Undergraduates' information literacy competency: A pilot study of assessment tools based on a latent trait model

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ABSTRACT

This study of information literacy focuses on opinions, evidence, reviews, and data analysis from a sample of Spanish university students from three major fields of study (information/documentation, psychology, and translation/interpretation). The results have been tabulated from the subject area of documentation alone, as this subject is shared in the students' curricular planning. This study highlights students' attitudes, motivation, and evidence with regard to information literacy (IL) competencies. The standardized statistical model for evaluating latent traits was used to capture the structure of such capabilities. Data collection was performed using the IL-HUMASS (subjective) and the EVALCI-K (objective) questionnaires. The purpose is to achieve a better understanding of how IL competencies—approached from both objective and subjective perspectives, and grouped into the categories of searching, evaluation, processing, and communication/dissemination of information—are interrelated. In this way, by combining objective (knowledge and skills) and subjective (belief-inimportance and self-efficacy) values with regard to IL competencies, the processes of teaching and learning may be better understood and therefore better integrated within the curriculum framework. Patterns of correlation and/or causality between observed and latent competencies are explored.

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1. Introduction

In recent years, a number of initiatives have sought to identify the core competencies that citizens need to acquire and cultivate concerning knowledge, skills, attitudes, and motivation required for an effective participation in the new knowledge society. A comparative study conducted by Eurydice (2002) in countries of the European Union has shown that "the imbalanced acquisition of key competencies is generally seen as the main reason for social division and the disparities in income that lead to marginalization and, ultimately, social exclusion" (p.12). Accordingly, citizens should be prepared to accept the philosophy of lifelong learning, which enables them to cope with technological changes, thus avoiding the danger of social exclusion. Educational curricula have to focus not only on knowledge acquisition, but also on the mastery of appropriate competencies to be applied in different contexts. "Postsecondary education has to prepare graduates with new skills, a broad knowledge base and a range of competencies to enter a more complex and interdependent world" (Altbach, Reisberg, & Rumbley, 2009, p.8). Some educational systems, mostly in higher education, have focused on the competencies with increased transfer value, as they can be applied to a greater number of real-life situations. At the core, due to its relevance, is information competency (Arum & Roksa, 2010; Gross & Latham, 2008, 2012; Head & Eisenberg, 2010; Markauskaite, 2007; Pinto & Sales, 2008b). Informational competencies actually help to shape emerging conceptualizations of information literacy (IL), this being understood in its broadest sense as the ability of people to function effectively in a world increasingly represented through information. In the case of higher education, the need for students to have adequate levels of information literacy is even more pressing, since their academic lives take place in a greater context of scientific information. In order to have a better understanding of IL levels among students, different evaluation models have arisen. Most of these are of an objective character. From this objective perspective, many experts believe that IL assessment should be applied at the beginning as well as at the end of the training process in order to correlate learning objectives and outcomes (Dugan & Hernon, 2002; Hernon, Dugan, & Schwartz, 2006). Also of interest are the models of subjective assessment or self-assessment. Student self-assessment serves cognitive purposes, but it also promises to increase the students' responsibility for their own learning and to make the relationship between teachers and students more collaborative (Shepard, 2000). The combination of subjective and objective assessment models provides relevant data for

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many research processes, much more so when it is related to the latent structures of IL competencies.

2. Problem statement

Recently, a variety of research methods on IL competencies in the context of higher education have been developed. However, an understanding of these competencies from a mixed perspective that combines students' perceptions and evidence, i.e., subjective (attitudes and motivations) and objective (knowledge and skills) values, has not been approached at present. A proper grasp of the relationships between the different categories of competencies, and especially of the underlying structures to key IL competencies, seems difficult to achieve.

In this study, which is part of a larger research project financed by the Spanish Ministry of Science and Innovation, a previously validated self-assessment instrument (IL-HUMASS) has been combined with another of an objective character (EVALCI-K). This is the first time that both instruments have been simultaneously applied to the same group of students, offering an opportunity to gain insights into the underlying structures of IL competencies. A better understanding of the internal relationships among competencies gives instructors and students better levels of performance within the teaching-learning process.

In the search for latent structures in IL competencies, some studies using the underlying methodology of factor analysis from an exploratory perspective have been found. However, the literature on IL reveals neither a confirmatory factor analysis where the researchers validate the factors (or constructs), nor the implementation of structural equation models in which the core competencies involved in each factor are included and the causal relationships or patterns of influence between these competency factors.

This study explores the following research questions:

R_1. Is the underlying structure of IL competency categories (searching, evaluation, processing, and communication/dissemination) similar across both instruments?

R_2. What are the patterns of influence on these four IL categories considering separately the following dimensions?

R_2-a. Students' belief-in-importance of IL competencies.

R_2-b. Students' self-efficacy concerning IL competencies.

R_2-c. Students' actual levels of knowledge and skills in IL competencies.

R_3. Which are the core IL competencies? That is, which competencies simultaneously support the latent structures in the three dimensions considered? At the other end, which are the irrelevant competencies—those not affecting any of these underlying structures?

3. Literature review

Studies evaluating the acquisition of IL competencies by college students have been increasing in recent years from a variety of academic perspectives, including those of librarians. A diagnosis of the perceptions of students regarding their own information literacy and its competencies can be accomplished through the application of self-assessment tests and their respective self-report measures (Oakleaf & Kaske, 2009; Pinto, Fernández-Ramos, Sánchez, & Meneses, 2012). Many studies derive from research that makes use of self-assessment as a diagnostic method and that provides information about students' training perceptions and needs (Colthart et al., 2008; Green & Macauley, 2007; Gross & Latham, 2007; Korobili, Malliari, & Christodoulou, 2009; Pinto, 2010, 2011). This is sometimes used as the main research method (Walsh, 2009).

Nevertheless, self-assessment initiatives do not usually appear in isolation, and there are many instances in which self-assessment is combined and compared with an objective assessment (Bandyopadhyay, 2012; Patterson, 2009). It is a matter of knowing "how students' self-assessment of their ability compares to their actual skill as demonstrated through testing." (Gross & Latham, 2012, p. 576). This combination of objective and subjective tools "provides a look at the relationship between a standardized measurement of student information literacy skills and students' estimates of their information seeking skills" (Gross & Latham, 2007, p. 314). From an educational viewpoint, the absence of a larger body of experimental work simultaneously applying self-assessment methods based on students' perceptions and objective evaluation methods based on the evidence of the students' actual achievement of IL competencies must be pointed out. Experts give significant importance to the implementation of studies of this type.

Focusing on the evaluation of IL competencies in the disciplines included in this research (information and documentation, psychology, and translation and interpretation), it can be observed that international studies are scarce and only recent in the last two areas.

In the area of translation and interpretation, the importance of the acquisition of information skills for the translator is evident, (Hurtado, 2001; Kelly, 2002; Pym, 2003; Vienne, 2000). The assessment of IL competencies has been addressed by Pinto and Sales (2008a, 2008b) in several studies examining the behavior of students, teachers, and professionals when accessing and using information. Also, there is the InfoliTrans model (Pinto & Sales, 2008a) for IL competencies training which, in its practical aspect (InfoliTrans Test), constitutes an open source web prototype, consisting of questionnaires, tests, and resolution of specific cases for each of the strategic information skills needed by translation and interpretation students (information search, evaluation, processing, and communication/dissemination). The test assesses the students' information knowledge and skills. It also provides teachers with a diagnosis and guiding proposals for action, among which a multilevel and accessible self-training pathway is included (Pinto, García-Marco, Granell, & Sales, 2014).

In the area of psychology, a number of studies have been developed that address the need for information competency training for students, especially in the tasks of search, access, and use of information resources (Carter & Daugherty, 1998; Daugherty & Carter, 1997; Sutton, 1995; Thaxton, Faccioli, & Mosby, 2004). Self-assessment methods have also been applied to psychology studies in order to diagnose IL competencies, in addition to interviews with experts, as Thaxton's (2002) work shows. Larkin and Pines (2005) and Lampert (2005) recognize the curricular importance of the students' mastery of IL competencies for academics teaching in psychology. Recently, McKinney, Jones, and Turkington (2011) published an interesting study where students' perceptions about their efficiency in information-related tasks were measured by a number of tools (questionnaire, test, focus groups, and students' tasks).

In the area of information and documentation, research on IL competencies assessment in the curriculum framework is also scarce. In this area, a recent multinational research project which included students from 19 countries stands out. The Project Information Literacy (PIL) survey instrument was used, adapted to the subject area and translated into various languages in order to develop comparative studies among countries (Head, 2013). It is an assessment questionnaire focused on key informational aspects related to library and information science (LIS) students' research experience, information behavior, and IL skills. A series of case studies have come from this macro study, such as one done in Turkey, conducted with students from five schools of LIS. It shows that, for students, "getting started on an assignment and defining the topic" (Kurbanoğlu & Doğan, 2013, p.138), are among the most difficult tasks within the research cycle (more than 50% of the students find it difficult). Search engines are the most frequently used tools to find information for course-related assignments. Librarians are the least consulted people. There are also studies from the University of Zagreb (Grgić & Špiranec, 2013), Jagiellonian University (Krakowska, 2013), the State University of Library Studies and Information Technologies of Sofia (Todorova & Peteva, 2013), and Vilnius University Lithuania (Rudžioniene, 2013). These indicate how important it is to provide information on the portability of IL competencies in the field of LIS, where it is often assumed that professionals master these capabilities.