

Metadata Literacy Skills: An Analysis of LIS Students

Tolga Çakmak^(✉) and Serap Kurbanoğlu

Department of Information Management, Faculty of Letters,
Hacettepe University, 06800 Ankara, Turkey
{tcakmak, serap}@hacettepe.edu.tr

Abstract. Resource description, one of the key components of the Library and Information Science (LIS) field, represents a set of processes based on standards and changes according to needs and new developments. Resource description processes and utilization of related standards require special skills and competencies for information professionals. Resource description skills are also known and described as metadata literacy skills. Metadata literacy skills are mainly composed of three sets of skills, namely basic skills, information object description skills and decision-making skills. LIS departments play an important role in equipping their students, in other words, future information professionals, with these skills. This study aims to explore the level of metadata literacy skills of undergraduate students in the Department of Information Management of Hacettepe University. A questionnaire was used as a data collection instrument. Findings of the survey indicate that these students have a higher level of confidence regarding basic and information object description skills, in comparison with decision-making skills.

Keywords: Metadata · Metadata literacy · Metadata literacy skills · LIS students · Turkey

1 Introduction

One of the services provided by cultural memory institutions to meet ever changing expectations of their users is increasing visibility and accessibility of their collections by the use of high quality metadata. Metadata is defined as “structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information object. Metadata is often called data about data or information about information” [1, p.1]. Metadata as a concept is understood and used differently in different environments. Some use it to refer only to records that describe digital objects, while others use it to refer to records that describe both digital and non-digital objects. In the library environment, the term metadata is used for any formal scheme of resource description (including traditional cataloging), applied to any type of object.

Skills used by information professionals for resource description processes (i.e. conceptualization, metadata creation and studies on metadata issues) are also referred to as metadata literacy skills [2–4].

There are some connections between metadata literacy skills and information literacy skills. First of all, resource description itself requires the use of searching, analyzing and critical thinking skills that can be described as high level information literacy skills [5–7]. Secondly, since developing a deeper understanding of how metadata is created helps to understand how information resources can be located and retrieved, metadata literacy seems to be, to a certain extent, a part of information literacy.

There is no doubt that metadata literacy skills are important for information professionals not only to perform their professional activities towards resource description in order to increase the accessibility and visibility of their collections, but also to teach information literacy in a more enhanced way.

Therefore, equipping LIS students with metadata literacy skills during their formal education is important, and that is why it is generally among the core courses and one of the main objectives of the curricula in many LIS schools.

The purpose of this study is to explore the perceived proficiency levels of students of the Department of Information Management of Hacettepe University regarding metadata literacy skills. Findings provide information about the current level of undergraduate students' perceived metadata literacy skills and also provide guidance to faculty as they prepare the curricula.

2 Related Works

As a concept, metadata literacy was first used in 2009 by Eric T. Mitchell in his doctoral dissertation titled *Metadata Literacy: An Analysis of Metadata Awareness in College Students* [2]. Mitchell describes metadata literacy under the skill-based literacies and defines the concept as “the ability to conceptualize, create and work with metadata within information environments” [2, p. 62]. He claims that some of these skills are already a part of information literacy skills set. He also points out other studies which analyze cataloging, critical thinking and abstracting skills of students in the context of information literacy skills [8, 9].

There are numerous studies in the literature on metadata skills. American Library Association's (ALA) Metadata Interest Group refers to metadata skills as understanding metadata standards, computer literacy skills, use of web tools and technical skills such as markup languages (especially XML), OAI, RDF structures and CSS [10]. The report published by the National Research Council reflects metadata related competencies as management abilities, understanding complex system structures, collaboration and communication skills, skills related to conceptualization of digital documents, and algorithmic thinking skills [11].

Some studies describe metadata skills by listing the skills of a metadata librarian, in some cases in comparison with the skills of a cataloging librarian. According to Chapman, for instance, skills metadata librarians should possess can be classified under the following titles: collaboration, research, education, and development. There are also studies determining metadata librarians' skills based on job announcements. In one of these studies, Mkhize indicates that metadata librarians should have adaptation and independent working abilities, critical thinking and problem solving skills, organizational and communication skills, as well as collaboration skills [12]. Park and Lu [13],

based on their analysis of 107 job postings, describe metadata skills as metadata creation, electronic resource management, awareness of trends, and digital library development. They also reveal that traditional cataloging and classification standards and skills are highly relevant as well.

In addition, a review of literature indicates that, skills required for resource description processes change with the effects of technology and new information environments. For instance, the importance of skills related to description of audio-visual formats and new information resources has been increasing [14]. Additionally, metadata related skills become important not only for library and information science but also for data literacy especially in e-science [15].

Besides librarians, some have studied students' metadata skills and competencies. In one such study, it was found that students use metadata in social networks and that their metadata literacy level was sufficient. A statistically significant difference was reported on the level of metadata literacy skills of students who have knowledge and experience of digital information and information literacy [2].

3 Methodology

The main aim of this study is to identify proficiency levels of LIS students regarding metadata literacy (use of metadata and decision making about metadata related issues). With this aim, an online survey was conducted of undergraduate students of Department of Information Management of Hacettepe University. At the Department, both core and elective courses are offered related to metadata literacy skills and competencies within the undergraduate curricula.

The research question of the study is “what is the perceived proficiency level of students about metadata literacy skills?”

A questionnaire, which consists of 21 statements under three main categories, was designed based on a five-point Likert Scale. It was disseminated to all students enrolled in the Department (281 students) via email and an internal information system. The survey generated 88 responses. Almost one third of the total students (31 %) in the Department were represented.

Collected data was analyzed by Predictive Analytics SoftWare (PASW). Descriptive statistics were used for analyses. Reliability level of gathered data was calculated via internal consistency tests of PASW software. Internal consistency was found significantly high with the Cronbach Alpha value calculated as 0.96.

4 Findings

Demographic data has shown that the majority were third year students (almost 40 %–35 students), while almost 33 % were second year students, 13.6 % were first year and final year students (29 and 12 students, respectively).

The results reported in this section of the study present findings according to three components of metadata literacy and metadata related skills: basic skills which are also related to information literacy skills, information object description skills, and decision making skills.

4.1 Basic Skills

Basic metadata skills/competencies were identified in six statements. According to the findings, almost 80 % of the students defined their proficiency level regarding *finding citations in texts* as either good or very good, while only 20 % defined it either as fair or poor or very poor (17 %, two percent, and one percent, respectively). While 86 % of students claim to be good or very good at *describing the elements in a citation*, only 33 % claim to be good at *understanding the standard used in a citation*. These findings indicate a gap in their knowledge regarding different citation styles, although they can recognize its components (Table 1).

Table 1. Basic skills

	Very Poor		Poor		Fair		Good		Very Good		Mean
	n	%	n	%	n	%	n	%	n	%	
Finding citations in a text	1	1.1	2	2.3	15	17	30	34.1	40	45.5	4.2
Description of the elements in a citation	0	0	5	5.7	7	8	27	30.7	49	55.7	4.4
Understanding the standard used in a citation	11	12.5	15	17	33	37.5	21	23.9	8	9.1	3
Understanding preferred metadata standard in a digital library	18	20.5	9	10.2	24	27.3	19	21.6	18	20.5	3.1
Understanding preferred metadata standard in a digital library	18	20.5	9	10.2	24	27.3	19	21.6	18	20.5	3.1
Understanding preferred classification system in a library	6	6.8	14	15.9	17	19.3	24	27.3	27	30.7	3.6
Finding description elements in a document or a resource.	3	3.4	1	1.1	9	10.2	28	31.8	47	53.4	4.3

As for *understanding preferred metadata standard in a digital library* 42 % defined their level as either good or very good, while 27 % define their level as fair, and 31 % as either poor or very poor. More than half the students indicated a deficiency in their proficiency regarding *metadata standards used in digital libraries*. On the other hand, when it comes to *understanding preferred classification system in an information center*, more than half the students (58 %) claimed to be good or very good (Table 1). Yet, almost 23 % evaluated their level as poor or very poor. *Finding description elements in a document or a resource* seems to be a metadata skill about which the majority of students (85.2 %) feel competent.

4.2 Information Object Description Skills

Students were asked to describe their information object description skills over six statements. Results show that more than half the students (55.7 %) claimed their levels to be either good or very good at *creating an abstract for a video*, while more than

one-fifth of them rated their level as poor or very poor. The majority of students feel competent (rating their level either good or very good) in *identification of keywords for a video* (70 %), *finding description elements of photograph or an image* (66 %), *understanding the structure of an electronic resource (navigation, content and context)* (60 %), and *adding tags and comments to a web page* (69 %). On the other hand, the majority (56 %) feels less competent (rating their level either fair or poor or very poor) when it comes to *finding descriptive elements of different information objects* (Table 2).

In this part of the study, mean scores are relatively lower compare with the basic skills, especially about the statements regarding *creation of an abstract for a video* and *finding description elements of different information objects* (Table 2).

Table 2. Information object description skills

	Very Poor		Poor		Fair		Good		Very Good		Mean
	n	%	n	%	n	%	n	%	n	%	
Creating an abstract for a video	5	5.7	15	17.0	19	21.6	31	35.2	18	20.5	3.5
Identification of keywords for a video	2	2.3	4	4.5	20	22.7	34	38.6	28	31.8	3.9
Finding description elements of a photograph or an image	4	4.5	10	11.4	16	18.2	26	29.5	32	36.4	3.8
Understanding the structure of an electronic resource (navigation, content and context)	2	2.3	10	11.4	24	27.3	26	29.5	26	29.5	3.7
Adding tags and comments to a web page	2	2.3	6	6.8	19	21.6	28	31.8	33	37.5	4.0
Finding description elements of different information objects	6	6.8	13	14.8	30	34.1	27	30.7	12	13.6	3.3

4.3 Decision Making Skills

Students were asked to describe their levels related to decision-making processes of metadata related activities that can potentially be used in any information center. More than one third of the students (37.5 %) rated their level fair about *determining description standard for resources in an information center*. Additionally, 28 % rated their level as poor or very poor while 34 % rated it as good or very good. There seems to be a deficiency regarding this specific skill.

More than half the students seem to be more competent (rating their level either good or very good) in *deciding on the elements for description of an information resource* (52.3 %), *deciding on description fields for object description* (62.5 %), *providing directive information about a resource via its metadata descriptions* (53.4 %), and *choosing information resources that can meet their information needs by metadata descriptions* (58 %). *Determining the type of an information resource* is the skill which gets the highest confidence level. 85 % of the students rated their level either as good or very good (36.4 % and 48.9 % respectively) (Table 3).

Table 3. Decision making skills

	Very Poor		Poor		Fair		Good		Very Good		Mean
	n	%	n	%	n	%	n	%	n	%	
Determining description standard for resources in an information center	6	6.8	19	21.6	33	37.5	24	27.3	6	6.8	3.1
Deciding on the elements for description of an information resource	5	5.7	10	11.4	27	30.7	27	30.7	19	21.6	3.5
Deciding on description fields for object description	3	3.4	8	9.1	22	25.0	22	25.0	33	37.5	3.8
Providing directive information about a resource via its metadata descriptions	6	6.8	9	10.2	26	29.5	34	38.6	13	14.8	3.4
Determining the type of an information resource	2	2.3	4	4.5	7	8.0	32	36.4	43	48.9	4.3
Choosing information resources that can meet my information needs by browsing their metadata	5	5.7	10	11.4	22	25.0	32	36.4	19	21.6	3.6
Choosing appropriate description fields of an information resource in different description standards	5	5.7	15	17.0	36	40.9	22	25.0	10	11.4	3.2
Choosing an appropriate metadata standard that can be served for an information center and its objective	11	12.5	17	19.3	31	35.2	19	21.6	10	11.4	3.0
Understanding the quality of metadata of an information resource	15	17.0	17	9.3	23	26.1	27	30.7	6	6.8	2.9

On the other hand, students seem to be feeling less competent on some skills in this category such as *choosing appropriate description fields of information resources in different metadata standards* (41 % of the students rated their level as fair, while 23 % rated it as poor or very poor), *choosing an appropriate metadata standard for an information center or its aims and objectives* (35 % of the students rated their level as fair, while 32 % rated it as poor or very poor), and *understanding the metadata quality of a resource* (31 % rated their level as fair, while 26 % rated it either as poor or very poor).

5 Conclusions and Recommendations

Libraries and information centers are memory institutions that are strongly affected by advancements in technology and changes in information environment. Therefore they have to update their infrastructures, policies and services in order cope with changes

and increase service quality to meet their users' expectations. Developments and changes in the information environment also have an impact on resource description units of these institutions along with the skills and competencies required from professionals who work in these units. As a result, there has been a transition from cataloging librarian to metadata librarian, as it is clearly seen in related job announcements. It is LIS departments' responsibility to follow up the change and make adaptations in their curricula accordingly to make sure that their students are equipped with new skills required in the field. There is no doubt that empowering students with such new skills will support their professional efficiencies.

This study attempts to determine LIS undergraduate students' perceptions on their metadata literacy skills. Findings indicate a high level of competence regarding most of the basic skills such as *determining the type of an information resource* and *understanding preferred classification system in an information center*, and skills heavily used on web and social media, such as, *identification of keywords for a video*, *finding description elements of photograph or an image*, and *adding tags and comments to a web page*. However the study also found that students feel less competent mostly in higher level skills which are listed under the decision making category, such as *understanding the standard used in a citation*, *understanding preferred metadata standard in a digital library*, *finding description elements of different information objects*, *determining description standard for resources in an information center*, *choosing appropriate description fields of information resources in different metadata standards*, *choosing an appropriate metadata standard for an information center or its aims and objectives*, and *understanding the metadata quality of a resource*.

Students' lack of confidence regarding certain skills could be affected by several factors such as the year of the study, subject specific elective courses they have taken, the experience they gained from practical work they carried out during their practicum, personal interest, and gaps in curricula. To the best of authors' knowledge, the Department's curricula cover all the aspects mentioned related to metadata skills, however some only addressed in elective courses but might not be detail. Further study is needed to uncover the factors behind the lack of certain metadata skills.

References

1. NISO: Understanding Metadata. NISO, Bethesda (2004)
2. Mitchell, E.T.: Metadata literacy: an analysis of metadata awareness in college students. Unpublished PhD Thesis. University of North Carolina at Chapel Hill, North Caroline (2009)
3. Intner, S.S.: A Plea for universal metadata literacy. *Technicalities* **27**(1), 13–15 (2007)
4. Martin, K.: Post Details: Nrmig Meeting at ALA Annual, Sunday 28 June 2008. http://blogs.ala.org/nrmig.php?title=nrmig_meeting_at_ala_annual_sunday_june_28_june_2008&more=1&c=1&tb=1&pb=1
5. Caplan, P.: *Metadata Fundamentals for All Librarians*. American Library Association, Chicago (2003)

6. Iannella, R., Waugh, A.: Metadata: enabling the internet. In: Proceedings of CAUSE 1997, The Information Professions and the Information Professional, pp. 87–98. Distributed Systems Technology Centre, Brisbane (1997)
7. Liu, J.: Metadata and its applications in the digital library: approaches and practices. Libraries Unlimited, Westport (2007)
8. Walczak, M.M., Jackson, P.T.: Incorporating information literacy skills into analytical chemistry: an evolutionary step. *J. Chem. Educ.* **84**(8), 1385–1390 (2007)
9. Pinto, M., Fernández-Ramos, A., Doucet, A.-V.: Measuring students' information literacy skills through abstracting: case study from a library & information science perspective. *Coll. Res. Libr.* **69**(2), 132–154 (2008)
10. Han, M., Hswe, P.: Metadata Librarians Today: Roles and Competencies. https://www.ideals.illinois.edu/bitstream/handle/2142/13624/ALA2009Annual_Han+Hswe.pdf?sequence=5
11. National Research Council: Being Fluent with Information Technology. National Academy Press, Washington DC (1999)
12. Mkhize, T. C.: A Transition! from Cataloguing Librarian to Metadata Librarian. http://iasa.org.za/sites/default/files/notices/mkhize_tholakele.pdf
13. Park, J., Lu, C.: Metadata professionals: roles and competencies as reflected in job announcements, 2003–2006. *Cataloging Classification Q.* **47**(2), 145–160 (2009)
14. Buttlar, L., Garcha, R.: Catalogers in academic libraries: their evolving and expanding roles. *Coll. Res. Libr.* **59**(4), 311–321 (1998)
15. Qin, J., D'ignazio, J.: The central role of metadata in a science data literacy course. *J. Libr. Metadata* **10**, 188–204 (2010)