AN EXPLORATORY FRAMEWORK FOR A STUDY ON DESIGNING A RESEARCH FOCUSED ADVANCED INFORMATION LITERACY PROGRAM FOR ENGINEERING POSTGRADUATES

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Abstract

Efforts to improve information literacy levels in academic institutions are often focused on undergraduate students, and mostly address the improvement of information retrieval skills. This practice is also evident in information literacy programs offered for postgraduate researchers, if offered at all. Although there have been radical transformations in scholarly communication and practice in recent years, there is still an assumption among many that researchers on postgraduate level are sufficiently information literate to deal with the new challenges. A gradual awareness of the unique needs of postgraduate researchers in a dynamic and demanding academic environment is, however, developing. Literature in this regard is, unfortunately, limited and scattered, with the majority of studies performed in academic institutions outside the borders of South Africa.

The aim of this paper, which forms part of an exploratory component of a doctoral study, is to suggest important components which should be included in the framework for planning and ultimately designing an advanced information literacy program focussing on postgraduate engineering researchers. This paper will report on the foundational exploration required to determine what an advanced information literacy program for postgraduate engineering students should entail. This includes: (1) a basic conceptualization of advanced information literacy; (2) a review of reports of information literacy programs aimed at postgraduate researchers; (3) the identification of advanced information literacy activities featuring during the research process; and (4) an encapsulating conceptualization (i.e. definition) of advanced information literacy, building on (1) – (3). The latter could direct data collection from postgraduate engineering researchers on their research information needs and skills to determine their needs for an advanced information literacy program. In this paper issues (1) – (4) are presented as an exploratory framework for a study on designing a research focused advanced information literacy program for engineering postgraduates.

Keywords: research support services, advanced information literacy, academic libraries, higher education, postgraduate research, engineering researchers

1. INTRODUCTION

The rationale for this paper came from observations made during postgraduate induction programs offered at the Vaal University of Technology during 2010. These induction programs formed part of an initiative to increase the throughput rates of postgraduate researchers at this university. It became evident that the majority of postgraduate researchers across all disciplines were unclear regarding many aspects relevant to scholarly research practices and were also lacking basic information literacy skills. This observation is also confirmed and documented by previous studies performed, which found that postgraduate students often feel overwhelmed, anxious, underprepared, frustrated, and incapable of effectively keeping up with literature (Harris, 2011:600; Marcus, Covert-Vail & Mandel, 2007:17; Pilerot, 2004:93).
The researcher is therefore arguing for the use of the concept “advanced information literacy”, which indicates a shift from information literacy offered to undergraduate students towards support specifically aimed at postgraduate researchers. The exploratory framework put forward in this paper can also guide empirical data collection processes of similar studies in future.

2. BACKGROUND

For many years undergraduate students in Higher Education institutions were perceived as those most in need of information literacy support (Jankowska, Herter & Young, 2006:61). At the same time, there was also an assumption among many academic librarians that researchers on postgraduate level are sufficiently information literate to deal with challenges in scholarly communication and practice (Harkins, Rodrigues & Orlov, 2011:28; Streatfield, Allen & Wilson, 2010:231; Booth, 2007; Kong, Hunter & Lin, 2007:154). This assumption resulted in academic librarians mostly being involved with the managing and preserving of only the final product (output such as dissertations and theses) of researchers (Bracke, 2011:70).

Literature in recent years confirms a gradual awareness among academic librarians of the scattered, unique and complex needs of postgraduate researchers (Blanton-Kent et al., 2010:1; Hoffmann et al., 2008; Green & Macauley, 2007:317; Wainwright, 2005:452). This awareness may partly be due to new knowledge creation methods emerging as a result of technical developments, namely: computational, simulation and sensing methods and technology (Bracke, 2011:66), interdisciplinary research which can involve unfamiliar disciplinary areas (Newby, 2011:224), as well as more collaborative research projects, where researchers are often making use of networks and networked technologies (Brewerton, 2012:97).

As a result, there is a growing recognition that postgraduate researchers need to develop various skills (O’Grady & Beam, 2011:76; Streatfield, Allen & Wilson, 2010:237; Rempel, 2008:157; Booth, 2007; Genoni, Merrick & Wilson, 2006:743). There is also evidence of positions specifically created in academic libraries to focus on research support, often advertised as: “Research support librarian”, “Research support specialist”, or “Research liaison Manager” (Brewerton, 2012:98), which confirm that there are opportunities to develop services specifically aimed at researchers in the 21st century (Carlson, 2011:12; Bent, Gannon-Leary & Webb, 2007:82).

The awareness among academic librarians to engage more deeply with the information needs of postgraduate researchers has, however, been associated with marginal effort (O’Grady & Beam, 2011:76; Streatfield, Allen & Wilson, 2010:230; Housewright & Schonfield, 2008:31; Rempel, 2008:163; Jankowska, Herter & Young, 2006:60; Wright et al., 2006:141) and with attempts associated with varying levels of success (Hoffmann et al., 2008:1). Without a uniform strategy available across universities (Streatfield, Allen & Wilson, 2010:235), many academic librarians may be unsure regarding the way forward with respect to supporting the information needs of postgraduate researchers (Brewerton, 2012:97). Academic libraries may therefore currently be failing to offer services which are addressing crucial information needs of postgraduate researchers (Bracke, 2011:72; Gomersall, 2007:301; Streatfield, Allen & Wilson, 2010:230). This situation may especially be true for academic librarians in South Africa, since most of the existing studies performed regarding the support of the information needs of postgraduate researchers have been performed outside the borders of South Africa.

This paper is part of a doctoral thesis, of which the theme is the support of the advanced information literacy needs of postgraduate engineering researchers. The purpose of this paper is to suggest an exploratory framework which could guide the planning and design of advanced information literacy programs for engineering postgraduates, as well as other groups of postgraduates. It is especially aimed at guiding empirical data collection on the research needs of the specific target group. This paper will focus on the following sub-problem of the doctoral study:
How does advanced information literacy differ from the current general understanding of information literacy? A discussion of this sub-problem could lead to a conceptualization of advanced information literacy that can be used as an exploratory framework for the design of advanced information literacy programmes, focusing on assisting and supporting postgraduate engineering researchers.

The exploratory framework suggested in this paper will start with a short overview of information literacy in an undergraduate environment, followed by highlighting concepts relevant to a postgraduate environment, with a specific focus on the research lifecycle and the workplace environment. The discussion in this paper will conclude with an illustration of an exploratory framework which could guide the planning and design of information literacy support initiatives to postgraduate engineering researchers, as well as empirical data collection when preparing for a specific context such as the Vaal University of Technology.

3. THE CONCEPTUALIZATION OF ADVANCED INFORMATION LITERACY

The conceptualization of advanced information literacy is a necessary step in the process of planning information literacy support to postgraduate researchers. Current understandings and definitions of information literacy will be discussed briefly in the following paragraphs, from where the discussion will move to advanced information literacy as a concept.

3.1 Information Literacy in an undergraduate environment

Librarians have been engaged with information literacy for many years, which resulted in extensive literature published by professional organizations and individuals in this regard. The American Library Association (ALA) Presidential Committee on Information Literacy provided a widely accepted and highly cited definition of an information literate person as somebody who is able to “recognize when information is needed, and have the ability to locate, evaluate, and use effectively the needed information” (ALA, 1989). Various other international information literacy models been developed of which some include: Eisenberg/Berkowitz’s Information Problem-Solving (Big6 Skills), Irving’s Information skills, and the Stripling/Pitts Research Process (Eisenberg, Lowe & Spitzer, 2004:40). Models developed in the United Kingdom include: The seven pillars model of information literacy developed in 1999 by the Society of College, National and University Libraries (SCONUL), the PLUS (Purpose, Location, Use and Self-evaluation), and PGCE (Plan, Gather, Communicate, Evaluate) models (Ordidge, 2001:2). A popular model developed in Australia is known as the “seven faces of information literacy” which was developed by Christine Bruce in 1997 (Bruce, 1997).

Most of the information literacy models mentioned above are currently governing undergraduate information literacy curricula and support initiatives in many academic institutions. These curricula therefore often include aspects related to basic skills associated with the seeking, evaluation and use of information (Smith, 2003:9). A strong focus on information retrieval skills is evident in these support initiatives which may be associated with a narrow set of information literacy skills (Streatfield, Allen & Wilson, 2010:238; Green & Macauley, 2007:317).

3.2 Information literacy in a postgraduate environment

The researcher is of the opinion that services and support specifically aimed at postgraduate researchers should not be based on undergraduate programs. Information literacy support should go beyond the mere seeking and retrieving of information (Brewerton, 2012:104; Streatfield, Allen
& Wilson, 2010:230) since a postgraduate environment requires the developing of higher level research skills (Harris, 2011:601). The support of postgraduate research may therefore require a much broader scope of skills and activities which imply a necessary shift in focus between the planning of basic information and more advanced information literacy support.

Due to the lack of a clear definition of advanced information literacy in the literature, certain skills and competencies associated with postgraduate researchers were identified, which could be regarded as essential for postgraduates in order to function effectively in an ever changing information environment. The literature suggests various areas in which support can be offered to postgraduate researchers of which some include: the citing of sources and an introduction to library services on offer (Streatfield, Allen & Wilson, 2010:232), managing and organizing of research information, repository capabilities, publishing channels, copyright and open access, intellectual property issues, evaluation of information, promotion and dissemination of research findings (Rempel, 2010:545; Streatfield, Allen & Wilson, 2010:234; Wainwright, 2005:452; Hooks & Corbett, 2005:246), conceptualizing new research, collection of data, reflecting on information and data, as well as on the commercialization process (Brewerton, 2012:104), the literature review process (Green, 2010:314; Rempel, 2010:535; Rempel, 2008:157; Gomersall, 2007:302), searching and scanning of information (O’Grady & Beam, 2011:76; Booth & Tattersall, 2009; Booth, 2007; Gomersall, 2007:303, Antwi-Nsiah et al., 2006), current awareness strategies (Boden, 2007:172; Booth, 2007), bibliographic management software (Booth, 2007; Harrison & Jones, 2007; Antwi-Nsiah et al., 2006), collaboration with other researchers (Thomas, 2011:43; Genoni, Merrick & Willson, 2006:735), data management practices (Thomas, 2011:43; Rempel, 2010:539; Pilerot, 2004:94), journal ranking systems (Herther, 2008:367; Booth, 2007), funding and grant writing support (Hensley, 2009:207; Genoni, Merrick & Willson, 2006:744; Harrison & Hughes, 2001:11), assistance regarding research ethics (Harrison & Hughes, 2001:19), and research methodologies (Rasul & Singh, 2010:83; Harrison & Hughes, 2002:19).

The above mentioned suggestions are evidence of an awareness that information literacy support for postgraduate researchers should cover a wide variety of aspects. Although many academic librarians may be offering postgraduate support and training in some of the above mentioned areas to a certain extent, a well-developed overall strategy regarding the offering of support to postgraduate researchers is lacking in the literature, especially one which could guide the support of engineering postgraduate researchers. In order to steer away from ad-hoc support initiatives, a more structured approach towards the information literacy support of researchers could ensure that all important aspects during the research process are covered. One way to ensure this is to take the various stages in the research lifecycle into consideration, since it has been increasingly proposed in the literature that support should include all stages of the research lifecycle (Haines, et al., 2010:78; RIN, 2010:8; Housewright & Schonfeld, 2008:30; Brophy, 2007:57). A short discussion regarding the research lifecycle will follow, which will serve as a suggestion on how to structure information literacy support to postgraduate researchers. This discussion provides insight on activities in the research process that can be interpreted as advanced information literacy activities.

### 3.2.1 The research lifecycle

There are several interpretations of the academic research lifecycle available in the literature, of which most include the following basic processes: progressing from an idea to proposal writing, followed by the collecting of data and publication of results. A basic research lifecycle as available on the Simon Fraser University’s webpage (http://www.sfu.ca/research-commons/research/research-lifecycle) is illustrated in Figure 1, which starts with the generation of an idea which can be inspired through structured or serendipitous information discovering methods, followed by the process of identifying and discovering research partners or experts with similar interests through the employing of online catalogs and databases, institutional repositories, current awareness services, and various other ways. The proposal writing process
often follows, which is associated with specific styles and guides, referencing techniques, and academic writing skills among others. The actual research process follows which varies between disciplines, and may include simulation, experiments, observations, and the collecting, managing and analyzing of data. The final process includes the publication of results to ensure that research is accessible to a wide audience.

Fig. 1 Illustration of a research lifecycle

It is evident that information plays an important part in all the processes illustrated above, and information literacy competencies can therefore be associated with each research process. A framework suggested by MacCall and Erway (2009) expands on this general conception of the research lifecycle by suggesting the following processes associated with the academic research cycle, namely: the obtaining of funding, discovering of information, managing and organizing of information, creating of new information, retaining of rights, sharing of information, and the assessing of impact. All of the stages (sometimes referred to as phases) in the research life cycle, in addition to the areas of support mentioned earlier, can be interpreted in terms of advanced information literacy.

The general conception of the research lifecycle can therefore be extended further, by adding the processes suggested by MacCall and Erway (2009). An extended version is illustrated in Figure 2. This illustration should not be seen as a linear process, since many processes may be performed simultaneously with others.

Figure 2. Extension of the research lifecycle
In addition to a focus on the various research processes, it may also be necessary to take the demands relevant to the workplace environment when planning to address advanced information literacy support for postgraduate researchers.

### 3.2.2 Information literacy in a workplace environment

Information literacy training or programs which do not take the future or potential workplace environment into account may be regarded as shortsighted, since it neglects wider contexts in which university students will be working after graduating which may include public, private or non-profit sectors (Hoyer, 2011:11). An understanding of the broader context and the need to transfer information skills outside an academic environment is therefore important (Hoyer, 2011:12). Some of the information skills which may be needed to complete projects outside an academic environment may include: dealing with grey literature, networking skills, non-academic writing, public communication, building community relationships, finding experts, writing for funding, and financial information management (Hoyer, 2011:19).

Taking engineers as focus in the literature confirms that there may be different approaches and preferences between engineers in academic institutions and those in the workplace with regard to: information sources (Jeffryes & Lafferty, 2012:3; Waters, Kasuto & McNaughton, 2012:127; Engel, et al, 2011:550; Du Preez, 2008:324; Fidel & Green, 2004:564), the use of libraries (Jeffryes & Lafferty, 2012:6; Du Preez & Fourie, 2009:138; Tenopir & King, 2004:39; Kwasitsu, 2003:472), and the publication of results (Harney, Monks, Alexopoulos, Buckley & Hogan, 2011:11; Speight & Foote, 2011:47; Pinelli & Haynie, 2010:54). Advanced information literacy support in academic institutions should therefore take both the academic and the workplace context into account, in addition to the requirements of the research process (i.e. the research life cycle).
3.3 Advanced information literacy

It is evident that advanced information literacy support to postgraduate researchers should build on information literacy support initiatives offered for undergraduate students. The specific framework suggested by MacCall and Erway (2009) is evidence of an expansion on basic information literacy support, as well as on the many general conceptions of the academic research process. This framework also focuses on competencies and skills specifically related to information literacy aspects relevant to the postgraduate research process. Most of the processes identified in their framework are also argued for in the literature, and therefore provide a suitable structure for advanced information literacy support in academic institutions.

An encapsulating definition of advanced information literacy may therefore stipulate that postgraduate researchers should be able to identify a researchable topic, to comfortably navigate themselves through the discovery of information in order to contribute to knowledge creation in a specific field of study by following specific processes, to obtain the necessary research funding to do so, to manage, organize and curate all information and data obtained and generated, to create output in various formats, to retain rights where needed, to share information with the academic community and others, and to assess their impact in order to become competent researchers in an academic environment, as well as in the workplace environment. Advanced information literacy support to postgraduate researchers therefore implies that support is aligned with the academic research process and the various activities associated with each process, as well as with disciplinary differences.

4. EXPLORATORY FRAMEWORK

The exploratory framework suggested in Fig.3 starts with the building on information literacy in an undergraduate environment toward a postgraduate environment, where advanced information literacy is connected to the research lifecycle. From here, data regarding the performing of engineering research in both an academic and workplace contexts is incorporated in an encapsulating definition of advanced information literacy. This encapsulating definition forms the starting point for the planning and design of an advanced information literacy program focused on engineering researchers, where continuous monitoring and improvement of advanced literacy as a concept, as well as of the program designed is recommended.

Fig. 3 Exploratory framework for the planning and design of an advanced information literacy program
The exploratory framework suggested above, can therefore be considered as a guide for academic librarians who wish to have a structured approach with regards to planning and designing advanced information literacy support to postgraduate researchers.

5. CONCLUSION

The suggested exploratory framework for planning and designing an advanced information literacy program presented in this paper can provide a starting point for interventions aimed at postgraduate engineering researchers (i.e. the focus of the doctoral study of which this paper forms a part) or researchers in any other field. This framework can also inform future empirical studies, which should ultimately influence the programs designed to improve the advanced information literacy levels of postgraduate researchers in academic institutions.

6. REFERENCES


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