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**Level of Information Literacy among
Upper-Secondary School Students in
Thailand and the Problems They Encounter**

Chumchit Saechan *

Associate Professor

E-mail : chumchit.s@psu.ac.th

Vorasiri Siriwiapat

Supervisor

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Chumchit Saechan^{a*} Vorasiri Siriwipat^b

Abstract

The research work described in this paper investigated the information literacy (IL) level of upper-secondary students in the southernmost provinces of Thailand and the problems that they encounter with respect to IL. Data were collected from a sample comprising of 390 students, who were selected by employing stratified random sampling. The research instruments included an IL test and a questionnaire concerning the problems encountered pertaining to IL. The data were analyzed based on percentages, means, and standard deviations. Moreover, significant differences were tested using t-tests, F-tests and a Scheffé test. The results revealed that, overall, the students' average level of IL, based on the seven standards, was at the Pass level. However, some students demonstrated Fail level of IL in Standard 3 (able to analyze, evaluate, and select the information required), as well as Standard 7 (have knowledge and the necessary skills to use ICT). Overall, the students encountered problems pertaining to IL at a moderate level. All variables, including sex, stream of study, GPA, and school location, affected the students' level of IL. However, only school location significantly impacted problems pertaining to IL. The researchers propose that teaching and learning activities should be redesigned utilizing collaborative teaching involving teachers, librarians, and ICT personnel in order to enhance students' IL. The Educational Supervisory Unit and the administrators of upper-secondary schools should set guidelines/standards for providing modern ICT equipment to students, which they can use in classrooms, libraries, and computer rooms.

Keywords: Information literacy, Southernmost Thailand, High school students, Library Science, Assessment, Problems of information literacy

Introduction

The need for people to be able to function effectively in a knowledge-driven society and to cope with continuous social, economic, and technological change has triggered an array of arguments about the competencies people require to have a successful life and career in the 21st century. The European Council

^a Assistant Professor, Department of Library and Information Science, Prince of Songkla University, Pattani, Thailand

^b Supervisor, Pattani Primary Educational Area Office, Pattani, Thailand

*Principal author for all correspondence. E-mail: chumchit.s@psu.ac.th

and the European Parliament have adopted a framework of key competencies necessary for lifelong learning. The framework identifies and defines the key competencies that citizens need for ensuring personal fulfillment, social inclusion, active citizenship, and employability in a knowledge-driven society. The framework includes competence in “traditional” subjects, such as mother-tongue literacy, numeracy, and knowledge of foreign languages, science, and technology. Furthermore, it covers other competencies such as learning to learn, digital competence, social and civic competence, initiative-taking, entrepreneurship, cultural awareness, and self-expression (European Commission, 2017).

The American Library Association (ALA, 2017) states that “literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society.” Correia (2002) suggests that literacy is active and effective, and it promotes responsible citizenship, while Boekhorst (2003) adds the aspect of self-actualization and Bundy (2004) gives importance to social responsibility in this regard. These competencies are referred to as “information literacy” (IL) in library science. Proponents of IL believe that it is the most critical kind of literacy for the 21st century, which is of utmost importance for the realization of not only most personal, academic, and professional goals but also for economic development. The Association of College and Research Libraries (ACRL, 2000) highlights IL as an educational goal that is “common to all disciplines, to all learning environments, and to all levels of education.” Moreover, it is an important factor in the workplace and is perceived to be an ongoing process that should be facilitated throughout one’s life (Boekhorst, 2003).

In modern society, every individual requires an increasingly sophisticated set of competencies in order to find, handle, and use information effectively. Facilitating the development of IL, as an essential competency in the 21st century, is therefore a task of the utmost importance. It has also created a need for a reconceptualization of the roles and responsibilities of professionals involved with libraries and imparting information in a new learning environment (Virkus, 2006). Librarians have always endeavored to assist library users to develop the ability of locating and finding information. However, in an increasingly complex information environment, students are presented with diverse and abundant choices with regard to sources of information that is “available in different forms, places, and increasingly in unfiltered forms and in uncertain quality” (Wilson, 2001, p. 2). Students have been found to possess insufficient IL in a series of studies (Centre for Information Behaviour and the Evaluation of Research, British Library, & Joint Information Systems Committee, 2008; Cole & Kelsey, 2004; Hepworth, 1999; Lonsdale et al., 2003; Pejova, 2002; Ray & Day, 1998; Stern, 2003).

The southernmost region of Thailand is located near Malaysia, which covers five provinces, including Narathiwat, Yala, Pattani, Satun, and Songkla. Majority of the population in this area comprises of Muslims. There are various kinds of schools that students can attend, but based on the Muslim way of life, the most popular ones in this region are Islamic private schools. Additionally, a number of studies have revealed low educational quality to be a major problem in this area, which includes an inefficacious learning process owing to a severe lack of effective communication, analytical thinking, teaching personnel, and cultural diversity (Farrungsang, Uttayawalee, Sungtong, & Haji-Awang, 2011; Wae-u-sengn, 2013).

Hence, the study concerning upper-secondary school students' IL and the problems they encounter in developing their IL is necessary, in order to improve the educational quality and management. This is exceedingly important, as it contributes to the limited knowledge available about IL of upper-secondary school students. Furthermore, empowering students by developing their IL is an important way of enhancing their ability to live in a global community, and this research will help teachers and librarians prepare their students to use information for supporting their studies appropriately.

Objectives of the Study

The primary objectives of the study were as follows:

1. Investigate the IL level of upper-secondary students in the southernmost provinces of Thailand.
2. Examine the problems that upper-secondary students studying in the southernmost provinces encounter with respect to IL development.
3. Analyze the students' level of IL and the problems that they encounter, by taking other variables into consideration, namely sex, stream of study, GPA, and school location.

Hypotheses

This research set out to test the following hypotheses:

1. The level of IL of upper-secondary students in the southernmost provinces of Thailand would differ based on the following variables: sex, stream of study, GPA, and school location.
2. The problems concerning IL encountered by upper-secondary students studying in the southernmost provinces would differ based on the following variables: sex, stream of study, GPA, and school location.

Literature Review

Many definitions and concepts pertaining to IL have been offered by different information organizations and professionals. According to ACRL (2000), IL is a set of abilities that require individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” On the other hand, according to Doyle (1994), IL is an intellectual framework employed for understanding, finding, and evaluating information and implies the ability to access, evaluate, and use information from a variety of sources; it also involves one’s ability to recognize when information is needed and know the way to learn. UNESCO (2016) suggests that IL “empowers people in all walks of life to seek, evaluate, use, and create information effectively to achieve their personal, social, occupational, and educational goals. It is a basic human right in a digital world and promotes social inclusion in all nations.”

Information literacy level and variables concerning upper-secondary school students

While many upper-secondary school students profess to be confident in at least a few aspects of IL (Herring, 2009; Latham & Gross, 2008), in reality, when their IL skills are tested or assessed in college, the majority of them receive poor scores or fail to acquire passing marks (Maughan, 2001). In their study, Smith, Given, Julien, Ouellette, and DeLong (2013) found that the IL skills of upper-secondary school students were insufficient, as they lacked skills that are required to effectively and efficiently complete undergraduate course work. Several students were unable to demonstrate sophisticated information searching and critical evaluation skills (Julien & Barker, 2009). Furthermore, Adams (1999) found that upper-secondary school students faced difficulty in evaluating information while writing their science assignments. While Brem, Russell, and Weems (2001) discovered that upper-secondary school students could not decide on the reliability and correctness of websites, Brill, Falk, and Yarden (2004) found that upper-secondary school students studying biology read through science documents superficially, without thinking about them intently or analyzing their content. In addition, Heinstrom (2006) found that most students tended to ascertain the relevance of information based on easy accessibility and regarded only superficial criteria for considering information. Head and Eisenberg (2009), along with Denison and Montgomery (2012), found that the participants of their study encountered difficulties while conducting their research and expressed their frustration concerning the information search process, especially in the digital age.

The findings of Chang et al. (2012), who studied IL skills of students studying in secondary schools in Singapore, asserted that students needed to

develop their skills in order to use, synthesize, and evaluate information. A case study of a secondary school in Hong Kong revealed certain significant findings stating that the strength pertaining to students' IL was the ability to identify potential sources of information, whereas the weakness was the ability to use information responsibly and ethically (Chu, Yeung, & Chu, 2012). Furthermore, a study of Kuwaiti upper-secondary school students found that the majority of students lacked skills with regard to catalog searching as well as use and selection of information sources (Rehman & Alfaresi, 2009).

The literature available worldwide revealed that demographic differences exert an influence on the use of information (Martin, 2011). Liu and Sun's (2012) findings revealed that males were better off than females regarding certain aspects concerning IL, namely information consciousness, information competence, and information ethics. Certain studies also indicate a connection between IL and students' performance as well as academic achievement. Levels of information competency are associated with higher GPAs and both short-term and long-term students' success (Cameron, Wise, & Lottridge, 2007; Glendale Community College, 2007; Katz et al., 2008). Foo et al. (2014) indicated that the types of schools and academic streams of study seemed to exert significant influences on IL. Harrison and Newton's (2010) research concluded that a strong relationship existed between performance of IL skills and students' academic performance throughout their degree program. One's intelligence or cognitive ability is considered to be the most significant indicator of academic success (Jensen, 1998; Kuncel, Ones, & Hezlett, 2001; Mayer, 2011). Some researchers argue that information searching requires the same set of skills to a certain extent at least, which is measured by common intelligence tests, including several analytical ones (Lenox & Walker, 1993).

Research findings, concerning IL assessment of school students and undergraduate students in Thailand, found that the existent levels of IL were different; overall, they were moderate (Maitongthong, 2011). With respect to IL of upper-secondary school students, in terms of information retrieval, information use, information evaluation, and their ability to access information, it was found that each was different. However, they were mostly measured to be at the moderate level (Busabung, 2007; Cheunwinya, 2011; Dourungkul, 1997; Saengsoda, 2010). Moreover, it is important to note that Songsaengchan, Chansawang, and Prapinpongsakorn (2008) determined that female students had a higher IL level than male ones.

Problems pertaining to promoting information literacy

Most teachers agreed that IL was extremely important for students. Information literacy helps students attain lifelong learning; it also helps them

to learn on their own in a better manner. Thus, students do require IL skills (Aroonsri, Loipha, & Vongprasert, 2014). Studies addressing the problems encountered when promoting IL asserted that teaching and learning IL in schools was not available as a course (Cheunwinya, 2011). Integration of IL into each subject course is necessary and of utmost importance (Aroonsri et al., 2014). The findings of Pakhathirathien and Siriwipat (2012) indicate that students from the three southernmost provinces of Thailand experienced moderate-level problems when using the Internet. Moreover, in their opinion, not enough computers were available, and they experienced problems while accessing the Internet.

To summarize, IL of upper-secondary school students preparing to enroll in colleges is important. However, poor research skills still seem to be the norm not only in Thailand but also throughout the world. In addition, while promoting IL, most schools in Thailand experience problems with respect to internet access, and no educational courses on IL are available.

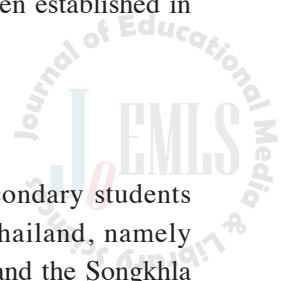
Conceptual Framework

Numerous professional organizations have developed standards and rubrics, which offer a framework to those who are involved in teaching information skills. These include ACRL and the American Association of School Librarians (AASL), which makes use of “Standards for the 21st Century Learner” (American Association of School Librarians [AASL], 2017). Furthermore, Sacchanand’s study (2011) concerning Thailand suggested six standards and indicators of IL for Thai students, which are as follows: 1) Students perceive the importance and necessity of information; 2) Students are aware of various sources of information and capable of using information retrieving tools; 3) Students can analyze, evaluate, and select the information that they need; 4) Students have the ability to compile, organize, and synthesize information; 5) Students are able to use information to produce and present their work; 6) Students are moral, obey laws, and possess a sense of social responsibility pertaining to information. In addition, the Ministry of Education, Thailand (2008) has issued technology standards and indicators for upper-secondary students. Overall, the standard for IL and problems pertaining to IL for upper-secondary students have been established in the conceptual framework of this research, as illustrated below.

Method

Participants

The population of this study included 16,228 upper-secondary students studying in schools located in five southern provinces of Thailand, namely Narathiwat (4,349), Yala (3,719), Pattani (6,020), Satun (950), and the Songkhla



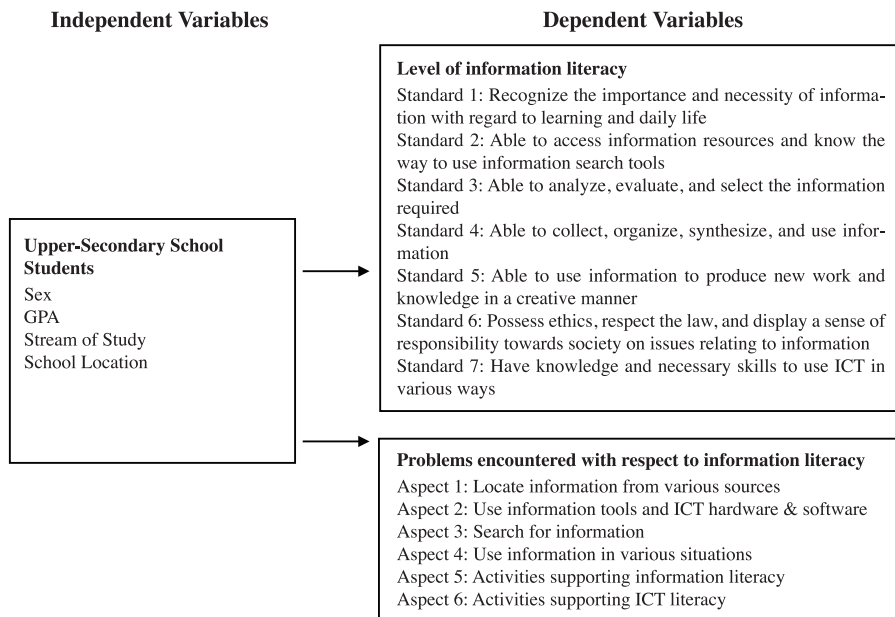


Figure 1 Conceptual Framework of Upper-Secondary School Students: Variables, Levels of IL, and Problems Encountered Concerning IL

districts of Thapa, Jana, Nathavee, and Sabayoi (1,190). One sample included 390 students, where the sample’s size was determined using Yamane’s formula; it was selected by stratified simple random sampling, according to the students’ province, sex, GPA, stream of learning, based on the ratio of the population.

Instruments

Data were collected using two research instruments, namely an IL test and a questionnaire, which were designed according to the Indicator of Information Literacy of Thai Students (Sacchanand, 2011) and the Indicator of ICT for Upper-Secondary Students (refer to Figure 1 for details; Ministry of Education, Thailand, 2008). The IL test provided four multiple-choice options for each question and contained a total of 56 items, covering seven standards; there were eight items in each standard.

The questionnaire collected demographic information relevant to the variables of interest to the study and the problems pertaining to IL, which were collected according to the information obtained from the reviewed literature and suggestions from experts. Subsequently, they were divided into six aspects, which are as follows: locating information from various sources, using information tools and ICT hardware and software, searching for information, utilizing information in various situations, activities supporting IL, and activities supporting ICT literacy.

In each aspect, five items were included, to form a total of 30 items. The Likert 5-point rating scale (5 = very high, 4 = high, 3 = moderate, 2 = low, 1 = very low) was employed to determine the level of the problems encountered by students pertaining to IL.

These two research instruments were checked for content validity by six experts: four from a university, one from a school, and one from the Educational Supervisory Unit. In order to determine the validity of this study, the Cronbach method was employed with respect to the IOC (Index of Consistency); an item with scores between 0.5-1.00 was accepted, an item with scores lower than 0.5 was deleted. Subsequently, the instruments were tested for reliability by 40 students, who were not included in the sample of this study. The reliability of the instruments was analyzed by α -Coefficient; the instruments' total reliability was calculated to be 0.93.

Data collection and analysis

The researchers contacted school administrators and requested for their participation and permission to conduct the research, following which they administered the IL test and questionnaire with assistance from the assigned class teacher. Data from the 390 participants were analyzed using SPSS Statistics, a software for conducting statistical analysis, according to the research objectives. The descriptive statistics that were used included percentages, means, and standard deviations, while t-tests, F-tests, and a Scheffé test were employed to check for significant differences in the data. To ascertain a clear finding, the very high, high, moderate, low, and very low levels of IL problems from the questionnaire were grouped to form three levels: low, moderate, and high, using absolute criteria to justify the mean score of the IL problems.

Data from the test were checked and collected. Each correct answer added one point to the score, while a wrong answer added zero points. Two criteria were used to interpret the scores obtained from the test and the level of IL. Furthermore, five levels of IL were set up to categorize the sample, and the level of scores from 0-56 and 0-8 was calculated according to the five levels. The first criterion was concerned with the overall seven standards of IL (all 56 items in the test), and the second one included each of the seven standards (eight items each), which have been provided in the table below. Moreover, the data obtained from the questionnaire were thoroughly analyzed.

Results

In this section, the findings and discussions of the research have been presented in the following five parts: 1) sample demographics, 2) information literacy level of upper-secondary students in schools, 3) problems pertaining to

Table 1 Criteria Used to Justify the Scores Obtained from the Test Conducted for Ascertaining All Seven Standards of IL and Each of the Seven Standards Individually

Score		Level of information literacy
I. Seven standards of information literacy (all 56 items)	II. Each of the seven standards individually (8 items each)	
44.8-56.0	6.4-8.0	Excellent
39.2-44.7	5.6-6.3	Good
33.6-39.1	4.8-5.5	Fair
28.0-33.5	4.0-4.7	Pass
0-27.9	0-3.9	Fail

information literacy encountered by upper-secondary students studying in schools located in the southernmost provinces, 4) hypotheses tests, 5) opinions of and suggestions from the upper-secondary school students, concerning information literacy, obtained from the open-ended section of the questionnaire.

Sample Demographics

The demographic characteristics of the sample revealed that 70% of the students in schools were female, whereas the males constituted only 30% of the sample population. Their GPA levels were as follows: Excellent (12.3%), Good (63.9%), and Fair (23.8%); 80% students studied in the science-mathematics stream, while 20% studied in the arts stream; 37.2% students studied in schools located in the province Pattani, 26.7% in Narathiwat, 22.8% in Yala, 5.9% in Satun, and 7.4% in Songkhla (see Table 2).

Table 2 Sample Demographics

Sample Demographics		No.	Percentage
Sex	Total	390	100.00
	Male	117	30.0
	Female	273	70.0
Stream of study	Science-mathematics	312	80.0
	Arts	78	20.0
GPA	Excellent (3.01-4.00)	48	12.3
	Good (2.01-3.00)	249	63.9
	Fair (1.01-2.00)	93	23.8
Province (school location)	Narathiwat	104	26.7
	Pattani	145	37.2
	Yala	89	22.8
	Satun	23	5.9
	Songkhla	29	7.4

Information literacy level of upper-secondary school students

The primary finding with regard to the students' IL was that overall, as

shown in Table 3, among the seven standards, most students achieved a Pass level (average score 31.45 out of 56). Based on each standard, they achieved a Pass level in Standard 1: Able to recognize the importance and necessity of information in learning and daily life (average score 4.34) and in Standard 6: Possess ethics, respect the law, and display a sense of responsibility towards society on issues pertaining to information (average score 4.15). The students achieved a Moderate level in Standard 4: Able to collect, organize, synthesize, and use information (average score 4.96), and Standard 5: Able to use information to produce new work and knowledge in a creative manner (average score 4.83). Furthermore, they achieved a Good level in Standard 2: Able to access information resources and possess knowledge about the way to use information search tools (average score 5.92).

However, for Standard 3: Able to analyze, evaluate, and select the information required, the average score was only 3.93, which represents the Fail level. The students in this study also achieved the Fail level in Standard 7: Have knowledge and necessary skills to use ICT in various ways (average score 3.33) (refer to Table 3).

Table 3 IL of Upper-Secondary School Students, Overall and in Each Standard n = 390

Level of information literacy	Mean	S.D.	Level
Total	31.45	5.76	Pass
Standard 1: Recognize the importance and necessity of information in learning and daily life	4.34	1.30	Pass
Standard 2: Able to access information resources and know the way to use information search tools	5.92	1.58	Fair
Standard 3: Able to analyze, evaluate, and select the information required	3.93	1.26	Fail
Standard 4: Able to collect, organize, synthesize, and use information	4.96	1.46	Moderate
Standard 5: Able to use information to produce new work and knowledge in a creative manner	4.83	1.66	Moderate
Standard 6: Possess ethics, respect the law, and display a sense of responsibility towards society on issues pertaining to information	4.15	1.64	Pass

Standard 7: Have knowledge and necessary skills to use ICT in various ways	3.33	1.20	Fail
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Problems pertaining to information literacy of upper-secondary school students

Overall, the students encountered problems concerning information literacy at a moderate level (Mean, 2.69). They faced problems in Aspect 1: Locate information from various sources, Aspect 2: Use information tools and ICT hardware and software, Aspect 3: Search for information, Aspect 4: Use information in various situations, Aspect 5: Activities supporting IL, and Aspect 6: Activities supporting ICT literacy, at a moderate level (see Table 4).

Table 4 Problems Concerning IL of Upper-Secondary School Students, Overall and in Each Aspect n = 390

Problems concerning information literacy	Mean	S.D.	Level
Overall	2.69	0.76	Moderate
Aspect 1: Locate information from various sources	2.51	0.79	Moderate
Aspect 2: Use information tools and ICT hardware & software	2.91	0.97	Moderate
Aspect 3: Search for information	2.71	0.97	Moderate
Aspect 4: Use information in various situations	2.46	0.95	Moderate
Aspect 5: Activities supporting information literacy	2.70	0.99	Moderate
Aspect 6: Activities supporting ICT literacy	2.83	1.07	Moderate

Hypotheses tests

1. Levels of information literacy and variables

The levels of overall IL were compared on the basis of the variable sex, which found that there were significant differences at the 0.001 level; female students had higher levels of IL than male students. In Standard 1 and Standard 7, it was found that no differences existed between the two groups. However, in Standard 2, 3, 4, 5, and 6, it was found that there was a significant difference at the 0.001 level.

The levels of overall IL were compared based on the variable stream of study, which revealed that a significant difference was present at the 0.05 level; students in the science-mathematics stream depicted higher levels of IL than art students. In Standard 2, 3 and 7, no significant differences were found between the two groups. However, in Standard 1, 4, 5, and 6, a significant difference was identified at the 0.05 level.

Furthermore, the levels of overall IL were compared based on the variable GPA, which demonstrated that there was a significant difference at the 0.05 level; students with different GPAs had different levels of IL. In Standard 3, no difference was found. However, in Standard 1, 2, 4, 5, 6, and 7, a significant difference was identified at the 0.05 level. The students who had GPA at the

Table 5 Results of Comparison between the Overall Level of IL, Sex, and Stream of Study

Standard	Variables	N	\bar{X}	S.D.	t	Sig
Overall	Sex	390	31.45	5.76	3.95	0.000***
	Male	117	29.56	6.59		
	Female	273	32.26	5.17		
Standard 3	Male	117	3.57	1.36	3.74	0.000***
	Female	273	4.08	1.18		
Standard 4	Male	117	4.62	1.61	3.06	0.002**
	Female	273	5.10	1.36		
Standard 5	Male	117	4.31	1.70	4.16	0.000***
	Female	273	5.05	1.59		
Standard 6	Male	117	3.85	1.71	2.33	0.020**
	Female	273	4.27	1.59		
Overall	Stream of study	390	5.10	1.36		
	Science-math	312	31.98	5.28	3.12	0.002**
	Art	78	29.33	7.01		
Standard 1	Science-math	312	4.41	1.28	2.30	0.022**
	Art	78	4.04	1.34		
Standard 4	Science-math	312	5.06	1.39	2.86	0.004**
	Art	78	4.54	1.62		
Standard 5	Science-math	312	4.98	1.53	3.03	0.003**
	Art	78	4.24	1.99		
Standard 6	Science-math	312	4.23	1.64	1.99	0.048*
	Art	78	3.82	1.59		

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ **Table 6 Results of Comparison between the Overall Level of IL and GPA**

Standard	Variables	Total of variation	df	SS	MS	F	Sig
Overall	GPA	Between groups	2	1,355.39	667.70	22.71	0.000***
		Within group	387	1,549.18	29.84		
		Total	389	2,904.57			
Standard 1		Between groups	2	22.28	11.14	6.81	0.001***
		Within group	387	633.04			
		Total	389	655.32			
Standard 2		Between groups	2	26.84	13.42	5.46	0.005**
		Within group	387	950.53	2.46		
Standard 4		Between groups	2	43.73	21.86	10.84	0.000***
		Within group	387	780.53	2.02		
Standard 5		Between groups	2	72.23	36.11	13.97	0.000***
		Within group	387	1,000.60	2.59		
Standard 6		Between groups	2	37.27	18.64	7.17	0.001***
		Within group	387	1,006.10	2.60		
Standard 7		Between groups	2	18.97	9.49	6.76	0.001***
		Within group	387	543.02	1.40		

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Excellent and Good level showed higher levels of IL compared to the students who had GPA at the Fair level, with significant differences at the 0.05 level.

Subsequently, the levels of overall IL were compared based on the variable school location, which revealed that there was a significant difference at the 0.05 level; students from Narathiwat had higher levels of IL than students from Yala and Pattani. Moreover, the students from Yala had lower levels of IL than the students from Satun and Songkhla, with a significant difference at the 0.05 level.

Table 7 Results of Comparison between the Overall Level of IL and School Location

Standard	Variables	Total of variation	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Sig
Overall	School location	Between groups	4	783.37	95.84	6.22	0.000***
		Within group	385	2,121.21	32.48		
		Total	389	12,904.57			
Standard 1		Between groups	4	31.42	7.86	4.85	0.001***
		Within group	385	623.90	1.62		
		Total	389	655.32			
Standard 2		Between groups	4	56.02	14.01	5.85	0.000***
		Within group	385	921.35	2.39		
		Total	389	977.37			
Standard 4		Between groups	4	27.97	6.99	3.38	0.010**
		Within group	385	796.29	2.07		
		Total	389	824.26			
Standard 5		Between groups	4	38.18	9.55	3.55	0.007**
		Within group	385	1,034.65	2.69		
		Total	389	1,072.83			
Standard 7		Between groups	4	14.98	3.75	2.64	0.034*
		Within group	385	547.01	1.42		
		Total	389	561.99			

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

2. Problems pertaining to information literacy and variables

With regard to problems pertaining to IL, based on the following variables: sex, stream of study, and GPA, it was found that no significant differences existed at the 0.05 level. However, a significant difference was present at the 0.001 level based on the variable school location; the students from Narathiwat faced higher level of problems concerning information literacy compared to the students from Yala. The students from Pattani had higher level of problems concerning IL than the students from Yala and Songkhla.

Opinions of and suggestions from upper-secondary school students, concerning information literacy, obtained from the open-ended section of the questionnaire

There were 54 topics of opinions and suggestions from the upper-secondary school students, and 184 frequencies were included in this section. The ten most frequent problems highlighted by students with respect to developing IL were as follows: 1) Not enough computers with internet access for students, 2) Poor

Table 8 Results of Testing Paired Groups of Overall Problems Pertaining to IL and School Location

School Location	\bar{X}	Differences between the Mean				
		Narathiwat	Pattani	Yala	Satun	Songkhla
Narathiwat	2.73	—	-0.11	0.30*	-0.05	0.33
Pattani	2.84		—	0.41***	0.06	0.44*
Yala	2.43			—	0.35	0.03
Satun	2.79				—	0.38
Songkhla	2.41					—

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Internet and Wi-Fi signal, 3) Limited time for internet and Wi-Fi access; books not up-to-date, 4) No earphones available, 5) No loudspeakers available, 6) Not enough books available, 7) Small libraries without enough rooms, 8) Not enough workshops conducted on new computer programs, 9) Not enough scanners; plenty of report assignments, 10) Faced difficulties searching OPAC; sufficient book exhibition not available.

Table 9 Number, Percentage, and Rank of Opinions and Suggestions on Problems Pertaining to IL

Topics of problems pertaining to IL	Frequency	Percentage	Rank
Not enough computers with internet access available for students	15	8.15	1
Poor Internet and Wi-Fi signal	14	7.60	2
Limited time for internet and Wi-Fi access	11	5.97	3
Books not up-to-date	11	5.97	3
No earphones available	10	5.43	4
No loudspeakers available	9	4.84	5
Not enough books available	8	4.34	6
Small libraries without enough rooms	7	3.80	7
Not enough workshops conducted on new computer programs	6	3.26	8
Not enough scanners	5	2.71	9
Plenty of report assignments	5	2.71	9
Difficulties operating OPAC	4	2.17	10
Sufficient book exhibition not available	4	2.17	10

Conclusion

Conclusion and discussion

The results of this study indicate that upper-secondary school students in the southernmost province of Thailand lack abilities in Standard 3: Able to analyze, evaluate, and select the information needed and in Standard 7: Possess knowledge and necessary skills to use ICT. This is similar to the findings of Foo et al. (2014) who studied IL skills in secondary schools in Singapore, arriving at the conclusion that the students needed to develop their skills to use and evaluate information.

Furthermore, studies from western countries also showed that students studying in secondary schools lacked the skills pertaining to evaluating information. Adams (1999) found that upper-secondary school students faced difficulties in evaluating information while writing science assignments, whereas Brem et al. (2001) revealed that upper-secondary school students could not decide on the reliability and correctness of websites. Brill et al. (2004) found that upper-secondary school students studying biology read science documents superficially, without thinking about them intently or analyzing their content, and Heinström (2006) found that most students tended to ascertain the relevance of information based on easy accessibility and used only superficial criteria for considering information.

The students, overall, experienced problems concerning IL at a moderate level. To elaborate, they faced problems at a moderate level in Aspect 1: Locate information from various sources, Aspect 2: Use information tools and ICT hardware and software, Aspect 3: Search for information, Aspect 5: Activities supporting IL, and Aspect 6: Activities supporting ICT literacy. The five most frequently mentioned problems pertaining to developing the students' IL were as follows: 1) Not enough computers for students, 2) Poor Internet and Wi-Fi signal, 3) Limited time for internet and Wi-Fi access; books not up-to-date, 4) No earphones available, and 5) No loudspeakers available. Clearly, the problems most frequently identified by students with respect to developing IL concerned technological equipment, showing that the students were alert to the advantages of technology, had positive attitudes, and wanted to use it. According to Parang, Raine, and Stevenson (2000), IL involved the integration of several concepts, such as library literacy, computer literacy, media literacy, information ethics, critical thinking, and communication skills, and IL is closely related to information technology skills. This is relevant to the findings of the students' level of IL in Standard 7, which denotes that the students lacked enough knowledge and necessary skills to use ICT. Thus, it is a good opportunity for teachers and librarians to provide activities and facilities concerning ICT.

In conclusion, this research's findings presented interesting results, which ascertained that sex, GPA, stream of study, and school location play important roles in IL. This is relevant to Martin's (2011) study, which found demographics influencing student learning outcomes, and Foo et al.'s (2014) study, which indicated that types of school and academic stream of study seemed to have significant influences on IL. Harrison and Newton's (2010) research concluded that a strong relationship existed between the performance on the IL skills and students' academic performance throughout their degree program. With regard to the GPA and stream of study hypothesis, a positive relation between intelligence and information literacy was confirmed by many studies (Cameron et al., 2007;

Glendale Community College, 2007; Katz et al., 2008). Intelligence or cognitive ability was considered to be the most important indicator of academic success (Jensen, 1998; Kuncel et al., 2001; Mayer, 2011).

Moreover, this present study found that only school location had an impact on problems pertaining to IL. Obviously, schools located in urban areas seemed to have few problems compared to schools in rural areas. However, this subject requires further in-depth research to identify the differences of each school that impact students' IL development.

Implications

Based on the results of this study, the researchers propose that teaching and learning activities should be redesigned using collaborative teaching methods to enhance students' IL. The model of collaboration should include teachers who are responsible for discussing the topic or content of knowledge, librarians who provide learning materials from inside and outside the libraries, computer personnel who provide hardware and software for students' presentation. All the involved people, teachers; librarians; and computer personnel should take part in evaluating upper-secondary school students' learning process. The information science literature clearly demonstrates that collaborative efforts between librarians and academics lead to better results in students' acquisition of literacy skills (Boff & Johnson, 2002; Cunningham & Lanning, 2002; Korobili, Maliari, & Christodoulou, 2008). Additionally, the Educational Supervisory Unit and upper-secondary school administrators should set guidelines and standards for providing modern ICT equipment to students, which they can use in classrooms, libraries, and computer rooms. These implications would help improve the students' abilities to evaluate information as well as obtain knowledge and necessary skills to use ICT.

Moreover, more activities and programs on IL should be provided to students studying arts, male students, students who had GPA at Fair level, and schools located in Narathiwat and Pattani.

Further studies

The researchers also suggest that further studies need to be conducted with the aim of enhancing the IL of upper-secondary school students in the southernmost provinces of Thailand, while focusing on the issues concerning activities/games to support each of the seven standards of IL and promote awareness of the importance of IL among students as well as teachers. In addition, more studies on library management, librarians' roles, and technology in libraries and computer rooms in schools need to be conducted. Lastly, the learning and teaching process needs to be explored and investigated further in order to promote effective student IL.

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Appendix

I. Sample items of the test (Standard I, item 1–8; Standard II, item 9–16; Standard III, item 17–24)

Direction: Please tick the correct answer by marking ✓ on the letter in each question.

1. Which option is correct about “information”?
 - A. Information is important for students
 - B. Information is for administrators
 - C. Information is for researchers
 - D. Information is for everyone
2. Which option states the correct objective of information usage?
 - A. For news and information
 - B. For recreation
 - C. For studies and research
 - D. All of them
3. Which option is correct about using information?
 - A. Use information from the Internet, because it is free.
 - B. Use information from newspaper, because it is reliable.
 - C. Use information from the library, because it provides systematic services.
 - D. Use information from people who live in villages, because it is free.
4. If students want to search for up-to-date information pertaining to a research report, which is the best source among the options given below?
 - A. Magazine
 - B. Academic journal
 - C. Dictionary
 - D. Book
5. Students can use and search for information free of cost from which of the following?
 - A. Public library
 - B. Internet café/shop
 - C. Academic library
 - D. Corporate information center
6. Which option shows that a person is aware of the importance of information concerning taking care of one’s health?
 - A. Always reading the newspaper “Kom Chad Luek”
 - B. Always reading the magazine “Chivajit”
 - C. Always reading “Sally’s Happiness”
 - D. Always following “Suthichai” on Twitter
7. Which answer represents important sources of information in Southern Border Provinces?
 - A. Thonchang Waterfall, Yarang Ancient City, Baetong Centre, and Tarutuan Island
 - B. Arawan Waterfall, Chiya Ancient City, Baetong Centre, and Tarutuan Island
 - C. Samela cape, Saerung Waterfall, Ancient City, Baetong Centre, and Tarutuan Island
 - D. Thonchang Waterfall, Saithong Castle, Baetong centre, Khoyo Island, and Pratad Temple

8. Which is the correct scope of a study on “Internet usage for education”?
- A. Internet
B. Internet and education
C. Education
D. Education and technology
9. If you want to retrieve information from the OPAC, you should start searching which of the following options?
- A. Author and publisher
B. Author and keyword
C. Author and year
D. Author and place of printing
10. If you want to search for information about “Dangerous things on the Internet for Thai teenagers”, which is the best search term to acquire specific information?
- A. Dangerous
B. Thai teenager
C. Information and teenager
D. Internet and Thai teenager
11. Which program does not require the Internet?
- A. Internet Explorer
B. Yahoo
C. Google
D. PowerPoint
12. Search Engine is a tool for searching which of the following?
- A. CD-ROM information
B. Books from libraries
C. WWW
D. Interlibrary loan
13. Which of the following is a tool used to search for information on the Internet?
- A. Altavista
B. Yahoo
C. Google
D. All of them
14. Which option includes the most suitable places for conducting a report on “multi-culture”?
- A. Narathat Beach, Samila Beach, and Central Mosque
B. Big C, Lotus, and Sirorot Market
C. Mont Tanguay, Koh Lipe Island, and Limgonael
D. Central Mosque, Changhai Temple, and Limtokiem Shrine
15. Which is the best source to find information about organic agriculture?
- A. Owner of organic agriculture shop
B. Vegetable seller
C. Organic agriculture consumer
D. Awarded organic agriculturist
16. Aminoh wants to write a report about “How to make fish sauce”, which is an OTOP product of the community. Who is the best source for her to acquire information?
- A. Mrs. Fatimah, Head of the OTOP product
B. Mr. Maeae, Fish specialist
C. Miss Wana, Food specialist
D. Dr. Wichai, Health specialist

From the following extract of a news piece, please answer question 17 and 18:

The new epidemic disease spreads from person to person; some sources said, “students need to wear tiny nanotechnology products, costing 2,000 baht, in order to be safe”.

17. Which of the following is the correct conclusion?
- A. There is a new epidemic disease.
 - B. Nanotechnology is expensive.
 - C. Students need to wear nanotechnology products.
 - D. Many people have died.
18. Students can check the reliability of information from which of the following options?
- A. Friend
 - B. Health specialist
 - C. Teacher
 - D. Police
19. Which website URL is suitable for citations?
- A. .com
 - B. .org
 - C. .edu
 - D. .net
20. If you receive information from an email, you should do which of the following?
- A. Check for reliability
 - B. Forward it to your friend
 - C. Use it immediately
 - D. Find the sender
21. Why do you have to evaluate information obtained from the World Wide Web (WWW)?
- A. The information is complicated.
 - B. The information is not relevant to what you want.
 - C. The information is not checked by experts, whether it is correct or not.
 - D. The information is not up-to-date.
22. Information obtained from searching the Prince of Songkla University's website (www.psu.ac.th) is reliable, because of which of the following options?
- A. It is created by an educational institution.
 - B. It is recognized by people around the world.
 - C. Many people use it.
 - D. No correct answer.
23. Information from the website shoponline.com is reliable because of which of the following options?
- A. It is created by an educational institution.
 - B. It is recognized by people around the world.
 - C. Many people use it.
 - D. No correct answer.
24. Which of the following criteria is used for evaluating information gathered from a book?
- A. Price
 - B. Author's expertise
 - C. Illustration
 - D. Author's age

II. Samples of questionnaire on problems concerning information literacy

Instruction: Please put a tick mark (✓) beside specific levels of problems pertaining to information literacy, which you encounter.

Level 1 indicates problems are very low
 Level 2 indicates problems are low
 Level 3 indicates problems are moderate
 Level 4 indicates problems are high
 Level 5 indicates problems are very high

1. Levels of problems pertaining to locating information from various sources

Topic	Level of problems					Add more information if needed
	1	2	3	4	5	
1.1 Printed materials: books, journals, newspapers, etc.						
1.2 Electronic materials: e-book, e-journal, e-newspaper, website, etc.						
1.3 Social media platforms: Facebook, YouTube, etc.						
1.4 Audio-Visual materials, etc.						
1.5 People: librarians, teachers, friends						
1.6 Other (please specify).....						

2. Levels of problems pertaining to using information tools and ICT hardware & software

Topic	Level of problems					Add more information if needed
	1	2	3	4	5	
1.1 Software						
1.2 Computers						
1.3 Internet access						
1.4 Printers						
1.5 Scanners						
1.6 Other (please specify)						

