (and particularly so for ICT penetration), qualitative methods are much more expedient due to their competency-based nature. Indeed, qualitative methods are very useful for evaluating attitudes, assessments and motivations; they alloy trends to be diagnosed and, moreover, they get the population to which they are applied much more involved (Viñas, 2004).

Furthermore, the evaluation of information literacy programmes should have a clear reference to an educational approach; that is to say, face-to-face, blended or e-learning. The competency-based nature of information literacy in digital environments advocates their application to LMSs, meaning that evaluation approaches to e-learning are useful: socioeconomically, to evaluate the benefits of a programme; technologically, to evaluate the excellence of an LMS; educationally, to evaluate the effectiveness of learning construction by a student as a consequence of interaction with the content. These approaches are expressed in a number of evaluation principles, including interiorisation (mastery of the technologies), prioritisation (ability to select the ideal ICT for learning) and reintegration (the ability to master the language of ICTs to make the best use of them). These principles could become suitable indicators (Colás, Rodríguez & Jiménez, 2005).

## 4. Tools for Evaluating Information Literacy Competency

There have naturally been a number of proposals for evaluating information literacy. These include the classification proposed by the IFLA (diagnostic, formative and summative evaluation), the most relevant aspects that need to be evaluated for the ACRL (programme and teaching staff evaluation, student outcome evaluation and good practice transferability), and the evaluation criteria for good practices of the IIL (programmes, attainment and attainment programmes). There have also been some very interesting reflections on the topic, like the one made by B. G. Lindauer, with three areas particular to information literacy evaluation: the learning environment for both formal education curricula and non-formal and informal training courses; programme components referring to the existence of opportunities, their scope, curricula and evaluation; learning outcomes for student performance, evaluating their products throughout the programme (Lindauer, 2006). A number of other appropriate methods for evaluating information literacy have been pointed out, as published by Licea (2007).

On the basis of the evaluation design, as mentioned earlier, there are two ideal tools for evaluating and assessing an information literacy programme: questionnaires for assessment, to effectively process trends and perceptions; indicators to effectively process statistical factors. We should recall that each tool is based on quantitative and qualitative processing methods.

Indicators are understood as being a metric for measuring specific variables or conditions in order to analyse a phenomenon and its evolution, in that it processes data that contain a great deal of information, with reference to a general interpretation structure. When applying indicators, the approach and perspective taken to measure and evaluate the phenomenon are very important. For educational environments, the perspectives for information literacy pointed out by the OECD therefore appear to be appropriate: context of reference (strategic position of programme accreditation or certification), system potential (quantity and quality of programme resources), processes (planning, methodology, plan design and programme management), outcomes (attaining the objectives of the competency and its benefits).

The application of indicators requires a classification of several categories to establish effectiveness criteria:

- Situation and diagnostic indicators: for evaluating the planning of programme implementation, identifying deficiencies and dysfunctions in order to improve the design.
- Monitoring indicators: for evaluating the effectiveness and efficiency of programmes in order to improve the process. Infrastructure quantity, quality and effectiveness are relevant criteria.
- Outcomes/Results indicators: for verifying the fulfilment of the objectives and evaluating their benefits. Efficiency, coverage and impact are relevant criteria.

The gradual definition of measurement initiatives, methods and models for evaluating information literacy has given rise to a proposal for specific evaluation tools with its own methodology (Emmet & Ende, 2007). In 1997, and inspired by a Wisconsin Ohio evaluation programme, SAILS (Standardized Assessment of Information Literacy Skills) began to be developed. It was based on ACRL and AASL standards for evaluating information literacy programmes by level. For its part, the company Educational Testing Services developed the iSkills test, comprising a set of questions aimed at demonstrating a student's mastery of ICTs and information literacy by solving specific problems. In Australia, R. Catts has promoted the CAUL (Council of Australian University Librarians) Information Skills Survey (based on CAUL/ANZIIL standards), whose aim is to identify students' competency levels in specific academic areas, so that they can be used for decision-making purposes by universities and faculties, in their training programmes, as an indicator of the institution's quality. In the Spanish setting, worthy of note is the ALFIN-HUMA project led by M. Pinto, which is clearly applicable to the higher education environment.

As a global response to these initiatives, account should be taken of R. Catts & J. Lau's conceptual framework paper entitled *Towards Information Literacy Indicators,* published by UNESCO, Paris, in 2008. The project was put forward as a conceptual framework with a list of indicators for measuring information skills on the basis of indicators that had already been designed and had shown themselves to have a certain evaluative worth, such as the LAMP and PISA programmes, and the questionnaires of the UNESCO Institute for Statistics, the OECD, the DHS and the ILO. The orientation proposed for the indicators is significant, since they are directly related with the benefits expected from information literacy competencies, such as development, health and welfare, civil society, higher education and employability. Also very interesting are the generic indicators such as oral tradition, ethics and equality (gender, language, economic and political impact and constraints).

This set of initiatives for designing models, applying methods and managing systems of indicators, and for information literacy programmes also, has begun to consider the possibility of coherent analysis and interpretation problems. This has led to the creation of indicator model convergence bodies, such as the Partnership on Measuring ICT for Development, whose aim is to publish standards for indicators that allow them to be compared. Emphasis is placed on their international scope, reliability and comprehensibility, in order to ensure that they have greater analysis and interpretation power.

## 5. Incorporation of Evaluation Tools into an Information Literacy Programme

The scope and relevance of information literacy has become so clear for political, administrative and academic authorities that turning it into a subject for formal education (it has already been incorporated into the higher education curriculum, and not only in the documentation discipline) is now a reality in Spain. In 2001, Johnston & Webber offered the following classification, which corresponds to information literacy as an academic discipline according to Becher & Trowler's model: a soft applied discipline, in that it is grounded in theories that come from other sciences, of which it is an auxiliary part; its aim is to prepare citizens for managing and taking action in society; its methods are qualitative. Without a shadow of a doubt, the scientific principles, laws, standards, object, objectives, field, methods, methodology and research lines and paths have now been defined for information literacy as an academic discipline. Research teams and projects, conferences and scientific publications are evidence of this unstoppable advance.

Given this situation, it would seem useful to put forward an evaluation proposal for an information literacy programme. The programme arises from cooperative endeavours between the company Baratz and several lecturers in documentation at Carlos III University in Madrid (Miguel Ángel Marzal, Mercedes Caridad & Pablo Parra). The context for this cooperation is one of the lines of research of the ACRÓPOLIS research team at the mentioned university, focusing on information literacy and the development of the Baratz Absys.edu platform. This is an attempt to incorporate the social networks of library 2.0 and the semantic tagging of educational web resources into educational digital libraries (CRAI-Learning and Research Resources Centre and CREA-Learning and Teaching Resources Centre), with their content management tools.

The instructional context elements of the information literacy programme are: a blended educational approach (Moodle platform); an educational space, educational libraries (university, school and public libraries); a competency model, Tuning; information literacy standards, ANZIIL; target audience, e.g., teaching staff, librarian-lecturers with information literacy responsibilities and students (formal and non-formal education); teaching duration, six weeks.

The instructional design of the programme is neither projected as an e-learning course or a tutorial, nor as a web resource on an educational "site". The programme

has been designed on the basis of arguments associated with educational hyperdocument principles (interactivity, associativity, multisequentiality, virtuality, dynamicity) and, essentially, in accordance with the properties, characteristics and elements of learning objects.

The programme structure is divided into five training modules: module 1, *basic competencies*, for skills and abilities to search for and retrieve ideal resources for knowledge generation and, above all, for collaborative learning; module 2, *digital reading*, for abilities to use content management tools and to evaluate educational digital content; module 3, *content assimilation*, through the edition of concept maps and their application to web environments; module 4, *knowledge generation*, through the edition of knowledge and content using Web 2.0 tools; module 5, *digital writing*, which demonstrates know-how through the edition of learning objects.

Given its paramount importance, the programme incorporates *evaluation* as a substantial component, both programme-related evaluation for the institution and educational and diagnostic evaluation for the students, applying indicators to the former and questionnaires to the latter. The programme incorporates a module 0, *competency recognition*, with a diagnostic questionnaire to identify information literacy competency deficiencies. The purpose of this is to ensure that the programme does not conclude with a qualification, as in academic areas referring to knowledge and thought, but with questionnaires about competency attainment, evidencing that excellence in information literacy has been reached on completing module 5. Finally, the programme incorporates an impacts and benefits indicator for the programme at the institution, for the purposes of programme improvement and implementation, and educational strategy decision-making.

The questionnaires and indicators are the outcome of a research project on editing and publishing teaching materials, approved and funded by the Spanish Ministry of Education (approved in 2008 and funded until June 2009). The project had three phases: the creation of an indicator model for information literacy competencies; the development of questionnaires based on the indicator model, referring to the indicators, for effective competency processing and the effectiveness of educational analysis and interpretation; the application of questionnaires to Spanish primary and secondary schools in Asturias, Madrid and Navarre.

The indicator model was structured into three parts, in accordance with a scheme of capacities: *skill indicator category*, basically referring to a reader's capacities in terms of accessing and using technologies of resources that are read, meaning that the protagonism lies in the interaction of the reader with the resource; *ability indicator category*, referring to a reader's capacities to acquire knowledge and know-how through a grammatical mastery of the discourse, meaning that the protagonism lies in the reader's mastery of the inferential process of reading to generate knowledge, a procedural protagonism; *competency indicator category*, referring to the reader's capacities resulting from a mastery of information literacy standards, corresponding to the protagonism of a user-student, given that his/her competencies are evaluated in terms of lifelong learning autonomy, with inherent mechanisms, values and ethics. The structure of each indicator was designed so that each indicator was classified within its category. Each one has a label, a definition, definition milestones, objectives and source data, which, at all times, correspond to the data obtained after applying the questionnaire, which led to phase two of the project. The structural design was inspired by the indicators of the UNESCO Institute for Statistics, *Guide to Measuring Information and Communication Technologies in Education*. The aim of these indicators is, therefore, to serve as a basis for decision-making and for the evaluation of monitoring.

After consulting information literacy evaluation methods, model and tools, the questionnaires gave rise to the creation of a template reflecting the competency objectives that should be evaluated by the indicator model. These were categorised into skills, abilities and competencies. On the basis of the competency objective template, the competency questionnaires were designed, as a tool, in such a way that each objective led to several questions, in accordance with the interests and intellectual maturity of the institution and the students. Consequently, the model is scalable. A series of questions that vary in number and difficulty can be designed for each "course" of the programme, always in accordance with a competency template and an interpretation provided by an indicator.

In any event, the definition of principles conditioning the evaluation model is based on an insistence on generic aspects for the particular measurement of each object of the indicator, an object of the indicator being understood as a phenomenon on which action is taken. These generic aspects, which give a generic bias to the indicator model, are the insistence of the training function and the evaluative measurement. Moreover, it should deal with the intensity of the evaluable phenomenon as a means of highlighting priority actions that need to be taken. The properties of the indicators should not, therefore, simply focus on measuring the degree of competency fulfilment

and success, but rather on the transfer of the results of these actions to the educational community, which is a basic element of effectiveness and progress.

## Conclusions

For progress towards a knowledge society, which aims to be socially cohesive and inclusive, evaluation is a fundamental element for defining strategies and deciding on actions that need to be taken. However, evaluation is a complex phenomenon, and its incorporation into information literacy programmes is something that should be very well thought out. At the same time, a dynamic approach needs to be taken because the incorporation of these programmes into the educational activities of libraries and the educational curriculum means that the challenge is immediate. Evaluation has become an extremely important topic in the field of information literacy, and it should also become a priority line of research. The incorporation of evaluation into information literacy programmes should not be reduced to a qualification system; rather, it should outline a specific model for competency attainment. Evaluation models, methods and tools should undergo a concerted process of convergence and confluence, and become a second line of priority research. To that end, it is necessary to develop specific research projects and cooperation between research teams to generate standards and questionnaires referring specifically to educational digital libraries (CRAI and CREA).

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