Information Literacy Skills of Portuguese LIS Students: Some Topics on Evaluation of Resources Credibility

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Abstract. This paper focuses on the Portuguese results from an international survey on LIS students' information literacy skills. The results' analysis will be grounded on a literature review on the criteria application to evaluate information and determine the credibility by undergraduate students. The guidelines for the information evaluation, especially regarding credibility aspect, on three main information literacy frameworks will be presented. After an overall presentation of the main results, the analysis of the Portuguese survey results will focus on issues related to information evaluation skills, namely on criteria to assess information credibility and on difficulties to apply them.

Keywords: Information literacy, information evaluation, information credibility, LIS students, Portugal.

1 Information Evaluation Criteria Used by Undergraduates

Studies about undergraduate students' information-seeking behaviour provide an interesting image about the methods, criteria and processes to choose sources and information to perform course-related assignments. This brief literature review will focus on evaluation criteria, specially related to credibility. This concept, nowadays mainly associated with web credibility, has been extensively discussed. However, in this study, the Tseng's and Fogg's definition was adopted, which defines credibility as a perceived quality, as an human perception, that results from evaluating multiple dimensions simultaneously, including trustworthiness and expertise as two key components [1].

Results from a focus group about how web users make judgments of Web sites show that 12 categories emerged as factors of web credibility, namely: authority, page layout, site motive, URL, cross-check ability, user motive, content, date, professionalism, site familiarity, process and personal beliefs [2]. All these aspects can be taken into account to create Web sites or to promote lessons on web resources' assessment. One interesting finding is that page layout is a negative criterion for evaluation because if the page has a good layout that did not make information more believable but if the layout is poor information is perceived as less believable. This study involved 24 participants, some of them undergraduates but other studies focus only on undergraduates.

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Twait [3] conducted a qualitative study, with 13 undergraduates, to identify their source selection criteria, when working on an academic research project, and to understand their preferences for print, electronic and human sources. Results show that content, including topicality of sources, is the most important criteria ranked above the other criteria. Reputation/credibility was the third most frequently mentioned criterion but with a low average of 10%. Accuracy/validity is also an undervalued criterion with 3%. So it seems that undergraduates from this sample do not prize credibility or dimensions of it. This study also highlights that undergraduates do not use human sources, e.g. faculty experts or librarians, for recommending other information content. On the contrary, students prefer resources they used previously, prizing familiarity, as the second most chosen option.

The scarce use of evaluating criteria applied to information sources is stressed in some researches. A study of five web page evaluations, made by 35 undergraduates students, shows that they only use one or two judgments about the surface features of web pages, and ignore the content of the documents themselves [4]. Source coverage, accuracy, authority, presentation and objectivity were the five most ranked criteria. Additionally, participants tended to employ only one or two criteria and repeatedly use them. This behaviour is in line with the findings of another study where undergraduates did not use the necessary criteria for evaluating sources for a research paper, having difficulties to identify scholarly sources. Despite the fact that students indicated that they were looking for credible sources, they were unable to list specific criteria to determine if the source is credible or not [5]. These criteria are well defined in some information literacy frameworks and three of them will be analysed next.

2 Evaluation Competencies in Information Literacy Frameworks

The Information Literacy Competency Standards for Higher Education [6] presents five standards, twenty-two performance indicators and a wide range of outcomes. Standard three is about critical evaluation of information and its sources; furthermore it addresses the ability to incorporate selected information in previous knowledge. It includes in performance indicator number 2, which states that information literate students must be able to articulate and apply initial criteria in order to evaluate information and its sources. This implies the following outcomes: examine and compare information from various sources to evaluate items such as reliability, validity, accuracy, authority, timeliness and bias. To analyse the structure and logic of the content and recognize prejudice, deception or manipulation are also presented as suitable outcomes. Information assessment is also part of the performance indicator 4, as it emphasizes the comparison between prior and new knowledge to find added value or content contradictions. This implies outcomes such as: consciously use criteria to determine whether the information contradicts or verifies information used from other sources and select information that provides evidences for the topic. Since 2013, this document is under revision with a new title and structure proposal. In June 2014, a draft of the *Framework for Information Literacy for Higher Education* [7] was released based upon six threshold concepts that are: scholarship is a conversation,

research as inquiry, authority is contextual and constructed, format as a process, searching as exploration and information has value. Threshold concepts are illustrated by knowledge practices (demonstrations of ways in which learners can increase their understanding of these information literacy concepts) and dispositions (ways in which the affective, attitudinal or valuing dimensions of learning can be addressed). In this version, evaluation/credibility is mainly present on the concept of authority as contextual and constructed and the terms critical/critically appear 17 times. The framework states that "authority of information resources depends upon the resources' origins, the information need, and the context in which the information will be used. This authority is viewed with an attitude of informed skepticism and an openness to new perspectives, additional voices, and changes in schools of thought". Some similarities can be found between the knowledge practices and the dispositions and the performance indicators and outcomes of the standard three from the 2000 version. Anyway, a more accurate study is needed to compare the perspective about evaluation/credibility of the two documents.

Australian and New Zealand Information Literacy Framework: Principles, Standards and Practice [8] recognizes six core standards which underpin information literacy acquisition, understanding and application by an individual, to develop lifelong learners through undergraduate studies. These core standards are the following: the information literate person recognises the need for information and determines the nature and extent of the information needed; the information literate person finds needed information effectively and efficiently; the information literate person critically evaluates information and the information seeking process; the information literate person manages information collected or generated; the information literate person applies prior and new information to construct new concepts or create new understandings; and, at last, the information literate person uses information with understanding and acknowledges cultural, ethical, legal, and social issues surrounding the use of information. Regarding standard three about evaluation, it is interesting to verify that it includes assessment of the information access tools, the inherent characteristics of information and also information seeking process and search strategies.

The SCONUL Seven Pillars of Information Literacy: Core Model For Higher Education [9] underpins a broad understanding of information literacy as an umbrella which encompasses concepts as digital, visual and media literacies, information handling, information skills or data management, among others. The model includes seven pillars of information literacy and each pillar includes a series of statements relating to a set of skills/competencies and a set of attitudes/understandings. Within each pillar an individual can develop from novice to expert, but it is also possible to move down a pillar. The seven pillars are: identify (ability to identify a personal need for information); scope (can assess current knowledge and identify gaps); plan (can construct strategies for locating information and data); gather (can locate and access the information and data they need); evaluate (can review the research process and compare and evaluate information and data); manage (can organise information professionally and ethically); and present (can apply the knowledge gained). Evaluation understandings include issues of quality data, accuracy, relevance, bias, reputation and inherent aspects to information/data sources credibility. But evaluation

should also focus on knowing the process by which information is evaluated and published, in order to help inform personal evaluation. Abilities related to these understandings are: distinguish between different information sources and the content they can provide, apply appropriate criteria to choose suitable material on a search topic, assess the quality, accuracy, relevance, bias, reputation and credibility of information sources, assess credibility of the data gathered, critically read, appraise and evaluate personal findings and those of others.

The concepts from these information literacy standards will support the understanding and analysis of the results from the survey, presented in the next topic.

3 Main Results Presentation

This paper presents the Portuguese results from an international survey on LIS students' information literacy skills, with a focus on issues regarding credibility. First the main results will be presented and compared with data from other countries that participate in the study. Secondly, questions regarding assessment of information credibility issues will be stressed.

The international Information Literacy Survey was supervised by the Department of Information Science at Hacettepe University of Ankara and the Portuguese study was conducted by the Information Science Department at the School of Industrial Studies and Management from Polytechnic Institute of Porto. This survey was carried out in Australia, Bulgaria, Croatia, Finland, France, Hungary, Japan, Lithuania, Malta, the Netherlands, Poland, Romania, Russia, Singapore, Switzerland, Turkey, United Kingdom, and the USA.

The Portuguese survey was sent by e-mail to all the 65 undergraduate students of our department. Fifty-three responses were collected, of which five were incomplete. Only the 48 complete questionnaires were analysed for this paper. Data were collected through an online questionnaire available between March and May 2013. This data collection instrument had 16 closed questions and one open for comments. Generic data to characterize the respondents and specific data about their information practices were collected. Thus, self-reported data were collected among LIS students regarding their research experience, information behaviour and information literacy skills. The 48 complete questionnaires were answered by 60% of female and 40% of male. First year students' responses predominate with 50%, followed by third year (31%) and then second year (19%). About an half (52%) of the students are between 18 and 20 years old and 27% are between 21 and 23 years old. The remaining 21% of the students are divided into several categories among 24 years old and over 35 years old.

3.1 Information Processes for Course-Related Assignments

With regard to students' perceptions about the various tasks related to starting and searching information for course-related assignments (Q6a), it appears that 63 percent agree or strongly agree that getting started on the assignment is difficult. This tendency is also visible in the data results from USA, where for 84% the most

difficult step of course-related research process is getting started [10]. It should also be stressed that on the options saying that narrowing down the topic is difficult, finding articles in the library's database is difficult (e.g. LISA, Wos, EBSCO, JSTOR) and figuring out where to find sources in the library is difficult, one third of respondents (33 %, 33% and 31%) choose indicating neither agree nor disagree. In other cases, nearly a quarter of respondents selected the same option (getting started on the assignment is difficult - 21%, defining the topic for the assignment is difficult - 23%, building up the search strategy is difficult - 29%, deciding which database to use is difficult - 23% and finding "gray literature" is difficult - 25%). It is possible to consider that these percentages mean that students prefer not to report their difficulties or that they are unaware of them.

3.2 Information Resources Used for Course-Related Assignments

Regarding the resources most used in course-related assignments (Q7a), respondents could choose from 15 options. It appears that most of the respondents chose the option search engines, including Google, (98%). This result is in line with data obtained in Croatia [12] where this option also ranked first. It also seems to follow the trend of the data presented by Project Information Literacy [10], where in 2010 this option collected 95%. So it seems that search engines represent the gateway to the search path for almost all undergraduate students, regardless of their geographic location.

Secondly, in this Portuguese study, it appears that the highest percentage of 88% corresponds to three options: course readings, personal collection and Wikipedia. Here, there are similarities and differences with USA and Croatia. The Portuguese use of course readings is close to the USA value, where the option got 96%, as the most chosen [10]. The rank of Wikipedia in the Portuguese study also approaches USA results from 2009 (85%). However, the results differ markedly with regard to use of personal collection, where in USA, in 2010, it ranks in eighth with 56%. Distinctively in Croatia [12], course readings were only the fourth most chosen option and Wikipedia the sixth option. Note that in this country, the use of library shelves and of library catalog stands out occupying the second and third most chosen options. Thus, in Croatia, LIS students do a more intense use of the library resources than in Portugal, since those options here occupy the seventh and eighth preferences. Another significant difference between Portugal and Croatia is related to the use of blogs by Portuguese students that choose this option in seventh place, with 73%, while for the Croatian students it is the fourteenth option. As for the use of social networking sites, e.g. Facebook, Portuguese and Croatian choices are aligned as it lies in the last place. Another interesting difference between Croatia and Portugal is that, in the former, Encyclopedias occupy the fourth place (before Wikipedia) but in Portugal this option ranks last (46%). It also appears that the Portuguese students do a very intense use of video-sharing (81%) and slide-sharing (79%) sites. In contrast, the use of grey literature (63%) and research databases through the library Web site (58%) is lower.

3.3 Study Practices to Complete Course-Related Assignments

Regarding the use of tools for preparing and sharing course-related assignments (Q11), almost all the students (92%) use spell checkers and presentation tools. Track-changes feature of word processors (77%) and video sharing sites (73%) are also popular. Document sharing programs, blogs, social networking sites and wikis all have an average of 63% of use. Alerting services (46%) and social bookmarking (40%), which help to deal with the information overload on the Internet, have a low range of use.

The three most valued aspects when working on a course-related assignment (Q12), all ranked first as very important with 83%, are getting a good grade from the instructor, passing the course and getting the paper finished. Moreover, no one indicated that these factors are not important. Impressing family and friends with the grade received is not important for 10% and it is the option with the lower average on very important, with 33%. These Portuguese results are quite similar to results from Lithuania [13]. It seems students focus on getting the paper finished and not really on improving their skills and knowledge. The options improving my writing skills (52%), learning something new (50%) and improving analytical skills (48%) have lower averages. It is also interesting to stress that the option integrating my own perspective into the paper ranks only 46%, but on Q10 the similar option, I work my own perspective into the assignment, so that the instructor knows what I think, ranks 98%.

Regarding the used devices for accessing information like databases, library catalogs and Web sites (Q13), Portuguese students use laptops almost always (79%) and never tablets (77%) nor cell phones (50%). Finally, to communicate with teachers, mentors or librarians (Q14), 67% of students almost always use email via desktop or laptop and only 2% said that they never use this option. The same average of 67% states they never use instant messaging via desktop or laptop.

4 Results on Information Evaluation Skills: A Focus on Credibility

After this brief presentation of the main results, the analysis will focus on issues related to information evaluation skills, namely on criteria to assess information credibility and on difficulties to apply them. The applied questionnaire addressed generically various aspects related to information evaluation, especially regarding credibility.

In Q6a, when asked about statements on starting and searching information for course-related assignments, 43% of students agree or strongly agree that determining whether a Web site is credible or not is difficult and 34% did not feel any problem regarding this aspect as they disagree or strongly disagree with the statement. Of them 23% neither agreed nor disagreed. Overall, it seems that the majority should be quite comfortable on determining credibility. In this same question, Portuguese students did not express great difficulties in sorting irrelevant results and find what they need: only 33% agree that is difficult, 48% disagree and 31% have no opinion. The results in

Q6b confirm that tendency since only 44% find difficult to evaluate the information sources they found.

These statements have to be related to the feeling of students' self-confidence in the ability to search web resources. This feeling is very high because 81% disagree or strongly disagree with the option that finding sources to use "out on the web" is difficult (e.g. Google, Wikipedia, government sites). In what concerns library resources, students show to be less confident because only 60% disagree or strongly disagree with the option that indicates difficulty associated with this task. Students did not express problems with information searching, presenting themselves as experts especially in web environment, as they think they know and apply all the adequate techniques to find and filter information. With this personal point of view it is not easy to recognise competencies problems regarding information credibility assessment, especially on web resources.

Competencies in information credibility assessment involve not only abilities to search and retrieve credible resources but also the ability to use them in order to create credible information. This second perspective is crucial for undergraduate students when they have to prepare course-related assignments. This involves issues as re-phrasing, make citations, know when to cite a source, taking notes or integrate different points of view in their own assignments. For tasks involved in preparing course-related assignments (Q6b), Portuguese students' biggest problem is re-phrasing what is already well expressed in the source because 63% agree or strongly agree that it is difficult. This ability is related to the lexical field and the components of understanding, assimilation and appropriation of reading in a personal perspective. This result is quite different from that found in Poland because only 36.84% consider this task difficult [11]. Knowing how to cite the source in the right format is difficult for 48% of the respondents who agree or strongly agree with the statement. Thus, it appears that nearly half of the students have not mastered the basic techniques of citation, even though these are formally included in the curriculum of the course plan. The same percentage of students (48%) expresses relative difficulty to know when they should cite a source, indicating that they do not realize the importance and value of consulted information sources citation, which may be related to the frequent practice of plagiarism. Students show quite confident with regard to their ability to taking notes, as 58% disagree or strongly disagree that it is a difficult task. For the option integrating different sources from my research into my assignment is difficult, only 29% agree or strongly agree with the statement, while 46% disagree or strongly disagree. So it seems that almost an half of the students have no difficulties to combine different points of view, which is really important in academic discourse in order to produce credible papers. In the basic tasks of reading through the material and writing, only 42% of the students disagree that is difficult for the first one and 27% for the second one. However, 31% neither agree nor disagree that reading is difficult and 38% feel the same about writing. So students seem to be more comfortable with reading than with writing, which is natural, but as they are in an university context they should really be competent in these tasks because they are the foundation of all academic work, and namely to assess credibility resources or to produce credible course-related assignments.

One important way to make acceptable academic papers is to have adequate study practices. So results from Q10, about students' research techniques and styles, will be analysed to understand if these LIS Portuguese undergraduates are on track to make credible academic work. In this question the two most ranked options (98 percent) are I work my own perspective into the assignment, so that the instructor knows what I think, and I come up with a thesis statement early on (hypothesis). It seems that students value the construction of their own idea, with the hypothesis construction, and then explain it on the assignment so that the instructor can gauge it. Yet, it seems that students have their own way to organize their research, to the extent that 90 percent said that one of the first things they do is to figure out what search terms to use, 88 percent said they develop an overall research plan to guide the research process and 81 percent develop an outline for how to proceed with the assignment. The majority of the students indicate that they make an effort to have a global approach to the assignment, valuating the construction of their own perspective, using initial hypothesis, which seems to be an adequate option to produce credible papers. In contrast, 50 percent indicate that they just sit down and start writing without much of a plan for what they are going to say, working without a pre-established plan. As to the effort expended, a very significant part of students are trying to save it, since 85 percent tend to use the same set of research resources from one assignment to the next, 65 percent tend to write about the same topic from one assignment to the next, 63 percent said that once they find the number of citations the instructor expects, they end the research process, and 48 percent recognize that they tend to spend as little time as possible on assignments. The ability to persist in finding relevant/credible information is reduced to 38 percent who say that they start over with a brand new topic if they do not find something in one or two searches. On contrary, all these choices seem not to be the most adequate to fit credibility criteria, as time to evaluate information resources, diversity of resources and adequacy between information resources and study topic are key elements.

These Portuguese results are a bit different from the Croatia [12] and Lithuania [13] results. In these countries, the most common practices are to develop an outline for how to proceed with the assignment, choose adequate search terms and develop an overall research plan.

Valued aspects regarding library and web resources were checked in Q8 and Q9. For the purpose of this section, the analysis will focus on options related to information evaluation, especially on criteria that can be considered related to credibility.

In Q8, nine options are related to criteria that helps to assess information credibility, namely: how current the Web site is, author's credentials (e.g. where he/she works); whether the website content acknowledges different viewpoints (i.e. not biased); whether the website gives credit for using someone else's ideas (e.g. footnotes, references); what the URL (i.e. Web site address) is and what it may mean; whether the website has links to other resources on the Web; whether the website has bibliography/reference list; if there are charts - whether vital information is added (i.e. not just attractive graphics); whether a librarian mentioned using the Web site and whether an instructor mentioned using the Web site.

The most important aspect students point out when considering library resources is that the instructor recommended them (94%). It is a quite interesting rank for this option because library resources were already evaluated by editor, publishers, librarians and others but students need a direct recommendation to use them. Possibly it is a question related to the "marketing" of library resources and not a perception about a problem related to the source evaluation. In Lithuania students also give the first place to the instructor's advice regarding library resources [13].

In second place, students value (92%) sources where the author gives credit for using someone else's ideas (e.g. footnotes, references), understanding that every work is based on previous ideas, from concrete people, that have to be recognized. This option can be related to the one asking whether the source has a bibliography/ reference list (83%) and to the one that contains acknowledgement of different viewpoints (i.e. not biased), which ranks 77%.

How current the source is ranks in third place (90%) and seems to be an important issue for students when they evaluate information to use in course-related assignments. On contrary, author's credentials are important only for 75% of the students, which means that one quarter did not care about the author's affiliation and his/her previous work. The same happens to the publisher of the source, which is important only for 56% of the students.

Information design and presentation is not enough for 79% of the students who believe that if there are charts they must contain vital information. Another interesting and preoccupying aspect is that librarians are the least important factor motivating students to use library resources, but it seems to be a tendency in other countries like Lithuania [13], Croatia [11] and the USA [10].

It is also interesting to compare the results regarding library resource evaluation and web content. On the web almost all the students (98 percent) report that they evaluate whether the Web site gives credit for using someone else's ideas. So it seems that they are aware of plagiarism on the Internet and that they use credibility criteria to avoid the use of this kind of resources. This idea is complemented by the fact that 92% value the Web site because it has links to other resources on the Web, 88% because the Web site content acknowledges different viewpoints and 81% because it has a bibliography or a reference list. Here the design and presentation are valuated as credibility criteria because 90% use design to evaluate the legitimacy of the site and 85% assess if the charts present vital information. The fact that the Web site is current is also of great importance because 96% use the option to assess web resources. A specificity of web, the URL, is used by 81% of the students to know the origin of the source and it ranked very close to the author's credential with 83%. For web resources the role of the instructor (88%) is not as important as for the library resources, but the fact that a librarian recommended the source is equally valuated by 52%.

Portuguese results are a bit different from Croatia because in Croatia students mostly value three top options: how current the Web site is, whether the Web site has links to other resources on the web and whether the Web site has bibliography/ reference list [12].

5 Conclusions

These results from Portugal show an image of the information activities and preferences from a sample of LIS undergraduates, information professionals of the future and by now representatives of the Google generation. In fact, they exhibit information behaviour typical of their generation with direct implications on the approach to information credibility issues: great confidence in their abilities to deal with information, especially in Web environment. In a library context, they do not feel so comfortable. However, when presented with some difficulties, the most frequent option is to neither agree nor disagree, meaning they are not conscious of their skill limitations or that they do not want to formally express them. On the credibility assessment, students report evaluating important criteria to assess the information source, whether in a library context or in web environment. Further studies should confirm its real application. As information professionals of the future, they should have high competences related to all information literacy dimensions. LIS curriculum and teaching/learning practices should support and improve this.

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