

DOI: [https://doi.org/10.48009/3\\_iis\\_2022\\_108](https://doi.org/10.48009/3_iis_2022_108)

## Information seeking and verification of web information: A comparative study

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### Abstract

This study explores information search and verification of students and employees in Thailand and the impacts of demographics. A survey of 453 participants was collected. Online searchers focus on accessible, economical, timely, simple, reliable, and flexible of information. They have different information seeking, information evaluation, and search performance. This work guides universities and companies to effectively support their people in information seeking and verification for studying/working tasks. The findings reflect the gaps between knowledge, experience, intention, and the information behavior of various user groups.

**Keywords:** information seeking; information verification; information behavior; credibility judgment; Thailand; comparative study; web information

### Introduction

Information-seeking behavior is a user's attempt to obtain information to deal with work-related, personal, and social problems (Nagar & Munshi, 2014). The purpose of information seeking varies according to the work task and different role-playing of a user (Li & Belkin, 2010; Nagar & Munshi, 2014). Goal, problem, task, and information needs are why users interact with information systems (J. Kim, 2009). More research on how tasks influence information-seeking behavior is thus called for (Athukorala, Głowacka, Jacucci, Oulasvirta, & Vreeken, 2016; Bin, 2009; J. Kim, 2009; Li, 2009).

Users apply different approaches and strategies to perform information-seeking tasks (J. Kim, 2009). Information-seeking behavior and its impact such as innovative performance have recently drawn the interests of scholar researchers and practitioners (Bin, 2009). Human-information interaction phases comprise information seeking, information judgment (verification), and information use. However, these phases have been normally investigated in isolation (Du, 2014). The knowledge of users' information-seeking behavior is vital for information source providers to enhance their services to meet users' information needs (Fasola & Olabode, 2013).

The development of Information and Communication Technologies (ICTs) is useful in storing, processing, and sharing both information and knowledge (Fari & Ocholla, 2015), particularly the Internet. Although the Internet is the most credible among new media, it is less credible compared to the traditional media in the study by Idid, Sannusi, and Arandas (2019). However, the issues of information quality and credibility of online information are increasingly important due to the abundance and unreliable of information (Catalano, 2013; Hjørland, 2012; S. Y. Lee, 2018) and the lack of quality control mechanisms of the Web and social media (K.-S. Kim & Sin, 2011; S. Y. Lee, 2018; Savolainen, 2011).

Users' information-seeking behavior is impacted by their information judgments, which reflect their perceived value of information (Du, 2014). Information quality criteria, such as accuracy and credibility, influence users' information judgments (Rowley & Johnson, 2013; Savolainen, 2011). The importance of exploring users' credibility assessment of information has been recognized by several researchers (Rieh, 2014). Also, there is little research examining how the quality of information influences its subsequent use (Du, 2014). One of the major challenges of educators and information source providers is to help users in selecting quality sources and information (K.-S. Kim & Sin, 2011).

Information Literacy (IL) is the set of literacy and competencies that people need to involve in an information society (Pinto, 2010). Assessing the quality and relevance of search results, evaluating the reliability, validity, authority, and timeliness of retrieved information, and applying new information to create scholarly and professional pursuits are also high-order abilities of information literacy (Pinto, 2010). However, there is evidence that some students might forget the information literacy that they have learned from universities (Eldermire et al., 2019).

Information suppliers have to understand the specific needs of users since they are different (Krampen, Fell, & Schui, 2011). In terms of credibility judgments, there are differences among user groups such as active and less active searchers in their credibility assessment (S. Y. Lee, 2018; Liu et al., 2009). Studying the evaluating behavior of students to help them improve their searching and validating web information is important (Keshavarz, 2020). Credibility judgments of information, particularly in the workplace environments, are relatively unexplored (Du, 2014). Other characteristics of information seekers such as level of knowledge, gender, education, job, source experience, and expertise are suggested by various studies to be future research (Al-Maskari & Sanderson, 2011; Athukorala, Hoggan, Lehtiö, Ruotsalo, & Jacucci, 2013; Krampen et al., 2011; Liu et al., 2009; Mishra, Allen, & Pearman, 2015; Rowley & Johnson, 2013; Rowley, Johnson, & Scaffi, 2017).

Although there are some studies relating to information seeking, no recent studies explore both information seeking and verification in terms of knowledge, experience, intention, and behavior to show the gap and the fact about information seeking and evaluation deeper. Many of them use students rather than employees or workers as samples and compare the differences in these samples to show various needs of users although they use the information for similar purposes.

Thus, the research objectives are 1) to explore the important quality factors of online information, 2) to compare information seeking and verification of students and employees with different educational backgrounds and gender, 3) to compare information seeking and verification between students and employees according to task types, and 4) to guide librarians, teachers, and companies in supporting their students or employees in seeking and verifying information.

## **Background and Hypotheses**

### **The Relationship between Quality Information, Information Seeking, Information Verification, and Search Performance**

This study applies a similar approach to the study of S. W.-Y. Lee and Tsai (2011) that compare three dimensions (capacity, experience, interests) in online and face-to-face environments using the same set of questions. However, this study compares each item in detail to clearly show the gap between explored aspects in different sample groups and different demographic factors. The quality of information is the starting point leading to information verification. This study applies quality aspects from the characteristics of quality information, published in the MIS textbook of Stair and Reynolds (2013). Thongmak (2016) uses these characteristics to explore the gaps between the intention and behavior of students regarding quality

information. In addition to quality information that calls for information evaluation, there are some linkages between information-seeking intention, information verification intention, and information verification behavior in the study of Thongmak (2019). Information verification intention significantly increases information verification behavior. Thongmak (2020) also investigate the associations between knowledge, experience, intention, and search performance from the bigger samples. The results indicate the significant impact of experience in information seeking/ information verification on knowledge regarding information seeking/ information verification. This knowledge significantly affects participants' intention to search/ judge information, which later significantly influences their search performance. Thongmak (2021) explores the antecedents and consequences of information-seeking intention. Information-seeking intention significantly affects information-seeking behavior for all purposes and significantly impacts search performance. These results show the linkage between dimensions and items to be explored further.

## Information Seeking

### *Knowledge*

Knowledge and skills form the basis of the search (Quintana, Pujol, & Romaní, 2012). When exploring web search behavior, prior knowledge is generally taken into account (Hahnel et al., 2020). A user's knowledge is a factor affecting information-seeking behavior (Athukorala et al., 2016; Catalano, 2013; Grant, Clarke, & Kyriazis, 2007). Prior knowledge determines an individual's information search behaviour (Dickinger, 2011; Kerstetter & Cho, 2004; Xiao, Sharman, Rao, & Upadhyaya, 2014).

### *Experience*

Experience in information searching is a key aspect to comprehend users' search behavior (Al-Maskari & Sanderson, 2011). The previous experience of recipients is one source to be consulted in online searches and respective selection criteria (Almeida et al., 2022). The Web usage experience impacts online information involvement, which affects the degree of online searches (Lehto, Kim, & Morrison, 2006). Experience influences information acquisition from both internal and external sources (Jang, 2004; Kerstetter & Cho, 2004).

### *Intention and behavior*

According to the Theory of Reasoned Action (TRA), a person performs a specific behavior because of behavioral intention (Bin, 2009). Higher levels of search motivation could enhance information search activities (Kulviwat et al., 2004; Schmidt & Spreng, 1996). Intention for media participation has a positive association with the use of media (Idid et al., 2019). Motivational forces behind information searches are information needs, problems, or goals (J. Kim, 2009). Information seeking happens when users show their information needs (Mishra et al., 2015). Thus, the following hypotheses were developed:

*H1: There will be a difference in students' information seeking in terms of (a) knowledge vs. experience, b) experience vs. intention, and c) intention vs. knowledge).*

*H2: There will be a difference in employees' information seeking in terms of (a) knowledge vs. experience, b) experience vs. intention, and c) intention vs. knowledge).*

*H20: There will be a difference in students' information-seeking behavior (a) for academic achievement vs. for problem-solving, b) for academic achievement vs. for personal needs, c) for academic achievement vs for entertainment, d) for problem-solving vs. for personal needs, e) for problem-solving vs. for*

*entertainment, and f) for personal needs vs for entertainment).*

*H22: There will be a difference in employees' information-seeking behavior (a) for working achievement vs. for problem-solving, b) for working achievement vs. for personal needs, c) for working achievement vs for entertainment, d) for problem-solving vs. for personal needs, e) for problem-solving vs. for entertainment, and f) for personal needs vs for entertainment).*

## **Information Verification**

### ***Knowledge***

Information credibility is an individual assessment of whether the information is trustworthy or not using their knowledge (Savolainen, 2011). When people are asked about credibility, they often compare information to their prior knowledge (Robertson-Lang et al., 2011). Perceived credibility of information could be varied by the amount of knowledge or familiarity that readers have with the topic (S. Y. Lee, 2018). Educational and knowledge levels of Internet affect respondents' believability and source (news) selection (Idid et al., 2019).

### ***Experience***

A person's experience with the Internet positively affects his/ her information verification (Flanagin & Metzger, 2000). A user's perceived credibility of online information differ according to his/ her experience with the Internet (S. Y. Lee, 2018). The trust of online information is determined by a user's experience (Xiao et al., 2014).

### ***Intention and behavior***

People use multiple criteria to assess credibility to get high-quality information (Savolainen, 2011; Shanahan, 2008). Teenagers search for different topics with different purposes. However, they only occasionally evaluate information quality and source credibility. Past studies also confirm that people from adolescence through to adulthood do not always put efforts into evaluating message content and source credibility (Almeida et al., 2022). Therefore, the following hypotheses were examined:

*H3: There will be a difference in students' information verification in terms of (a) knowledge vs. experience, b) experience vs. intention, c) intention vs. knowledge, and d) intention for studying info. vs. intention for entertaining info.).*

*H4: There will be a difference in employees' information verification in terms of (a) knowledge vs. experience, b) experience vs. intention, c) intention vs. knowledge, and d) intention for working info. vs. intention for entertaining info.).*

*H21: There will be a difference in students' information verification behavior (a) for academic achievement vs. for problem-solving, b) for academic achievement vs. for personal needs, c) for academic achievement vs for entertainment, d) for problem-solving vs. for personal needs, e) for problem-solving vs. for entertainment, and f) for personal needs vs for entertainment).*

*H23: There will be a difference in employees' information verification behavior (a) for working achievement vs. for problem-solving, b) for working achievement vs. for personal needs, c) for working achievement vs for entertainment, d) for problem-solving vs. for personal needs, e) for problem-solving vs. for entertainment, and f) for personal needs vs for entertainment).*

## Search Performance

Search performance is one of the search outcomes (Ghosh et al., 2018). Search time, search amount, and accuracy represent the efficiency and effectiveness of search performance (Sharit et al., 2015). Task difficulty is an important determinant of search performance (Liu, Liu, Cole, Belkin, & Zhang, 2012). Hence, the following hypotheses were investigated:

*H9: There will be a difference in the search performance of students studying lower than bachelor's degrees and students studying bachelor's degrees or higher.*

*H10: There will be a difference in the search performance of employees with bachelor's degrees and employees with master's degrees.*

*H15: There will be a difference in the search performance of male and female students.*

*H16: There will be a difference in the search performance of male and female employees.*

*H19: There will be a difference in the search performance of students and employees.*

## Demographic Factors: Gender, Education Background, and Working Status

Individual differences generally affect their credibility evaluations (Flanagin et al., 2018). Therefore, conducting studies by having variables such as tasks, gender, education, and experience are suggested by Keshavarz (2020) to enhance the related literature. People with various characteristics search for different types of information online (Niu & Hemminger, 2012; Sin & Kim, 2013). Individuals' demographics affect their information search and usage (Xiao et al., 2014). Thus, the following hypotheses were presented:

*H5: There will be a difference in information seeking in terms of (a) knowledge, b) experience, c) intention, and d) behavior) of students studying lower than bachelor's degrees and students studying bachelor's degrees or higher.*

*H6: There will be a difference in information seeking in terms of (a) knowledge, b) experience, c) intention, and d) behavior) of employees with bachelor's degrees and employees with master's degrees.*

*H7: There will be a difference in information verification in terms of (a) knowledge, b) experience, c) intention for studying info., d) intention for entertaining info., and e) behavior) of students studying lower than bachelor's degrees and students studying bachelor's degrees or higher.*

*H8: There will be a difference in information verification in terms of (a) knowledge, b) experience, c) intention for working info., d) intention for entertaining info., and e) behavior) of employees with bachelor's degrees and employees with master's degrees.*

*H11: There will be a difference in information seeking in terms of (a) knowledge, b) experience, c) intention, and d) behavior) of male students and female students.*

*H12: There will be a difference in information seeking in terms of (a) knowledge, b) experience, c) intention, and d) behavior) of male employees and female employees.*

*H13: There will be a difference in information verification in terms of (a) knowledge, b) experience, c) intention for studying info., d) intention for entertaining info., and e) behavior) of male students and female students.*

*H14: There will be a difference in information verification in terms of (a) knowledge, b) experience, c) intention for working info., d) intention for entertaining info., and e) behavior) of male employees and female employees.*

*H17: There will be a difference in information seeking in terms of (a) knowledge, b) experience, c) intention, and d) behavior) of students and employees*

*H18: There will be a difference in information verification in terms of (a) knowledge, b) experience, c) intention for studying info./ working, d) intention for entertaining info., and e) behavior) of students and employees.*

## Participants and Research Design

This study is a sub-project of the INFORMATION VERIFICATION project. This study employed quantitative methodology, did empirical research, and used surveys for data collection. Participants were students who were studying full-time and had aged less than 35 years old and employees who were working full-time and had aged more than or equal to 20 years old. They were asked to recall and compare their perception of their knowledge, experience, and intention in both information seeking and information verification as well as their behavior and search performance. Participants were recruited voluntarily by research assistants. Finally, a total of 453 filled questionnaires, from 210 employees and 243 students, were collected using Google Form and analyzed.

For comparison purposes, a set of twelve items to assess knowledge, experience, and intention in information seeking and verification were measured using similar questions, but different dimension names. Intention to verify the information was evaluated in two aspects: the verifications of information for working/studying and for entertaining. Both information-seeking behavior and information-verification behavior was investigated in four tasks/ purposes. All Items were adapted from past studies (Flanagin & Metzger, 2000; Kaye & Johnson, 2004; S. W.-Y. Lee & Tsai, 2011; Limberg & Sundin, 2006; Madden, Ford, Miller, & Levy, 2006; Metzger, Flanagin, & Zwarun, 2003; Nayak, Priest, & White, 2010; Rieh & Hilligoss, 2008).

Reliability (Cronbach's alphas) of constructs (knowledge, experience, intention, behavior, search performance) in a final questionnaire for students were ranging from 0.743 to 0.915, while Cronbach's alpha values of constructs in a final survey for employees were ranging from 0.784 to 0.906, indicating good internal consistency.

## Findings and Discussion

### Demographic Analysis

Of all samples (n=453, 210 employees and 243 students), the majority of participants were females (69.3%). Most of the participants were at age 20-24 (34.9%). Most of the students were studying for a bachelor's degree (79.4%), while most of the employees received a bachelor's degree (50%). Both groups used mobile phones (88.5%) and notebooks/ netbooks (74.0%) as the main devices for Internet access and applied 3G (84.8%) and hi-speed Internet (62.9%) as the main Internet access networks. All samples gave importance to accessible (16.0%), economical (13.0%), timely (12.8%), simple (11.3%), and reliable (10.3%) more

than others. Students chose simple (12.3%) as the top-three quality factors more than economical (12.2%) and timely (11.8%). Employees selected economical (14.0%) and timely (14.0%) equally and preferred flexibility (10.5%) slightly more than simple (10.2%).

### **Information Seeking and Information Verification of Students and Employees**

As shown in Table 1, the results from the paired-sample t-test indicated that there were significant average differences between knowledge and experience in information seeking of full-time students in all sub-dimensions (to search for new learning materials, to try different searching approaches, to read and understand the content of a text, and to organize and synthesize the searched materials/ information from various sources). As shown in Table 2, the results of full-time employees were quite similar to the results of full-time students, except for the comparison between knowledge and intention to try different searching approaches. Then, there were enough pieces of evidence to support alternative hypotheses (*H1a*, *H1b*, and *H2a – H2c*).

As shown in Table 3, the results from a paired-sample t-test indicated that there were significant average differences between knowledge and experience in verifying information of full-time students in two sub-dimensions: evaluating the quality of information content before use and evaluating information sources before use. As shown in Table 4, there were significant differences in the scores between knowledge and experience in information verification in all sub-dimensions. Thus, there was enough evidence to partially accept the alternate hypotheses (*H3a – H3d* and *H4a – H4d*).

**Table 1 Paired-samples t-test comparisons of all sub-scales of knowledge, experience, and intention of full-time students' information seeking (n=243)**

<b>Dimension/ sub-scale</b>	<b>Knowledge/ Capacity in Information Seeking M (SD)</b>	<b>Experience in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	<i>3.94 (.733)</i>	3.67 (1.02)	242	4.269	.000***
To try different searching approaches	<i>3.72 (.899)</i>	3.47 (.993)	242	4.034	.000***
To read and understand the content of a text	<i>3.67 (.782)</i>	3.47 (.882)	242	3.483	.001**
To organize and synthesize the searched materials/ information from various sources	<i>3.61 (.760)</i>	3.42 (.898)	242	3.571	.000***
<b>Dimension/ sub-scale</b>	<b>Experience in Information Seeking M (SD)</b>	<b>Intention/ Interest in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	3.67 (1.02)	<i>3.90 (.751)</i>	242	-3.961	.000***
To try different searching approaches	3.47 (.993)	<i>3.63 (.951)</i>	242	-2.720	.007*
To read and understand the content of a text	3.47 (.882)	<i>3.67 (.761)</i>	242	-3.519	.001**
To organize and synthesize the searched materials/ information from various sources	3.42 (.898)	<i>3.62 (.052)</i>	242	-3.422	.001**
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Seeking M (SD)</b>	<b>Knowledge/ Capacity in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	3.90 (.751)	<i>3.94 (.733)</i>	242	-.870	.385
To try different searching approaches	3.63 (.951)	<i>3.72 (.899)</i>	242	-1.627	.105
To read and understand the content of a text	3.67 (.761)	<i>3.67 (.782)</i>	242	.000	1.000
To organize and synthesize the searched materials/ information from various	3.62 (.052)	<i>3.61 (.760)</i>	242	.101	.919

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Table 2 Paired-samples t-test comparisons of all sub-scales of knowledge, experience, and intention of full-time employees' information seeking (n=210)**

<b>Dimension/ sub-scale</b>	<b>Knowledge/ Capacity in Information Seeking M (SD)</b>	<b>Experience in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	<i>4.10 (.711)</i>	3.72 (1.036)	209	6.740	.000***
To try different searching approaches	<i>3.91 (.849)</i>	3.59 (.960)	209	5.544	.000***
To read and understand the content of a text	<i>3.98 (.722)</i>	3.73 (.920)	209	4.882	.000***
To organize and synthesize the searched materials/ information from various sources	<i>3.88 (.770)</i>	3.64 (.882)	209	4.291	.000***
<b>Dimension/ sub-scale</b>	<b>Experience in Information Seeking M (SD)</b>	<b>Intention/ Interest in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	3.72 (1.036)	<i>4.10 (.728)</i>	209	-5.924	.000***
To try different searching approaches	3.59 (.960)	<i>3.80 (.917)</i>	209	-3.399	.001**
To read and understand the content of a text	3.73 (.920)	<i>3.96 (.724)</i>	209	-4.216	.000***
To organize and synthesize the searched materials/ information from various sources	3.64 (.882)	<i>3.85 (.786)</i>	209	-3.838	.000***
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Seeking M (SD)</b>	<b>Knowledge/ Capacity in Information Seeking M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To search for new learning materials	4.10 (.728)	4.10 (.711)	209	-.098	.922
To try different searching approaches	3.80 (.917)	<i>3.91 (.849)</i>	209	-2.584	.010*
To read and understand the content of a text	3.96 (.724)	3.98 (.722)	209	-.346	.730
To organize and synthesize the searched materials/ information from various sources	3.85 (.786)	3.88 (.770)	209	-.797	.426

\*\*\**p*<.001 \*\**p*<.005 \**p*<.05 Note: significant greater dimensions were shown in italics.

**Table 3 Paired-samples t-test comparisons of all sub-scales of knowledge, experience, and intention of full-time students' information verification (n=243)**

<b>Dimension/ sub-scale</b>	<b>Knowledge/ Capacity in Information Verification M (SD)</b>	<b>Experience in Information Verification M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.56 (.823)</i>	3.37 (.989)	242	3.309	.001**
To evaluate source factor (information sources) before use	<i>3.55 (.833)</i>	3.40 (.984)	242	2.757	.006*
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.50 (.820)</i>	3.46 (.919)	242	.811	.418
<b>Dimension/ sub-scale</b>	<b>Experience in Information Verification M (SD)</b>	<b>Intention/ Interest in Information Verification [Information for studying] M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	3.37 (.989)	<i>3.60 (.896)</i>	242	-3.369	.001**
To evaluate source factor (information sources) before use	3.40 (.984)	<i>3.55 (.858)</i>	242	-2.712	.007*
To evaluate presentation factor (the appropriateness of presentation) before use	3.46 (.919)	<i>3.67 (.823)</i>	242	-3.623	.000***
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Verification [Information for studying] M (SD)</b>	<b>Knowledge/ Capacity in Information Verification M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.60 (.896)</i>	3.56 (.823)	242	.961	.338
To evaluate source factor (information sources) before use	<i>3.55 (.858)</i>	3.55 (.833)	242	.000	1.000
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.67 (.823)</i>	3.50 (.820)	242	3.716	.000***
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Verification [Information for studying] M (SD)</b>	<b>Intention/ Interest in Information Verification [Information for entertaining] M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.60 (.896)</i>	3.53 (1.057)	242	1.168	.244
To evaluate source factor (information sources) before use	<i>3.55 (.858)</i>	3.43 (1.047)	242	1.956	.052
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.67 (.823)</i>	3.46 (.967)	242	3.336	.001**

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Table 4 Paired-samples t-test comparisons of all sub-scales of knowledge, experience, and intention of full-time employees' information verification (n=210)**

<b>Dimension/ sub-scale</b>	<b>Knowledge/ Capacity in Information Verification M (SD)</b>	<b>Experience in Information Verification M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.79 (.774)</i>	3.50 (.955)	209	5.154	.000***
To evaluate source factor (information sources) before use	<i>3.74 (.842)</i>	3.61 (.897)	209	2.613	.010*
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.87 (.743)</i>	3.60 (.902)	209	4.880	.000***
<b>Dimension/ sub-scale</b>	<b>Experience in Information Verification M (SD)</b>	<b>Intention/ Interest in Information Verification [Information for working] M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	3.50 (.955)	<i>3.81 (.800)</i>	209	-4.961	.000***
To evaluate source factor (information sources) before use	3.61 (.897)	<i>3.87 (.819)</i>	209	-4.915	.000***
To evaluate presentation factor (the appropriateness of presentation) before use	3.60 (.902)	<i>3.85 (.780)</i>	209	-4.558	.000***
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Verification [Information for working] M (SD)</b>	<b>Knowledge/ Capacity in Information Verification M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.81 (.800)</i>	3.79 (.774)	209	.599	.550
To evaluate source factor (information sources) before use	<i>3.87 (.819)</i>	3.74 (.842)	209	2.380	.018*
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.85 (.780)</i>	3.87 (.743)	209	-.576	.565
<b>Dimension/ sub-scale</b>	<b>Intention/ Interest in Information Verification [Information for working] M (SD)</b>	<b>Intention/ Interest in Information Verification [Information for entertaining] M (SD)</b>	<b>df</b>	<b>t</b>	<b>p</b>
To evaluate information factor (the quality of information content) before use	<i>3.81 (.800)</i>	3.52 (1.032)	209	4.073	.000***
To evaluate source factor (information sources) before use	<i>3.87 (.819)</i>	3.47 (1.013)	209	5.795	.000***
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.85 (.780)</i>	3.56 (.977)	209	4.356	.000***

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Information Seeking, Information Verification, and Search Performance of Students and Employees with Different Educational Backgrounds**

To manage the oversampling of students, females, and participants with bachelor’s degrees, data in the bigger groups were randomly drawn by a statistical program to be equal to the smaller groups before conducting the independent t-tests. As shown in Table 5, the results from independent-samples t-test indicated that full-time students studying in bachelor’s degree or higher had significantly greater knowledge than students studying in lower than bachelor’s degree levels. They also had more intention to search than full-time students studying lower than bachelor’s degrees, but the frequencies to search online for various purposes among these groups were not significantly different. For full-time employees, there were no statistically significant differences in knowledge, experiences, intention, and behaviors of full-time employees with bachelor’s degrees and full-time employees with master’s degrees in all sub-dimensions, as presented in Table 6. Therefore, there was enough evidence to support alternative hypotheses (*H5a and H5c*).

**Table 5 Independent-samples t-test results comparing lower than a bachelor’s degree and a bachelor’s degree or higher on all sub-scales of knowledge, experience, intention, and behavior of full-time students’ information seeking**

Dimension/ sub-scale	Education level – lower than bachelor’s degree (n=40) M (SD)	Education level – bachelor’s degree or higher (n=40) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Seeking</b>					
To search for new learning materials	3.60 (.810)	4.10 (.545)	68	- 3.238	.002**
To try different searching approaches	3.43 (1.059)	3.83 (.844)	78	- 1.868	.066
To read and understand the content of a text	3.43 (.931)	3.90 (.632)	69	- 2.670	.009*
To organize and synthesize the searched materials/ information from various sources	3.50 (.679)	3.78 (.577)	78	- 1.952	.055
<b>Experience in Information Seeking</b>					
To search for new learning materials	3.18 (.958)	3.60 (1.008)	78	- 1.933	.057
To try different searching approaches	3.43 (.958)	3.53 (.816)	78	-.503	.617
To read and understand the content of a text	3.55 (.904)	3.48 (.751)	78	.404	.688
To organize and synthesize the searched materials/ information from various sources	3.40 (.744)	3.48 (.716)	78	-.397	.692
<b>Intention/ Interests in Information Seeking</b>					
To search for new learning materials	3.55 (.846)	3.95 (.639)	73	- 2.387	.020*
To try different searching approaches	3.28 (.905)	3.55 (.904)	78	- 1.359	.178
To read and understand the content of a text	3.40 (.744)	3.83 (.781)	78	- 2.492	.015*
To organize and synthesize the searched materials/ information from various sources	3.43 (.958)	3.80 (.687)	71	- 2.012	.048*
<b>Information-Seeking Behavior</b>					
Frequency to search online information for academic achievement	3.65 (2.007)	3.88 (1.620)	75	-.552	.583

**Table 5 (Continued)**

Dimension/ sub-scale	Education level – lower than bachelor’s degree (n=40) M (SD)	Education level – bachelor’s degree or higher (n=40) M (SD)	df	t	p
Frequency to search online information for problem-solving	3.40 (1.945)	3.18 (1.394)	71	.595	.554
Frequency to search online information for personal information needs	3.90 (1.751)	4.48 (1.261)	71	-1.685	.096
Frequency to search online information for entertainment	4.58 (1.880)	5.18 (1.318)	70	-1.653	.103

\*\*\**p*<.001 \*\**p*<.005 \**p*<.05 Note: significant greater dimensions were shown in italics.

**Table 6 Independent-samples t-test results comparing bachelor’s degree and master’s degree on all sub-scales of knowledge, experience, intention, and behavior of full-time employees’ information seeking**

Dimension/ sub-scale	Education level – bachelor’s degree (n=85) M (SD)	Education level – master’s degree (n=85) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Seeking</b>					
To search for new learning materials	4.13 (.651)	4.24 (.630)	168	-1.078	.283
To try different searching approaches	3.95 (.830)	4.01 (.880)	168	-.449	.654
To read and understand the content of a text	3.98 (.690)	4.12 (.625)	168	-1.398	.164
To organize and synthesize the searched materials/ information from various sources	3.86 (.726)	3.98 (.707)	168	-1.070	.286
<b>Experience in Information Seeking</b>					
To search for new learning materials	3.75 (.987)	3.89 (.976)	168	-.938	.350
To try different searching approaches	3.60 (.915)	3.69 (.926)	168	-.666	.506
To read and understand the content of a text	3.72 (.868)	3.89 (.873)	168	-1.322	.188
To organize and synthesize the searched materials/ information from various sources	3.62 (.873)	3.75 (.815)	168	-.999	.319
<b>Intention/ Interests in Information Seeking</b>					
To search for new learning materials	4.18 (.693)	4.16 (.633)	168	.116	.908
To try different searching approaches	3.93 (.813)	3.74 (.990)	162	1.355	.177
To read and understand the content of a text	3.94 (.661)	4.06 (.713)	168	-1.116	.266
To organize and synthesize the searched materials/ information from various sources	3.84 (.800)	3.98 (.723)	167	-1.207	.229
<b>Information-Seeking Behavior</b>					
Frequency to search online information for working achievement	5.26 (1.381)	5.18 (1.364)	168	.391	.696
Frequency to search online information for problem-solving	4.16 (1.717)	3.86 (1.364)	160	1.286	.200
Frequency to search online information for personal information needs	4.65 (1.445)	4.52 (1.402)	168	.592	.554
Frequency to search online information for entertainment	4.76 (1.548)	4.53 (1.296)	168	1.074	.284

\*\*\**p*<.001 \*\**p*<.005 \**p*<.05 Note: significant greater dimensions were shown in italics.

The results of independent-samples t-tests were shown in Table 7. There was a significant difference in the scores for the experience to evaluate the information factor of full-time students studying lower than bachelor’s degrees and those studying bachelor’s degrees or higher. Intention to evaluate information sources of information for entertainment before usage of students studying the bachelor’s degree level or higher was lower than those studying lower than a bachelor’s degree level. Moreover, full-time students

studying lower than bachelor’s degrees significantly frequently verified online information for problem-solving more than students studying bachelor’s degrees or higher. Full-time students studying bachelor’s degrees or higher significantly had better search performance than students studying lower than bachelor’s degrees in almost all sub-dimensions except for found information quickly. On the other hand, as shown in Table 8, only one aspect of search performance was significantly different among full-time employees with different educational backgrounds. Hence, there was enough evidence to support alternative hypotheses (*H7b, H7d, H7e, H9, and H10*).

**Table 7 Independent-samples t-test results comparing lower than a bachelor’s degree and a bachelor’s degree or higher on all sub-scales of knowledge, experience, intention, and behavior of full-time students’ information verification and search performance**

Dimension/ sub-scale	Education level – lower than bachelor’s degree (n=40) M (SD)	Education level – bachelor’s degree or higher (n=40) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.68 (.917)	3.48 (.784)	78	1.049	.298
To evaluate source factor (information sources) before use	3.45 (.876)	3.60 (.810)	78	-.795	.429
To evaluate presentation factor (the appropriateness of presentation) before use	3.28 (.640)	3.43 (.844)	78	-.896	.373
<b>Experience in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.53 (.987)	3.08 (.971)	78	2.056	.043*
To evaluate source factor (information sources) before use	3.55 (.986)	3.13 (1.017)	78	1.897	.061
To evaluate presentation factor (the appropriateness of presentation) before use	3.38 (.952)	3.23 (1.025)	78	.678	.500
<b>Intention/ Interests in Information Verification [Information for studying]</b>					
To evaluate information factor (the quality of information content) before use	3.53 (.960)	3.55 (.904)	78	-.120	.905
To evaluate source factor (information sources) before use	3.35 (.975)	3.50 (.934)	78	-.703	.484
To evaluate presentation factor (the appropriateness of presentation) before use	3.58 (.747)	3.68 (.859)	78	-.556	.580
<b>Intention/ Interests in Information Verification [Information for entertaining]</b>					
To evaluate information factor (the quality of information content) before use	3.55 (.815)	3.30 (1.224)	68	1.075	.286
To evaluate source factor (information sources) before use	3.58 (.781)	3.10 (1.236)	66	2.055	.044*
To evaluate presentation factor (the appropriateness of presentation) before use	3.33 (.730)	3.23 (1.074)	69	.487	.628
<b>Information-Verification Behavior</b>					

**Table 7 (Continued)**

Dimension/ sub-scale	Education level – lower than bachelor’s degree (n=40) M (SD)	Education level – bachelor’s degree or higher (n=40) M (SD)	df	t	p
Frequency to verify online information for academic achievement	5.48 (2.926)	5.20 (2.911)	78	.421	.675
Frequency to verify online information for problem-solving	<i>6.30 (3.268)</i>	4.33 (3.511)	78	2.604	.011*
Frequency to verify online information for personal information needs	4.73 (3.113)	3.95 (3.336)	78	1.074	.286
Frequency to verify online information for entertainment	5.00 (3.195)	4.55 (3.351)	78	.615	.541
<b>Search Performance</b>					
Found the information that you want	3.35 (.975)	<i>3.80 (.723)</i>	78	-2.344	.022*
Quickly found information	3.53 (.987)	3.85 (1.001)	78	-1.462	.148
Get sufficient information	3.33 (.859)	<i>3.90 (.778)</i>	78	-3.138	.002**

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Table 8 Independent-samples t-test results comparing bachelor’s degree and master’s degree on all sub-scales of knowledge, experience, intention, and behavior of full-time employees’ information verification and search performance**

Dimension/ sub-scale	Education level – bachelor’s degree (n=85) M (SD)	Education level – master’s degree (n=85) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.78 (.713)	3.74 (.774)	168	.309	.758
To evaluate source factor (information sources) before use	3.76 (.811)	3.80 (.842)	168	-.278	.781
To evaluate presentation factor (the appropriateness of presentation) before use	3.84 (.738)	3.96 (.680)	168	-1.189	.236
<b>Experience in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.47 (.894)	3.55 (.919)	168	-.592	.555
To evaluate source factor (information sources) before use	3.58 (.836)	3.66 (.920)	168	-.611	.542
To evaluate presentation factor (the appropriateness of presentation) before use	3.59 (.863)	3.62 (.886)	168	-.263	.793
<b>Intention/ Interests in Information Verification [Information for working]</b>					
To evaluate information factor (the quality of information content) before use	3.86 (.758)	3.82 (.804)	168	.294	.769
To evaluate source factor (information sources) before use	3.87 (.768)	3.93 (.828)	168	-.480	.632
To evaluate presentation factor (the appropriateness of presentation) before use	3.84 (.769)	3.86 (.774)	168	-.199	.843
<b>Intention/ Interests in Information Verification [Information for entertaining]</b>					
To evaluate information factor (the quality of information content) before use	3.62 (1.069)	3.45 (1.075)	168	1.073	.285
To evaluate source factor (information sources) before use	3.52 (1.019)	3.46 (1.030)	168	.374	.709

**Table 8 (Continued)**

Dimension/ sub-scale	Education level – bachelor’s degree (n=85) M (SD)	Education level – master’s degree (n=85) M (SD)	df	t	p
To evaluate presentation factor (the appropriateness of presentation) before use	3.59 (1.027)	3.49 (.983)	168	.610	.543
<b>Information-Verification Behavior</b>					
Frequency to verify online information for working achievement	6.01 (2.881)	6.02 (3.086)	168	-.026	.980
Frequency to verify online information for problem-solving	5.49 (3.432)	4.79 (3.310)	168	1.365	.174
Frequency to verify online information for personal information needs	5.92 (2.871)	5.56 (3.238)	168	.752	.453
Frequency to verify online information for entertainment	5.92 (2.916)	5.53 (3.164)	168	.832	.407
<b>Search Performance</b>					
Found the information that you want	3.89 (.845)	<i>4.13 (.669)</i>	168	-2.012	.046*
Quickly found information	4.02 (.786)	4.15 (.716)	168	-1.122	.263
Get sufficient information	3.87 (.842)	4.05 (.722)	168	-1.467	.144

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Information Seeking, Information Verification, and Search Performance of Students and Employees with Different Gender Groups**

Independent-samples t-tests were conducted to compare information seeking among genders. As shown in Table 9, female students significantly searched online information more frequently than male students. For full-time employees, as shown in Table 10, males significantly had higher the experience more than females. However, male employee’s information-seeking intention and behaviour and female employee’s information-seeking intention and behavior in all information need categories were not different. Thus, there was enough evidence to support the alternative hypotheses (*H11d and H12b*)

**Table 9 Independent-samples t-test results comparing males and females on all sub-scales of knowledge, experience, intention, and behavior of full-time students’ information seeking**

Dimension/ sub-scale	Gender – male (n=80) M (SD)	Gender – female (n=80) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Seeking</b>					
To search for new learning materials	3.94 (.785)	3.99 (.665)	158	-.435	.664
To try different searching approaches	3.70 (.973)	3.76 (.846)	158	-.434	.665
To read and understand the content of a text	3.71 (.830)	3.75 (.684)	158	-.312	.756
To organize and synthesize the searched materials/ information from various sources	3.71 (.799)	3.63 (.736)	158	.721	.472
<b>Experience in Information Seeking</b>					
To search for new learning materials	3.70 (1.060)	3.79 (.867)	152	-.571	.569
To try different searching approaches	3.58 (1.016)	3.48 (.981)	158	.663	.527
To read and understand the content of a text	3.66 (.856)	3.48 (.826)	158	1.410	.161
To organize and synthesize the searched materials/ information from various sources	3.61 (.879)	3.45 (.870)	158	1.175	.242
<b>Intention/ Interests in Information Seeking</b>					
To search for new learning materials	3.94 (.817)	3.95 (.673)	158	-.106	.916
To try different searching approaches	3.66 (.954)	3.74 (.938)	158	-.501	.617
To read and understand the content of a text	3.69 (.739)	3.75 (.788)	158	-.517	.606

Table 9 (Continued)

Dimension/ sub-scale	Gender – male (n=80) M (SD)	Gender – female (n=80) M (SD)	df	t	p
To organize and synthesize the searched materials/ information from various sources	3.69 (.821)	3.73 (.729)	158	-.306	.760
<b>Information-Seeking Behavior</b>					
Frequency to search online information for academic achievement	3.50 (1.691)	3.79 (1.532)	158	- 1.127	.262
Frequency to search online information for problem- solving	3.41 (1.597)	3.28 (1.449)	158	.570	.569
Frequency to search online information for personal information needs	4.00 (1.509)	<i>4.68 (1.199)</i>	158	- 3.132	.002**
Frequency to search online information for entertainment	4.81 (1.543)	5.21 (1.099)	143	- 1.888	.061

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

Table 10 Independent-samples t-test results comparing males and females on all sub-scales of knowledge, experience, intention, and behavior of full-time employees' information seeking

Dimension/ sub-scale	Gender – male (n=59) M (SD)	Gender – female (n=59) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Seeking</b>					
To search for new learning materials	4.29 (.589)	4.07 (.691)	116	1.864	.065
To try different searching approaches	3.86 (.918)	4.05 (.775)	116	- 1.192	.236
To read and understand the content of a text	4.12 (.672)	3.97 (.694)	116	1.213	.228
To organize and synthesize the searched materials/ information from various sources	4.07 (.763)	3.83 (.769)	116	1.683	.095
<b>Experience in Information Seeking</b>					
To search for new learning materials	<i>4.19 (.819)</i>	3.46 (1.006)	111	4.316	.000***
To try different searching approaches	3.61 (.983)	3.59 (.912)	116	.097	.923
To read and understand the content of a text	<i>4.00 (.809)</i>	3.58 (1.037)	110	2.474	.015*
To organize and synthesize the searched materials/ information from various sources	<i>3.85 (.867)</i>	3.49 (.898)	116	2.190	.031*
<b>Intention/ Interests in Information Seeking</b>					
To search for new learning materials	4.27 (.739)	4.07 (.716)	116	1.519	.132
To try different searching approaches	3.75 (1.092)	3.93 (.785)	105	- 1.065	.289
To read and understand the content of a text	4.12 (.721)	3.90 (.803)	116	1.568	.120
To organize and synthesize the searched materials/ information from various sources	4.03 (.765)	3.80 (.783)	116	1.665	.099
<b>Information-Seeking Behavior</b>					
Frequency to search online information for working achievement	5.12 (1.366)	5.25 (1.469)	116	-.519	.605
Frequency to search online information for problem- solving	4.12 (1.521)	4.07 (1.596)	116	.177	.860
Frequency to search online information for personal information needs	4.49 (1.478)	4.63 (1.202)	116	-.547	.586
Frequency to search online information for entertainment	4.64 (1.362)	4.41 (1.379)	116	.941	.349

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

Table 11 presented that there were no gender differences in knowledge in information verification, experience in information verification, intention to verify the information for studying/ entertaining, information verification behavior, and search performance. For full-time employees, the experiences of male employees were greater than female employees. Male employees also performed a better search than female employees, as shown in Table 12. Therefore, there was enough evidence to support the alternative hypothesis (*H14b and H16*).

**Table 11 Independent-samples t-test results comparing males and females on all sub-scales of knowledge, experience, intention, and behavior of full-time students' information verification and search performance**

Dimension/ sub-scale	Gender – male (n=80) M (SD)	Gender – female (n=80) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.65 (.843)	3.56 (.744)	158	.696	.487
To evaluate source factor (information sources) before use	3.60 (.805)	3.69 (.789)	158	-.694	.489
To evaluate presentation factor (the appropriateness of presentation) before use	3.48 (.795)	3.59 (.807)	158	-.888	.376
<b>Experience in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.61 (.974)	3.39 (.934)	158	1.491	.138
To evaluate source factor (information sources) before use	3.60 (.922)	3.38 (.905)	158	1.557	.121
To evaluate presentation factor (the appropriateness of presentation) before use	3.60 (.908)	3.51 (.811)	158	.643	.521
<b>Intention/ Interests in Information Verification</b>					
<b>[Information for studying]</b>					
To evaluate information factor (the quality of information content) before use	3.70 (.833)	3.58 (.823)	158	.955	.341
To evaluate source factor (information sources) before use	3.64 (.846)	3.64 (.767)	158	.000	1.000
To evaluate presentation factor (the appropriateness of presentation) before use	3.78 (.729)	3.74 (.742)	158	.323	.747
<b>Intention/ Interests in Information Verification</b>					
<b>[Information for entertaining]</b>					
To evaluate information factor (the quality of information content) before use	3.56 (1.065)	3.60 (1.074)	158	-.222	.825
To evaluate source factor (information sources) before use	3.50 (1.079)	3.51 (1.136)	158	-.071	.943
To evaluate presentation factor (the appropriateness of presentation) before use	3.58 (.938)	3.46 (1.055)	158	.713	.477
<b>Information-Verification Behavior</b>					
Frequency to verify online information for academic achievement	4.88 (2.721)	5.19 (2.668)	158	-.734	.464
Frequency to verify online information for problem-solving	4.88 (3.309)	5.43 (3.193)	158	-1.070	.286
Frequency to verify online information for personal information needs	4.04 (2.914)	4.45 (2.929)	158	-.893	.373
Frequency to verify online information for entertainment	4.48 (3.031)	4.78 (3.210)	158	-.608	.544
<b>Search Performance</b>					
Found the information that you want	3.61 (.961)	3.86 (.742)	148	-1.842	.068
Quickly found information	3.74 (1.003)	3.91 (.845)	154	-1.194	.235
Get sufficient information	3.65 (.099)	3.74 (.103)	158	-.611	.542

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Table 12 Independent-samples t-test results comparing males and females on all sub-scales of knowledge, experience, intention, and behavior of full-time employees' information verification and search performance**

Dimension/ sub-scale	Gender – male (n=59) M (SD)	Gender – female (n=59) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.88 (.768)	3.76 (.773)	116	.836	.405
To evaluate source factor (information sources) before use	3.80 (.867)	3.63 (.908)	116	1.037	.302
To evaluate presentation factor (the appropriateness of presentation) before use	3.97 (.742)	3.80 (.805)	116	1.189	.237
<b>Experience in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.58 (1.004)	3.42 (.986)	116	.833	.407
To evaluate source factor (information sources) before use	<i>3.75 (.883)</i>	3.41 (.931)	116	2.030	.045*
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.86 (.880)</i>	3.37 (.908)	116	2.986	.003**
<b>Intention/ Interests in Information Verification [Information for working]</b>					
To evaluate information factor (the quality of information content) before use	3.90 (.845)	3.69 (.856)	116	1.299	.197
To evaluate source factor (information sources) before use	3.93 (.848)	3.78 (.930)	116	.931	.354
To evaluate presentation factor (the appropriateness of presentation) before use	3.93 (.807)	3.90 (.781)	116	.232	.817
<b>Intention/ Interests in Information Verification [Information for entertaining]</b>					
To evaluate information factor (the quality of information content) before use	3.46 (1.150)	3.49 (1.073)	116	-.166	.869
To evaluate source factor (information sources) before use	3.36 (1.126)	3.41 (1.036)	116	-.255	.799
To evaluate presentation factor (the appropriateness of presentation) before use	3.47 (1.040)	3.51 (1.104)	116	-.172	.864
<b>Information-Verification Behavior</b>					
Frequency to verify online information for working achievement	6.20 (3.039)	5.88 (3.018)	116	.578	.565
Frequency to verify online information for problem-solving	4.92 (3.229)	5.32 (3.365)	116	-.670	.504
Frequency to verify online information for personal information needs	5.90 (3.072)	5.58 (3.097)	116	.567	.572
Frequency to verify online information for entertainment	5.86 (2.874)	6.00 (2.704)	116	-.264	.792
<b>Search Performance</b>					
Found the information that you want	4.02 (.799)	3.92 (.896)	116	.651	.516
Quickly found information	4.17 (.813)	3.98 (.841)	116	1.225	.223
Get sufficient information	<i>4.08 (.816)</i>	3.76 (.878)	116	2.065	.041*

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

**Information Seeking, Information Verification, and Search Performance between Students and Employees**

Results from independent-samples t-tests were shown in Table 13. There were statistically significant differences between full-time students and full-time employees in almost all aspects of information seeking, excluding their experiences. Hence, there was enough evidence to support alternative hypotheses ( $H17a - H17d$ ).

**Table 13 Independent-samples t-test results comparing full-time students and full-time employees on all sub-scales of knowledge, experience, intention, and behavior of information seeking**

Dimension/ sub-scale	Full-time employees (n=210) M (SD)	Full-time students (n=210) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Seeking</b>					
To search for new learning materials	<i>4.10 (.711)</i>	3.90 (.745)	418	2.813	.005*
To try different searching approaches	<i>3.92 (.849)</i>	3.69 (.910)	416	2.771	.006*
To read and understand the content of a text	<i>3.98 (.722)</i>	3.64 (.790)	415	4.578	.000***
To organize and synthesize the searched materials/ information from various sources	<i>3.88 (.770)</i>	3.59 (.767)	418	3.936	.000***
<b>Experience in Information Seeking</b>					
To search for new learning materials	3.72 (1.036)	3.68 (1.016)	418	.380	.704
To try different searching approaches	3.59 (.960)	3.45 (1.002)	418	1.491	.137
To read and understand the content of a text	<i>3.73 (.920)</i>	3.46 (.864)	418	3.170	.002**
To organize and synthesize the searched materials/ information from various sources	<i>3.64 (.882)</i>	3.42 (.894)	418	2.528	.012*
<b>Intention/ Interests in Information Seeking</b>					
To search for new learning materials	<i>4.10 (.728)</i>	3.89 (.749)	418	2.972	.003**
To try different searching approaches	<i>3.80 (.917)</i>	3.60 (.974)	418	2.167	.031*
To read and understand the content of a text	<i>3.96 (.724)</i>	3.64 (.759)	418	4.471	.000***
To organize and synthesize the searched materials/ information from various sources	<i>3.85 (.786)</i>	3.60 (.814)	418	3.172	.002**
<b>Information-Seeking Behavior</b>					
Frequency to search online information for academic/ working achievement	<i>5.02 (1.501)</i>	3.65 (1.610)	416	9.059	.000***
Frequency to search online information for problem- solving	<i>3.97 (1.592)</i>	3.19 (1.531)	418	5.155	.000***
Frequency to search online information for personal information needs	4.55 (1.451)	4.31 (1.422)	418	1.732	.084
Frequency to search online information for entertainment	4.61 (1.473)	<i>5.01 (1.421)</i>	418	- 2.798	.005*

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

As shown in Table 14, independent-sample t-tests showed that there were significant differences between full-time students and full-time employees in terms of their knowledge, experience, intention, frequencies to evaluate information, and search performance. Thus, there was enough evidence to support the alternative hypothesis (H18a - H18c, H18e, and H19).

**Table 14 Independent-samples t-test results comparing full-time students and full-time employees on all sub-scales of knowledge, experience, intention, and behavior of information verification and search performance**

Dimension/ sub-scale	Full-time employees (n=210) M (SD)	Full-time students (n=210) M (SD)	df	t	p
<b>Knowledge/ Capacity in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	<i>3.79 (.774)</i>	3.54 (.807)	418	3.208	.001**
To evaluate source factor (information sources) before use	<i>3.74 (.842)</i>	3.56 (.830)	418	2.277	.023*
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.87 (.743)</i>	3.50 (.808)	415	4.964	.000***
<b>Experience in Information Verification</b>					
To evaluate information factor (the quality of information content) before use	3.50 (.955)	3.32 (.983)	418	1.914	.056
To evaluate source factor (information sources) before use	<i>3.61 (.897)</i>	3.38 (.962)	418	2.519	.012*

Table 14 (Continued)

Dimension/ sub-scale	Full-time employees (n=210) M (SD)	Full-time students (n=210) M (SD)	df	t	p
To evaluate presentation factor (the appropriateness of presentation) before use	3.60 (.902)	3.43 (.917)	418	1.931	.054
<b>Intention/ Interests in Information Verification</b> <b>[Information for studying/ working]</b>					
To evaluate information factor (the quality of information content) before use	<i>3.81 (.800)</i>	3.56 (.901)	412	3.092	.002**
To evaluate source factor (information sources) before use	<i>3.87 (.819)</i>	3.53 (.848)	417	4.155	.000***
To evaluate presentation factor (the appropriateness of presentation) before use	<i>3.85 (.780)</i>	3.66 (.811)	418	2.454	.015*
<b>Intention/ Interests in Information Verification</b> <b>[Information for entertaining]</b>					
To evaluate information factor (the quality of information content) before use	3.52 (1.032)	3.50 (1.055)	418	.187	.852
To evaluate source factor (information sources) before use	3.47 (1.013)	3.40 (1.046)	418	.664	.507
To evaluate presentation factor (the appropriateness of presentation) before use	3.56 (.977)	3.41 (.951)	418	1.569	.117
<b>Information-Verification Behavior</b>					
Frequency to verify online information for academic/ working achievement	<i>5.93 (2.930)</i>	5.09 (2.739)	418	3.045	.002**
Frequency to verify online information for problem-solving	5.24 (3.280)	5.11 (3.220)	418	.405	.685
Frequency to verify online information for personal information needs	<i>5.63 (2.968)</i>	4.17 (2.880)	418	5.123	.000***
Frequency to verify online information for entertainment	<i>5.71 (2.945)</i>	4.60 (3.028)	418	3.823	.000***
<b>Search Performance</b>					
Found the information that you want	<i>3.98 (.803)</i>	3.72 (.843)	410	3.201	.001**
Quickly found information	<i>4.05 (.784)</i>	3.79 (.904)	414	3.172	.002**
Get sufficient information	<i>3.91 (.810)</i>	3.60 (.892)	418	3.665	.000***

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$  Note: significant greater dimensions were shown in italics.

### Information Seeking and Verification according to Task Types of Students and Employees

The results of paired-sample t-tests were shown in Table 15 and Table 16. For full-time students, there were significant differences between their frequencies to search online information for all task types. For full-time employees, there were significant differences between their frequencies to search online information for almost all activities except frequency to search online information for personal needs and entertainment. Hence, there was enough evidence to support the alternative hypothesis ( $H20a - H20f$ ,  $H21b - H21f$ ,  $H22a - H22e$ ,  $H23a$ , and  $H23e$ ).

Table 15 Paired-samples t-test comparisons of information seeking and verification behavior by task types of full-time students (n=243)

Dimension/ sub-scale	M (SD)	1	2	3
<b>Information-Seeking Behavior</b>				
<i>t (df)</i>				
1 Frequency to search online information for academic achievement	3.71 (1.601)			
2 Frequency to search online information for problem-solving	3.21 (1.554)	5.193*** (242)		
3 Frequency to search online information for personal information needs	4.32 (1.427)	-6.000*** (242)	- 10.362*** (242)	

**Table 15 (Continued)**

Dimension/ sub-scale	M (SD)	1	2	3
4 Frequency to search online information for entertainment	5.03 (1.423)	- 11.158*** (242)	- 16.193*** (242)	- 8.499*** (242)
<b>Information-Verification Behavior</b>		<b>t (df)</b>		
1 Frequency to verify online information for academic achievement	5.05 (2.721)			
2 Frequency to verify online information for problem-solving	5.12 (3.272)	-.371 (242)		
3 Frequency to verify online information for personal information needs	4.19 (2.904)	5.225*** (242)	4.358*** (242)	
4 Frequency to verify online information for entertainment	4.55 (3.038)	3.146** (242)	2.956** (242)	-2.421* (242)

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$

**Table 16 Paired-samples t-test comparisons of information seeking and verification behavior by task types of full-time employees (n=210)**

Dimension/ sub-scale	M (SD)	1	2	3
<b>Information-Seeking Behavior</b>		<b>t (df)</b>		
1 Frequency to search online information for working achievement	5.02 (1.501)			
2 Frequency to search online information for problem-solving	3.97 (1.592)	11.518*** (209)		
3 Frequency to search online information for personal information needs	4.55 (1.451)	4.654*** (209)	-5.680*** (209)	
4 Frequency to search online information for entertainment	4.61 (1.473)	3.494** (209)	-5.126*** (209)	-.640 (209)
<b>Information-Verification Behavior</b>		<b>t (df)</b>		
1 Frequency to verify online information for working achievement	5.93 (2.930)			
2 Frequency to verify online information for problem-solving	5.24 (3.280)	3.109** (209)		
3 Frequency to verify online information for personal information needs	5.63 (2.968)	1.469 (209)	-1.716 (209)	
4 Frequency to verify online information for entertainment	5.71 (2.945)	1.123 (209)	-2.337* (209)	-.536 (209)

\*\*\* $p < .001$  \*\* $p < .005$  \* $p < .05$



**Figure 1. Knowledge, experience, intention, and behavioral gaps (a) within students and employees and (b) between groups of students and employees.**

Figure 1a showed the significant gaps within students’ information seeking and verification, whereas Figure 1b presented the significant differences of information seeking and verification of students and employees who had different demographic backgrounds.

**Discussion**

*H1 – H6, H17 – H23* conformed to the literature review supports. According to the testing of *H7 – H10*, insignificant differences could be explained by the study of Rowley and Johnson (2013) emphasizing that credibility evaluation might mainly rely on the criticality of information needs and convenience. According to the testing of *H11* and *H12*, the insignificant differences of gender in both students and employees were supported by the insignificant effects of genders in the studies of Sin and Kim (2013), Niu and Hemminger (2012), and Krampen et al. (2011). Female students searched online information for

personal needs more often than males. This was supported by the study of Rowley et al. (2017) proposed that women were more active and proactive in health information seeking than men.

According to the testing of *H13 – H16*, the findings were in accord with insignificant gender effects on confidence, evaluation, and terminology regarding health information in the study of Enwald et al. (2016). The insignificant differences according to gender could also be explained by the study of Fakharzadeh and Amini (2021) showing the insignificant impact of gender on credibility judgment behavior.

## Implications

For theoretical implications, this study enhances the existing literature in terms of exploring knowledge, experience, intention, and behavior of information seeking and verification, investigating and comparing information seeking/ verification, and search performance of students and employees, and determining the gaps between their experience, knowledge, and intention in information search and evaluation, exploring the effects of gender and education backgrounds on information seeking and verification.

For practical implications, first, participants give importance to the quality of information in terms of accessible, economical, timely, simple, reliable, and flexible respectively. Therefore, schools, universities, and companies should provide trusted information sources that are updated and easy to access in economical ways. The information which is accessed via mobile devices and laptops through universities/ companies' portals should be easy to understand and flexible to use for various purposes. Universities and companies should provide Internet infrastructure such as Wi-Fi in place.

Second, students and employees significantly have less experience in information seeking and verification, compared to their knowledge and intention. Both groups have a higher intention to verify the information for studying than information for entertainment. Their knowledge in verification is generally lower than their intention. Thus, teachers/ managers should assign more information search tasks, related to studying/ working, to them to enhance their experience. Students/ employees should be commissioned to search for new materials from various sources with different search approaches, to evaluate the information, source, and presentation of materials, and to show their understanding/ applications of the materials. The increase in experiences could lead to more knowledge about information seeking and verification further. University lecturers should persuade their students to assess the content quality and information sources and teach them how to evaluate the information presentation properly. Managers should persuade their employees to conduct more searches, use various approaches, and guide them on how to evaluate information sources.

Third, for students studying lower than a bachelor's degree, they have limited knowledge regarding information seeking than those who are studying for a bachelor's degree or higher. Thus, teachers should educate them about how to find new materials, and how to comprehensively read them and synthesize various online materials. Although the students studying lower than a bachelor's degree believe to have more experience in assessing information and intention to verify information sources, their search performances are lower than those studying a bachelor's degree. Hence, teachers should help them improve their search performance to find the right and sufficient information for their studying. For companies, employees with master's degrees have better search performance compared to those with a bachelor's degree. Therefore, companies should guide search strategies for their employees with bachelor's degrees to help them effectively find information.

Fourth, female students conduct searches more often than male students, but male students believe that they have more search experience than female students. For companies, males perceive higher experience and search performance than females. Thus, companies should assign females to fulfill tasks about searching information resources, reading/ analyzing/ synthesizing those resources, and verifying information's source

and presentation, to indirectly help them to get enough information for work and increase their experiences. Fifth, employees perceive higher knowledge, experience, intention, and behavior in information seeking, information verification, and search performance than students in almost all aspects except for verification intention. This could happen because employees generally are older than students, so they gain more knowledge, experience, intention, and behavior about information than younger people. However, employees still feel that they have less experience compared to their knowledge and intention. Thus, companies should increase employees' experience in information seeking by enabling them to search online sources with different approaches more improve their information verification in terms of assessing information and presentation factors of Internet information.

Sixth, students frequently conduct information searches for personal needs and entertainment more than for academic and problem-solving. Thus, teachers should additionally assign them to seek information to solve academic problems. However, they tend to verify the information for academic achievement and problem-solving more often than information for personal needs and entertainment, which is satisfactory. On the contrary, employees generally conduct information searches for works greater than for other purposes, which is good for companies. However, they should be encouraged to verify online information for working and problem-solving more to help them gain quality information for their works. These guidelines could be applied to refine universities' / corporates' IL programs.

## Limitations and Future Research

The limitations of this study are: first, non-probability sampling is applied. Second, females, some age groups, and participants with bachelor's degrees are more than others. Future research should collect data in the same amount. Third, this study has looked only at students with ages less than 35 years old and employees with ages more than or equal to 20 years old, limiting the generalization across all student and employee populations. Forth, a self-administered questionnaire (SAQ) is applied. Thus, the results of this study should be applied with caution. Fifth, this study focuses on broad information behavior, so future studies should investigate specific tools such as Google search or companies' portals. Information seeking, verification, and search performance between complex tasks and simple tasks should also be explored. Last, this study is based on Thai participants, which could limit the generalization of research findings. Future research should expand the study into other Southeast Asian countries to compare and contrast these gaps between knowledge, experience, intention, and information behavior.

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