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Research Article

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Abstract

This article presents the factors affecting the integration of information literacy in the teaching and learning processes of general education courses at an undergraduate level, where information literacy is used as a tool in the student-centered teaching approach. The research was divided into two phases: (1) The study of factors affecting at a policy level — a qualitative research method conducted through an in-depth interview of the vice president for academic affairs and the Director of the General Education Management Center, and (2) The survey of factors affecting in the teaching and learning processes, which is concluded through the questioning of lecturers of general education courses, and librarians. The qualitative data was analyzed on content, and the quantitative data was analyzed through the use of descriptive statistics, weight of score prioritization and percentage. Two major categories were found to have an impact on integrating information literacy in the teaching and learning of general education courses at an undergraduate level. (1) Six factors at a policy level, namely, institutional policy, administrative structure and system, administrators' roles, resources and infrastructures, learning resources and supporting programs, and teacher evaluation and development. (2) There are eleven instructional factors: roles of lecturers, roles of librarians, roles of learners, knowledge and understanding of information literacy of lecturers and librarians, cooperation between librarians and lecturers, learning outcomes, teaching plans, teaching methods, teaching activities, teaching aids, and student assessment and evaluation.

Keywords: *General education; Information literacy; Information literacy integration; Learning and teaching processes; Thailand; Undergraduate teaching*

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Introduction

Undergraduate programs in universities are offered with the aim of fostering the country's human resources to meet the national development needs, thereby become as advanced and developed as other countries. Thailand, as well as other countries, sees the importance of college education. Until recently, the increase of enrollment numbers has resulted in a deteriorating quality of knowledge of the graduates; our graduates are, in some respects, still lacking in comparison to the international standards. In order to better prepare graduates and improve teaching programs and methodologies, the government stipulated the National Tertiary Qualifications Standards in 2009. These standards cover the following aspects: moral, virtue, knowledge, intellectual skills, skills related to interpersonal relationship, responsibility, numerical analysis skills, communication, and use of information technology. Without these qualities, and the integration of these aspects into the curriculum, there is the potential of resulting in selfishness and social problems. These graduates may be under-qualified, and not able to work in places that require sociability, they may be unable to apply knowledge in real situations, adjust themselves to changing conditions, work with others, and compete at an international level where a foreign language and technology are vital for efficient accessibility of information.

All of these aspects reflect a crisis in the tertiary educational system. The strength of the country's present and future competitive competence is affected, reflecting weaknesses in learners' development processes. These are all issues that universities must consider since universities, as the country's major mechanism, are responsible for high-level manpower development (Bureau of Standards and Evaluation, Office of the Higher Education Commission, 2004). Nevertheless, the crisis has led to the reformation of both sides of the education system (teaching and learning), a major step-forward in the process of preparing and creating qualified graduates. The Office of the National Education Board (2001) has developed the means by which many programs can meet the needs of students in the present, as well as encourage life-long learning. It is fundamental that teaching and all learning-based activities be student-centered; important elements of this type of education are the incorporation of knowledge, ethics, learning processes, up-to-date teaching and curriculum reform. The various steps taken to solving the issue of university graduates in Thailand have been principally aimed at the teaching and learning processes, in particular, focusing (with various teaching development tools) on student-centered and life-long learning approaches.

Information literacy is a tool that facilitates life-long learning. It is a set of abilities requiring individuals to "recognize when information is needed and

have the ability to locate, evaluate, and use effectively the needed information" (American Library Association, 1989). This can be done through a focus on the following areas: the student-centered approach, problem solving, critical thinking, increase of self-learning opportunities, and the extension of knowledge boundary through the use of multiple information resources. These learning processes are based on a variety of patterns that link information literacy in assignments with real-life experiences. This is particularly true when information literacy is integrated in the curriculum (Curricular integration), a process that results in the promotion of student-centered and problem-based learning, in which students are trained to think and act responsibly as agents in control of their own knowledge (ACRL, 2000; ACRL's Institute for Information Literacy, 2003). With graduates who are developed in terms of the qualities stipulated in educational reform, then integrating information literacy into both teaching and learning would be, therefore, an important mechanism to rely on. This pattern enables us to effectively solve the critical problems of the characteristics of the Thai graduates. As a consequence of the integration of information literacy in teaching approaches, research results reflect the following capabilities of graduates: (1) improved language and communication skills (from the presentation of research); (2) right-brained learning habits and the ethical use of information (by giving references in reports); (3) improved knowledge about how to solve problems in real-life situations or in simulated roles that are related to life and work, increased knowledge of information resources in their own fields, an interest in following news and present-day issues, and the ability to draw conclusions from texts in order to support research study, (4) the ability to think critically, especially in evaluating information resources appropriately and critically, as well as improved understanding of how to design research processes and link ideas from read texts to research work, as well as the ability to integrate the writing of references in reports; (5) new understanding of how to retrieve databases of libraries, computer programs, and Internet searching for assigned work, and exchange computer experiences with peers, (6) improved research skills that lead to opportunities that are more concerned with self-learning, ability to search and have access to information sources and acquire new bodies of knowledge from researching (Bowler & Street, 2008; Dakshinamurti & Horne, 2006; Hiscock & Marriott, 2003; Sult & Mills, 2006; Tucker & Palmer, 2004; Walczak & Jackson, 2007; William, Blowers, & Goldberg, 2004).

This process of teaching development through the integrating of information literacy in undergraduate programs in tertiary institutions abroad has been greatly successful. For instance, at the California State University—San Marcos (CSUSM), information literacy has been integrated into all general education

courses for first and second year students, and in major subject courses where integration depends on the requirements of third and fourth year students. The learning outcomes are determined according to ACRL standards. The teaching approach is based on the cooperation between lecturers and librarians who set the learning objectives of each subject together. The evaluation of information literacy of the students and evaluation of teachers is performed every year (CSUSM, 2008; Sonntag & Ohr, 1996). At the Florida International University (FIU), integration of information literacy is compulsory for seven consecutive periods of class meetings for each program. The first two subjects in which information literacy was integrated (into four sessions of class meeting) were the courses: Experience for First Year Students and Writing Course (a preparatory skill course for first and second year students). As a means of evaluating the work, the teacher of each subject established the learning outcomes and assignments both in class and after class. The last three of the mandatory seven sessions were integrated with information literacy into one or more major subjects of the third and fourth year students. This is done depending on the agreement between the department and the library. The learning outcomes follow the framework stipulated by the teacher and the librarian, and evaluation of work both for program and classroom levels was carried out. However, the success of information literacy integration of FIU was emphasized for people in other management roles (FIU, 2000; Florida International University Libraries, 2000). On the contrary, integrating information literacy in undergraduate courses in Thailand is only stipulated in certain skills in subjects such as Research Methods, Life Skills, Ethics, Thai for Communication, English for Communication, Critical Reading and Writing, etc. This does not go so far to cover information literacy and has no clarified policy at an institutional level.

The past studies on the integration of information literacy into undergraduate curricula, and on current situations and development both domestically and abroad show that general education courses and major area courses have been integrated. This has been done through the cooperation of lecturers and librarians in establishing learning objectives, learning outcomes, teaching approaches, learning activities, and assessment. Studies on factors related to such integration of information literacy in teaching, and in the development of efficient teaching patterns had not been conducted. Therefore, it was necessary to study the factors affecting in information literacy integration. The findings of this study reveal the factors that can be applied in the development of teaching patterns integrated with information literacy, and the development of the means to integrate information literacy in the future.

Research Objectives

The research query, "What are the factors affecting in the integration of information literacy in the teaching and learning of general education courses of undergraduate programs?" was set with an aim to study the factors affecting in information literacy integration in the instruction of general education courses of undergraduate curricula. The study was conducted at Srinakharinwirot University and covered the factors at two levels, namely, (1) at the policy level, and (2) at the instructional level.

Literature Review

Related literature and research reviews were performed on the impacts of the integration of information literacy, and the teaching and learning of general education courses at an undergraduate level, as detailed hereunder:

The teaching and learning of undergraduate general education courses

The aims of the teaching and learning of undergraduate general education courses cover various aspects. It targets developing learners to: understand the nature, oneself, and the society; be eager to learn; think reasonably; use language to communicate and convey meanings well; have virtue; appreciate values of art and culture of Thailand and international countries; be able to apply knowledge in the living; and be able to conduct oneself well in the society (Bureau of Standards and Evaluation, Office of the Higher Education Commission, 2006). The programs and contents of the general education courses are integrated and emphasize broad attitudes and perspectives. More programs are being reviewed, with a number of new courses being created (Sinlarat, 2006). The study of Jiarakul (1998) reveals that the general education courses integrate knowledge and emphasize content that is related to ways of life in society; humanistic thought, the understanding of sciences, technology and its impact; and the use of language to communicate and acquire knowledge.

Sinlarat (2007) explained that teaching and learning in general education courses should be aimed at enhancing growth and development in the planned directions. As such, lecturing approach will not form or fulfill the expected traits. Learners must be trained to think and seek knowledge by themselves. Hence, teachers should not only lecture, but provide a facilitating environment, and provoke and force learners to think on their own before the teachers give feedback. (It should be noted that self-thinking must be based, originally, on research.) Besides the above-mentioned aspects, general education courses should also emphasize and foster the growth of a well-rounded individual. Teaching therefore accents thinking and analyzing processes at all stages as well

as the means to acquire knowledge and understanding in the field. The study by Sinlarat (2006) also reflects problems in the teaching and learning. While the new approach provides more activities for students to choose and emphasizes critical mind, this teaching is still based on lecturing.

Integrating information literacy

Study of literature related to the integration of information literacy in universities enables us to be informed of Thai universities' implementation of information literacy conceptual framework in three levels. 1) The institutional level involves policy development in different disciplinary or professional areas, preparation of evaluative strategies for the efficiency of information literacy programs, emphasis on the integration of information literacy in institutional missions, goals, and different projects. Institutional implementation is based on the agreement within each university to integrate information literacy holistically and the agreement related to support and allocation of appropriate resources. 2) The program/discipline level is the setting of framework and outline of curricular objectives, learning outcomes, and evaluation criteria for information literacy integration incorporated by the programs. 3) At the course level, information literacy is taught so as to instill among the students the awareness of the importance of information literacy according to information capability standard. Coverage of the standard and proficiency of each student differ according to the discipline area requirements and each student's ability (Andretta, 2005). Universities are required to holistically integrate information literacy and conduct learning evaluation at all levels (Fitzwater, et al., 2003). However, implementation at the course level involves instruction that liaise information literacy with assignment that principally aims at instigating information literacy skills (ACRL's Institute for Information Literacy, 2003; Eisenberg, Lowe, & Spitzer, 2004; Fitzwater, et al., 2003).

Teachers and librarians take an important role in the teaching and learning where information literacy is to be incorporated. They must have knowledge and understanding of information literacy. In the studies by Costantino (2003), Gullikson (2006), McAdoo (2008), and Weetman (2005), teachers were found to understand the effect of information literacy on their own teaching and their students' learning and see the importance of students' information literacy. Teachers and librarians should take the responsibility in improving information skills of the students and integrate information literacy in their teaching. Besides the knowledge and understanding of information literacy, research studies by Birmingham, et al. (2008), Black, Crest, & Volland (2001), Cobus (2008), Floyd, Colvin, & Bodur (2008), Lindstrom & Shonrock (2006), McGuinness (2006), and Paglia & Donahue (2003) also indicate the importance of cooperation or team

working of teachers and librarians to integrate information literacy.

Development of information literacy among students is viable by means of the student-centered and problem-based approaches, but instructional management must be cooperated by teachers and relevant personnel. In such approaches, students will practice thinking and understand the course content better than acquiring it from lectures. Students have to use their critical thinking skill when they want to use information sources and take more responsibilities in self learning (ACRL, 2000). Integrating information literacy is also based on various teaching approaches that respond to learning acquisition from various styles where information literacy is linked to course assignments and appropriate life experiences (ACRL's Institute for Information Literacy, 2003). Nevertheless, integration of information literacy at the course level accents the progression or continuous development of learning opportunities. Information literacy is the outcome of learning at the course level that integrates and links to the course content where teachers set the regular and progressive activities as well as assignments that are based on course objectives. Cooperation must be sought between teachers and librarians in the instruction as well as in evaluation of students' knowledge and skills (Fitzwater, et al, 2003).

There are a number of teaching techniques and learning activities that can be integrated to build information literacy in learners. Active learning, which is one of these techniques, enables students to learn by themselves from information skill textbooks, from visiting the library on their own, from doing the exercises and assignments by themselves or in small groups, and from conducting group discussion in class, all of which are assisted and supervised by librarians and the course teacher so that their research and completion of assignments are expedited (Dabbour, 1997; Higgins & Cedar Face, 1998; Paglia & Donahue, 2003; Sonntag & Ohr, 1996; Tucker & Palmer, 2004; Ursin, Lindsay, & Johnson, 2004). The second technique is the Cooperative Learning, in which learners are grouped together in 3-4 persons in order to search information for answering questions in the assigned worksheet. Each student takes a different role and works toward the same goal. Their duties are shifted so that they learn various skills with the assistance of teachers and librarians (Dabbour, 1997; Walczak & Jackson, 2007). The Project-Based Learning approach aims at each individual student or small group setting a study topic which can be derived from the course assignment. The group members cooperate to search information and present their work in a written report with referencing as well as orally in class. Teachers then evaluate each project from the references, the decision of sources, and the use of information (Hiscock & Marriott, 2003; Paglia & Donahue, 2003; Ursin, Lindsay, & Johnson, 2004; Williams, Blowers, & Goldberg, 2004). Web-Based Learning, another

approach, is assisted by librarians who provide instructional supporting tools on the website such as library introduction video, an information retrieval manual, Portal, teaching plans, exercises, related documents, and learning management programs such as Blackboard (Farmer, 2003; Hiscock & Marriott, 2003; Parang, Raine, & Stevenson, 2000; Tucker & Palmer, 2004). Finally, there is the Problem-Based Learning approach in which students are placed in small groups of not more than 10 persons. Each group learns either a real or virtual problem by searching information and making references of the information when they attempt to answer the question. Students have to think together, compile information for tackling the question, build an assumption, and make conclusion of the learning issues. Librarians and teachers assist students in the course of their investigation (Bowler & Street, 2008; Eldredge, 2004; Williams, Blowers, Goldberg, 2004).

Research Methodology

This research was conducted in two phases: (1) the study of factors affecting at a policy level, which is a qualitative research study by means of the in-depth interview carried out with the Vice President in Academic Affairs and the Director of the Center of General Education Administration; and (2) the study of factors affecting at the instructional management level, which is a survey determining the opinions of lecturers of general education courses and librarians.

The study was conducted at Srinakharinwirot University as a case study. The research population was comprised of university administrators, lecturers of general education courses, and librarians. The sample groups were selected by the purposive sampling method. The sample in the study of factors at a policy level consisted of the Vice President in Academic Affairs and the Director of the Center of General Education Administration. The sample in the study of factors at the instructional management level comprised 125 lecturers of general education courses and 42 librarians, totaling 167 persons (Srinakharinwirot University, 2009).

The research tools included: (1) In-depth interviews to elicit information on the current situations of instructional management, and opinions on developmental directions of information literacy, and problems from past implementation. Questions were posed related to the institutional policy, structure and administrative system, roles of administrators, lecturers, and librarians; resources and infrastructures, learning resources and learning support programs; and development and evaluation of lecturers. (2) Questionnaire to collect information on the opinions of lecturers and librarians. Questions were asked on factors related to the integration of information literacy in the instruction of general education courses; and in the roles of administrators, lecturers, librarians, and students; understanding of information literacy of lecturers and librarians;

cooperation between lecturers and librarians; learning outcomes, teaching plans; teaching methods, learning activities, teaching media, and learning assessment and evaluation. Both research tools were verified by three experts for content validity. The questionnaire was tried out with 96 lecturers and librarians and then run a statistical test which resulted in the questionnaire reliability at 0.912 (see Appendix 1 & 2)

Data collection was achieved through interviews with the Vice President in Academic Affairs and the Director of the Center of General Education Administration on February 23, 2010. The interview was recorded. One hundred and twenty-five questionnaire forms were distributed to the course lecturers and forty two forms to librarians. This was carried out from January 27 until February 26, 2010. One hundred and fifty-four questionnaire forms were returned from the total of 167, or 92.2 percent. From this number, 112 forms were from the lecturers (89.6%) and 42 forms were from the librarians (100%). All of the questionnaires returned were checked for completeness before any conclusions were drawn.

The data obtained from the interview was analyzed for its content and principle elements identified before explanation. The questionnaire data was analyzed using descriptive statistics for the integration of information literacy. Score weights from prioritization and percentage were based on: 5 for the first priority of choices, 4 for the second, 3 for the third, 2 for the fourth, and 1 for the fifth.

Research Results and Discussion

The results of the study on factors affecting the integration of information literacy in the instruction of general education courses show both the main and sub-factors as discussed in the following section (see Table 1):

Table 1 Factors Affecting the Integration of Information Literacy in the Instruction of General Education Courses

Main factors	Sub-factors
Policy level	1. University's policy 2. Structure and administration system 3. Roles of administrators 4. Resources and infrastructures 5. Learning sources and learning support programs 6. Development and evaluation of lecturers
Instructional management level	1. Roles of lecturers 2. Roles of librarians 3. Roles of students 4. Perception of lecturers and librarians 5. Cooperation between lecturers and librarians 6. Teaching plans 7. Learning outcomes 8. Teaching methods 9. Learning activities 10. Instructional media 11. Measurement and evaluation of student's learning

Factors affecting at a policy level

The interview conducted with the Vice President in Academic Affairs and the Director of the Center of General Education Administration led to conclusion of the factors affecting at a policy level into six items as follows:

1. The university's policy includes five sub-factors, namely: (1) forming learners who are information literate, are able to make decision on their topic of study, search for information, assess information, and use information for presentation of their research work, (2) offering information literacy subject as a general education course for first year students, (3) implementing student-centered instructions and using various teaching methods such as problem-based learning; small group teaching and brainstorming that enables students to select the topic of study, search information, and assess information obtained, (4) preparing information technology and communication that support seeking and acquisition of knowledge relevant to the course, (5) arranging student competency tests on information, information technology, and communication. The interviews of the university administrators also revealed that the university had clear policy on the student development which aimed for enhancing the graduates' lifelong learning skills. Information literacy course was offered in most undergraduate programs. Lecturers were enforced to apply the student-centered approach and ICT in their courses' teaching. In addition, the students' competency on information literacy should be tested to ensure their knowledge and skills according to the university minimum standards. The research results are in line with the work of: George, McCauslan, Wache, & Doskatsch (2001) which states that information literacy plays an important part in developing life-long learning; Andretta (2005) and Fitzwater, et al. (2003) which states that the integration of information literacy into a course should direct students to become information literate; ACRL (2000) which involves integrating information literacy as a mechanism promoting student-centered and problem-based learning that aims at sharpening students' skills in considering information sources and self-responsibility; and Jackson (2006) which supported the notion that tertiary level institutions set the policy and approaches related to information technology that emphasizes students information usage skills.

2. Structure and administration system comprises six sub-factors: (1) establishing a working unit to coordinate with faculties, institutes, offices that are responsible to integrate information literacy in their courses, (2) assigning a course instruction committee to take charge of the integration of information literacy as required by the program, (3) assigning lecturers who understand and are well-informed of information literacy or are interested to improve student's information literacy skills in their courses, (4) assigning personnel to support teaching,

who should be able to monitor teaching equipment and aids and information technology and communication, (5) following up lecturers implementation by considering the integration of information literacy in the instruction, (6) having students evaluate information literacy integrating instruction. The research results correlate with the studies of Higgins & Cedar Face (1998) and McMillen, Miyagishima, & Maughan (2002), in which a working group is assigned with a librarian coordinating the teaching of information literacy in different courses and librarians appointed as committee members of courses. The studies reflect that universities should establish a working unit and personnel to be responsible for the integration of information literacy into instruction, assign a working committee, lecturers, supporting staff, and set up the follow-up and evaluation of the integration of information literacy.

3. The roles of administrators consist of six sub-factors: (1) setting up a policy to integrate information literacy in general education courses, (2) stipulating information literacy as one quality of graduates, (3) providing facilities such as computers, computer laboratories, small group discussion rooms, etc., (4) monitoring the integration of information literacy so that it suits the general education course requirements, (5) arranging activities to develop knowledge and understanding of information literacy for lecturers of the courses and librarians, (6) having librarians support the teaching, or co-teach information literacy in general education courses. The research results correlate with the studies of: McMillen, Miyagishima, & Maughan (2002), Ojedokun & Lumande (2005), and Sugarman & Mosby (2002) which state that administrators should provide support in terms of materials and equipment used in the teaching of information literacy; McMillen, Miyagishima, & Maughan (2002) and Sugarman & Mosby (2002) who support that time and remuneration should be allocated to librarians to prepare for information literacy instruction and that it should be clearly explained to other staff members, this responsibility of librarians when replacement is required.

4. Resources and infrastructures consists of six sub-factors, namely: (1) requesting for and recruiting personnel competent in information literacy and the use of information technology and communication, (2) allocating budget to support the integration of information literacy in general education instruction, (3) equipping lecturers' preparatory rooms with adequate facilities for preparing lessons, such as computers and teaching aids, (4) providing computer laboratories for students to practice information retrieval and learn information technology and communication, (5) providing adequate computers for students in the university library to facilitate their self-research activities from various sources, (6) providing supplementary materials and equipment including computers, overhead projectors, and instructional materials that aim at developing information literacy

of students. The research results are in accordance with the work of the following people: Ojedokun & Lumande (2005) who believe that universities should provide necessary resources for instruction and that librarians interested in teaching should be recruited; Andretta (2005) and Fitzwater, et al. (2003) who hold similar ideas that institutions should provide and allocate resources and infrastructures appropriately; and Jackson (2006) who agrees that the provision of information technology and communication is an important factor in the development of students' information literacy.

5. Learning sources and learning support programs include six sub-factors: (1) providing information resources and library services that enable students to seek and obtain information and knowledge by themselves, (2) compiling an inventory of learning sources outside classrooms for students to select and learn as they see preferable, (3) providing learning sources on campus to encourage students' self-access learning, i.e., small group discussion rooms, film rooms, computer rooms, reading corners, and resting areas, (4) setting up an instruction material reading corner to develop students' information literacy and allow students to borrow these materials, (5) compiling an inventory of electronic information sources that have been reviewed by lecturers as supplementary materials, (6) procuring computer programs to supplement lecturers' teaching of information literacy and self-access learning of students. These results are in line with Hernandez & Urena (2003) and Malliari & Nitsos (2008) who support the notion that libraries provide information sources on the website; and the work of Ojedokun & Lumande (2005) who advocate computer learning program to supplement students' learning.

6. The development and evaluation of lecturers were found to include five sub-factors: (1) arranging meeting among lecturers of different courses to discuss the integration of information literacy in their instruction, (2) providing space for the exchange of opinions and experiences in integrating information literacy among lecturers and experts, (3) arranging training on information literacy skills and on the use of computer programs to integrate information literacy in instruction, (4) providing chances for lecturers to participate in activities that develop information literacy skills, integrated teaching, or topics related to their taught course, (5) evaluating the teaching of each course from instructional management that emphasizes the improvement of information literacy skills of learners. The findings agree with the studies of Higgins & Cedar Face (1998), who support lecturers' brainstorming as a means of teaching development; Black, Crest, & Volland (2001) who state that librarians have a role to arrange seminars on the importance of integrating information literacy in instruction, as this assists lecturers be informed and understand information literacy both formally and informally; Black, Crest, & Volland (2001) and Sult & Mills (2006) who also

believe that librarians are responsible for training lecturers in information literacy so that the latter will be able to teach efficiently; and Farmer (2003) and Ojedokun & Lumande (2005) who advocates for a staff development unit or academic development unit to organize workshops on information literacy and technology for lecturers and librarians co-teaching the course.

Factors affecting at an instructional management level

Factors affecting at instructional management level were compiled from questioning general education lecturers and librarians. From 154 respondents, 72.73% were lecturers and 27.27% were librarians. Most of the respondents were females (64.94%), ages between 31-40 years old (40.26%) and master degree's holders (57.80%). The study found that there are eleven main factors related to instruction management. The factor seen as the most important by lecturers and librarians was the teaching methods (scored 2,081). This was followed by the roles of students (2,070), teaching plans (2,065), learning activities (2,058), roles of lecturers (2,056), measurement and evaluation of student's learning (2,039), roles of librarians (2,037), instructional media (2,030), perception of lecturers and librarians (2,026), cooperation between lecturers and librarians (1,988), and learning outcomes (1,988). (see Table 2.) The findings indicate that both the lecturers and librarians believe that teaching methods are the most important element in the integration of information literacy in the instruction. The teaching approach seen as mostly effective is the small-group teaching, and the second is the problem-based or case-study teaching and self-learning. Our research findings correspond to the concept of ACRL (2000) which states that the integration of information literacy is a mechanism that promotes student-centered learning, especially the problem-based learning in which students practice thinking and taking responsibility of self-learning. The findings also correlate to ACRL's Institute for Information Literacy (2003) in terms of information literacy integration that requires various teaching methods. Since general education instruction accents critical thinking that is based on research, various teaching methods that link information literacy in the instruction will enable students to acquire the skills expected in the course objectives.

Upon considering the findings on the impact at instructional level item by item, we found that lecturers and librarians prioritized 10 items, namely: introducing information sources and resources and library services that support students' requirements (scored 528), establishing the learning objectives that aims to develop students' information literacy by measuring behaviors and learning outcomes that relate to general education courses (493), lecturers and librarians seeing the importance of information literacy for students and general education courses (486), cooperating in preparing and introducing information sources and

resources useful for students in their research for their study topics (474), students being able to determine their own information retrieval strategies and adjust them to obtain the accurate information (474), teaching materials and textbooks that link information literacy and the content of general education courses (462), lecturers and librarians knowing and understanding the scope of information literacy that assists in forming satisfactory graduates (437), self-access research and study of group members to survey information sources that present their learning issues (423), teaching students to analyze their needs for information in their given topic (408), and establishing the teaching processes that aim at students choosing their study topics and analyzing the learning issues until they are able to acquire the needed information (401).

From the findings, it can be seen that lecturers and librarians see that the most important factor related to the integration of information literacy is the introduction of information sources and resources and library services that support students' requirements. This is one impact element in terms of librarians' roles. The study reflects that emphasis on assignments of various patterns that aim at self-learning is seen as important. This correlates to the studies of Huerta & McMillan (2000) and McGuinness (2006) in which librarians were found to take the roles in providing advices on information sources related to the courses that students should use in order to attain the answers to their searched topic. These roles can be clearly seen in writing courses or courses with assignments requiring students to research and write reports.

The ten highly rated factors in the integration of information literacy denote the significant roles of lecturers and librarians in integrating information literacy in the instructional process. Lecturers and librarians should see the importance of information literacy concept on student development. They should cooperate in order to prepare and introduce information sources/resources relevant to the taught courses that will be useful for students in their assignments. Knowledge and understanding and cooperation between lecturers and librarians lead to common understanding in the integration of information literacy and hence they will be working together towards the same target of developing students' information literacy. Providing knowledge in analyzing the students' needs for information in the studied topic is also a major role of the lecturers to enable students to stipulate their frame of thoughts and accurately select the relevant information for the topic. It is the teacher who knows the scope of the course content and the topics chosen by the students, while librarians have an important role to recommend the information sources supporting students' information searching for their assignments. Librarians' advice enables students to attain the various information sources relevant to the students' studied topic. In terms of information literacy

integration, lecturers and librarians have to cooperate in order to plan the teaching whereby learning outcomes are stipulated together with learning objectives, teaching methods, and learning activities that emphasize the searching of information related to the chosen topic. Instructional materials and texts will have to be prepared that connect information literacy and course content. Thus, instruction that integrates information literacy is cooperation between the course teacher who is knowledgeable in the content and the librarian who has expertise in information retrieval. Both must have common understanding for the preparation of teaching plans that aim towards assignments and reports in which students have to use their abilities to search information from various sources that concern their studied topic.

Table 2 Factors Affecting at Instructional Management Level

Factors	Score weights	Percent
1. Roles of lecturers	**2,056**	**100.0**
• Teaching students to analyze their needs for information in their given topic	408	19.8
• Providing consultation to students in selecting a topic	382	18.6
• Posing questions for students to connect learning issues to the survey of information resources that support the issues	329	16.0
• Encouraging students to discuss and exchange ideas in information retrieval	271	13.2
• Preparing exercises and assigning work that enable students to seek and use information to answer the questions posed	244	11.9
• Introducing information sources and resources and library services that support students' requirements	170	8.3
• Commenting on the students' self-studies, both the paper's contents and references	144	7.0
• Evaluating the student's learning outcomes on the given assignments especially on the issue of the use of information ethically and legally	108	5.3
2. Roles of librarians	**2,037**	**100.0**
• Introducing information sources and resources and library services that support students' requirements	528	25.9
• Advising and assisting students to plan and set strategies for required information searching	396	19.4
• Teaching students to analyze information requirements in the study topic	326	16.0
• Advising students in selecting needed information	313	15.4
• Advising students in selecting their given topics	300	14.7
• Preparing exercises and assigning work that enable students to seek and use information to answer the questions posed	87	4.3
• Commenting on the students' self-studies, both the paper's contents and references	50	2.5
• Evaluating the student's learning outcomes on the given assignments especially on the issue of the use of information ethically and legally	37	1.8
3. Roles of students	**2,070**	**100.0**
• Seeking information related to their study topic and determined scope	396	19.1
• Surveying information from various sources to set queries on the topic	385	18.6
• Studying and researching by themselves relying on information resources and services provided in the library	382	18.5

• Posing questions related to the learning issues that will assist them to lay the scope of needed information	340	16.4
• Assessing information and its sources and incorporating that into their study topic	160	7.7
• Presenting searched information in the study topic by organizing the content and making references	143	6.9
• Discussing and exchanging ideas and experiences in information searching with peers	138	6.7
• Working on the given assignments by placing the importance on the use of information ethically and legally	126	6.1
4. Perception of lecturers and librarians	**2,026**	**100.0**
• Seeing the importance of information literacy for students and general education courses	486	24.0
• Knowing and understanding the scope of information literacy that assists in forming satisfactory graduates	437	21.6
• Seeing their roles in the development of information literacy of students	328	16.2
• Being able to link information literacy with learning objectives and outcomes of general education courses	310	15.3
• Seeing the importance of cooperation between lecturers and librarians in the instruction of information literacy that is integrated to general education courses	206	10.2
• Evaluating and developing the knowledge and understanding on information literacy of themselves continually	130	6.4
• Being able to link information literacy with the general education course topics and design the learning and teaching activities	129	6.4
5. Cooperation between lecturers and librarians	**1,988**	**100.0**
• Cooperating in preparing and introducing information sources and resources useful for students in their research for their study topics	474	23.8
• Cooperating in constructing teaching supplementary tools for the instruction of information literacy such as websites, videos, etc.	327	16.4
• Cooperating to write teaching plans by taking into account the topics in general education courses that can be linked to information literacy	318	16.0
• Discussing and exchanging ideas and experiences in the searching of information of students	217	10.9
• Cooperating in preparing exercises and assignments in general education topics with an aim to have students seek and use information to answer the questions	208	10.5
• Cooperating in advising the students to use information ethically and legally	174	8.8
• Cooperating in commenting on the students' self-studies, both the paper's contents and references	158	7.9
• Cooperating in constructing the information literacy level test to use for student evaluation	112	5.6
6. Teaching plans	**2,065**	**100.0**
• Establishing the learning objectives that aims to develop students' information literacy by measuring behaviors and learning outcomes that relate to general education courses	493	23.9
• Establishing the teaching processes that aim at students choosing their study topics and analyzing the learning issues until they are able to acquire the needed information	401	19.4
• Establishing teaching methods that are related to the topics in the general education courses and linking the information literacy skills to the course contents	370	17.9
• Establishing outcomes that aim at developing moral and virtue of students in the use of information ethically and legally	261	12.6
• Establishing teaching media with an emphasis on introducing information sources and information resources that link between general education course content and students' assignments	238	11.5

• Establishing the student assignments and their reports resulting from the information seeking and use, which is a part of the general education course evaluation	176	8.5
• Establishing the evaluation methods of the learning outcomes for general education course that emphasize on the development of students' information literacy	126	6.1
7. Learning outcomes	**1,988**	**100.0**
• Students being able to determine their own information retrieval strategies and adjust them to obtain the accurate information	474	23.8
• Students being able to determine characteristics and scope of information that is relevant to their study topics	327	16.4
• Students being able to analyze and synthesize information in order to create new concepts and information	318	16.0
• Students being able to draw the main elements of the obtained information	217	10.9
• Students being able to use information to organize and present their work	208	10.5
• Students having knowledge, and understanding and using information ethically	174	8.8
• Students being able to record and store the acquired information	158	7.9
• Students being able to identify and use the criteria for evaluation of information and information resources	112	5.6
• Students having knowledge and understanding on the use of information ethically and legally	112	5.6
8. Teaching methods	**2,081**	**100.0**
• Small-group teaching to enable students to discuss and exchange opinions and experiences in information searching	319	15.3
• Problem-based or case-study teaching in which students have to acquire and use information to research and solve their topic problems	303	14.6
• Self-learning from research done in libraries and other information sources	285	13.7
• Lecturing which is co-taught by librarians and links information literacy to more general education courses	264	12.7
• Project-based learning that aims at fostering the abilities of students to acquire and use information to research their study topics	260	12.5
• Brainstorming among group members to determine the study topic, and analyzing information requirements, and setting information retrieval strategies	257	12.3
• Demonstration teaching of means of information retrieval	243	11.7
• Field-trip studying at the different learning resources	77	3.7
• Using the program instruction for enhancing students' self-learning	73	3.5
9. Learning activities	**2,058**	**100.0**
• Self-access research and study of group members to survey information sources that present their learning issues	423	20.6
• Brainstorming in students groups to determine their given topics, to analyze information needs, and determine the strategies for information retrieval	356	17.3
• Exercises and assignments based on information searching and use in answering the questions	312	15.2
• Discussion to exchange views and experiences of members in information retrieval	300	14.6
• Practices of information retrieval in computer laboratories	251	12.2
• Questioning and answering on the issues of information seeking, evaluating and use in relations to the course topics	194	9.4
• Writing and presenting the self-study reports by encouraging the discussions and criticisms among the students	159	7.7
• Seeking for suggestions and advices from the librarians on the information seeking and references writing	63	3.1

10. Instructional media	**2,030**	**100.0**
• Teaching materials and textbooks that link information literacy and the content of general education courses	462	22.8
• Supplementary websites that assist in compiling teaching materials, exercises, worksheet, and quizzes that aim at students' searching and using information in answering questions	355	17.5
• Information sources on websites that link the course content and students' study topics	351	17.3
• Videos introducing the library and its services	242	11.9
• Computer laboratories used in information retrieval practices	202	10.0
• Program instructions on the information searching processes, both inside and outside the libraries	178	8.8
• External learning resources relating to the general education course contents and enhancing the students' information literacy	148	7.3
• Computer programs for bibliographical and reference writing, i.e. EndNote	92	4.5
11. Measurement and evaluation of student's learning	**2,039**	**100.0**
• Stipulating criteria for evaluating students' information literacy levels	364	17.9
• Stipulating the conceptual framework that links information literacy and general education course content in order to measure the level of students' information literacy	329	16.1
• Evaluating students' report/research/project regarding organization and referencing	292	14.3
• Evaluating exercises and assignments from searching and using information to answer questions	260	12.8
• Evaluating small group work in determining study topics, analyzing information requirements, and determining retrieval strategies	194	9.5
• Evaluating the discussions and experiences of students on the information searching	171	8.4
• Evaluating the student's information literacy levels, both pretest and posttest	154	7.6
• Evaluating the students' presentation resulting from their self-study	145	7.1
• Evaluating the results of final examination that shows the links between information literacy and course topics	130	6.4

Conclusion

In the integration of information literacy in general education instruction, the important impact at the policy level is the institutional policy and the roles of administrators. Institutional policy governs the implementation on information literacy integration so that the whole institution will follow the same direction. Administrators at the university and faculties/library levels have major roles to build understanding, acceptance, and cooperation in the integration of information literacy in the institution. Their roles also cover the support of the integration of information literacy of the relevant organization and personnel. The policy should spell out student development such that they acquire characteristics of being information literate and life-long learners. Instructional management should stipulate an information literacy course as a general education course for the first year student and integrate information literacy in different courses of the program. Instruction should emphasize student-centered learning and utilize different teaching methods. Students should be assigned to choose their own studied topics

and search information from various sources. Proficiency in information literacy should be measured through a standard test. Administrators at the university and faculties/library levels should stipulate integration of information literacy in general education courses, stipulate a working unit and committee on the teaching and learning who will propel integration of information literacy, support the teaching and co-teaching of relevant individuals, allocate budgets, provide facilities, information technology and communication and learning sources, monitor and follow-up evaluation of teaching and arrange activities to develop knowledge and understanding of information literacy among teaches and librarians.

At the instructional management level, integration of information literacy should obtain cooperation between course lecturers and librarians. Their roles along with teaching techniques and learning activities are significant. Cooperation between lecturers and librarians enables exchange of knowledge and experiences. Lecturers are knowledgeable in the course content and in teaching, whereas librarians have expertise in retrieving information. Working together, understanding of information literacy will be strengthened while student development will be in the same direction. Lecturers and librarians can cooperate in preparing teaching plans, preparing exercises and assignments, preparing information resources relevant to the course and the assignments, and arranging various learning activities. The roles of lecturers and librarians are very important in the teaching and learning that integrates information literacy. The teacher has the important role in stipulating the research topics for students, since the teacher knows the course content and concept and can very well relate the learning topics with the related information. The librarian's important role is in information retrieval by providing students advice for the searching of information related to their studied topics from various sources. In terms of teaching techniques and learning activities, the teaching methods should vary in order to enable students to learn and acquire information literacy skills. Effective teaching methods include small-group teaching, problem-based or case-study teaching, and self-learning, all of which emphasize information retrieval on one's own that are related to the studied topics. Students' brainstorming on the topics to study and doing assignments using different learning styles will emphasize the practice of information retrieval skills and group process skills when they give their opinions in discussion.

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Appendix 1

Interview Questions for the University Administrator

1. General information

Interviewee: _____Position: _____

Date/Time/Place of

2. Interview questions

2.1 The university policy

- What is the primary university policy on teaching and learning?
- What is the university policy on teaching and learning support which aimed for development of graduates' expected qualifications?
- What is the university policy on teaching and learning of general education program?
- What is the university strategic direction for enhancing the students' information literacy skills, and what are the problems of policy implementation?

2.2 The structure & administrative system

- How does the university construct the structure and administrative system for the teaching and learning of general education program, eg. the responsible unit, human resources, monitoring and evaluation processes, etc.?
- How does the university construct the structure and administrative system for students' development in relations to the students' information literacy skills?

2.3 The roles of administrators

- What are the roles of the university administrators, lecturers, and librarians in supporting the general education program teaching and learning activities, and developing the students' information literacy skills?

2.4 The resources and infrastructure

- What are the resources and infrastructures the university has prepared and allocated for the developing and managing the general education program and developing the students' information literacy skills?

2.5 The learning sources and learning support programs

- What are the learning sources and learning support programs the university has supported and provided for managing the general education program and developing the students' information literacy skills?

2.6 The development & evaluation of lecturers

- What are the criteria for development and evaluation of lecturers in relations to their teaching performances, and what is the alignment of the criteria with the teaching of general education courses and development of students' information literacy skills?

Appendix 2

Questionnaire for Lecturers and Librarians

Part I - Information of the respondent

1. Sex ☐ Male ☐ Female
2. Age ☐ < 31 years old ☐ 31-40 years old ☐ 41-50 years old
   ☐ 51-60 years old ☐ > 60 years old
3. Education
   ☐ Bachelor's degree ☐ Master's degree ☐ Doctoral degree
   ☐ Other (Please specify) _____
4. Position/Job
   ☐ Lecturer ☐ Librarian

Part II – Factors affecting the integration of information literacy in the teaching and learning processes of general education courses

Please respond to the following questions by giving the number 1 or 2, 3, 4, 5 (only 5 ranks) in front of the items in each main factor which you rank the most important sub-factor and the next important sub-factors that affect the integration of information literacy in the teaching and learning processes of general education courses respectively.

Main Factor 1 - Roles of lecturers

_____ 1)Teaching students to analyze their needs for information in their given topic

_____ 2)Providing consultation to students in selecting a topic

_____ 3)Posing questions for students to connect learning issues to the survey of information resources that support the issues

_____ 4)Encouraging students to discuss and exchange ideas in information retrieval

_____ 5)Preparing exercises and assigning work that enable students to seek and use information to answer the questions posed

_____ 6)Introducing information sources and resources and library services that support students' requirements

_____ 7)Commenting on the students' self-studies, both the paper's contents and references

_____ 8)Evaluating the student's learning outcomes on the given assignments especially on the issue of the use of information ethically and legally

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Main Factor 2 - Roles of librarians

_____ 1)Introducing information sources and resources and library services that support students' requirements

_____ 2)Advising and assisting students to plan and set strategies for required information searching

_____ 3)Teaching students to analyze information requirements in the study topic

_____ 4)Advising students in selecting needed information

_____ 5)Advising students in selecting their given topics

_____ 6)Preparing exercises and assigning work that enable students to seek and use information to answer the questions posed

_____ 7)Commenting on the students' self-studies, both the paper's contents and references

_____ 8)Evaluating the student's learning outcomes on the given assignments especially on the issue of the use of information ethically and legally

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Main Factor 3 - Roles of students

_____ 1)Seeking information related to their study topic and determined scope

_____ 2)Surveying information from various sources to set queries on the topic

_____ 3)Studying and researching by themselves relying on information resources and services provided in the library

_____ 4)Posing questions related to the learning issues that will assist them to lay the scope of needed information

_____ 5)Assessing information and its sources and incorporating that into their study topic

_____ 6)Presenting searched information in the study topic by organizing the content and making references

_____ 7)Discussing and exchanging ideas and experiences in information searching with peers

_____ 8)Working on the given assignments by placing the importance on the use of information ethically and legally

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Main Factor 4 - Perception of lecturers and librarians

_____ 1)Seeing the importance of information literacy for students and general education courses

_____ 2)Knowing and understanding the scope of information literacy that assists in forming satisfactory graduates

_____ 3)Seeing their roles in the development of information literacy of students

_____ 4)Being able to link information literacy with learning objectives and outcomes of general education courses

_____ 5)Seeing the importance of cooperation between lecturers and librarians in the instruction of information literacy that is integrated to general education courses

_____ 6)Evaluating and developing the knowledge and understanding on information literacy of themselves continually

_____ 7)Being able to link information literacy with the general education course topics and design the learning and teaching activities

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Main Factor 5 - Cooperation between lecturers and librarians

_____ 1)Cooperating in preparing and introducing information sources and resources useful for students in their research for their study topics

_____ 2)Cooperating in constructing teaching supplementary tools for the instruction of information literacy such as websites, videos, etc.

_____ 3)Cooperating to write teaching plans by taking into account the topics in general education courses that can be linked to information literacy

_____ 4)Discussing and exchanging ideas and experiences in the searching of information of students

_____ 5)Cooperating in preparing exercises and assignments in general education topics with an aim to have students seek and use information to answer the questions

_____ 6)Cooperating in advising the students to use information ethically and legally

_____ 7)Cooperating in commenting on the students' self-studies, both the paper's contents and references

_____ 8)Cooperating in constructing the information literacy level test to use for student evaluation

Main Factor 6 - Teaching plans

_____ 1)Establishing the learning objectives that aims to develop students' information literacy by measuring behaviors and learning outcomes that relate to general education courses

_____ 2)Establishing the teaching processes that aim at students choosing their study topics and analyzing the learning issues until they are able to acquire the needed information

_____ 3)Establishing teaching methods that are related to the topics in the general education courses and linking the information literacy skills to the course contents

_____ 4)Establishing outcomes that aim at developing moral and virtue of students in the use of information ethically and legally

_____ 5)Establishing teaching media with an emphasis on introducing information sources and information resources that link between general education course content and students' assignments

_____ 6)Establishing the student assignments and their reports resulting from the information seeking and use, which is a part of the general education course evaluation

_____ 7)Establishing the evaluation methods of the learning outcomes for general education course that emphasize on the development of students' information literacy

Main Factor 7- Learning outcomes

_____ 1)Students being able to determine their own information retrieval strategies and adjust them to obtain the accurate information

_____ 2)Students being able to determine characteristics and scope of information that is relevant to their study topics

_____ 3)Students being able to analyze and synthesize information in order to create new concepts and information

_____ 4)Students being able to draw the main elements of the obtained information

_____ 5)Students being able to use information to organize and present their work

_____ 6)Students having knowledge, and understanding and using information ethically

_____ 7)Students being able to record and store the acquired information

_____ 8)Students being able to identify and use the criteria for evaluation of information and information resources

_____ 9)Students having knowledge and understanding on the use of information ethically and legally

Main Factor 8 - Teaching methods

_____ 1)Small-group teaching to enable students to discuss and exchange opinions and experiences in information searching

_____ 2)Problem-based or case-study teaching in which students have to acquire and use information to research and solve their topic problems

_____ 3)Self-learning from research done in libraries and other information sources

_____ 4)Lecturing which is co-taught by librarians and links information literacy to more general education courses

_____ 5)Project-based learning that aims at fostering the abilities of students to acquire and use information to research their study topics

_____ 6)Brainstorming among group members to determine the study topic, and analyzing information requirements, and setting information retrieval strategies

_____ 7)Demonstration teaching of means of information retrieval

_____ 8)Field-trip studying at the different learning resources

_____ 9)Using the program instruction for enhancing students' self-learning

Main Factor 9 - Learning activities

_____ 1)Self-access research and study of group members to survey information sources that present their learning issues

_____ 2)Brainstorming in students groups to determine their given topics, to analyze information needs, and determine the strategies for information retrieval

_____ 3)Exercises and assignments based on information searching and use in answering the questions

_____ 4)Discussion to exchange views and experiences of members in information retrieval

_____ 5)Practices of information retrieval in computer laboratories

_____ 6)Questioning and answering on the issues of information seeking, evaluating and use in relations to the course topics

_____ 7)Writing and presenting the self-study reports by encouraging the discussions and criticisms among the students

_____ 8)Seeking for suggestions and advices from the librarians on the information seeking and references writing

Main Factor 10 - Instructional media

_____ 1)Teaching materials and textbooks that link information literacy and the content of general education courses

_____ 2)Supplementary websites that assist in compiling teaching materials, exercises, worksheet, and quizzes that aim at students' searching and using information in answering questions

_____ 3)Information sources on websites that link the course content and students' study topics

_____ 4)Videos introducing the library and its services

_____ 5)Computer laboratories used in information retrieval practices

_____ 6)Program instructions on the information searching processes, both inside and outside the libraries

_____ 7)External learning resources relating to the general education course contents and enhancing the students' information literacy

_____ 8)Computer programs for bibliographical and reference writing, i.e. EndNote

Main Factor 11 - Measurement and evaluation of student's learning

_____ 1)Stipulating criteria for evaluating students' information literacy levels

_____ 2)Stipulating the conceptual framework that links information literacy and general education course content in order to measure the level of students' information literacy

_____ 3)Evaluating students' report/research/project regarding organization and referencing

_____ 4)Evaluating exercises and assignments from searching and using information to answer questions

_____ 5)Evaluating small group work in determining study topics, analyzing information requirements, and determining retrieval strategies

_____ 6)Evaluating the discussions and experiences of students on the information searching

_____ 7)Evaluating the student's information literacy levels, both pretest and posttest

_____ 8)Evaluating the students' presentation resulting from their self-study

_____ 9)Evaluating the results of final examination that shows the links between information literacy and course topics