

A Study for Exploring Information Literacy of PhD Student: Based on Thesis Topic Discovery Process

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Abstract. The search process research topic is concerned for every doctoral student from all major colleges and all educational subjects. Previous studies indicate that the information literacy is a tool aids in the process of finding a research topic. This study aims to determine how the role of information literacy for doctoral students to find a thesis topic through interviews with doctoral students of engineering and non-engineering majors from several countries. The results showed that the use of information literacy required in the process of finding a research topic by using the channel information journal in websites and search engines is the most frequently used by students. Information literacy education in the form of short courses on material which is supporting the conduct of research, guides and self-learning module is a new discovery in this research.

Keywords: topic research, information literacy, information need, channel information, information literacy education

Introduction

The process of finding a thesis topic or research topic is very important for PhD students. Not just for the benefit completion of education, but also for the benefit of career development. [Jensen \(2013\)](#), mentions about the reasons why the choice of PhD research topic has important and persistent effects on an economist's career. While there are many factors that determine whether an economist has a successful career, He argues that the choice of PhD topic is an issue, which deserves more attention.

[Mandušić and Lucija \(2013\)](#) also explain that the information literacy is the future, the key of success, a foundation of getting an education. They also suggested that the information literate person recognized the need for information, determinate the importance of information, access information efficiently, knows how to evaluate the valid information and its source, knows how to "nestle" founded information in his knowledge base, understand economic, legal, social and cultural questions of using this information.

Development of information literacy is important to support student studies ([Bellard, 2005](#)). Increased skills and use of technology is also very important for a PhD student to assist in the process of finalizing the study ([Gullikson, 2006](#); [Larkin & Pines, 2005](#); [Maleki, Majidi, Haddadian, Rezai, & Alipour, 2012](#)). Also requires an understanding of the workplace information literacy and how to assess information literacy ([Jinadu & Kaur, 2014](#); [Lloyd, 2010](#)).

The used of information literacy in contrast to the original research because information literacy targeting the original researcher therefore needs different approaches to frame teaching efforts. Analyzing the existing literature at higher levels, identifying and applying theory, mind-mapping and personal information management techniques to organize and support analytical work, and related advanced techniques are very different and very important to the support of original researchers ([Exner, 2014](#)).

[Creedy \(2007\)](#) explains that most students have a broad idea of the area of research they would like to pursue. This may come from previous reading required

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or coursework or it may be stimulated by attending research seminars. The students need to refine the problem statement. The process of arriving at a clear question and hence starting point begins in the library. And then, the student can discuss with your supervisor. A supervisor will nevertheless lead you towards getting a clear focus to start the first paper, and will form a judgement about whether there is likely to be 'mileage' in any suggested topic.

Academic curriculum had a core role in several universities like Auckland University for their library department ([Moselen & Wang, 2014](#)). [Saunders \(2012\)](#), conduct research on the importance of curriculum integration in the faculty with information literacy competencies in several scientific disciplines such as Anthropology, Biology, English Literature, Psychology, Political Science, and Technology with survey and interview method. The results of this study provide academic librarians a broader insight into faculty understanding of information literacy and will help to advance the discourse of information literacy further into the disciplines.

This research shows that channels of information literacy are needed for the discovery thesis topic process. [Huang and Chen \(2014\)](#), more detail has been explored channels of information literacy in molecular biology research on graduate and PhD students. They found that there are two sources of information channels that formal channels and informal channels. Formal channels consist of biomedical databases, journal web sites, search engines, libraries, conferences, and academic colloquium. And then, informal channels are advisors/supervisors, lab mates and other colleagues.

Researcher interest in conducting research similar to [Huang and Chen \(2014\)](#) to generalize the results of such research and provide additional information that is important to research the development of information literacy. Researchers make a little difference by using respondents from different departments and from some country university respondents. It is important to support the generalization of the results of research.

Research Question

The study was conducted to answer the question of how the process of finding a thesis topic or a research topic for PhD students of information literacy. In detail, the research questions is what information literacy education, how to obtain information literacy and how to activity of information literacy to search

thesis topic, and what constraints of information literacy for PhD student during the search process research topic.

Research Scope and Limitation

The research scopes broader than previous research, because researchers used data source of doctoral students from several countries such as Australia, England, Indonesia and Taiwan, as well as from a variety of educational backgrounds. Research would like to extend the findings of previous studies with different respondents. [Dold \(2014\)](#), also examines how to different disciplines may be included in a shared problem, using psychopathy as an example.

Qualitative methods with very good interview for this research because it can explore a lot of information on respondents, but the number of small sample makes it difficult to research results in general. In addition, inadequate distribution of respondents that still trouble making a judgment to determine the effect of different sample views of the university and of education of the respondents.

Literature Review

Information Literacy

Definition of information literacy by ACRL is a set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in community of learning. ACRL in Information Competency Standards for Higher Education mentions that information is available through libraries, community resources, special interest organizations, media, and the Internet- and increasingly, information comes to individuals in unfiltered formats, raising questions about its authenticity, validity, and reliability.

Information literacy is common to all disciplines, to all learning environments, and to all levels of education. An information literate individual according to ACRS is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Incorporate selected information into one's knowledge base

- Use information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

[Huang and Chen \(2014\)](#), conduct their research based on role information literacy by ACRL published.

The problem is the students' understanding of access to information literacy still needs improvement, so ACRL state that incorporating information literacy across curricula, in all programs and services, and throughout the administrative life of the university, requires the collaborative efforts of faculty, librarians, and administrators. Research by [Saunders \(2012\)](#) investigate students to know role faculty and library about the learning process of information literacy at a university.

ACRL also suggested student students' self-directed learning, as they become engaged in using a wide variety of information sources to expand their knowledge, ask informed questions, and sharpen their critical thinking for still further self-directed learning. Because achieving competency in information literacy requires an understanding that this cluster of abilities is not extraneous to the curriculum but is woven into the curriculum's content, structure, and sequence.

Digital Resource

The developments of information technology also have an impact on the development of information literacy form digital resource. Thus, "fluency" with software and hardware associated with "computer literacy" is very important. Several research found that problem for digital literacy is lack of use technology information ([Asadullah, 2014](#)).

ACRL state that information literacy is related to information technology skills, but has broader implications for the individual, the educational system, and for society. Information technology skills enable an individual to use computers, software applications, databases, and other technologies to achieve a wide variety of academic, work-related, and personal goals. Thus, information literate individuals necessarily develop some technology skills.

Information literacy, on the other hand, is an intellectual framework for understanding, finding, evaluating, and using information--activities which may be accomplished in part by fluency with information technology, in part by sound investigative methods, but more importantly through critical

discernment and reasoning. Information literacy initiates, sustains, and extends lifelong learning through abilities which may use technologies but are ultimately independent of them. This is reasonable because the information literacy possessed a broader scope than media literacy ([Lee & So, 2014](#)).

[Mackey and Jinwon \(2005\)](#), investigated a convergent model for information literacy (IL) based on complementary proficiencies in research and web literacy. This paper identifies three dimensions of IL and IT: web environment knowledge, web development knowledge, and research skills. This model is portable to other courses, programs, and organizations engaged in IL and IT instruction.

[Mahdian and Shahbazi \(2012\)](#), conduct research to investigate the barriers and challenges to information literacy based on technology of faculty members of Boroujerd Azad University. The result showed that the most important barriers to information literacy are, respectively, lack of familiarity with electronic information research skills with medium, lack of English proficiency in searching and lack of complete access to electronic information database and digital libraries.

Information literacy should be developed at all levels of education, and a goal of our educational institutions should be on education of IT literate professionals prepared for lifelong learning. Society of knowledge requires that teachers and educators take over some new roles, including redirecting research towards learning, the use of modern information technology, ability to work, the necessity of cooperation with other educators, collaboration with professional associates, research and evaluating their own work ([Mandušić & Lucija, 2013](#)).

[Raju \(2014\)](#), investigated what key knowledge and skills are required for LIS professionals to effectively and efficiently practise in a digital era academic library in South Africa? The triangulated findings (using content analysis of job advertisements and semi-structured interviews) from this preliminary investigation are used to ascertain an initial picture of key knowledge and skill sets required for LIS professionals in this environment. These preliminary findings also proved useful in teasing out some of the parameters for the wider study targeting the development of a comprehensive skills statement for higher education libraries in South Africa.

The Strategy of Research Title

Strategy for discovery research title according [Creedy \(2007\)](#) is starting from has a broad idea from previous reading required for coursework or it may be stimulated by attending research seminars. And then, the process of arriving at a clear question begins in the library. The process of investigating the literature has been considerable by the existence of computer search facilities. Your supervisor will be important in influencing the way you begin. But do not expect a supervisor to place a topic on your lap. Finding a research subject is your responsibility. A supervisor will nevertheless lead you towards getting a clear focus to start the first paper, and will form a judgement about whether there is likely to be 'mileage' in any suggested topic.

[Huang and Chen \(2014\)](#), suggested that to use channel of information literacy to obtain research topic such as search engines, journal websites, conferences, libraries, colloquium, databases, advisor, lab mates and other colleagues.

Important to suitable with standards, performance indicators, and outcomes which has been issued by the ACRL (Association of College and Research Libraries), because will assist researcher to make a planning discovery research title. Consists of a standard 5 as a framework to use information literacy:

1. The information literate student determines the nature and extent of the information needed
2. The information literate student accesses needed information effectively and efficiently
3. The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system
4. The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose
5. The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

Research Design

Research Method

This research use semi-structured in-depth interview to get data from respondents. Interview done directly face to face, by phone and through Skype.

Interview conducted directly face to face, by phone and through Skype. Before the interview, the general description of information literacy and questions was sent to the respondent either by email or through Facebook. A few days later contacted back respondents to identify their willingness to interview, and make an appointment time for the interview. Approximately 10 days to conduct the interview process. At the time of the interview was recorded, and then the transcript was also noted at the time of interview and immediately equipped after finishing the interview.

Similarly, with interviews by phone and Skype, interviews were conducted after making an appointment prior. Time to interview at least 30 minutes every interviewee, this is in accordance with the interview schedule/protocol. Interview schedule attached in appendix. But in practice need approximately 40 to 50 minutes because there are some things that are difficult to explain to respondents related to the use of information literacy. There was also talk out of context so that it may take longer. This conversation is sometimes also important because it can dilute the atmosphere so that the information can be explored well.

After the interviews were conducted, at this stage of the process of analysing the transcripts if still found things that need to be confirmed, the researchers will confirm the interviewee via email or message or Facebook. This is important so that the data obtained better. Step analysis of data using NVivo and then reports the results are presented in a narrative to express the results in detail. In order obtained complete information about the study's information literacy.

Research Object

Object of research are doctoral students from several universities from several countries such as Australia, Britain, Taiwan and Indonesia. In addition, respondents also consist of engineering and non-engineering students. Engineering student consist of students from electronics and informatics department. While the non-engineering students consists of student of accounting, finance and economics department.

Here is the data of demography respondents. The respondent's name is not present in this study to maintain the confidentiality of respondents. Based on the origin of the university, consists of two respondents from universities in Australia, one of the respondents from the UK, two respondents from

Indonesia and three respondents from universities in Taiwan. Based on the subject of education, there are three (3) non-engineering students and five (5) students of engineering. Each respondent has research interests are different, one is interested in the field of robotics, government information systems, machine

learning, and electronic materials for engineering. Since non engineering research interest is behavioural finance, accounting, government, and the regional government. Most respondents entering its third year and only 3 respondents were students in the first year.

Table 1
Demography of Respondents

Respondent	University	Country	Department	Research Area	Year to date
1	University of Wollongong	Australia	Engineering, Faculty of Computer Science	Robotics	3
2	University of Wollongong	Australia	School of Information Systems and Technology, Faculty of Engineering and Information Sciences	Information Systems – E-Government	3
3	Sheffield University	UK	Automatic control & system engineering	Unmanned Aerial Vehicles (UAVs)	1
4	National Chung Cheng University	Taiwan	Electronic engineering	Machine Learning	1
5	National Chao Tong University	Taiwan	Mechanical Science Electronic	Electronic Materials	3
6	National Chung Cheng University	Taiwan	Department of Finance	Behavioural Finance	1
7	University of Indonesia	Indonesia	Department of Accountancy	Accounting of Government Sector	3
8	University of Indonesia	Indonesia	Department of Economic	Regional Government	3

Research ([Huang and Chen \(2014\)](#)) only explain that information literacy is only observation on master students and PhD students majoring in molecular biology research. Rarely found publication of information literacy research with samples from several countries and with educational background of engineering and non-engineering.

Qualitative Data Analysis

Analysis of data from interviews conducted with content analysis. Basically, content analysis can be done in two ways, i.e. both manually and using digital equipment. Digital equipment used in this study is NVivo.

The process of data analysis is making coding, in order to facilitate the grouping and summarizing the results of the research. The process of making the code is using NVivo to facilitate the process of data analysis and for a more convincing data validation. Making coding with NVivo performed on each item question based on the framework of a previous study.

Coding used by the framework to determine the education of information literacy is a basic curriculum, seminars, training lab and library. But in the process of development are coding using NVivo coding based on existing transcript of interview data, namely seminars, short courses, friends and self-learning. After that, then the data are presented. Presentation of data can be presented through a table in the summary and grouping of data, and presented also in the form of

a narrative about the detail of respondents. Coding related types of information literacy education obtained is like reading the paper, information retrieval skills, information, research method, citation format, writing research papers, supporting for research.

Furthermore, coding for channel information literacy used by previous studies is a coding of databases, journal web sites, search engines, libraries, conferences, academic colloquiums, advisors, lab mates, and colleagues. In this section there is the additional question of coding i.e. professional. Coding of information literacy sought using sufficient long statement because it is not a word, but a sentence like research topics by google search, literature from the web library or endnotes, journal websites and scientific journal, the idea of strengthening the research gap. All coding is more easily done because using NVivo software.

To determine the consideration selecting a channel of information literacy, researchers used a coding conformity with the object of research, a prestigious, quality and novelty. This question is a question of the development of channel information to determine factors-factors that influence in selecting a channel of information literacy by doctoral students.

The next coding is to determine how information literacy for doctoral students in the process of finding a research topic. The coding is information need, acquisition, evaluation, utilization, ethics. Whereas coding to know the details of the activity in accordance with the aspects of the activity in the form of a

statement stating in detail as identify the right information systems, knowledge about the theory, reference, search topic of research, reading and understanding paper, search previous lack of research, research motivation, and research strategy.

The latter is a coding related to the question of what are the barriers perceived by doctoral students with information literacy. Sample code is the lack of information literacy, lack of reliability facility, lack of understanding in the research area, and lack of interview skill. This question is also the development of research which aims to provide feedback that can improve the shortcomings or difficulties related to information literacy and research topic discovery process.

Results and Discussion

Information Literacy Education for PhD student

Results of interviews about information literacy education, shows that a short course on information literacy is one of the methods used by the majority of respondents to learn information literacy. It cannot be avoided because of the short course is a facility provided by the respective college. This short course is optional, only given to those who need information about information literacy as well as about other things as support to conduct research from start to search the literature or access journal, reading literature, cites and how to write. Respondent suggested that:

“Short course is a doctoral development program that prepared by the university to support research students program”

Thus, this program is made by each college to assist or as a support to carry out the research. The program is made very intense because the program is very important for the students, because there is no learning process for students in the UK and in Australia. Students are directly doing research since the beginning of college. Thus, these programs help to improve their knowledge of research. Whereas for students in Indonesia also received training in information literacy, but in the form of seminars, which are only given at the beginning of university classes, it is only a glance introduction of information literacy and then students will be directed to the library to learn on their own about information literacy.

For doctoral students in Taiwan, they gain knowledge of information literacy are varied, such as seminars, self-learning and colleagues. Respondents

mentioned that they get the information literacy of friends by learning about sources of information literacy and how to create a citation. Self-learning used to get information retrieval skill. Results can be seen in Table 2 of the source of information literacy education, information literacy education, number of the respondent and the respondent country by the university.

Table 2
Source of Information Literacy Education

Sources	Information Literacy Education	Res.	Respondents by country of universities/Subject
Short Course	Information retrieval skill	3	Australia, UK (Engineering 3)
	Reading paper		
	Information research method		
	Citation format		
	Writing a research paper		
Seminar	Supporting for research	3	Taiwan, Indonesia, UK (Engineering 2) (non-engineering 1)
	Recent Information		
	How to access the journal		
Self-Learning Colleagues	Object research	1	Taiwan (engineering 1) (Engineering 1) (non-engineering 1)
	Update information		
	Information retrieval skills		
	Citation format		
	How to access the journal	2	Taiwan (non-engineering 1)
	Recent Information		
	Use professional software		

Interview results in this study showed different results with previous research on information literacy education. In this study of information literacy education is dominated by short courses and seminars, then their self-learning and colleagues or friends from other faculties or juniors who have obtained the material earlier.

Based on the analysis of the origin of the university there is a difference in the education of information literacy, such as in Australia and the UK there is a short course and program development of knowledge and skills to enhance the ability and skill in conducting the research. While in the countries of Taiwan and Indonesia, the education of its information literacy obtained from guide books, seminars, self-learning and colleagues. This is due to the system of education for different doctoral student, between Australia and the UK, with Indonesia and Taiwan. PhD student in Indonesia and Taiwan, focus on completing his study first. Thus, they are more focused on the lesson, and then efforts to obtain information about the research

carried out during the learning process, from seminars, friends, and self-learning.

Education department/subjects may also affect its role in information literacy education, because compared with a previous study using student subjects of biomedical, information literacy education of its slightly different from the results of interviews of respondents in this study. But perhaps it is because the differences caused by the origin university. In addition, the data in each country respondents are not well distributed between engineering and non-engineering, making it difficult to distinguish the researchers the possibility of differences in

information literacy education when viewed from the subject of education of the respondents.

Information Obtaining Route for PhD student

Channel of information literacy used by many responding are search engine and journal web site, follow by the advisor, colleagues, conferences, libraries, databases, lab mates and professional. Table 3 is presenting sources of information literacy channel, information literacy sought, the number of respondents, respondent by country of university and subject.

Table 3
Channel of Information Literacy

Sources	Information Literacy Sought	Respondents	Respondents by Country of universities /Subject
Databases	TEJ data base, data streaming, government data base, regional data base, research variable, research topic	3	Indonesia, Taiwan; non-engineering
Journal web sites	Updates of information and updates about literature from Ebsco, science direct, Proquest and IEEE, relevant paper, literature review and background knowledge, government journal.	8	All; non-engineering (3), engineering (5)
Search engines	Research topic by google search, literature from web library or end note, journal website & scientific journal, establish gap research idea	8	All; non-engineering (3), engineering (5)
Libraries	Updates of information, theory, added literature and knowledge, research strategies, portal connecting with a paper/journal	4	All; non-engineering (2), engineering (2)
Conferences	Research topic, other published article In the related area, updates of new information, update new knowledge, to develop a relationship with professor & researchers, research strategies	5	All; non-engineering (1), engineering (4)
Advisor	Updates of research topic, new information about field research	6	All; non-engineering (1), engineering (5)
Lab Mates	Updates of information	2	Taiwan; Engineering (2)
Colleagues	Updates of information, new information, core knowledge, updates of other techniques, e book information, research topics	6	All; non-engineering (2), engineering (4)
Professional	Update new information, research strategies	2	Australia; Engineering (2)

Journal website is widely used by engineering students, i.e. IEEE and science direct. Whereas for non non-engineering student most of used Ebsco and Proquest. Information sought are updates of information, literature review and background knowledge.

Search engine which popular is google scholar. The information sought is search research topic and literature review as strengthen the research idea. The search engine is frequently used for searching journal website and scientific journals. Other search engines are web library and Endnote. Before respondent knowing google scholar, several respondents only used search engines like google search.

Advisor and colleagues are also having an important role as an information literacy channel in the thesis topic discovery process. Advisor role is much used by engineering student than the non - engineering student. Information literacy sought is research topic,

updates of information, updates of other techniques, e-book information, and core knowledge.

Conferences are one of the channels of information literacy, which is dominant used by respondents, primarily by engineering students. Information literacy sought are research topic, other published article in the related area, updates of new information, update new knowledge, to develop relationships with professors and researchers, and research strategies.

The next information literacy channel is a library. The library used by engineering and non engineering for updates of information, theory background, added literature and knowledge, research strategies, and portal connecting with paper or journal. Engineering student there is not use the library as a channel of information literacy, because engineering student more likely to use journal web sites.

The data base is the channel information literacy that is only used by the respondent's non-engineering. The database used is as TEJ database, government data

base, and a regional database. A research topic and research variable can be obtained from the database.

Lab mate is one of the channels of information that can be used for updates of information. However, some respondents expressed a bit difficult to use lab mates as a channel of information because not all respondents have lab mates. Even if they had a lab mate, because different research interest to discuss the research may provide input to be biased.

Channels of the information literacy latter are professional. Some respondents prefer to use a professional as a channel of information, because professionals have direct experience in the practice field. So they have a lot of important input for improving research. Information can be obtained from a professional is updated new information and research strategies.

Consideration of the most frequently used by the respondents to determine the use of a channel information literacy is the intersection or the suitability of the field of science or research topic, publication-quality, prestigious conferences and newest publications. Here are excerpts of an interview on the information channel selection considerations:

We like using more prestigious the CFP's source (e.g. Journal, conference or book chapter), we have a better chance to get "reliable" direction from the CFP.

The first consideration is the intersection with the field of science, which has sliced the field of science. Secondly, published by a publisher who would qualify, if "factor infarct" I do not know, my judgment is indexed by Scopus. The third consideration is the issue of the journal (minimum four years). Finally, the last consideration is the conference journal/conference proceedings.

In the process of finding these research ideas, not all respondents find the idea based on the above information channel. However, there are respondents who got the idea to look at the contextual or field conditions. After that, the researchers reinforce the idea of literature as an amplifier.

Channel usage information literacy when viewed from the country of origin Universities, there is little difference between the countries of origin of the respondents. The difference is only in the use of lab mate and professional. Of the respondents in Taiwan they use lab mates to get updated information, while the other countries there are no lab mates. They prefer to use another friend or colleague.

Similarly, the subject of education of respondents on the channel of information literacy is no different. The difference in the use of the database, because only used by students from non-engineering. While engineering students do not use the database as a channel of information literacy. The use of channels of information literacy lab mates and professionals is also only used by engineering students.

Information Literacy for PhD student

Information literacy for doctoral students is a tool used to assist in the conduct of research on the topic until the discovery process of making a report or presentation of results. The benefits of information literacy are divided into several aspects that need information, information acquisition, evaluation of information, utilization of information, information ethics, self-motivated learning.

Here is a table of activity information literacy for PhD students based on the results of interviews with respondents.

Table 4
Activity Information Literacy for PhD Student

Activities	Respondents	Respondents by Country of universities /Subject
Information need	Identical selects the right information systems, knowledge about theory, search reference, search topic research, reading & understanding paper, search lack previous research, research motivation, research strategy	6 All; non-engineering (3), engineering (5)
Information acquisition	Knowledge of literature, search research topic, search right information, knowledge precise theory, research strategy	5 Australia, UK, Taiwan Engineering (5)
Evaluation of information	Searching a good journal, check the validity, reliability and rank of the information sources, interpret the literature if the experiment failed, search right information, compare practise and theory	5 All; non-engineering (1), engineering (4)
Utilization of information	Comparing the available information sources, comparing our interest with the information received, guidelines for research, use right journal	4 Australia, Taiwan, Indonesia non-engineering (1), engineering (4)
Information ethics	Care about issue ethics, care about information ethics, care about legal use of information, care about integrity problem and plagiarism, search legal source	5 All; non-engineering (1), engineering (4)

Based on Table 4 above, mentioned that aspects of information literacy activities for PhD students are an information need, information acquisition, evaluation of information, utilization of information, and information ethics. Related fifth aspect of this activity, the researchers found that the views of the needs of information literacy, information literacy require respondents to identify to select the right information systems, knowledge about the theory, reference, search topic of research, reading and understanding paper, search previous lack of research, research motivation, and research strategy.

Based on the information acquisition by the respondent activity is knowledge of the literature, search research topic, search right information, precise knowledge, theory, and research strategy. Whereas from the evaluation aspect of information, activities respondent is to search a good journal, check the validity, reliability and rank of the information sources, interpret the literature if the experiment failed, search right information, compare practice and theory.

From the aspects of the utilization of information, respondents using information literacy to compare the available information sources, compare our interest with the information received, guidelines for research, and use right journal. Furthermore, for the information on ethics, the activities of the respondents are care about the issue of ethics, information ethics care about, care about the legal use of information, care about the integrity of the problem and plagiarism, legal search source.

Ethics is an activity of information which is the concern of all respondents from all universities, although not all respondents understood. Even on some campuses have a special office to help students related ethical issues in research, there are colleges that have research ethics courses. Here is an excerpt from the respondents on research ethics:

“There are courses on research ethics, there is even a service of writing techniques related to research ethics in order to avoid plagiarism”.

Differences at the university and the subject of education of respondents did not cause differences in the activities of information literacy. Evident from the results that are similar to previous studies.

Obstacle of Information Literacy for PhD student

Some of the constraints obtained from the respondents are the problem with the lack of

understanding of information literacy, lack of adequate facilities related to information literacy, lack of understanding of the research area and the lack of interview skills, difficulty finding paper that corresponds to the area of research, and often troubled by advisors for feedback changed.

Most problems are the lack of information literacy facilities needed by the student. For example, the database is not available or incomplete, or the difficulty of finding appropriate information literacy research idea because these studies are still rare. The second largest problem is the lack of understanding of information literacy it is due to the difficulty in understanding a paper that caused the problem of language and different ways of thinking of the author so elusive reader. The result support previous research by ([Mahdian & Shahbazi, 2012](#)).

Summary and Discussion

Based on qualitative data analysis, stated that the source of information about educational information literacy partly derived from short courses, seminars, colleagues, and self-learning. Education information contains material that is important in the process of discovery research and implementation of research topics such as information retrieval skills, reading papers, recent information, writing, and the paper citation format.

Background the origin respondent education may lead to different educational resources given information literacy education system for PhD students each country is slightly different. Background subject of education also may affect educational resources given the results of this research differs from previous research to sources of information literacy education. Previous there are basic curriculum, seminars, lab training and libraries ([Huang & Chen, 2014](#)).

Channel information literacy that is popularly used is the journal web sites and search engines, followed by advisors, colleagues, conferences, libraries, the databases, lab mates and professional. Addition information about the channel of information literacy in this study is the professional who can help the student to provide newest information updates and research strategies.

Academic colloquium is not a channel of information literacy for the respondent, because none of the respondents giving out this information.

Probably, most of the respondents had never participated academic colloquium.

Background the origin respondent education and the subject of education of respondents, perhaps only in part the effect on the channel information. This is because not many differences between the information that is used by other research results of previous studies now. For example, the use of a database that is widely used by non-engineering students, and use professional lab mates and used by engineering students. While the others, literacy information channel is much used by engineering and non-engineering.

The process of discovery research topic according to the respondents can be obtained from the databases, search engines, conferences, advisors and colleagues. While on the journal web site library is used more with the background knowledge and literature. Lab mates and professionals used to update newest information and research strategy. Research topic can also be obtained from the contextual happens on the field by looking at the actual condition or phenomenon in practice.

Considerations for using a channel information literacy is the intersection or the suitability of the field of science or research topic, publication-quality, prestigious conferences and newest publications. Intersection or suitability with the most scientific fields be taken into consideration, even some of the respondents did not think too much about the quality of the paper. For respondents from their engineering subject only use paper from IEEE.

The search process research topic every student is different, as well as student activities on information literacy in the process of finding a thesis topic. Most of the students used information literacy as information needs to search for a topic of research, reading and understanding paper, search previous lack of research, motivation research, and research strategy. There is also a search topic on information acquisition activities. In addition to finding a research topic in information acquisition activities are also carried out activities looking for background knowledge, theory, and research strategy. While the evaluation of activities of information and utilization information is an activity in order to find a good journal, checking validity, reliability and rank of the information sources, interpretation of literature, compare practice and theory, and guidelines for research. Information ethics is aimed at finding the source of legal problems and concern for the integrity, ethics and plagiarism.

Problems encountered by the PhD student related information literacy is still a lack of information literacy required by the student at a university and a lack of understanding of information literacy. This constraint is caused not all Universities have the same facilities in providing facilities for research students, and the second constraint is caused not all PhD students have good language skills to understand a paper.

Conclusion

Research Finding

The process of discovery research topic for PhD students can not be separated from information literacy. Channel information that is widely used to get an idea of research topic is the search engines and the journal's website, taking into account the suitability of the research fields of interest. Information literacy activities are undertaken to find the idea of research topic as an information needs and information acquisition.

Knowledge of information literacy in this research may be obtained from short courses, seminars, colleagues, and self-learning. In contrast the results with previous studies is presumably due to differences in the background of the respondent state universities and educational background differences respondents who mostly come from engineering, finance, economics and accounting. Constraints perceived by respondents to the information literacy are still a lack of resources and the lack of understanding literacy to information literacy.

Future Research and Suggestion

The researchers' conclusion about the differences in educational background and the background of the respondent universities that because there are differences in the results of the present study with previous research many uses judgment of the researcher and perhaps this is very subjective. Researchers suggestions for future research on information literacy if you want to see from the background research, the university should the selection the origin and educational background really be considered to be comparable and explored the advantages and additional data to be obtained to improve the results in this study. Research can also be done with different methods, for example by means of

a survey of the respondents to obtain the general judgment.

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