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**ESSENTIAL COMPETENCIES OF AN INFORMATION PROFESSIONAL WORKING IN A
DIGITAL LIBRARY ENVIRONMENT, IN THE OPINIONS OF NORWEGIAN AND THAI
LIBRARY AND INFORMATION SCIENCE EDUCATORS**

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[ABSTRACT]

Essential competencies required of an information professional to work in the digital environment have been a significant discussion topic the Library and Information science (LIS) world. Both in Norway and Thailand, one of the issues discussed by LIS educators and librarians in several discussions on LIS curriculum development is the competencies required for an information professional to be effective and efficient working in the library, archive, museum and related areas in this digital era. However, there has been no empirical study which examines the opinions of educators on this topic. Therefore, this thesis aims to identify the essential competencies of an information professional working in a digital library environment, in the opinions of Norwegian and Thai LIS educators. The study has used online questionnaires, face-to-face interviews, online interviews and email interviews as data collection methods. The results revealed that the essential competencies, that is personality traits, required of the information professionals were analytical, creative and technical competencies. In addition, the results indicated that Metadata, Database Development and Database Management System and User needs were regarded as the most discipline specific knowledge essential competencies. Finally, communication, critical thinking, information literacy and teamwork were the generic skills needed for an information professional to work efficiently and effectively in a digital library environment.

Key words: information professional, digital librarian, skills and knowledge

DECLARATION

I hereby declare that this dissertation is my own work, and other sources of information used have been acknowledged. This dissertation is submitted in partial fulfillment of the requirements for the program of International Master in Digital Library Learning (DILL).

A handwritten signature in black ink on a light blue background. The signature is stylized and appears to be 'Pussadee Nonthacumjane'.

Pussadee Nonthacumjane (signature of candidate)
Submitted electronically and signed.

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CHAPTER 1: INTRODUCTION

This chapter presents an outline of research. Firstly, it gives introductory background information that lead to the research problem. Secondly, the research question is discussed, followed by the objective and target group of the study. Methodology; definitions and limitation of this study are included.

1.1 Background

Library and Information Science education both in Norway and Thailand is in a state similar to the LIS education in a worldwide perspective. That means it has been moving to adjust to the change from the printed era to the digital era. This is supported by Lawal (2009), who provided a brief overview of history, condition, and management of librarianship in the USA. Concerning LIS education, she stated that “the curriculum of LIS schools was originally geared towards the practice of librarianship with core courses in cataloguing, acquisitions, collection management, reference and preservation. The need to respond to a rapidly changing technological society prompted the injection of content such as web design, Web 2.0 applications, electronic resources, digitization and networking into the curriculum.” (Lawal, 2009, p. 179-180)

Regarding the LIS curriculum development in Norway and Thailand, one of the big issues which have interested LIS educators and librarians in several discussions is “What are exactly competencies required for an information professional to be effective and efficient working in the library, archive, museums and related areas in this digital era?” It is expected that this issue would be critical considered as a must to study. Then, it can be applied in developing the LIS curriculum or course serving the competencies requirement for working in this era.

1.2 Research Problem

Regarding competencies of an information professional working in a digital library environment, some researchers have studied this area. Spink and Cool (1999) studied curricula needed to educate information professionals working in a digital library

environment, and they stated that “We do not know what knowledge is required to produce information or computer professionals to work as digital librarians, digital developers, or in other job categories, or even what the job designations or requirements will be in the future.” Additionally, Weech (2005) studied an analysis of courses and modules: education for digital librarianship to find out the knowledge and skills needed of an information professional working in the digital library environment. Weech (2005, p.1) stated that “we do not know much about what skills are needed for professionals who work as digital librarians.” Another survey investigating practitioners in a digital library environment, Choi and Rasmussen (2006b) conducted a survey current digital library professionals in academic libraries in the United States. Marion (2001) studied 250 online academic librarian employment advertisements posted during 2000 to determine current requirements for technologically oriented jobs. The findings indicated that 19 categories included of both computer related skills and behavioral characteristics. However, there was no specific “digital librarian” category. Gerolimos, M. and Konsta, R. (2008) studied librarians’ skills and qualifications in a contemporary informational environment through 200 job advertisements from the UK, Canada, Australia and the USA in 2006 and 2007. They found out that overall, 38 skills and qualifications were identified through the job advertisements. In addition, Partridge and Hallam (2004) presented the skills, knowledge and attitudes of the typical information professional in the twenty-first century.

Regarding to Norway and Thailand, there is no evidence found of research being carried out specifically for the essential competencies of an information professional working in a digital library environment in the opinion of LIS educators. However, it is important to understand what - in terms of competencies - is actually required to work in a digital library environment. Thus, it could reflect development of the digital library course or curriculum development adjusting with this environment.

1.3 Research Question

The main research question to this study is:

What are the essential competencies of an information professional working in a digital library environment, in the opinion of Norwegian and Thai LIS educators?

1.4 Objective: the aim of this study is:

to determine the competencies required by an information professional working in a digital library environment in the opinion of Norwegian and Thai LIS educators

1.5 Target group of the study:

1. Norwegian LIS educators of Oslo University College and the University of Tromsø.

2. Thai LIS educators of public universities namely Burapha University, Chiang Mai University, Chulalongkorn University, Khon Kaen University, Mahasarakham University, Prince of Songkla University, Silpakorn University, Srinakharinwirot University, Suranaree University of Technology, Taxin University, Thammasat University, and Walailuk University.

1.6 Methodology:

This study employed a mixed-methods research which constitutes of both qualitative and quantitative research approaches. In the study, a survey, and interview methods were utilized to explore the essential skills and knowledge of an information professional working in a digital library environment. The target groups of the study were Norwegian and Thai LIS educators.

1.7 Definitions

Personal competency; personality traits: this study uses 15 personality traits for instance analytical, creative, helpful, enterprising, and technical and etc. These traits are classified into five categories based on a classification of five types made by Holland (1966) as follows: investigative, artistic, social, enterprising and realistic.

Discipline Specific Knowledge: includes knowledge which is learned in the Library and Information Science programmes both undergraduate and postgraduate level, for instance Collections Development, Digital Library Architecture, Digital Library Software, Metadata and etc..

Generic Skills: are general skills which cut through disciplines for example communication, critical thinking, information literacy, teamwork and etc.

1.8 Limitation

The Limitations of this study were as following list.

- Only Thai LIS educators of public universities were included in the target groups
- Only English language literature and references was reviewed.

1.9 Outline of the thesis

This thesis is divided into 5 chapters as follows:

Chapter 1: it presents an introduction about background, research problem, research question, objective, target group, methodology, definitions, and limitation of this study.

Chapter 2: it provides the literature review on some essential topics namely an overview on LIS education in Norway and Thailand, digital libraries, digital library environment, skills and knowledge of an information professional working in a digital era and related researches.

Chapter 3: it describes the methodology used in this study including with an explanation for that choice. In addition, target group of the study, data collection tools, questionnaire distribution, conducting an interview, email interview distribution and data analysis methods were also appraised.

Chapter 4: it includes the data analysis. There are three major data analysis comprises of Norwegian LIS educators results, Thai LIS educators responses, the comparison between Norwegian and Thai LIS educators results on each criteria.

Chapter 5: it presents a discussion of the findings which related to the literature. Additionally, it provides a conclusions about the findings of this study. Finally, suggestions for further research are also provided.

CHAPTER 2: LITERATURE REVIEW

Studying and collecting as much related information as possible is a good way to understand the problem thoroughly, design research instrument efficiently and conduct research successfully. An overview of this study includes a review of literature in several areas. Generally, all contents are related to the competencies, skills and knowledge aspect of what are required by an information professionals working in a digital library environment.

This chapter presents related and essential topics in five sections. Firstly, a brief overview of Library and Information Science in Norway with focus on programs which are related to digital library. Secondly, an overview of LIS education which is offered in Thailand, and programs in digital libraries. Thirdly, an explanation about digital libraries. This is followed by the significant emphasis of this literature review of competencies, skills and knowledge of library and information professionals. Holland's typological theory on personality type and related study on librarianship personality type are also described. Finally, an overview of the literature involving the competencies, skills and knowledge for an information professional to work in a digital library environment is provided.

2.1 Library and Information Science in Norway

The Library and Information Science education in Norway has been moving and developing through a period of change. Thus, starting with the LIS background and the developments to the present. In Norway, three schools have provided education in LIS and related disciplines. The Norwegian School of Library and Information Science, is at present a part of Oslo University College (OUC). OUC was integrated into the national system of degrees which is offered a LIS program in bachelor and master degree (BA, and MA). Although since 1996, "it has had a comparatively high number of doctoral students, has so far not had the right to award doctoral degrees. Therefore one has had to find cooperative solutions with other universities. From this year on, Oslo University College has been given the right to grant doctoral degrees in so-called professional studies which also includes LIS." (Audunson, 2005)

The arena of the LIS focuses on the theme that “gives a broad introduction to the organization, retrieval and transmission of different form of media and text. The focus is on the point of view of the users, as well as information, knowledge and culture in multicultural and digital societies. The programme qualifies for work in libraries, as well as work in enterprises and organizations where the handling of documents and the transmission of information and culture is part of the activity.” (Faculty of Journalism, Library and Information Science, 2010). At the beginning of the program, it provided a three year programme. At the graduation, the candidate received a diploma in librarianship, and now it is called a bachelor programme in Library and Information Science (B.A. in LIS). In addition, the OUC also provided a two year programmes on a master level, namely master programme in Library and Information Science, and an International Master in Digital Library Learning (DILL) (English, joint programme).

Program in Library and Information Science

“The programme qualifies for higher positions within document-related organizations, research and development work within document-related subject areas, teaching posts within the library and information field, and admission to doctoral degree programme. On completion, successful students will be awarded a Master Degree by Oslo University College.”

Program in International Master in Digital Library Learning

“This is a two-year master programme for information professionals who intend to work in the complex world of digital libraries. The programme is offered in cooperation with Tallinn University in Estonia and Parma University in Italy, and all teaching is conducted in English. The students will follow a given structure, spending at least one semester at each partner institution. The programme is an Erasmus Mundus programme supported by EU. On completion, successful students will be awarded a joint Master Degree from all the partner institutions.” (Faculty of Journalism, Library and Information Science, 2010).

In addition, two other universities established educational programmes within LIS. in Trondheim (The National University for Technology and the Natural Sciences, NTNU). NTNU established a master and doctoral programme in information resources

management, with emphasis on digital libraries. The University of Tromsø also offers a programme in documentation science which goes from BA via master to PhD. (Audunson, 2005).

2.2 Library and Information Science in Thailand

The Library and Information Science education in Thailand has been moving and developing through a period of change. Thus, starting with the LIS background and the developments to the present.

Premsmith (2005) presents an overview of Thai LIS education namely history, curriculum provided as stated the following section.

“Library education in Thailand was initiated at Chulalongkorn University in 1951. A special program in library management was offered under the auspices of the Fulbright with five American professors conducting six courses, one at a time, for five consecutive years.

The Department of Library Science in the Faculty of Arts, Chulalongkorn University was founded in 1955. This was the first library school to offer a diploma program. The objectives of the School are to promote librarianship, provide well-educated librarian to work in various types of libraries, and to support educational programs which depend on extensive library materials. (Suthilak Ambhanwong 1964: 6 cited in Premsmith, 2005)

A first course on “library use” was offered to freshmen of the Faculty of Arts in 1957. Two years later, a full undergraduate programme in library science was offered to juniors and seniors. In 1964, the master’s program in Library Science was introduced. The curriculum was based on the graduate library schools in United States, with modifications to meet the needs of Thailand. The graduate curriculum consists of both theoretical courses such as library history and library administration; as well as practical courses such as cataloging and classification, and reference services. Dr. Frances L. Spain, an American professor, who was the consultant of the program at that time, stated that the graduate level of education for librarianship offered opportunities for librarians to contribute to the progress and direction of library development in Thailand. (Spain 1964: 1 cited in Premsmith, 2005)

Another graduate level of education offered in 1965 was Advanced Certificate in Library Science at the College of Education, Prasanmitr Campus (now Srinakharinwirot University). It was a one-year post bachelor's degree program aimed to produce school librarians, comprising three main subjects, namely, survey of library science, theory and technical process, and practicum in library service. (Supat Songsangchan, 2003 cited in Premsmith, 2005)

LIS Education Programs

Undergraduate Programs

During the intervening 50 years library and information science programme have been updated and expanded. At present more than 15 universities offer the programme of library and information science at undergraduate, masters and Ph.D. levels.

The first degree for information professionals in Thailand is the bachelor's degree and most universities offer such programme. However, the titles of those degrees are different. The bachelor's degree in Information Studies, is offered at 5 universities, firstly at Chulalongkorn University, and at Ramkhamhaeng University, Chiang Mai University, Suranaree University of Technology, and the University of the Thai Chamber of Commerce. Khon Kaen University, Mahasarakham University, Sukhothaimathirat Open University award Bachelor of Arts in Information Science. The Bachelor's in Library and Information Science degree is offered at Srinakharinwirot University, Burapha University and Thammasat University. Silpakorn University and Dhurakijpundit University offer Bachelor of Arts in Information and Library Science. Prince of Songkla University and Walailuk University award Bachelor of Arts in Information Management degrees.

The undergraduate programme's mission is preparing professionals for library and information work. These graduates are expected to have sufficient competency to work in government and private sectors.

Graduate Programmes

Master's Programmes

Since the inception of graduate education in library science in 1964 at Chulalongkorn University, 10 universities offer master's programmes. Most of the programmes lead to a Master of Arts in Library and Information Science have been developed. In addition, Sukhothaithammathirat Open University awards a Master of Arts in Information Science. Most graduate programmes are thesis-programmes. Some universities offer both thesis and non-thesis programmes. Thammasat University is now in the process of curriculum revision and plans to offer both thesis and non-thesis programmes.

Curricula for master's program vary in terms of structure as well as components. All universities have thesis programs. Four universities Chiang Mai, Khon Kaen, Mahasarakham, and Srinakharinwirot University, offer both thesis (Plan A) and non-thesis (Plan B) programs. For non-thesis programs, the student have to conduct independent studies.

All programs recognize the need for technology knowledge and skills as underlying competencies for information professionals.

The other graduate program meriting mention is the Program for an Advanced Graduate Diploma in Library and Information Science, Started in 1989, in the Department of Library Science at Chulalongkorn University. It is a one-year program for those who have received master's degrees in library science or library and information science. Currently, this program is temporarily closed for admission. The Asian Institute of Technology, a private international higher education institution, offers a master's degree and a Ph.D. in information management.

Doctoral Program

The first doctoral program in Thailand was initiated in 2003 at Khon Kaen University with the degree title of "Doctor of Philosophy in Information Studies". The curriculum focuses on the integration of a knowledge base in management; information, communications and technology (ICT); and social knowledge. Graduates are expected to

have competencies in management, ICT, knowledge and information management, and research.”

Digital library courses, were provided in the LIS schools in Thailand on the level of BA and MA master degree in most of LIS schools. There is no university which has provided a curriculum on digital library. However, the joint program between the Asian Institute of Technology and Boras university in Sweden provides one curriculum, Master’s in Library and Information Science, Digital Library and Information Services, which based in the University of Boras, Sweden.

“The program includes three types of studies: obligatory courses, a practice-related project and a thesis and is conducted through lectures, seminars, independent and small group work, which will include practice-related exercises and will also provide opportunities for students to improve their oral and written presentation skills for a variety of audience.

The program formulates a variety of problems from different perspectives of social sciences and information technology and draws the international body of knowledge (e.g., best practices in Sweden and elsewhere) regarding digital libraries and dialog with the participants in international and national co-operation network.

The two-week, face-to-face meeting with the faculty members from School of Library and Information Science, UB, and Computer Science and Information Management Program, AIT, at AIT Campus, Thailand.” (Asian Institute of Technology, 2010).

2.3 Digital Libraries

This section presents an overview of definitions, and themes of digital libraries.

The Digital Library Federation (1998) states “Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities.”

Lang (1998) describes a digital library as a worldwide term describing the use of digital technologies to acquire, store, preserve, and provide access to information and material originally published such as book, journal articles, newspapers in digitized form. It can be also digitized from existing print, non-printed formats.

Lesk (2005) defines the digital library as a collection of information which is both digitized and organized. It can be searched for any phrase, and also can be accessed all over the world.

Digital library is an online collection of information, which is stored in digital formats and can be accessed remotely via computer networks. (Wikipedia, 2008)

It can be seen that the above definition mostly convey the same meaning. In summary, digital library represents network resources. It is also a source of information presented in several format such as text, audio, video, multimedia etc; and its information is stored digitally.

Surowiecki (2004) points out that the important mission of digital libraries is to integrate the professional resource selection with the wisdom of the crowd.

Blandford (2006) describes digital libraries as having changed the way humans interact with information, when an internet connection is available and user has a suitable access device. In addition, a user can access information from anywhere at anytime. The digital library also introduces new dimensions to approaches to learning.

Borgman (2003) suggested that digital libraries services should include resource searching that meets the user needs at any formats and with no space limitations.

2.4 Skills and Knowledge

Skills and knowledge of an information professional in the changing role of the digital era are studied, and the main focus is to indicate the core skills and knowledge that are required.

2.4.1 Changing Roles and Skills of Library and Information Professionals

Dolan and Schumacher (1997) emphasized that influx of the internet and innovative technologies impacted the LIS professionals that they enable to be qualified in a new variety of technological career. Fourie (2004) indicated that the information technology (IT) has impacted on the future of librarians works and responsibility. She described that librarians are in the cyberspace world and their role have to be changed according to the new IT. Ashcroft (2004) presented that LIS is changed because of the IT trends, thus their role, characteristics and skills are set to adjust the changes.

2.4.2 Categories of Skills

Skills categories has been classified by some LIS researchers as follows:
Orme (2008) studied a content analysis of 180 job advertisements collected time frame between June 2006 and May 2007 including the library sectors in the United Kingdom. She categorizes skills into generic, personal and professional. The findings indicated that generic skills are the most normally required. Professional skills and personal skills are as the second and the third place. The three most regular skills in each category are listed below

Generic: interpersonal/communication; general computing;
team work.

Professional: professional related experience; customer service;
chartered librarian; cataloguing, classification and metadata

Personal: enthusiasm; flexibility; self motivation

Goulding, Bromham, Hannbuss and Cramer, (1999) investigated the personal characteristics necessitated of information professionals by conducting a content analysis of job advertisements in order to find a list of the personal characteristics. The questionnaire was sent to chief librarians in the United Kingdom including all library sectors. The results summarized the four most essential qualities skills required namely communication skills, flexibility, the ability to work under pressure and deal with a range of users.

Partridge and Hallam (2004) investigated the comparison of the structure of human DNA to the skills, knowledge and attitudes of the model information professional for the twenty first century. They indicated that both discipline knowledge and generic capabilities were needed to be a successful information professional in today's information environment. Partridge and Hallam (2004) defined generic capabilities as personal and generic skills. They conducted focus groups in the South East Queensland region of Australia with library and information professionals, educators and students. Thus, they found out from the study that no in-depth discussion on the generic capabilities of the information professionals existed by compiling lists in the areas of generic capabilities and discipline knowledge from the literature. Then, these lists were used to create discussion at the focus group sessions. Ten generic capabilities were considered to be significant in the needed framework of an information professional. Thus, the focus groups also identified skills which were not presented in the list, such as IT skills, marketing or promotion and teaching skills. The findings were presented in a list of 14 items of discipline knowledge, all were vital to the information professional. The final result of the discussion indicated that the discipline knowledge which was identified covered the essential knowledge. However, political skills, project management, communication and teamwork was also recommended.

Kwasik (2002) studied the technological change in connecting with serials librarians. She discovered that the traditional skills were the most frequently mentioned as a requirement. Followed by communication skills at a second place. Additionally, she indicated that these skills that could be considered fitting to a digital environment, for instance knowledge of metadata standards, markup languages, experience in cataloguing electronic publications and web design etc. were normally rated as knowledge desired for an information professional.

O'Connor and Li (2008) analysed 138 academic librarian position advertisements from Australia, America, United Kingdom, New Zealand and Hong Kong between July and November 2007 in the study from 1973 to 1998. The position descriptions were analysed and classified into four groups as computing and technology; interpersonal and intrapersonal; service approaches; and traditional approaches to libraries. In addition, they found that the skills most frequently presented were communication, leadership and

interpersonal skills, independent, innovative, confident, judgment, energetic and enthusiasm

Lynch and Smith (2001) conducted a content analysis of 220 job advertisements from American academic libraries. They found that oral and written communication skills were the most important. However, flexibility, creativity and leadership were also more and more appearing in the advertisements. Computer technologies and related skills were regularly mentioned in the ads.

Feret and Marcinek (1999) utilized the Delphi method to predict the future role of the academic library and the skills required by the academic librarian in 2005. The findings were divided in the five main categories namely communication or training skills; IT skills; Managerial; Commitment; and Subject Knowledge or Profiling. Team working skills, public communication skills, project management skills, leadership qualities, knowledge of international standards, commitment to the profession and flexibility were also mentioned as required skills.

Gerolimos and Konsta (2008) conducted their study of 200 job advertisements by collecting data from the United Kingdom, Canada, Australia and the United States in 2006 and 2007 to investigate the qualifications as the skills required of a modern professional librarian. The findings indicated that communication skills were one of the highest ranked skills followed by experience. Additionally, interpersonal skills also appeared frequently.

With regards to the other personal competencies theme, the researcher considered investigating the personality trait type of an information professional by applying the Holland typological theory in this study. To find out what kinds of personality type an information professional working in a digital library should represent.

Holland's typological theory

Holland (1966) set the choice of a vocation is partly related to a person's personality. He theorized that members of a vocation would tend to have similar personalities. People would choose vocations that relate to their personality.

Holland (1966) presented the typological theory on personality type as six categories as following stated list.

1. Realistic personality type: genuine, persistent, and practical

The realistic person is apt to show him/herself to be: sociable, shy, conforming, frank, genuine, masculine, materialistic, natural, normal, persistent, practical, self-effacing, stable, thrifty, unselfish.

2. Investigative personality type: analytical, curious, and methodical

Such investigative persons are found to be: analytical, cautious, critical, curious, independent, intellectual, introspective, introverted, methodical, passive, pessimistic, precise, rational, reserved, unassuming, unpopular.

3. Artistic personality type: creative, idealistic, and imaginative

The artistic person is apt to show him/herself to be: complicated, disorderly, emotional, feminine, idealistic, imaginative, impractical, impulsive, independent, introspective, intuitive, non-conforming, original.

4. Social personality type: empathetic, friendly, and helpful

Members of this type are apt to show themselves to be ascendant, co-operative, feminine, friendly, generous, helpful, idealistic, insightful, kind, persuasive, responsible, social, tactful, understanding (empathetic).

5. Enterprising personality type: acquisitive, energetic, and exhibitionistic

The enterprising person is apt to show him/herself to be: acquisitive, adventurous, ambitious, argumentative, dependent, domineering, energetic, exhibitionistic, flirtatious, impulsive, optimistic, pleasure-seeking, self-confident, social, talkative

6. Conventional personality type: efficient

The conventional person is apt to show him/herself to be: conforming, conscientious, defensive, efficient, inflexible, inhibited, obedient, orderly, persistent,

practical, prudish, self-controlled (calm), unimaginative. (Holland, 1966 cited in Afolabi, 1996)

Five personality traits types as investigative, realistic, artistic, social, enterprising were selected to suite with the research theme.

The researcher found out that there was only a study of Afolabi (1996) who applied the Holland's theory on librarianship personality type. Afolabi investigated the library science students' main personality type and the main environment of a department of library science. Thus, the finding of the study was that the library science students desired to be an enterprising,. In addition, the library science department environment studied was enterprising. Consequently, the opinion of the students are likely to be dissimilar from practitioners.

Roles and Skills for the Digital Librarian

Several studies mentioned that the information technology (IT) impacted the information professional role, skills and knowledge requirement changed. Additionally, it is also one of the important courses which is required to be included in the LIS curriculum. (Khoo 2005; Bakar, 2005; Fisher, 2003; Budd and Miller, 1999; Dolan and Schumacher, 1997).

However, a small number of studies stated the roles and skills for an information professional to work in a digital library environment, as summarized in the following sections.

Tennant (1999) presented a list of Discipline Specific Knowledge which the digital librarians should know and be qualified in. Tennant classified the vital skills needed to create and manage digital library collections and services namely Imaging technologies, Optical character recognition (OCR), Markup languages, including HTML, SGML, and XML, Cataloging and metadata, Indexing and database technology, User interface design, Programming, Web technology, and Project management.

In addition, Sreenivasulu (2000) considered that an essential role of a digital librarian in digital libraries is to act as a liaison who brings together users and information. Additionally, he mentioned that one of the essential skills which the digital librarian need to develop is the ability to manage digital libraries and digital knowledge in terms of

digital knowledge management. However, he did not indicate any list of personal characteristics. Among, the specific skills needed for working as a digital information professional, comprises knowledge of web publishing, imaging technologies, optical character recognition and markup languages.

Choi and Rasmussen (2006) surveyed practitioners in the United States who were in the digitization or digital library projects from September to December 2005. One of the purpose of the study was to find out skills and knowledge required for digital librarians. The findings of the study were correspond with many of the studies previously mentioned. Communication skills, Project management and leadership skills also rated highly. The five highest ranked choices for the technical area namely understanding of digital library architecture and software; knowledge of technical and quality standards; web markup languages; database development and management systems; and web design skills. The most highly cited were cataloguing, electronic collection development/management and systems analysis.

Howard (2009) studied the digital library education from an Australian perspective. One of the aims of the study was to identify the skills and knowledge required to work in a digital library environment, in order to establish what might be included in an LIS curriculum. The target group of the study are practitioners working in academic libraries and Library and Information Science (LIS) educators in Australia. This study used an online questionnaire as a research method. The skills and knowledge applied in the study were classified in three categories as personal competencies, generic skills and discipline specific knowledge. The findings indicated that skills namely Communication, Critical thinking and the necessity to be Flexible were required in the digital library environment. User needs, Metadata and Copyright were regarded as highly desirable knowledge areas.

This study is similar to Howard (2009) in the theme of researching the opinion on skills and knowledge required of an information professional working in a digital library environment from the LIS educators. Though this study analyzed and compiled lists of skills and knowledge from related literature. Considering essential skills and knowledge, the researcher applied the theme of skills and knowledge as personality type, discipline specific knowledge, and generic skills from the previous studies mentioned.

CHAPTER 3: METHODOLOGY

This chapter describes the methodology used in this research, including interview and questionnaire design, the pilot studies, and data collection process. In addition, advantages and disadvantages of data collection tools are discussed as well as the methods used in analyzing.

3.1 Methodology

This study employed a mixed-methods research which constitutes of both qualitative and quantitative research approaches. In the study, a survey, and interview methods were utilized to explore the essential skills and knowledge of an information professional working in a digital library environment. The target groups of the study were Norwegian and Thai LIS educators.

3.2 Participants of the study

3.2.1 Norwegian LIS Educators

The total population consisted of 26 educators. The Norwegian LIS educators who participated in the present study were from Oslo University College and the University of Tromsø, which provide the LIS programmes. All LIS educators from these institutions were reached through institutional mailing lists. Three educators who were recommended by professionals participated in the interviews.

3.2.2 Thai LIS Educators

The total population consisted of 95 educators. Thai LIS educators who participated in the study were from the public universities, which provide the LIS programmes, including Burapha University, Chiang Mai University, Chulalongkorn University, Khon Kaen University, Mahasarakham University, Prince of Songkla University, Silpakorn University, Srinakharinwirot University, Suranaree University of Technology, Taxin University, Thammasat University, and Walailuk University. Most of

the participants were identified via their university's websites. Additionally, some of the educators were recommended by professionals as well as from the interviews. There were 81 Thai LIS educators participated in the study.

3.3 Method of Data Collection

An online questionnaire, face-to-face interview, online interview and email interview were used as the data collection methods for this study. Due to the research theme, the researcher chose to do data collection from all Norwegian and Thai LIS educators. Yet, the destination and time constraint on this study are main factors. For this reason, the online questionnaire was the first priority selected to be the data collection tool for this research. Additionally, online questionnaire was considered as one of the most effective methods of collecting data from both Norwegian and Thai respondents, as the researcher was based in Norway. The researcher designed the online questionnaire by using Questback (an online survey services for gathering and analyzing data. (<http://www.questback.com>))

Advantages of online questionnaire

Using an online questionnaire has its advantages; it can collect the perspectives from the number of remote research participants with low cost. In addition, all respondents are able to answer questions anonymously. Furthermore, online questionnaire can be automatically gathered, summarized and analyzed. (O' Neill, 2004; Wright, 2005)

Disadvantages of online questionnaire

O' Neill (2004) states that the disadvantage of using online questionnaire as a tool is that "not everyone has access to the internet." Regarding this study, the online questionnaire was distributed to all Norwegian and Thai LIS educators via their email addresses for data collection. However, respondents who did not access to the internet during the period of data collection might lack of opportunity to fill the questionnaire.

Regarding the online questionnaire method used, a study was related to the current study as Howard (2009) conducted an online questionnaire to Australian LIS educators and practitioners to determine the important and desirable skills, knowledge required of an information professional to work in a digital library environment. The respondents were asked to rate the skills and knowledge as either highly desirable, desirable or less desirable.

The current study was different from the previous study as mentioned in that the respondents were asked to select the three or five most essential competencies from the selections listed, in order to find out the most highly considerate skills and knowledge according to the point of view of the respondents. Forcing subjects to choose only a few competencies from each list enabled the researcher to better distinguish the essential from the less essential, without giving the subjects the extra of having to rank all of the competencies listed.

Interviews were also included in the current study to get more understanding, and refine the preliminary idea related to this study.

Advantages of online interview

Using an online interview has several advantages.

- a. Cost: it saves cost to conduct an interview.
- b. Access: it allows access to people who have geographically distant locations.
- c. Time: it can provide the possibility to interview more than one interviewee or group at that time.
- d. Venue and participation: it can also used an email and discussion board as a supplementary tool in this interview. (James and Busher, 2009).

Disadvantages of online interview

It can be assumed that the disadvantage of using online interview are the same as O' Neill (2004) states that "not everyone has access to the internet."

3.4 Data Collection Instrument

The section describes the explanation for considering and applying the tools for the current study.

3.4.1 Questionnaire Design:

The online questionnaire was created to identify the vital skills and knowledge required of information professionals to work in a digital library environment.

The demographic information included gender, age, number of years of experience in the LIS discipline and as LIS educators, including with their teaching fields.

These factors made Gender and age were included as it would be interesting to note if any differences in the opinion of competencies required of an information professionals working in the digital era.

The questionnaire was developed only in an English version, which could reach the two target group of this study.

To decide which competencies, skills and knowledge should be considered in the questionnaire, the previous research were considered. Partridge and Hallam studied on this skills and knowledge for the information professional in the twenty one century. Thus, they provided lists of generic skills and type of knowledge.(Partridge and Hallam, 2004).

Consequently, the competencies applied in the current study are separated into three mains broad areas as

- a. Professional skills: which include the professional knowledge required of one's field.

The description noted in the questionnaire was:

Discipline Specific Knowledge: includes knowledge which is learned in the Library and Information Science programmes both undergraduate and postgraduate level

- b. Generic skills: comprise integrated skills which can be applied.
- c. Personal competencies (personality trait)

Discussion on skills and knowledge selected to be included in the questionnaire are as listed below:

3.4.1.1 Personal competencies (personality traits)

The skills listed on the topic Personal competencies (personality traits) on the questionnaire were extracted from Holland (1966) which presented personality types classified into six categories as realistic; investigative; artistic; social; enterprising; and conventional. Regarding to the study, the researcher considered not to include conventional type in the study because it is not very much suited to the theme of an information professional working in the digital library environment. The five selected types are described personality traits lists for instance analytical, creative, helpful and technical and etc. From the list of traits, three traits were represent each of the personality types. The selected traits were those who were considered to most clearly indicate the various personality type. Full detail of the list provided on the questionnaires can be found in the appendix 1.

3.4.1.2 Discipline Specific Knowledge

Discipline Specific Knowledge listed in the current study was developed from the study of Choi and Rasmussen (2006b) and Howard (2009). In this section, 19 selections representing Discipline Specific Knowledge structured in the questionnaire. Full detail of the list provided in the questionnaires can be found in the appendix 1.

3.4.1.3 Generic Skills

The Generic Skills listed in the current study was extracted based on the related studies of Fisher (2004), Partridge and Hallam (2004) Orme (2008), and Howard (2009). The total number of generic skills offered in the questionnaire was 16. Full detail of the list provided in the questionnaires in the appendix part1.

3.4.2 Interview design

Semi -structured interviews were designed to ask the interviewees to give their reasons for selecting the three or five most essential competencies. For instance, personal competencies, discipline specific knowledge and generic skills. Full detail of the list provided in the semi -structured interviews in the appendix part 2.

3.5 Questionnaire and interview outline

3.5.1 Online questionnaire design

The researcher designed the online questionnaire by using Questback. Regarding to questionnaire development, both closed and open ended questions were designed.

The questionnaire was divided into 2 sections

Section I. Demographics consist questions on background of the participants namely gender, age range, work experience as LIS discipline and LIS educator, and teaching filed(s).

Section II. Essential competencies consist of questions on the essential competencies of an information professional working in a digital library environment. Thus, questions were also separated into 3 subsections as a following list:

- a. Personal competencies (appropriate attitudes, values, and personality traits)

b. Discipline Specific Knowledge are taught in the LIS programme which support on essential competencies of an information professional working in a digital library environment

c. Generic skills (a combination of competencies providing a strong basis for further learning).

Some questions in this part were opened to collect opinions from the participants.

3.5.2 Interview design

Semi-structured interviews consist of three questions. The questions were focus on the reason for selection the three of five most essential competencies of an information professional working in a digital library environment, namely personal competencies, discipline specific knowledge and generic skills.

3.6 The pilot studies

In order to test a validity, reliability, accessibility of questionnaire, the pilot studies were considered to include in this study. The questionnaire was piloted with two DILL students. In addition, the questionnaires were sent to some Norwegian LIS educators, and two Thai LIS educators.

From the testing, some suggestions for formatting of questionnaire were given as listed below.

a. Accessibility to the questionnaire

During the testing, some testers have encountered technical errors or problems with accessibility to the link, the questionnaires were stuck in a junk mail, and some testers had a problem on receiving the link etc. Regarding these problems, they suggested to redevelop the link.

b. Content and language

Competencies grouping, translation in Thai version, or giving an alternative on answering in Thai language were suggested to be edited and developed.

Subsequent to this testing, the researcher analyzed and decided the format of the questionnaire.

The last version of the questionnaire contained a total of 11 questions. Three of these focused on skills and knowledge required for an information professional to work in a digital library environment. The respondents must select the three or five most essential competencies from the lists. From the pilot studies, the testers spent 7 minutes on the testing, so this testing supported the expectation that the respondents could complete the questionnaire in 10 minutes.

3.7 Data Collection Procedures

3.7.1 Questionnaire Distribution

The online questionnaire were distributed to all both Norwegian and Thai LIS educators via their email 's addresses.

a. Norwegian LIS educators received the questionnaire on 6 th April, and the questionnaire was available until 18 th April. There were few respondents completed the questionnaire. A reminder was sent to respondents on 27 th April, and the questionnaire was available until 3 rd May. The total number of respondents, who answered the questionnaire was 14 (53.85%).

b. Thai LIS educators received the questionnaire on 17 th April. Due to long holiday period and the technical problems accessing the online questionnaire, the response was only 5 respondents who completed the questionnaire. The questionnaire was resent on 23 rd April. Then, the second questionnaire was available until 10 th May. In order to get more responses, the researcher contacted some educators from each university to ask them to serve as a coordinator in reminding the other educators to fill in the questionnaire. Regarding to this communication procedure, email, Skype, Windows

Live Messenger, Google talk, Facebook Chat and telephone were used. Finally, the total number of respondents who answered the questionnaire was 44 (54.32%).

Some probable causes the limited of response were listed.

- a. Inaccessibility to the online questionnaire
- b. the email was stuck in the junk mail
- c. Late answered online questionnaires
- d. Declining to answer the questionnaire from unknown email
- e. Inactive email 's address of educators
- f. Inappropriate time for questionnaire distribution

3.7.2 Conducting the interviews

Norway

As the researcher was based in Norway, the researcher could conduct the face-to-face interviews with three educators, who were identified through professional recommendations. Most of interviewees' teaching fields are related to digital library context. The interviews were conducted on 14 th May. The language used during the interviews was in English. Sound recorder was used in the interviews. Notes were also taken during the interviews.

Thailand

The researcher conducted the interviews with six Thai LIS educators from different universities. All interviewees were identified through professional recommendations. Four of interviewees' teaching fields are in digital library context, which in both undergraduate and/ or post graduate program. Two of interviewees are the head of department of the library science department from two universities. The interviews were conducted via MSN messenger, Skype and telephone on 18, 19, 20, 21, 25 th May. The language used during the interviews was both in English and Thai. However, most of the interviews were in Thai. Sound recorder was used in the

interviews. Notes were also taken during the interviews. Additionally, the email interviews were also sent to the interviewees in order to receive more opinions on this issue.

3.8 Data Analysis

The data was analyzed by using descriptive statistics such as frequency distribution and percentages. The collected data was divided for analysis in two formats. First, the closed questions were analyzed statistically by using Questback, and Microsoft excel. The other, the open-ended questions, and interview results were analyzed by using content analysis. The result of the data analysis is presented in tables with description in Chapter 4.

CHAPTER 4: DATA ANALYSIS

The data analysis is split into 4 sections, describing the results from Norwegian LIS educators (section 4.1) and Thai LIS educators (section 4.2) followed by a comparison of Norwegian and Thai LIS educators' opinion on the essential competencies (section 4.3), and conclusion (section 4.4)

Quotes from respondents are cited as they are written in the questionnaire, including with the interview results.

The total number of responses received from Norwegian LIS educators was 17, with 14 being completed surveys. The total number of responses received from Thai LIS educators was 44, all of them completed surveys.

Most of the questions relating to demographic information were completed by both Norwegian and Thai LIS educators, nevertheless some respondents select not to answer all questions in the following sections. The percentages presented in this chapter are based on the number of completed responses received for each question.

4.1 Data Analysis: Norwegian LIS Educators

4.1.1 Demographics

The majority of respondents were male, 8 (66.7%), compared with 4 (33.3%) females. Most respondents were in the age range 40 – 49 years, 4 respondents (30.8%). Both the age ranges 30 – 39 years, and 50 – 59 years received 3 respondents (23.1%). Followed by 2 respondents (15.4%) in the age range 60 years or older. Only one respondent was in the 20-29 years 's age range (7.7%).

The majority had work experience in the LIS discipline of 20+ years, 5 respondents (38.5%). Followed by “ More than 1 and up to 5 years”, 3 respondents (23.1%). Both the groups “ More than 5 up to 10 years”, and “ More than 10 up to 15 years”, were selected

by 2 respondents (15.4%). One respondent (7.7%) has had work experience of more than 15 up to 20 years.

A majority of 5 respondents stated their work experience as LIS educator as “ More than 1 and up to 5 years”, (38.5%). Followed by “ More than 10 and up to 15 years”, 4 respondents (30.8%). Working experience as “ More than 5 up to 10 years”, received from 3 respondents (23.1%). One respondent (7.7%) has had work experience of more than 15 up to 20 years.

The most common teaching fields were Information Retrieval 8 respondents (61.5%), Followed by Information Organization 6 respondents (46.2%), and Information Technology & System chosen by 5 respondents (38.5%). Thus, 3 respondents (23.1%) selected th “others” field, but none of them mentioned specific fields.

4.1.2 Skills and Knowledge

In this section, the questionnaire presented a list of skills taken from the academic literature, and the respondents were asked to select, respectively, the three and five most essential competencies which they believe are required of an Information Professional working in a digital library environment.

4.1.2.1 Personal competencies (Personality traits)

Table 1: Personality traits

Personality traits	Frequency (N=13)	Percent
Analytical	7	53.8
Creative	9	69.2
Curious	3	23.1
Empathetic	1	7.7
Energetic	1	7.7
Enterprising	0	0.0
Exhibitionistic	0	0.0
Genuine	0	0.0

Helpful	3	23.1
Idealistic	2	15.4
Imaginative	1	7.7
Methodical	6	46.2
Persistent	1	7.7
Practical	1	7.7
Technical	7	53.8

The three most essential personality traits were as follows: Creative received 9 responses (69.2%). Followed by both analytical and technical with 7 responses (53.8%). There were no response in either enterprising, exhibitionistic, and genuine.

Regarding the interviewing results, some interviewees provided their opinion on the personality traits which support the general results as creative and analytical.

“Everybody who works in the digital environment should be analytical, curious and creative. The digital library is the new thing and the solution is not set yet, you need to accommodate the change, you need to know why to do things. I think all the three competencies help working in digital library.” (*Interviewee # 1*)

“The information professionals should have the ability to sort out different parts and solve the problems effectively. They should also be creative because creativity is important in technological development and practice concerning change. In addition, we need more creative librarians or information professionals to see more new opportunities and being creative to update for the change.”(*Interviewee # 2*)

“Creative is really important because we live in an environment where things change all the time. So, being creative, is to see possibilities being able to see new ways of the developing library as a living organism. And also, analytical is the core intellectual skill. We have to analyze what is the problem and how to reach our aim in the library environment. Analytical tools like PESTLE analysis (Political, Economics, Social,

Technological, Legal and Environmental) are used to serve the needs of the users in the changing digital world.” (Interviewee # 3)

According to the Holland’s typological theory on librarianship personality type, it can be summarized that the essential personality traits of an Information professional working in a digital library environment in the opinion of Norwegian LIS educators, namely creative as artistic, analytical as investigative, and technical as realistic.

In addition, some educators suggested other personality traits as innovative.

4.1.2.2 Discipline Specific Knowledge

Table 2: Discipline Specific Knowledge

Discipline Specific Knowledge	Frequency (N=13)	Percent
Basic Systems Administration	3	23.1
Collection Development	7	53.8
Content Management Systems	1	7.7
Copyright	3	23.1
Database Development and Database	7	53.8
Digital Archiving and Preservation	2	15.4
Digital Library Architecture	5	38.5
Digital Library Software	3	23.1
Digital Protocols	3	23.1
Imaging Technology	0	0.0
Integrated Library Management Systems	0	0.0
Licensing	0	0.0
Metadata	11	84.6
Programming Languages	3	23.1

Table 2: Discipline Specific Knowledge (Cont.)

Discipline Specific Knowledge	Frequency (N=13)	Percent
Technical and Quality Standards	3	23.1
User Need	6	46.2
Vendor Negotiation	0	0.0
Web Design	1	7.7
Web Markup Languages	2	15.4

The five most items of discipline specific knowledge were as follows: Metadata was the most selection with 11 responses (84.6%). Followed by Collection Development and Database Development and Database Management Systems with 7 responses (53.8%). 6 respondents (46.2%) selected User Need. Digital Library Architecture received 5 responses (38.5%). There were no response in either Imaging Technology, Integrated Library Management Systems, Licensing, and Vendor Negotiation.

Regarding the interview results, interviewees provided their opinion on the discipline specific knowledge which supports the general results as Metadata, Collection Development, Database Development and Database Management Systems, User Need, and Digital Library Architecture.

Metadata

“Metadata is of course important because as an Information professional, we are dealing with Metadata. It is that we already have done, when we have cataloged. Metadata are becoming more and more important. Thus, we have a challenge in telling people that we are the Metadata expert.” (*Interviewee # 2*)

“Metadata is one of the most important competencies for an Information professional because if you work in the library, archive or museum, they have collections, and we need to give access to the collection. One of the ways to do that, it is metadata, and it will be a

very essential competency because we are depending on exchanging metadata with other environment in the library world, with metadata creators, and publishers. For instance, we need to have metadata on the web, so we need to know about the new standards of the web, and the MARC format. That is an XML exchange, and Linked data. From this point of view, there is a great demand for Metadata knowledge.” (Interviewee # 3)

Collection Development

“The digital library is a collection.” (Interviewee # 1)

Database Development and Database Management Systems

“Knowing how it works and is organized would help to understand the function of the database.” (Interviewee #1)

“Database theory, and Database Development and Database Management Systems is like the heart and the mind of the knowledge organization field inside LIS. So, we see also that new era of knowledge organization that are based on the Net .The Semantic web, RDF, SPARQL, FRBR principle and related technology They build upon which are very closely related to the Database theory and principle. If you have this basic knowledge, it helps you to work in the digital library environment efficiency.” (Interviewee # 2)

“I also think that is essential that the librarian working in the digital library environment should know about Database Development and Database Management Systems, because it is so essential those days, for example the FRBR is an entity relationship model build on modern database design. If you do not know how a database is built. I do not know how you can really understand the functional requirements.” (Interviewee # 3)

User Need

User Need is very important, especially when you want to develop services. You need to do analysis the user need to see: how we can meet it, for example whatever services such as web site or blog, what is a good design for them. Thus, OCLC research in 2005 has shown that there is very accurate gap between what librarians want and what users want. The librarians quite often speak on behalf of users but the need of librarians and the

need of users are definitely different. For certain, we should do research with emphasis on the users need (*Interviewee # 3*)

Digital Library Architecture

“The information professionals need to know the structure of the website. (*Interviewee # 3*)

4.1.2.3. Generic skills

Table 3: Generic skills

Generic skills	Frequency (N=14)	Percent
Business Acumen	0	0.0
Change Management	4	28.6
Communication	9	64.3
Critical Thinking	9	64.3
Ethics and Social Responsibility	4	28.6
Grant/Proposal Writing	0	0.0
Human Resources Management	1	7.1
Information Literacy	11	78.6
Leadership	1	7.1
Negotiating Skills	2	14.3
Problem Solving	8	57.1
Project Management	4	28.6
Promotion and Marketing	1	7.1
Research	6	42.9
Teamwork	7	50.0

The five most frequent generic skills were as follows: Information Literacy was the most frequent selection with 11 responses (78.6%). Followed Communication and Critical Thinking, who both received 9 responses (64.3%).

Problem Solving

received 8 responses (57.1%). Teamwork received 7 responses (50%)

None of the respondents selected Business Acumen, Grant or Proposal Writing.

With regard to the interview results, interviewees provided their opinion on the generic skills which support the general results, Communication, Critical Thinking, Problem Solving, and Teamwork.

Communication

“Communication and negotiation skill are important for working with the team and users.”
(*Interviewee # 1*)

“Communication is more important today. The information professionals are definitely related to interact with users. Regarding this digital era, they need to communicate with user via Internet, for instance through the library web page. This is an example that the information professional has to know the communication stuff in order to communicate with user on service and information resources.” (*Interviewee # 2*)

Critical thinking

“Problems need critical thinking to figure out which is the best solutions and proper solving problem is the way to deal with it.” (*Interviewee # 1*)

“Critical Thinking is very important especially in the digital world, that information professionals are able to see, and to think what things will change in this digital library environment.” (*Interviewee # 2*)

“Critical thinking helps investigating and developing process of intellectuality.”
(*Interviewee # 3*)

Problem Solving

“Problem Solving is something we all need to have as the core competency. I think when you interact with people, you have to know how to deal with it, and how to move on.” (*Interviewee # 3*)

Teamwork

“Digital or not digital, you always need to have teamwork because you never work alone.”
(*Interviewee # 1*)

“Teamwork is a basic component in a well done project. We have to know the competencies of the people inside the project. It is like to know such things as “Put the right man to the right job.” We also have to make sure that the project contains the relevant people with the right competencies. That is a good project management, and a good teamwork as well.” (*Interviewee # 2*)

“I think that working in a team is a core competencies these days, You need to work with other people. The best thinking is not from one person, but come from a good team. People thinking together, that is basically teamwork, having creativity in a work place, I think it is really important to come up with a good innovative solution as well. (*Interviewee # 3*)

4.2 Data Analysis: Thai LIS Educators

4.2.1 Demographics

The majority of respondents were female, 37 (84.1%), compared with 7 (15.9%) male. The most frequent age range was 50 – 59 years, 18 respondents (40.9%). Followed by age range 30 – 39 years, 15 respondents (34.1%), and age range 40 – 49 years, 7 respondents (15.9%). The age range 60 years or older had 3 respondents (6.8%). Whereas, the 20-29 years' age range had only one respondent (2.3%).

The majority had work experience in the LIS discipline of 20+ years, 19 respondents (43.2%), followed by “ More than 10 and up to 15 years”, 8 respondents (18.2%). Working experience as “More than 5 up to 10 years”, received 7 responses (15.9%). Both working experience as “ More than 1 and up to 5 years”, and “More than 15 up to 20 years”, received 5 responses (11.4%).

A majority of respondents had work experience as LIS educator of 20+ years, 13 respondents (29.5%), “More than 10 and up to 15 years”, received 10 respondents (22.7%). “More than 1 and up to 5 years”, received 8 respondents (18.2%). “More than 5

and up to 10 years”, received 7 respondents (15.9%). “More than 15 and up to 20 years”, received 5 respondents (11.4%). There was only one respondent (2.3%) with work experience of less than 1 year.

The most common teaching fields were Information Technology & System with 23 respondent (52.3%). User services with 19 respondents (43.2%). Followed by Information Organization 17 respondents (38.6%). Both Knowledge Management and Information Organization was selected by 14 respondents (31.8%), Information Retrieval by 13 respondents (29.5%) and Collection Management by 6 respondents (13.6%) 19 respondents (43.2%) selected the “others” field, and list of the fields are as follows: Information resources in the Humanities and Social Sciences, Serial, Science and Technology Information Database, Programming, Information Literacy, Mobile Library, Reading Promotion Activity, Development of Library and Information Sciences, Research in Library and Information Science, Classification and Cataloging , User studies, Information Sources of Business & Industry, Management of Information Technology, Serials, Information Systems Analysis and Design, Law Librarianship, Business Information, Information and Society, Evaluation of Library and Information Services, Archives and Government Publications, Non-Print Materials, Information and Knowledge Management, Document and Electronic Document Management, Introduction to LIS, LIS Research, and Library Automation.

4.2.2 Skills and Knowledge

In this section, the questionnaire presented a list of skills taken from the academic literature, and the respondents were asked to select, respectively, the three and five most essential competencies which they believe are required of an information professional working in a digital library environment.

4.2.2.1 Personal competencies (Personality traits)

Table 4: Personality traits

Personality traits	Frequency (N=44)	Percent
Analytical	29	65.9
Creative	27	61.4
Curious	4	9.1
Empathetic	3	6.8
Energetic	10	22.7
Enterprising	4	9.1
Exhibitionistic	4	9.1
Genuine	3	6.8
Helpful	11	25.0
Idealistic	3	6.8
Imaginative	5	11.4
Methodical	13	29.5
Persistent	3	6.8
Practical	24	54.5
Technical	24	54.5

The three most personal competencies were: Analysis with 29 responses (65.9%), followed by Creative with 27 responses (61.4%) and Both Practical and Technical with 24 responses (54.5%).

In the interviews, some interviewees provided their opinion on the personality traits which support the general results as analytical, creative, practical and technical.

Analytical

“Analytical is the main competency of the information professionals that help serving the right information and services to the user need.” (*Interviewee #5*)

“The information professionals should be eligible to analyze and select the accurate resources and programme for the digital library.” *(Interviewee #6)*

“The information professionals should have the analytical competency, on user need, and content analysis in order to serve user's need.” *(Interviewee #8)*

“The Informational professionals need analytical skill to solve the problem properly.” *(Interviewee #9)*

Creative

“Creativity helps the information professionals inventing innovative methods or procedures to manage the digital collections.” *(Interviewee #4)*

“Creativity would encourage new usage adaptation of digital technology that would be of benefit to the user.” *(Interviewee #7)*

“Creativity on information and services promotion and digital library user interface help making the information easily accessible for the user.” *(Interviewee #8)*

“The information professions need creativity, especially working in a digital library environment which is the new and changing technology. The creativity helps the information professional to adapt and work with it effectively.” *(Interviewee #9)*

Practical

“The digital library is the combination of computer sciences, communication, management, psychology, marketing, etc. The information professionals should be able to select and integrate all disciplines on serving information and services on user demand.” *(Interviewee #4)*

“Practical is a process of bringing the knowledge into productivity. Information professional should be able use the right tool to reach the success.” *(Interviewee #5)*

Technical

“Technical skill is the basic of managing. The information professionals should have both librarian skill and technological skill.” *(Interviewee #4)*

“Technical skill such as acquisition, cataloging, abstracting, indexing are the main competency for the librarian.” *(Interviewee #5)*

“Technical skill would help the information professionals maintain the digital library effectively, solve the problem and improve the system.” (*Interviewee #7*)

“The information professionals must be keen in the concept of digital library, for instance definition, framework, implement, and services to serve the user's need.” (*Interviewee #8*)

“Technical skill needs for catch up with the new information technology, including the skill in computer literacy and library science.”(*Interviewee #9*)

According to the Holland’s typological theory on personality type, it can be summarized that the essential personality traits of an Information professional working in a digital library environment in the opinion of Thai LIS educators, namely analytical as investigative, creative as artistic, and practical and technical as realistic.

In addition, some Thai LIS educators listed other personality traits, such as dynamic.

4.2.2.2 Discipline Specific Knowledge

Table 5: Discipline Specific Knowledge

Discipline Specific Knowledge	Frequency (N=44)	Percent
Basic Systems Administration	12	27.3
Collection Development	5	11.4
Content Management Systems	31	70.5
Copyright	15	34.1
Database Development and DMS	20	45.5
Digital Archiving and Preservation	21	47.7
Digital Library Architecture	14	31.8
Digital Library Software	12	27.3
Digital Protocols	3	6.8

Imaging Technology	1	2.3
Integrated Library Management Systems	12	27.3
Licensing	1	2.3
Metadata	27	61.4
Programming Languages	1	2.3
Technical and Quality Standards	7	15.9
User Need	18	40.9
Vendor Negotiation	1	2.3
Web Design	4	9.1
Web Markup Languages	7	15.9

The five most frequently selected discipline specific knowledge elements were as follows : Content Management Systems was the most frequent selection with 31 responses (70.5%). Metadata was the second selection with 27 responses (61.4%), followed by Digital Archiving and Preservation with 21 responses (47.7%). Database Development and Database Management Systems received 20 responses (45.5%), User Need received 18 responses (40.9%).

There was only one response (2.3%) each on Imaging Technology , Licensing, Programming Languages and Vendor Negotiation.

In the interviews, interviewees provided their opinion on the discipline specific knowledge which supports the general results of Content Management Systems, Metadata, Digital Archiving and Preservation, Database Development and Database Management Systems, and User Need.

Content Management Systems

“The information professionals should be able to manage the content for the user properly and help the user easily accessible to information resources and services in various alternative ways.” (*Interviewee #5*)

“Content Management System can be applied in digital collection management. It helps the user easily accessibility to the right information which they need.” (*Interviewee #7*)

“It is a basic knowledge of the information professional to select and manage the right and proper content for the user.” (*Interviewee #8*)

“CMS is very important in digital library environment. So, the Information professionals need CMS skill to manage content storing, retrieving and related procedures by applying the standard format.” (*Interviewee #9*)

Metadata

“Metadata makes the data accessible for the user.” (*Interviewee #4*)

“Metadata is the important skill for the digital library including AACRII and cataloging.” (*Interviewee #5 and 6*)

“Metadata is essential in content management, retrieving, sharing and preserving digital information.” (*Interviewee #7*)

“Metadata is important in content management. The resource recovery metadata help managing the system, vitalize the library and serving the user's need.” (*Interviewee #8 and 9*)

Digital Archiving and Preservation

“Preserving is the main object of the library even in the digital one.” (*Interviewee #4*)

“Digital Archives are rare and valuable information should be well organized by the information professionals.” (*Interviewee #6*)

“It is essential in this digital era because the technology changes rapidly. The information professional should have all this competencies to manage and preserve and conserve all this archive and adjusting for the technological change.” (*Interviewee #7*)

“Digital library is developed to serve and preserve the data, the information professionals have know how to manage the digital archiving and preserving. In addition, authentication, integrity, legacy control, storage, easily accessible.” are the important issues to be concerned.” (*Interviewee #8*)

“Digital Archiving and Preservation knowledge is necessary to apply in storing and preserving the archives, especially historical data.” (Interviewee #9)

Data Development and Database Management Systems

“Database is changing from the conventional one like OSS, OA to the newly developed method. The information professionals should be qualified in this aspect.” (Interviewee #4)

“Data Development and Database Management Systems is the managing of digital media on the internet and computer database, so this is one of the important skill for information professionals.” (Interviewee #9)

User Need

“User’s need is important in designing the digital library. The information processionals should know the user's community, their need, be able to analyze and manage the appropriate content for them.” (Interviewee #8)

In addition, some Thai LIS educators listed other discipline specific knowledge such as Information systems, Information Retrieval, Information Organization, and Web technology.

4.2.2.3. Generic skills

Table 6: Generic skills

Generic skills	Frequency (N=44)	Percent
Business Acumen	4	9.1
Change Management	17	38.6
Communication	24	54.5
Critical Thinking	23	52.3
Ethics and Social Responsibility	24	54.5
Grant/Proposal Writing	3	6.8
Human Resources Management	6	13.6
Information Literacy	25	56.8

Table 6: Generic skills (Cont.)

Generic skills	Frequency (N=44)	Percent
Leadership	6	13.6
Negotiating Skills	3	6.8
Problem Solving	17	34.6
Project Management	16	36.4
Promotion and Marketing	14	31.8
Research	17	38.6
Teamwork	21	47.7

The five most frequently selected generic skills were as follows: Information Literacy was the most frequent selection with 25 responses (56.8%). Both Communication, Ethics and Social Responsibility received 24 responses (54.5%), followed by Critical Thinking with 23 responses (52.3%) and Teamwork with 21 responses (47.7%).

There were few respondents who selected Business Acumen, Grant or Proposal Writing, and Negotiating Skills.

In the interviews, interviewees provided their opinion on the generic skills which support the general results as above.

Information Literacy

The information professionals should be able to select and evaluate the information and serve effectively to the user need.” (*Interviewee #4*)

“In a digital era, all data can be published easily. So, the Information Literacy is a core competency needed for an information professionals to select and evaluate accurate and appropriate information for the user.” (*Interviewee #7*)

Communication

“Good communication in different ways helps inform the user about the library resources and services provided.” (*Interviewee #4*)

“Good communication skills would be an important role in problem solving and user relationship.” (*Interviewee #6*)

“The information professionals should be excellent at all communication skills such as interpersonal & human relationship skills, and public relation skills to interact with the stakeholders especially users. It supports on a good reception and collaboration of users and staff as well.” (*Interviewee #7*)

“In the digital environment, it is easily to communicate via internet on several alternative ways. To be successful on communication with users, the information professionals should have an excellence capacity on communication skills namely, oral communication skills & presentation skills, and language and written communication skills.” (*Interviewee #8*)

“It’s the main role of the librarian to communicate with the user through the developed media. The library media will be useful when the user use it. By the way, the conventional way as reading in the library shouldn’t be abandoned.” (*Interviewee #9*)

Ethics and Social Responsibility

“It is a one of the core generic skills which an Information professionals should have because the information in the digital world are very easy publicized. So, it is a duty of the information professionals to be eligible to select accurate and appropriate content, and evaluate the source of the data , and provide to the user.” (*Interviewee #5 and 7*)

“The information professionals should be neutral in selecting appropriate information.” (*Interviewee #6*)

“It’s the important issue in digital world, because the copyright and equality could be violated easily.” (*Interviewee #9*)

Critical Thinking

“Critical thinking helps the professional understand user and content, that can serve user’s need properly.” (*Interviewee #8*)

Teamwork

“Digital library composed of various sections, a good teamwork is necessary.” (*Interviewee #6*)

4.3 Comparison of Norwegian and Thai LIS educator’s opinions on the essential competencies:

4.3.1 Personality traits

Table 7: Comparison Norwegian and Thai LIS educator’s opinion on Personality traits

Personality traits	Norwegians		Thais	
	Frequency	Percent	Frequency	Percent
Analytical	7	53.8	29	65.9
Creative	9	69.2	27	61.4
Curious	3	23.1	4	9.1
Empathetic	1	7.7	3	6.8
Energetic	1	7.7	10	22.7
Enterprising	0	0.0	4	9.1

Table: 7 Comparison Norwegian and Thai LIS educator's opinion on Personality traits (Cont.)

Personality traits	Norwegians		Thais	
	Frequency	Percent	Frequency	Percent
Exhibitionistic	0	0.0	4	9.1
Genuine	0	0.0	3	6.8
Helpful	3	23.1	11	25.0
Idealistic	2	15.4	3	6.8
Imaginative	1	7.7	5	11.4
Methodical	6	46.2	13	29.5
Persistent	1	7.7	3	6.8
Practical	1	7.7	24	54.5
Technical	7	53.8	24	54.5

From the data analysis, it can be summarized that both Norwegian and Thai LIS educators had the same opinion on the three most essential personality traits of an Information professional working in a digital library environment namely analytical, creative and technical. Regarding to the Holland's typological theory on librarianship personality type, the information professional should be as investigative (analytical), artistic (creative), and realistic (technical).

4.3.2 Discipline Specific Knowledge

Discipline Specific Knowledge	Norwegians		Thais	
	Frequency	Percent	Frequency	Percent
Basic Systems	3	23.1	12	27.3
Collection Development	7	53.8	5	11.4
Content Management	1	7.7	31	70.5

Copyright	3	23.1	15	34.1
Database Development and Database Management	7	53.8	20	45.5
Digital Archiving and	2	15.4	21	47.7
Digital Library Architecture	5	38.5	14	31.8
Digital Library Software	3	23.1	12	27.3
Digital Protocols	3	23.1	3	6.8
Imaging Technology	0	0.0	1	2.3
Integrated Library	0	0.0	12	27.3
Licensing	0	0.0	1	2.3
Metadata	11	84.6	27	61.4
Programming Languages	3	23.1	1	2.3
Technical and Quality	3	23.1	7	15.9
User Need	6	46.2	18	40.9
Vendor Negotiation	0	0.0	1	2.3
Web Design	1	7.7	4	9.1
Web Markup Languages	2	15.4	7	15.9

Table 8: Comparison Norwegian and Thai LIS educator's opinion on DSK

Both Norwegian and Thai LIS educators had similar opinions on the most essential discipline specific knowledge as Metadata, Database Development and Database Management Systems, and User Need. In addition, Norwegian and Thai LIS educators agreed that Imaging Technology, Licensing, and Vendor Negotiation were the least important skills.

4.3.3 Generic skills

Table 9: Comparing Norwegian and Thai LIS educators' opinion on

Generic skills	Norwegians		Thais	
	Frequency	Percent	Frequency	Percent
Business Acumen	0	0.0	4	9.1
Change Management	4	28.6	17	38.6
Communication	9	64.3	24	54.5
Critical Thinking	9	64.3	23	52.3
Ethics and Social	4	28.6	24	54.5
Grant/Proposal Writing	0	0.0	3	6.8
Human Resources	1	7.1	6	13.6
Information Literacy	11	78.6	25	56.8
Leadership	1	7.1	6	13.6
Negotiating Skills	2	14.3	3	6.8
Problem Solving	8	57.1	17	34.6
Project Management	4	28.6	16	36.4
Promotion and Marketing	1	7.1	14	31.8
Research	6	42.9	17	38.6
Teamwork	7	50.0	21	47.7

Both Norwegian and Thai LIS educators had the same opinion on the most essential generic skills namely Information Literacy, Communication, Critical Thinking, and Teamwork. They also agreed on seeing Business Acumen, and Grant or Proposal Writing as the least important skills.

4.4 Conclusion

This chapter presented the data analysis which obtained in this study. Regarding to the two target groups (Norwegian and Thai LIS educators), the analysis has been offered separately description. Then, a comparison of Norwegian and Thai LIS educators results was given.

CHAPTER 5: DISCUSSION AND CONCLUSION

In this section, comparisons between Norwegian and Thai LIS educator's result are presented. Regarding the main purpose of the study, this section discusses opinions on the essential competencies required of an information professional working in the digital library environment. In addition, the findings are related to previous studies which informed the present study.

5.1 Demographics

Among Norwegian LIS educators, 14 respondents completed questionnaires, from Thai LIS educators 44 completed questionnaires were received (100%).

Most of the respondents among Norwegian LIS educators were male: 8 (66.7%), whereas the largest group of Thai LIS educators were female: 37 (84.1%). According to the study on digital library education in Australia, Howard (2009) stated that "the feminized nature of the LIS discipline was not surprisingly reinforced by the data collected in this study as the aging of the profession." The gender distribution in the present study is illustrated by Figure 1.

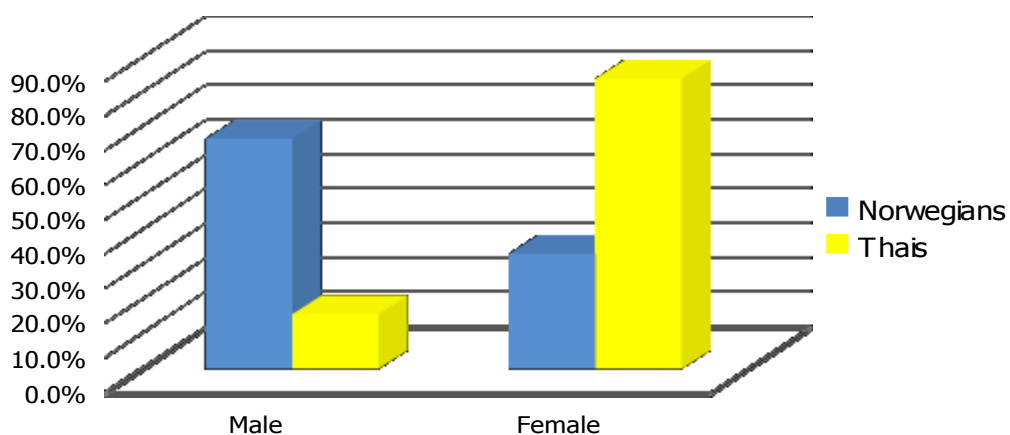


Figure 1: Gender between Norwegian and Thai LIS educators

The highest number of respondents among Norwegian LIS educators were found in the 40-49 age group with 4 respondents (30.8%). Whereas among Thai LIS educators the most frequent age range was 18 respondents (40.9%) in the 50-59 age group, which was similar to the study of digital library education in Australia, Howard (2009) reported that the highest number of educators was in the 50-59 age group. The age distribution is illustrated by Figure 2.

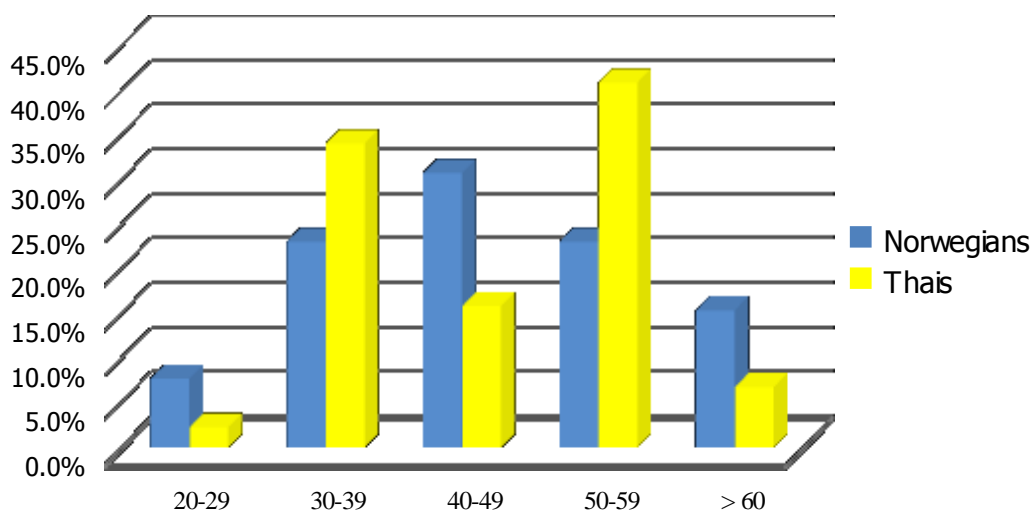


Figure 2: Age range between Norwegian and Thai LIS educators

Both Norwegian (5, (38.5%) and Thai LIS educators (19, 43.2%) had number of years of working experience in the top of the scale at the 20+ years of experience category. In comparison to a study of digital library education in the Australia, Howard (2009) noted that with regard to the number of years experience of educators the highest percentages were found in the 20+ years experience category.

According to result from this study and a previous, similar study, it can be summarized that age demographics of the LIS profession in Norway, Thailand and Australia show the same decline in responses in the “more than 15 and less than 20 years experience” group. Thus, it is probably the representative of status of the LIS educator’s age range from a worldwide perspective. This experience distribution is illustrated by Figure 3.

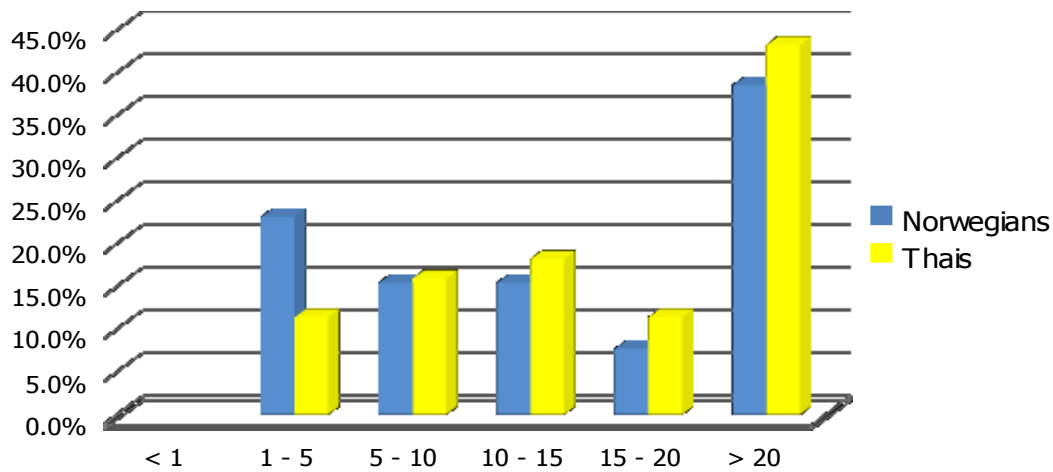


Figure 3: Working experience in LIS discipline between Norwegian and Thai LIS educators

5.2 Personality traits

Analytical, creative and technical, were the three most frequent personality traits selected by both Norwegian and Thai LIS educators. In terms of Holland’s typological theory on librarianship personality types, the information professional should, based on this, be investigative (analytical), artistic (creative), and realistic (technical). From the result, no single personality type emerges, each of the top selected personality traits represent, in Holland’s terms, one of the three types mentioned. It can be assumed that an information professional working in a digital library environment should be analytical, creative, and technical. All three personality traits are important, thus they can apply each trait to manage and achieve successful work in the digital area. Some selected interviewee opinions on personality traits support this result.

“Creative is really important because we live in an environment where things change all the time. So, being creative, is to see possibilities, being able to see new ways of the developing library as a living organism. And also, analytical is the core intellectual skill. We have to analyze what is the problem and how to reach our aim in the library environment. Analytical tools like PESTLE analysis (Political, Economics, Social, Technological, Legal and Environmental) are used to serve the needs of the users in the changing digital world.” (*Interviewee # 3*)

“Technical skill is the basic of managing. The information professionals should have both librarian skill and technological skill.” (*Interviewee #4*)

“Technical skill such as acquisition, cataloging, abstracting, indexing are the main competency for the librarian.” (*Interviewee #5*)

“Technical skill would help the information professionals maintain the digital library effectively, solve the problem and improve the system.” (*Interviewee #7*)

“The information professionals must be keen in the concept of digital library, for instance definition, framework, implement, and services to serve the user's need.” (*Interviewee #8*)

“Technical skill needs for catch up with the new information technology, including the skill in computer literacy and library science.”(*Interviewee #9*)

Practical was selected by Thai LIS educators as one of the three most essential personal competency same place as Technical. It was supported by interviewee result as

“The digital library is the combination of computer sciences, communication, management, psychology, marketing ,etc. The information professionals should be able to select and integrate all disciplines on serving information and services on user demand.” (*Interviewee #4*)

“Practical is a process of bringing the knowledge into productivity. Information professional should be able use the right tool to reach the success.”(*Interviewee #5*)

Whereas Norwegian LIS educators selected it at a low frequency and percentage (only 1 response (7.7 %))

The only study which has applied Holland's theory on library and Information Science summarized that the LIS students personality trait were classified as enterprising. (Afolabi, 1996). Therefore, this study was not supported by previous research as mentioned. The result is illustrated by Figure 4.

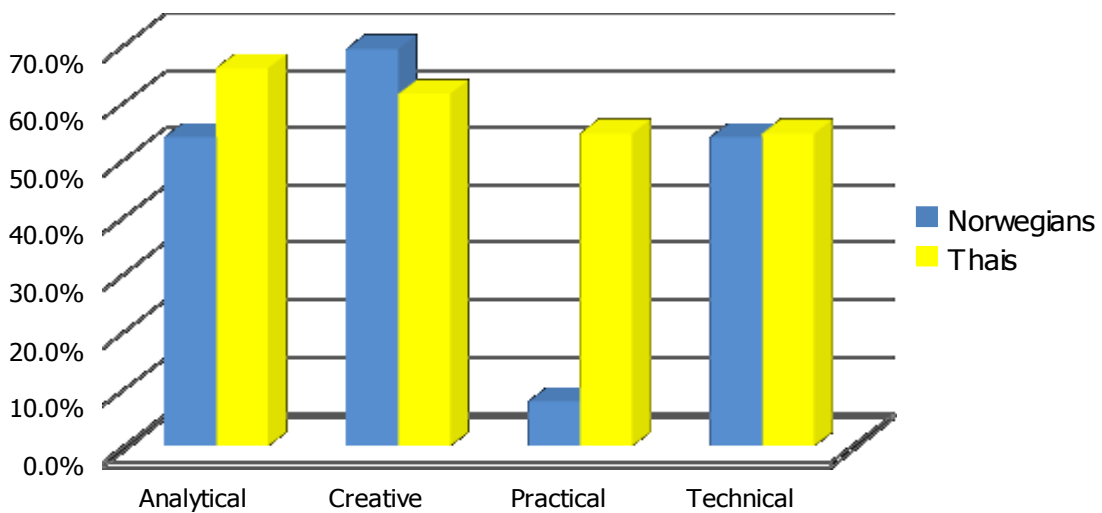


Figure 4: Comparison between Norwegian and Thai LIS educator’s opinion on personality traits

When asked for suggestions on other personality traits, one educator mentioned innovative. This personality trait is related to creative, which has been already listed in the study. In addition, dynamic was suggested to be another personality trait that should be included in the essential list. However, this may be said to be covered as the energetic personality type.

5.3 Discipline Specific Knowledge

Metadata, Database Development and Database Management Systems and User Needs are among the five most important competencies in the category of Discipline Specific Knowledge which were selected by both Norwegian and Thai LIS educators.. Yet, there were slightly different competencies selected among the two groups. Collection Management and Digital Library Architecture were selected by Norwegian LIS educators to be in the five most essential competencies list. Whereas Thai LIS educators believed that Content Management Systems and Digital Archiving Preservation belonged in the five most essential competencies list. This is illustrated by Figure 5.

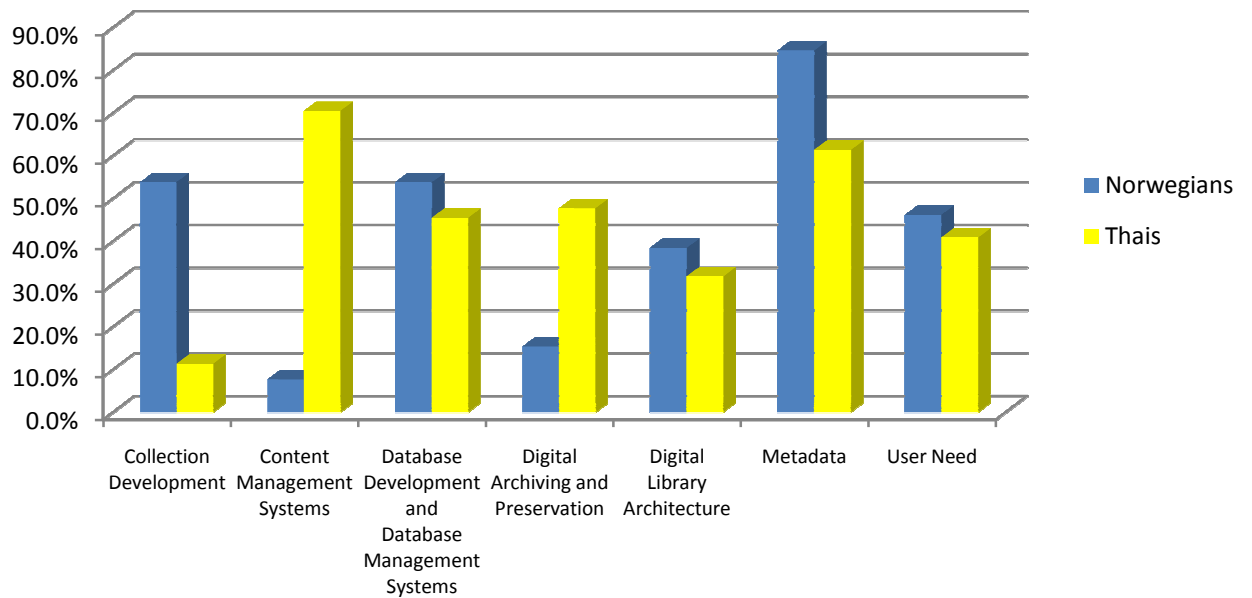


Figure 5: Comparison between Norwegian and Thai LIS educators' opinion on Discipline Specific Knowledge

In related previous studies, Choi and Rasmussen (2006) and Howard (2009) reported that User Needs and Metadata were also the highest ranked of their results. In addition, it is supported by Pomerantz et al. (2007) who quoted that the LIS focus in digital library related curricula emphasize on users (human perspective) as different from the Computer Science curricula that focus on systems (technological perspective).

The findings above are supported by the interview results, where most of both Norwegian and Thai interviewees believed that Metadata, Database Development and Database Management Systems and User need are core knowledge in the LIS profession. From their point of view, Metadata is a very important competency which Information professional should have especially when working in the digital era. They should be able to create and provide Metadata which guide users to get easily access to the location information at their demand. Excerpts of interview results are as follows:

Metadata

“Metadata is of course important because as an Information professional, we are dealing with Metadata. It is that we already have done, when we have cataloged. Metadata

are becoming more and more important. Thus, we have a challenge in telling people that we are the Metadata expert.” (*Interviewee # 2*)

“Metadata is one of the most important competencies for an Information professional because if you work in the library, archive or museum, they have collections, and we need to give access to the collections. The one of the ways to do that, it is metadata, and it will be a very essential competency because we are depending on exchanging metadata with other environments in the library world. with metadata creators, and publishers. For instance, we need to have metadata on the web, so we need to know about the new standards of the web, and the MARC format. That is an XML exchange, and Linked data. From this point of view, there is a great demand for Metadata knowledge.” (*Interviewee # 3*)

“Metadata makes the data be accessible for the user.” (*Interviewee #4*)

“Metadata is the important skill for the digital library including AACRII and cataloging.” (*Interviewee #5 and 6*)

“Metadata is essential in content management, retrieving, sharing and preserving digital information.” (*Interviewee #7*)

“Metadata is important in content management. The resource recovery metadata help managing the system, vitalize the library and serving the user's need.”(*Interviewee #8 and 9*)

Database Development and Database Management Systems

“Knowing how it works and is organized would help to understand the function of the database.” (*Interviewee #1*)

“Database theory, and Database Development and Database Management Systems is like the heart and the mind of the knowledge organization field inside LIS. So, we see also a new era of knowledge organization that are based on the Net .The Semantic web, RDF, SPARQL, FRBR principle and related technology they build upon, are very closely related to Database theory and principles. If you have this basic knowledge, it helps you to work in the digital library environment efficiency.” (*Interviewee # 2*)

“I also think that is essential that the librarian working in the digital library environment should know about Database Development and Database Management Systems, because it is so essential those days, for example the FRBR is an entity relationship model build on modern database design. If you do not know how a database is built, I do not know how you can really understand the functional requirements.” (*Interviewee # 3*)

“Database is changing from the conventional one like OSS, OA to the newly developed method. The information professionals should be qualified in this aspect.” (*Interviewee #4*)

“Data Development and Database Management Systems is the managing of digital media on the internet and computer database, so this is one of the important skill for information professionals.” (*Interviewee #9*)

User Need

User Need is very important, especially when you want to develop services. You need to do analysis the user need to see: how we can meet it, for example whatever services such as web site or blog, what is a good design for them. Thus, OCLC research in 2005 has shown that there is very accurate gap between what librarians want and what users want. The librarians quite often speak on behalf of users but the need of librarians and the need of users are definitely different. For certain, we should do research with emphasis on the users need (*Interviewee # 3*)

“User’s need is important in designing the digital library. The information professionals should know the user's community, their need, be able to analyze and manage the appropriate content for them.” (*Interviewee #8*)

Choi and Rasmussen (2006) ranked Digital archiving and preservation as one of the highest in their study, thus it is supported by the current study on Thai LIS educators ’s opinion which indicate Digital archiving and preservation as one of the five most essential competencies required (21 responses, (47.7%). Norwegian LIS educators did not select it as the five most important competencies required (2 responses, (15.4%). This result is in its turn supported by the study of Howard (2009) which finds that both educators and practitioners ranked it in sixth position.

This result might be explained by the differences in the digital archiving and preservation context between Thai and Norway. It is one of the big issues, which is quite important from a Thai perspective. In addition, the Thai government provides grants to information institutions including libraries and archives supporting this digital archiving and preservation project. Some organizations also support the projects themselves. For this reason, information professionals who are qualified, are highly demanded. On the basis of their knowledge and experience, the information professionals should be eligible to manage this digital archiving and preservation. For instance, knowledge on management of digital information resources, authentication, integrity, version control, legacy control, storage, personal privacy, and right to access, problem and solution on digital archiving, copyright, technologies, costs and trends, and record management on procedures, manual, staffing, planning and scheduling. Consequently, Digital archiving and preservation has been selected as one of the five most essential competencies required. It can be confirmed through the interview result from Thai LIS educators as stated in the following quotes:

“Preserving is the main object of the library even in the digital one.”
(*Interviewee #4*)

“Digital Archives are rare and valuable information should be well organized by the information professionals.” (*Interviewee #6*)

“It is essential in this digital era because the technology changes rapidly. The information professional should have all this competencies to manage and preserve and conserve all this archive and adjusting for the technological change.” (*Interviewee #7*)

“Digital library is developed to serve and preserve the data, the information professionals have to know how to manage the digital archiving and preserving. In addition, authentication, integrity, legacy control, storage, ease of access are important issues to be concerned.” (*Interviewee #8*)

“ Digital Archiving and Preservation knowledge is necessary to apply in storing and preserving the archives, especially historical data.” (*Interviewee #9*)

Choi and Rasmussen (2006b) and Howard (2009) ranked Collection development at highest place. It was supported by the Norwegian LIS educators which selected this knowledge as one of the five most required competencies, with 7 responses, (53.8%), while it was selected by only 5 respondents (11.4%) among Thai LIS educators .

Content Management Systems was the most frequent selection with 31 responses (70.5%) by Thai LIS educators. This is supported by the similar study in Australia, where Howard (2009) reported that Content management systems was highly placed as the third most frequent selection. It can also be supported from a Thai LIS educator which stated that “The information professionals should be able to manage the content for the user properly and help give the user easy access to information resources and services in various alternative ways.” (*Interviewee #5*) In contrast, only one (7.7%) of the Norwegian LIS educators selected this item .

Technical and quality standards was ranked highly in Choi and Rasmussen. (2006b). Nevertheless, both Norwegian and Thai educators selected this category infrequently with 3 responses (23.1%), and 7 responses (15.9%) respectively. It is supported by the similar study by Howard (2009) which reported that the educators ranked Technical and quality standards in the seventeenth place.

Tennant (1999) identified some technical areas, for instance, Imaging technology, Web markup languages and Programming languages as being required to work in a digital library environment. In comparison to this result, both Norwegian and Thai LIS educators selected these areas with low frequency and percentages, similar to the study of digital library education in Australia (Howard 2009). It could be summarized that Tennant’s findings were not supported by this study.

5.4 Generic skills

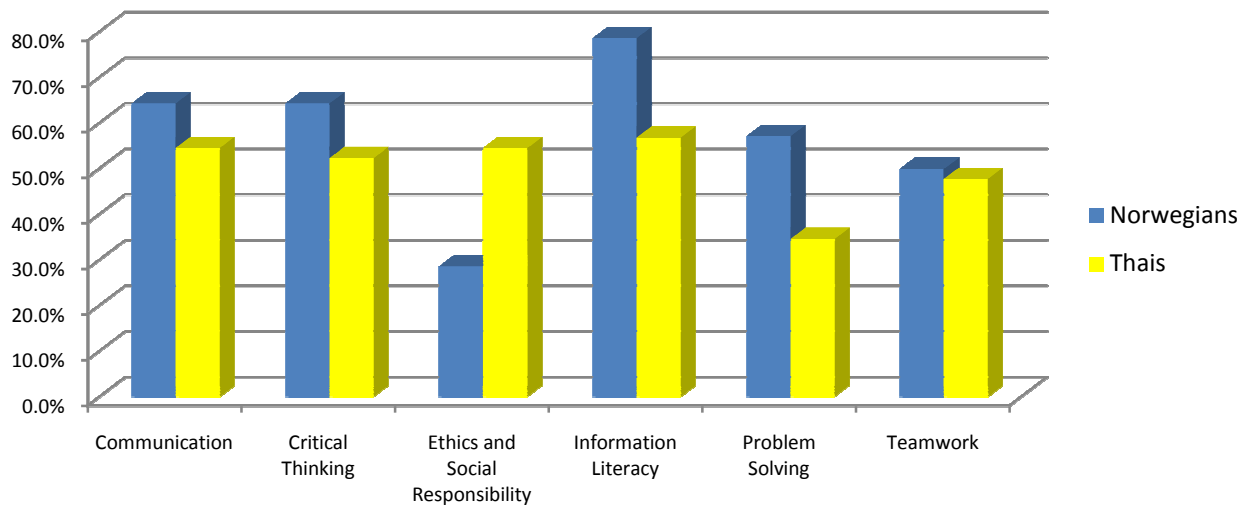


Figure 6: Comparison between Norwegian and Thai LIS educators' opinion on generic skills

Information Literacy, Communication, Critical Thinking, and Teamwork were selected as the most essential generic skills required by both Norwegian and Thai LIS educators.

In the interviews, interviewees provided their opinion on the generic skills which support the general results namely Information Literacy, Communication, Critical Thinking, and Teamwork.

Information Literacy (IL)

The information professionals should be able to select and evaluate the information and serve effectively to the user need.” (Interviewee #4)

“In a digital era, all data can be published easily. So, the Information Literacy is a core competency needed for an information professionals to select and evaluate accurate and appropriate information for the user.” (Interviewee #7)

It can be summarized and assumed that IL was one of skills required in the librarianship work, especially in the digital environment. The fact is that the information professional is dealing with users in assisting and guiding them on the searching, selection and evaluation of accurate and appropriate information. Consequently, it is an essential skill which can be applied to accomplish their work.

Communication

“Communication and negotiation skill are important for working with the team and users.”
(*Interviewee # 1*)

“Communication is more important today. The information professionals are definitely related to interact with users. Regarding this digital era, they need to communicate with user via Internet, for instance through the library web page. This is an example that the information professional has to know the communication stuff in order to communicate with user on service and information resources.” (*Interviewee # 2*)

“Good communication in different ways helps inform the user about the library resources and services provided.” (*Interviewee #4*)

“Good communication skills would be an important role in problem solving and user relationship.” (*Interviewee #6*)

“The information professionals should be excellent at all communication skills such as interpersonal & human relationship skills, and public relation skills to interact with the stakeholders especially users. It supports on a good reception and collaboration of users and staff as well.” (*Interviewee #7*)

“In the digital environment, it is easily to communicate via internet on several alternative ways. To be successful on communication with users, the information professionals should have an excellence capacity on communication skills namely, oral communication skills & presentation skills, and language and written communication skills.” (*Interviewee #8*)

According to both survey and interview result, Communication was one of skills required for the IPs working in the digital era because they can apply this skill to communicate (as mentioned) with users and staffs in order to be successful in their work.

Critical thinking

“Problems need critical thinking to figure out which is the best solutions and proper solving problem is the way to deal with it.” *(Interviewee # 1)*

“Critical Thinking is very important especially in the digital world, that information professionals are able to see, and to think what things will change in this digital library environment.” *(Interviewee # 2)*

“Critical thinking helps investigating and developing process of intellectuality.” *(Interviewee # 3)*

“Critical thinking helps the professional understand user and content, that can serve user’s need properly.” *(Interviewee #8)*

It is a requirement to have an information professional who has critical thinking skill to manage well in the digital library context, for instance collections, users, technological perspective, change management, problem solving and related areas.

Teamwork

“Digital or not digital, you always need to have teamwork because you never work alone.” *(Interviewee # 1)*

“Teamwork is a basic component in a well done project. We have to know the competencies of the people inside the project. It is like to know such things as “Put the right man to the right job.” We also have to make sure that the project contains the relevant people with the right competencies. That is a good project management, and a good teamwork as well.” *(Interviewee # 2)*

“I think that working in a team is a core competencies these days, You need to work with other people. The best thinking is not from one person, but come from a good team. People thinking together, that is basically teamwork, having creativity in a work place, I think it is really important to come up with a good innovative solution as well. *(Interviewee # 3)*

“Digital library is composed of various sections, good teamwork is necessary.” *(Interviewee #6)*

It was also supported by the study of digital library education in Australia, Howard (2009) showed Communication and Critical thinking being ranked in first place by both practitioners and educators. In addition, it was supported by related studies on the important knowledge and skills needed to work in the digital era: (Orme 2008; O'Connor and Li, 2008; Gerolimas and Konsta 2008; Choi and Rasmussen, 2006; Fisher, 2004; Partridge and Hallam, 2004; Lynch and Smith, 2001; Feret and Marcinek, 1999). All these studies mentioned Communication as the vital skill. With regard to Critical thinking, Partridge and Hallam (2004) and Fisher (2004) quoted that it is as being the essential skill for the 21st century. In addition, this is supported by the study on the role of the new information professional in the changing world by Myburgh (2005), which presented the new IPs' particular skills, attitudes and values as capacity for problem solving, teamwork, embracing continuous change, lifelong learning, interdisciplinary knowledge, service commitment demonstrate, effective communication and interpersonal skills, flexible, high ethical standards in professional and personal life demonstration, intellectual openness and curiosity posing, critical and conceptual engagement and reflective thinking of intellectual and practical activity contribute to develop their professional competencies.

Ethics and social responsibility was selected as one of the five most essential competencies needed by Thai LIS educators with 24 responses (54.5%). Support for this idea also came from the interviewees, which stated that

“It is a one of the core generic skills which an Information professionals should have because the information in the digital world are very easy publicized. So, it is a duty of the information professionals to be eligible to select accurate and appropriate content, and evaluate the source of the data, and provide to the user.”(*Interviewee #5 and 7*).

Howard (2009) indicated that Ethics and social responsibility were chosen by the Australian LIS educators in a high place (77%), whereas among Norwegian LIS educators this skill only received 4 responses (28.6%). It might be suspected that gender has impact on the result. The LIS occupation worldwide is known as the feminine profession, so that both Thai and Australian educators had the same view on this competency requirement. Among Norwegian educators, the largest group in the study are male. They might have a different opinion or idea from their masculine point of view. This can be tested by using

cross tabulation to investigate the relationship between gender and competencies. From this study, it can be seen that while overall, the three or five most frequently selected result were similar to each other, there were slight differences on some topics. In total, gender did not very much impact the specific competencies needed. This is illustrated by table 7, 8 and 9.

Table 7: Cross tabulation testing relationship between gender and personal competencies. (Personality traits)

Personality traits	Norwegians (Total N = 12)		Thais (Total N = 44)	
	Male (N = 8)	Female (N = 4)	Male (N = 7)	Female (N = 37)
Analytical	3 (37.5%)	3 (75%)	5 (71.4%)	24 (64.9%)
Creative	7 (87.5%)	2 (50%)	4 (57.1%)	23 (62.2%)
Technical	5 (62.5%)	2 (50%)	2 (28.6%)	22 (59.5%)

Table 8: Cross tabulation testing relationship between gender and
Discipline Specific Knowledge

Discipline Specific Knowledge	Norwegians (Total N = 12)		Thais (Total N = 44)	
	Male (N = 8)	Female (N = 4)	Male (N = 7)	Female (N = 37)
Basic Systems Administration	1(12.5%)	2(50%)	1(14.3%)	11(29.7%)
Collection Development	3(37.5%)	3(75%)	1(14.3%)	4(10.8%)
Content Management System	1(12.5%)	0(0.0%)	5(71.4%)	26(70.3%)
Database Development and DMS	4(50%)	2(50%)	4 (57.1%)	16(43.2%)
Digital Archiving and Preservation	2(25%)	0(0.0%)	3 (42.9%)	18(48.6%)
Digital Library Architecture	2(25%)	3(75%)	2(28.6%)	12(32.4%)
Digital Library Software	3(37.5%)	0(0.0%)	1(14.3%)	11(29.7%)
Digital Protocols	3(37.5%)	0(0.0%)	3 (42.9%)	0(0.0%)

Metadata	7 (87.5%)	3(75%)	3 (42.9%)	24(64.9%)
Programming Languages	3(37.5%)	0(0.0%)	1(14.3%)	0(0.0%)
User need	3(62.5%)	3(75%)	3 (42.9%)	15(40.5%)

Table 9: Cross tabulation testing relationship between gender and generic skills

Generic skills	Norwegians (Total N = 12)		Thais (Total N = 44)	
	Male (N = 8)	Female (N = 4)	Male (N = 7)	Female (N = 37)
Change management	1(12.5%)	3(75%)	2 (28.6%)	15 (40.5%)
Communication	4 (50%)	3(75%)	4 (57.1%)	20 (54.1%)
Critical thinking	6(75%)	2(50%)	4 (57.1%)	19 (51.4%)
Ethics and social responsibility	2(25%)	2(50%)	4 (57.1%)	20 (54.1%)
Information literacy	3(62.5%)	4 (100%)	3 (42.9%)	22 (59.5%)
Leadership	0(0.0%)	1 (25%)	1(14.3%)	5 (13.5%)
Problem Solving	4(50%)	2 (50%)	2 (28.6%)	15 (40.5%)
Research	3(37.5%)	2(50%)	3 (42.9%)	14 (37.8%)
Teamwork	3(62.5%)	0(0.0%)	3 (42.9%)	18 (48.6%)

Problem Solving received 8 responses (57.1%) as one of the five most essential competencies required by Norwegian LIS educators. An interviewee offered an idea as follows:

“Problem Solving is something we all need to have as the core competency. I think when you interact with people. You have to know how to deal with it, and how to move on.” (*Interviewee # 3*)

It was supported by the similar study by Howard (2008), which indicated that Problem Solving were selected by the Australian LIS educators in a high place (69%), whereas Thai LIS educators selected this skill with only 17 responses (38.6%). Comparing Norwegian and Thai LIS educators' opinion on the Problem Solving skill shows a significant difference.

Leadership was emphasized by some studies as an important skill (Fisher, 2004; O'Connor and Li, 2008; Lynch and Smith, 2001; Goulding et al. 1999 and Feret and Marcinek, 1999) However, this study did not confirm this, because both of Norwegian and Thai LIS educators selected it with low frequency and percentage (1 respondent (7.1%) and 6 respondents (13.6%) respectively). This is in tune with the study of Howard (2009), where leadership was not selected in the high place by educators.

CONCLUSION

This section presents conclusions about the findings of this study which relate to the research question. In addition, limitations of the study are analyzed. Finally, suggestions for the further research are provided.

Conclusions about Research Questions

The aim of this study was to establish the skills and knowledge required of an information professional working in a digital library environment.

Research Question:

What are the skills and knowledge required of an information professional working in a digital library environment, in the opinion of both Norwegian LIS and Thai educators ?

Generally, this study focuses on finding the competencies required by an information professional working in a digital environment in the opinion of both Norwegian LIS and Thai educators. The study was based on criteria selection among personality traits, generic specific knowledge and generic skills. From this research, a picture of the full set of competencies required of an information professional working in a digital environment can be drawn. The study resulted in the following list.

This research has resulted in the following list of competencies required of an information professional working in a digital environment:

Analytical (Investigative personality type), *Creative* (Artistic personality type) and *Technical* (Realistic) were selected as the most essential personal competencies (personal traits).

Metadata, Database Development and Database Management Systems, and User Need were selected as the most essential Discipline Specific Knowledge.

Information Literacy, Communication, Critical Thinking, and Teamwork were selected as the most essential generic skills.

From the finding of the study, it a complete picture of an archetypal set of competencies required for an information professional working in a digital library environment can be drawn. Due to digitization, libraries are faced with many kinds of changes, for instance with regard to technological aspects, user behavior and learning behavior, and social aspects. All have impact on the role, competencies, skills and knowledge of information professionals. This study identifies the required personality traits as primarily analytical, creative and technical. All of these traits can be applied to deal with the changes mentioned, because an information professional have to be analytical in the digital library

aspects for instance for the PESTLE, SWOT on collection, users, technological aspect etc. Additionally, creativity is also required to deal with the changes in collections, services, and users. Technical competency is also needed because digital library work although quite similar to the traditional one, is totally dependent on technical equipment in its execution. Thus, these personality traits can be classified in a group of personality traits types, namely a detective (analytical), as artist (creative) and information professional (technical). It is also sketch the picture of an information professional that may put on a hat as a detective (analytical), as an artist (creative) and information professional (technical), dependent on the activity, work or condition which an information professional must suit their role. In order to perform the main professional work successfully, the discipline specific knowledge has been studied. Metadata, Database Development and Database Management Systems, and User Need were selected as the most essential Discipline Specific Knowledge. A finding which can be confirmed by many studies on the most frequency required LIS knowledge is that metadata tops the list of required knowledge. Metadata is a core theme of LIS work, so it is quite reasonable that it is a basic knowledge which should qualify an information professional especially in this digital era. The information professional role involves to know how to create linking data that makes data in digital form accessible for the user. In addition, they need to know how to do content management, retrieving, sharing and preserving digital information to serve the user with easy accessibility.

Database Development and Database Management Systems is also noted as one of the most essential required items of knowledge. In the digital library environment, the organisational issues are all connected to database knowledge, such as the FRBR which is based on database design, the Semantic web, RDF, and SPARQL principle and related technology. To be successful working in the digital library environment, it is clearly indicated that an information professional should have a basic knowledge of DMS.

User need is also mentioned as required essential knowledge that an information professional should have. In the digital library, the main task is similar to the traditional one, that is providing information and knowledge services to users. User need is thus the highlight topic that an information professional should be expected to understand in depth. They have to identify who is the target group or user of the library such as the

“digitally born” group, or the “non digital born” group, the users who are leaning their behavior in the digital era. They also have to find out or do research on what the user demand, For instance in order to answer questions like

What kinds of services do users really need?

Do the collection meet their needs?

Are they satisfied with the collections or services provided?

etc.

Answering such questions can help fulfill the library mission to provide information that suits user demand.

Information Literacy, Communication, Critical Thinking, and Teamwork were the most required generic skills that an information professional should have. In the digital library environment, an information professional should be a person who is able to act as a facilitator or mentor to help the user to find the information needed and to evaluate it. Thus, the information literacy skill is needed. Communication is quite important to work in the digital era, both oral, written or presentation skills are needed to maintain contact between the library staff themselves and users in order to reach them to be successful in their work. In the digital library environment, the information professionals will encounter numerous changes, so the critical thinking skill is noted as a vital skill in which the information professional should be qualified. Teamwork is one of the key skills that an information professional should be qualified in. Because in the digital era, it is common that a combination of several practitioners work in groups representing a variety of professional areas as computer science, Information Science, and LIS etc. Thus, an information professional should know how to work as a part of a team. They should know also the role of fitting in a team. Thus, the group can fulfill projects successfully and reach the goal of the library as well.

In summary, all personal competencies and knowledge mentioned should be combined together in order for a practitioner to be working efficiently and effectively in the digital era.

Limitations

This study was limited to finding the opinions of Thai LIS educators from the public universities, which in the past were formerly called government universities. Two open universities, private universities, and Rajabhat universities were not included in this survey because of time constraints in data collection. It would be interesting to have richer data by including this remaining population in the study. In addition, the use of an online questionnaire encountered with some problems which are disadvantages, such as non-responses and incomplete responses. Even so, the study received a good response from both Norwegian and Thai LIS educators, with 14 respondents and 44 respondents, respectively. It is a sufficient number of participants to be considered national representations from each target group of the study.

Implications for Further Research

Suggestion for further research is to survey and conduct interviews with the chief practitioners in the LIS sectors both in Norway and Thailand. It can be broadened to studying the context of library, museum and archive to get fuller opinions on competencies required for an information professional working in a digital library environment. Additionally, an analysis of LIS curriculum content in Norway and Thailand would serve to find out to what extent the objectives of digital library courses and related subjects are meeting the requirements. Job advertisement analysis with emphasis on digital librarians is also an interesting alternative study. Through such options it would be possible to find more information on characteristics of the qualification and competencies needed of Information professional working in the digital library environment.

Conclusion, it is expected and hoped that the results of this study on essential competencies required of an information professional working in a digital library environment will be important for the participants, in that they can apply its in developing the curriculum to be adjusted according to the requirement of competency needed in digital library environment.

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APPENDIX 1: Questionnaire

Introduction:

This questionnaire is created to collect information for a master project investigating on essential competencies of an information professional working in a digital library environment. All responses will remain confidential.

The definition of information professional used during this questionnaire is: “An information professional or an information specialist is a person who works with information science, libraries, museums, or archives, although the field is changing rapidly to include other disciplines.”

I. Demographics questions.

1. Gender

2. What is your age range?

3. How many years experience do you have in the Library and Information Science (LIS) discipline?

Less than 1 year

More than 1 and up to 5 years

More than 5 and up to 10 years

More than 10 and up to 15 years

More than 15 and up to 20 years

20+ years

4. How many years experience have you been as the LIS educator?

Less than 1 year

More than 1 and up to 5 years

More than 5 and up to 10 years

More than 10 and up to 15 years

More than 15 and up to 20 years

20+ years

5. What is your teaching field (s)? You can select more than one answer.

- Collection Development
- Information Organization
- Information Retrieval
- Information Technology & System
- Knowledge Management
- Library Organization
- User Services
- Other, please specify

II. The essential competencies questions.

Personal competencies (appropriate attitudes, values and personal traits):

6. Please indicate the three most essential competencies which you believe are required of an information professional working in a digital library environment

- | | |
|------------------------------------------|--------------------------------------|
| <input type="checkbox"/> Analytical | <input type="checkbox"/> Helpful |
| <input type="checkbox"/> Creative | <input type="checkbox"/> Idealistic |
| <input type="checkbox"/> Curious | <input type="checkbox"/> Imaginative |
| <input type="checkbox"/> Empathetic | <input type="checkbox"/> Methodical |
| <input type="checkbox"/> Energetic | <input type="checkbox"/> Persistent |
| <input type="checkbox"/> Enterprising | <input type="checkbox"/> Practical |
| <input type="checkbox"/> Exhibitionistic | <input type="checkbox"/> Technical |
| <input type="checkbox"/> Genuine | |

7. Please list any other personal competencies which you believe are required of an information professional working in a digital library environment (Open question)

Discipline Specific Knowledge: includes knowledge which is learned in the Library and Information Science programmes both undergraduate and postgraduate level

8. Please indicate the five most essential competencies which you believe are required of an information professional working in a digital library environment

- Basic Systems Administration
- Collection Development
- Content Management Systems
- Copyright
- Database Development and Database Management Systems
- Digital Archiving and Preservation
- Digital Imaging
- Digital Library Architecture
- Digital Library Software
- Digital Protocols
- Integrated Library Management Systems
- Licensing
- Metadata
- Programming Languages
- Technical and Quality Standards
- User Need
- Vendor Negotiation
- Web Design
- Web Markup Languages

9. Please list any other Discipline Specific Knowledge which you believe are required of an information professional working in a digital library environment (Open question)

Generic skills: a combination of competencies providing a strong basis for further learning.

10. Please indicate the five most essential competencies which you believe are required of an information professional working in a digital library environment

- Business Acumen
- Communication
- Change Management
- Critical Thinking

- Ethics and Social Responsibility
- Grant/Proposal Writing
- Human Resources Management
- Information Literacy
- Leadership
- Negotiating Skills
- Problem Solving
- Project Management
- Promotion and Marketing
- Research
- Teamwork

11. Please list any other generic skills which you believe are required of an information professional working in a digital library environment (Open question)

APPENDIX 2: Interview guideline

An interview guideline: essential competencies of an information professional working in a digital environment, in the opinions of Norwegian and Thai LIS educators.

The interview questions:

Personal competencies (appropriate attitudes, values and personal traits):

1) Which are the three most essential **personal competencies** that you have selected from the list? Why did you believe that the selected items are essential for an information professional working in a digital library environment? Please give your reason in each item.

Discipline Specific Knowledge: includes knowledge which is learned in the Library and Information Science programmes both undergraduate and postgraduate level

2) Which are the five most essential **discipline specific knowledges** that you have selected from the list? Why did you believe that the selected items are essential for an information professional working in a digital library environment? Please give your reason in each item.

Generic skills: a combination of competencies providing a strong basis for further learning.

3) Which are the five most essential **generic skills** that you have selected from the list? Why did you believe that the selected items are essential for an information professional working in a digital library environment? Please give your reason in each item.