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A Comparative Study of Information Literacy Skill Performance of Students in Agricultural Sciences

Tomaž Bartol^{a,*}, Danica Dolničar^b, Bojana Boh Podgornik^b, Blaž Rodič^c, Tihomir Zoranović^d

^a Agronomy Department, Biotechnical Faculty, University of Ljubljana, Ljubljana, Slovenia

^b Department of Textiles, Graphic Arts and Design, Faculty of Natural Sciences and Engineering, University of Ljubljana, Ljubljana, Slovenia

^c Faculty of Information Studies, Novo Mesto, Slovenia

^d Faculty of Agriculture, University of Novi Sad, Novi Sad, Serbia

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ABSTRACT

The aim was to assess the information literacy (IL) of 310 first- and second-year students enrolled in nine different study programs at the School of Agriculture (Faculty of Agriculture), Novi Sad, Serbia, using an adapted version of a validated IL test (ILT) in an e-environment. Because the school does not provide systematic IL education, another purpose was to raise awareness of the importance of such instruction. ILT results were assessed according to five ACRL (Association of College & Research Libraries) standards, as well as three cognitive levels adapted from Bloom's taxonomy. The mean ILT score was 46.35%. Students were most successful in information evaluation and information need identification, and least successful in legal/ethical issues and information use. As expected, IL skills increase from the first to second year of study. Cognitive skills also increase, except for the highest level (applying knowledge), where all student groups are weak. Different study programs attract students with disparate knowledge/skill levels gained during secondary education, where some groups of first-year students may outperform second-year students in both IL and cognitive abilities. It is thus important to offer IL education to all students in order to provide a basis for more balanced academic progress.

Introduction

Information literacy (IL) has developed as an important research topic in the broader field of information science. The methods used to assess many IL aspects were established as part of the pioneering work of the Association of College & Research Libraries (ACRL, 2000), a division of the American Library Association (ALA). This work has been complemented by the activities of several other library associations. Libraries and information institutions have published sets of different standards that are interrelated and govern current research in this area. Our research of IL in higher education is based on the ACRL standards. These standards, which arrange specific competencies into five categories, have recently been revised and transformed under the Framework for Information Literacy for Higher Education (ACRL, 2016). Related designs organize competencies into different content topics, for example the seven faces of information literacy (Bruce, 1999). The principal indicators, however, are similar. More recent frameworks have been reviewed by Sparks, Katz, and Beile (2016). Several correlated standards have played an important role in global research networking in this field. This has been expressed most notably in recent

European Conferences on Information Literacy (ECIL). These annual conferences have brought together participants from around the world. The fifth ECIL conference was held in 2016 and was dedicated to IL as a prerequisite for an inclusive society (Kurbanoğlu et al., 2016).

IL assessment frequently focuses on tests, surveys, questionnaires and related evaluation tools. Tests have been developed and employed in different formats. These tests typically monitor attitudes, evaluate information seeking behavior and assess skills. Skill assessment, which was also the topic of our study, is usually based on IL standards and analyzed by specific IL categories represented by test subscales. Due to differences in structure and/or content, different tests are not directly comparable. The number of questions may vary, as may the number of answers to a specific question. The questions are sometimes open-ended, which requires students to reflect on their learning (Saunders, Severyn, Freundlich, Piroli, & Shaw-Munderback, 2016). Some other tests only assess certain aspects of IL, for example database searching (Hsieh, Dawson, & Carlin, 2013; Leichner, Peter, Mayer, & Krampen, 2014). The tests are not necessarily ACRL-based and may be discipline-specific (Kingsley et al., 2011; Swoger & Helms, 2015). On the other hand, some tests place more emphasis on library topics (Mery, Newby,

* Corresponding author.

E-mail addresses: tomaz.bartol@bf.uni-lj.si (T. Bartol), danica.dolnicar@ntf.uni-lj.si (D. Dolničar), bojana.boh@ntf.uni-lj.si (B.B. Podgornik), blaz.rodic@fis.unm.si (B. Rodič), tihomir@polj.uns.ac.rs (T. Zoranović).

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& Peng, 2011), as libraries play an essential role in IL in higher education (Cox & Corral, 2013). IL instruction may be embedded in content-specific courses or take the form of stand-alone courses. Very frequently, such instruction is only imparted as short seminars, which is certainly not optimal given the increasing complexity of new technologies and tools. Some of these possibilities were presented by Caminita (2015) in the case of an agricultural college. It is the opinion of several researchers in this field that IL should preferably be introduced as a stand-alone learning course (Johnson-Grau, Archambault, Acosta, & McLean, 2016; Johnston & Webber, 2003; Petermanec & Sebjan, 2017), although libraries may still face challenges when trying to place IL in various disciplines (Farrell & Badke, 2015). In any case, IL remains closely linked to the work of academic libraries that help students develop transferable skills (Shao & Purpur, 2016).

A more specific motivation behind our study was to bring the principal experiences of IL assessments to the environments of South-Eastern Europe (SEE), in particular to the School of Agriculture of the University of Novi Sad, Serbia, with the aim of the systematic appraisal of students. IL initiatives in the broader region were reviewed by Spiraneć and Pejova (2010). In a more general sense, IL was assessed through tests conducted by Kavsek, Peklaj, and Zugelj (2016). Some studies also focused on separate issues, such as students' use of web services (Pralica and Barović (2014). The region of SEE has a long history of advanced library-information systems, although the development of an IL strategy has been sporadic (Simončić & Vucković, 2010). It should be mentioned that IL courses are sometimes referred to as *information science courses* (Krstev & Trtovac, 2014).

Geopolitical events in recent history have disrupted former research structures in the region. The sphere of higher education has not been spared. Information and communication technology (ICT) development indicators are rather low compared to the European Union (Dobrota, Jeremić, & Marković, 2012). This is also reflected in IL, where Serbia ranks among the lowest in Europe (Bogdanović, 2014). Awareness that universities need to implement ICT and raise the level of IL is nevertheless growing (Vranes & Marković, 2015). Here we should mention that IL standards and the associated training can help students to develop cognitive skills at various levels according to Bloom's taxonomy (Reece, 2005). The development of such skills is linked to active teaching methods (Keene, Colvin, & Sissons, 2010).

The school that hosted our IL study (the School of Agriculture in Novi Sad) offers credit-bearing classes in ICT covering specialized topics relating to subject-specific agricultural production economics. These classes, however, do not include systematic IL instruction structured according to the ACRL or good LIS (Library and Information Science/Library and Information Services) practices. Given the lack of such instruction, an initiative linking ICT and LIS professors and researchers in Slovenia (a European Union Member State) and Serbia (an EU candidate country) was launched to assess students' generic IL skills that are transferable across specialties. The assessment was based on a published validated Information Literacy Test (ILT) (Boh Podgornik, Dolnicar, Sorgo, & Bartol, 2016), which is referred to in the Methodological section.

The principal aims of the study were (1) to adapt (translate and adjust the content of) the ILT for use in Serbia, and examine its applicability for local purposes; (2) to explore the level of students' IL by (2.1) analyzing results according to five ACRL standards in order to identify those topics where the IL of students is lower and may need special attention and (2.2) analyzing results according to cognitive levels; and (3) to identify possible differences with respect to study year and study program.

Materials and methods

Methodological background of the study

The school in Serbia, the Faculty of Agriculture, University of Novi

Table 1
Test group divided by study program.

Study program	Study year	No. of students	% of students
Agroecology and environmental protection	1	15	4.8
Agricultural economics	2	58	18.7
Agrotourism and rural development	2	29	9.4
Phytomedicine	1	48	15.5
Organic agriculture	1	17	5.5
Crop science	1	58	18.7
Water management	1	16	5.2
Veterinary medicine	1	49	15.8
Fruit science and viticulture	1	20	6.5
Total		310	100.0

Sad (in the text referred to as the School of Agriculture), does not provide systematic IL courses. It was decided that the ILT would be translated into the Serbian language and tested for the exploratory assessment of IL skills at this school. Both the English and Slovenian versions were used in parallel for translation purposes. The translation was done by a Serbian ICT professor and verified by a Slovenian LIS professor who is fluent in Serbian. Both professors are familiar with English terminology on the subject of information science and related library issues.

The original ILT was designed in a format that mitigates the possible local characteristics of a specific library setting, or national educational and cultural practices. A few questions were adapted to the specific national framework, i.e. when addressing copyright issues related to well-known national authors or documents. Such examples can be easily interchanged between different cultural settings.

Test group

The test group comprised 310 students enrolled in nine undergraduate study programs (Table 1) at the School of Agriculture of the University of Novi Sad, Serbia. More than 70% were first-year students, while the rest were second-year students (Table 2). Female students accounted for 62% of the sample (Table 3). Students may enroll after they have passed entrance exams. The final entrance exam scores are calculated as a combination of secondary-school grades and entrance exam results. The entrance exams for different study programs vary to some degree. For example, the agricultural economics exam also entails economy-related subjects, while the veterinary medicine exam involves medicine-related subjects.

Measuring instruments and data collection

The validated 40-item information literacy test (ILT) (Boh Podgornik et al., 2016) was used as a measuring instrument. All test items in English were provided in the original article. The test was translated into Serbian for the purpose of this study, with adaptations reflecting cultural/local differences.

Subscales A1 through A5 were created by grouping test items based on content according to the five ACRL standards:

- A1: Information need identification
- A2: Information access
- A3: Information evaluation

Table 2
Test group divided by study year.

Study year	No. of students	% of students
1	223	71.9
2	87	28.1
Total	310	100.0

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