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A Research of Computer Self-Efficacy and Information Security Literacy among College Students in Taiwan

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ABSTRACT: *This study focuses on college students and explores college students' computer self-efficacy and information security literacy through a survey in Taiwan. The questionnaire includes Student's Background Information, Computer Self-Efficacy Scale and Information Security Literacy Scale.*
The research result shows:
1. Students' computer self-efficacy is currently at a moderate to high level, and their information security literacy is at a relatively high level.
2. Among computer self-efficacy, the "Internet application ability" aspect performs best; among information security literacy, the "Internet ethics" aspect performs best.
3. In the comparison between colleges, there are significant differences in basic operational abilities, Internet application abilities, and overall self-efficacy of the Intellectual Science College, which are all higher than those of the other College students. In addition, there is a significant difference in the computer virus score of the students of Institute of Science and Technology, which is higher than that of the Polytechnic college students. The results of this study have important reference value for improving college students' computer self-efficacy and information security literacy.

KEY WORD*: Computer self-efficacy, Information security literacy, Information ethics attitude.*

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I. INTRODUCTION

For today's society, information technology has become an indispensable part, and computers are one of the necessary tools for modern people. The reason why information is important is that it is necessary for everyone's life; it is an essential tool in the learning process of all courses (Shi Meizhu, 2000). However, with the development of computer technology, information security issues are receiving increasing attention. Therefore, exploring college students' computer self-efficacy and information security literacy has become a very important research topic.

Taking I-Shou University students in Taiwan as an example to study will help to gain a deeper understanding of college students' self-efficacy and information security literacy when using computers, and can provide relevant school units with suggestions for improving teaching methods and information security measures, thereby improving students' learning outcomes. and information security awareness, which will be helpful to students' future career development and personal information security.

Due to the vigorous development of information technology and the Internet, more and more people are using the Internet. People use the Internet to engage in various activities. However, while enjoying the Internet, if individuals lack the habit of confidentiality or If information literacy is insufficient, you may face many information security threats, and most of the targets of network security incidents are college students. Therefore, this study takes students currently studying at I-Shou University as the research subjects to explore the relationship between information literacy and the Internet. The connection between the road security incident. This study adopts an empirical method to collect data through a questionnaire. The questionnaire targets students at I-Shou University. It attempts to understand the research subjects' awareness of information security from the analysis results.

Based on the above research motivation and background, this study focuses on the urban city of Kaohsiung in Taiwan, and aims to explore the relationship between the learning environment background variables, computer self-efficacy and information literacy of university students in different departments. Specifically, the research purposes have the following four items.

(1) There are significant differences in computer self-efficacy among college students with different background variables.

(2) There are significant differences in information security literacy among college students with different background variables.
(3) There is a significant correlation between college students' computer self-efficacy and information security literacy.
(4) College students' computer self-efficacy has significant predictive power on information security literacy.

II. RESEARCH OBJECTIVES

Based on the above research motivations, the research objectives of this study are as follows:
(1) What are the current differences in computer self-efficacy among college students with different background variables?
(2) What are the differences in the current status of information security literacy among college students with different background variables?
(3) What is the relationship between computer self-efficacy and information security literacy among college students?
(4) What is the predictive power of college students' computer self-efficacy on information security literacy?

III. LITERATURE REVIEW

Under Bandura's concept of self-efficacy, scholars such as Hill (1987) applied the concept to the use of information technology to form computer self-efficacy. This has laid the foundation for research related to "computer self-efficacy", which combines beliefs and behaviors and has an important impact on computer use (Yang, 2004). The following will further explore the connotation, theory and related research of computer self-efficacy through relevant literature. The definition of self-efficacy proposed by Bandura in 1977 refers to an individual's confidence and ability to complete specific tasks (Li, 2017). He emphasized that personal self-efficacy is a subjective assessment rather than an objective assessment of ability. It involves an individual's perception of his or her abilities, knowledge, and skills. Bandura believes that personal self-efficacy comes from the following aspects:

(1) Experience: Past successful experiences can enhance an individual's self-efficacy, while failure experiences can reduce an individual's self-efficacy.

(2) Observational learning: Observing the process and results of others completing tasks will also affect an individual's self-efficacy.

(3) Discourse persuasion: Others' words or self-motivating language can affect an individual's self-efficacy.

(4) Physiological reactions: An individual's physiological reactions, such as increased heartbeat or sweaty hands, can also affect an individual's feelings of self-efficacy.

Compeau and Higgins (1995) proposed four sources of self-efficacy based on Bandura (1986), and extended the explanation of the sources of computer self-efficacy as follows:

(1) Guidance proficiency: More experience in successfully using computers can produce higher computer self-efficacy.

(2) Behavioral imitation: Learning to solve problems by observing others' operations. This computer training method can improve individuals' computer self-efficacy.

(3) Social persuasion: The more people or words tell you that you have the ability to learn computers and that you perform well, the better your computer self-efficacy will be and the more confident you will be in using computers.

(4) Physiological state: Feeling nervous and anxious when using computers will reduce computer self-efficacy.

Information literacy was first defined in 1974, when Paul Zurkowski, president of the American Association for Library and Information Science, first proposed the term "information literacy" in a report of a meeting of the National Committee on Information Services and Library Personnel (Doyle, 1994), arguing that information literacy A literate person is someone who can learn a resource-rich tool and effectively solve the problems they face.

Yang Jing'en (2004), in "Research on the Impact of Domestic Police Officers' Information Security Literacy on Information Crime Investigation Capabilities", he believed that "information security literacy" should refer to individuals' ability to operate the tools and systems for information processing and dissemination, including computers and media systems. Basic abilities related to the Internet, as well as the ability to appreciate the value and power of information security, and understand the nature and management characteristics of information security. Wu (2023) concluded in his paper that the connotation of information security literacy should include four levels: "information security knowledge", "information security operation skills", "information security applications, limitations and impacts", and "information security ethics".

IV. RESEARCH METHODS

The purpose of this study is to explore the current status and relationship between computer self-efficacy and information security literacy among university students. To achieve the purpose of the study, this study collected data through a questionnaire survey. This chapter is divided into five sections. The first section is the research structure, the second section is the research hypothesis, the third section is the research object, the fourth section is the research tools and procedures, and the fifth section is the data processing, which is described in Research structure.

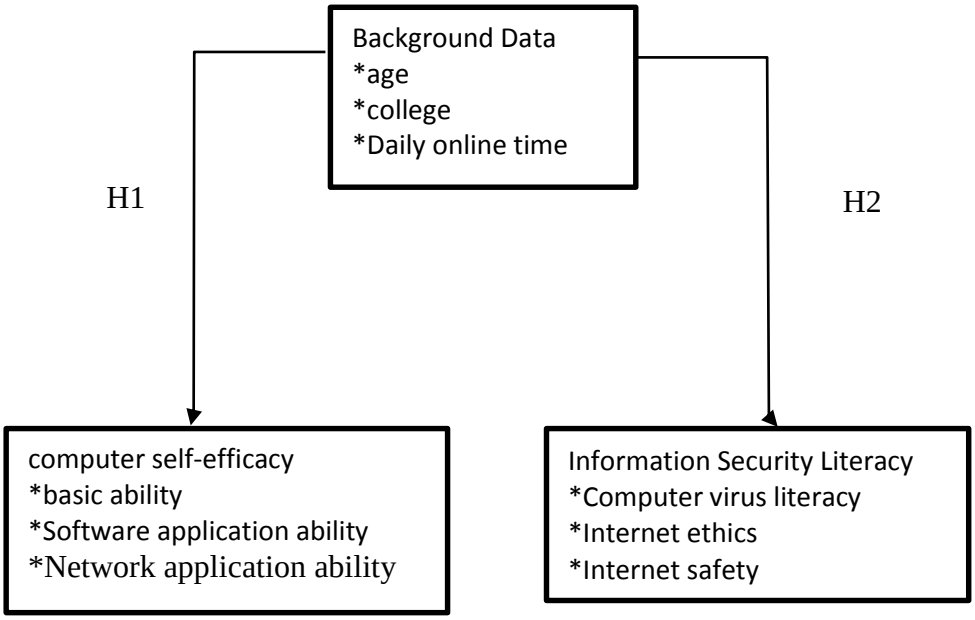

Figure 1: Research Structure

Based on the research purpose, research questions and research structure, this study puts forward the following research hypotheses:

H1: There are significant differences in computer performance among college students with different background variables.

H1-1: There are significant differences in computer self-efficacy among college students of different genders.

H1-2: There are significant differences in computer self-efficacy among college students of different grades.

H1-3: There are significant differences in computer self-efficacy among college students with different daily online time.

H1-4: There is a significant difference in computer self-efficacy between the College of Smart Technology and individual colleges of science.

H1-5: There are significant differences in computer self-efficacy among college students from different faculties of science.

H2: There are significant differences in information security literacy among college students with different background variables.

H2-1: There are significant differences in information security literacy among college students of different genders.

H2-2: There are significant differences in information security literacy among college students of different grades.

H2-3: There are significant differences in information security literacy among college students with different daily online time.

H2-4: There is a significant difference in information security literacy between the College of Smart Technology and individual colleges.

H2-5: There are significant differences in information security literacy among college students from different faculties of science.

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V. Analysis results and Conclusion

The frequency distribution of background variables in the formal sample of this study

(1) In terms of gender, there are 97 "boys", accounting for 45.3%; 117 "girls", accounting for 54.7%.

(2) In terms of grade, there are 38 "freshmen", accounting for 17.8%; 54 "sophomores", accounting for 25.2%; 78 "juniors", accounting for 36.4%; 33 "seniors", accounting for 15.4% %; 11 people are "Big Five or above", accounting for 5.1%.

(3) In terms of average daily online time, 1 person said "less than 1 hour", accounting for 0.5%; 12 people said "1 to 3 hours", accounting for 5.6%; 45 people said "3 to 5 hours", accounting for 21.0% ; "5 to 7 hours" 73 people, accounting for 34.1%; "7 to 10 hours" 62 people, accounting for 29.0%; "more than 10 hours" 21 people, accounting for 9.8%.
(4) In terms of the colleges they belong to, there are 49 people in the "School of Smart Technology", accounting for 22.9%; 27 people in the "School of Engineering", accounting for 12.6%; 46 people in the "School of Management", accounting for 21.5%; 20 people in the "School of Communication and Design" people, accounting for 9.3%; "International College" 6 people, accounting for 2.8%; "School of Tourism and Hospitality" 12 people, accounting for 5.6%; "School of Chinese Language and Literature" 15 people, accounting for 7.0%; "Medical College" 24 people, accounting for 11.2 %; "College of Medical Science and Technology" 12 people, accounting for 5.6%; "College of Aboriginal Peoples" 3 people, accounting for 1.4%.

Level name	1. (n=49)		2. (n=12)		t value	*p* value	95%CI	
	M	SD	M	SD			LL	UL
basic ability	3.37	0.61	2.93	0.39	3.04	.005	0.14	0.73
Software application ability	3.05	0.61	2.91	0.35	0.75	.454	-0.23	0.50
Network application ability	3.50	0.68	3.14	0.45	2.14	.042	0.01	0.69
computer self-efficacy	3.31	0.60	2.99	0.38	2.29	.030	0.03	0.60

Table 1: Independent sample t-test summary table of computer self-efficacy among college students from the Institute of Smart Technology (Intelligence Technology) and the Institute of Tourism and Hospitality

Level name	1. (n=49)		2. (n=27)		t value	*p*	95%CI	
	M	SD	M	SD			LL	UL
Computer virus literacy	4.15	0.59	3.69	1.25	2.18	.032	0.04	0.88
Internet ethics	4.20	0.63	3.85	1.31	1.54	.126	-0.09	0.78
Internet safety	4.23	0.62	3.87	1.31	1.61	.112	-0.08	0.80
Information Security Literacy	4.19	0.59	3.80	1.27	1.81	.073	-0.03	0.81

Table 2: Independent sample t-test summary table of information security literacy among college students from Smart Technology College and Polytechnic Institute

From Table 2 we know:
(1) At the level of basic operational abilities, $t(61)=3.04$, $p=0.005<.05$, the results show that there is a significant difference in the scores of college students from the School of Intellectual Science and the School of Dining at the level of basic operational abilities. Observing the average, we know The scores of college students from the College of Intellectual Science and Technology in basic operational abilities are significantly higher than those of college students from the College of Dining.
(2) In terms of Internet application ability, $t(61)=2.14$, $p=0.042<.05$, the results show that there is a significant difference in the Internet application ability scores of college students from the College of Intellectual Science and the School of Dining. The observed average value is, It was found that the scores of college students from the College of Intellectual Science and Technology in terms of Internet application ability were significantly higher than those of college students from the College of Dining.

(3) The overall computer self-efficacy part, t(61)=2.29, p=0.030<.05, the results show that there is a significant difference in the overall computer self-efficacy scores of college students from the College of Intellectual Science and College of Food and Drink. Observing the average, we know The overall computer self-efficacy scores of college students from the School of Science and Technology are significantly higher than those of college students from the School of Dining.

According to the results of the independent sample t-test, there are significant differences between Kaohsiung City college students at the Intelligent Science Academy and the Dining Academy in terms of basic operational abilities, network application abilities, and overall computer self-efficacy scores.

At the level of computer viruses, t (76)=2.18, p=0.032<.05. The results show that there is a significant difference in the scores of college students from the Institute of Intellectual Science and Technology and the Polytechnic Institute. Observing the average, it is known that the students from the Institute of Intellectual Science and Technology are more effective in computers. The virus level scores were significantly higher than those of polytechnic students.

According to the results of the independent samples t-test, there is a significant difference only in the computer virus level scores between Kaohsiung City college students at the Institute of Science and Technology and the Polytechnic Institute.

VI. FINDING

According to the research conclusions, specific personal suggestions are put forward for reference in relation to education-related units, and future research directions for the purpose of the research.

1. The information courses contribute to the cultivation of information literacy and the promotion of activities: Schools can use information courses to strengthen the cultivation of students' information literacy, promote the ethics and norms of correct use of the Internet, and prevent students from breaking the law by doing incorrect behaviour on the Internet.
2. Students' computer self-efficacy is currently at a moderate to high level, and their information security literacy is at a relatively high level.
3. Among computer self-efficacy, the "Internet application ability" aspect performs best; among information security literacy, the "Internet ethics" aspect performs best.
4. In the comparison between colleges, there are significant differences in basic operational abilities, Internet application abilities, and overall self-efficacy of the Intellectual Science College, which are all higher than those of the Dining College students. In addition, there is a significant difference in the computer virus score of the students of Institute of Science and Technology, which is higher than that of the Polytechnic college students. The results of this study have important reference value for improving college students' computer self-efficacy and information security literacy.

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