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Gender Differences in Computer Literacy among Students in the Computer Introduction Course of the Department of Technology Management, Open University of Kaohsiung

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Abstract:

This study assesses gender differences in the computer literacy level among students in the Introduction to Computer Science course at the Department of Technology Management, Open University of Kaohsiung. We analyzed questionnaires from 50 males and 50 females and conducted surveys on computer literacy, computer attitude, and self-efficacy. The classes were mainly taught online, and the questionnaires were filled out online. Compared with the females, the males had better computer literacy, computer attitude, and self-efficacy. Based on the results, certain aspects must be strengthened for students, for example, the meaning and identification of file extensions, recognition of domain names, simple troubleshooting of computer failures, and use of office software such as word processing and presentations. Additionally, compared with the males, the females' performances were significantly lower in email-related knowledge and computer software installation experience. These results provide teachers with references for curriculum plans and student counseling.

Keywords:

Gender, Adult, Online Teaching, Computer Literacy, Computer Attitude, Self-Efficacy, Open University Of Kaohsiung

1. Introduction

With the development of computer technology, the lifestyle of society has changed. The booming development of smartphones and smart wearable devices, along with the rapid increase in network transmission rates, will lead to another significant change. In this process of change, due to computer technology, computer literacy is a crucial problem. Most adults can use smartphones, for example, to browse the internet, search, send messages, and participate in social interactions, but may not understand the basic operations of traditional computers and the knowledge related to application software and computers.

1.1. Teaching Experience and Problem Description

Open University of Kaohsiung (OUK) promotes adult education and lifelong learning. Anyone aged over 18 years can apply for admission, and no academic qualifications are required. Most courses in OUK are taught online. Students can use traditional computers, tablet computers, and smartphones to study online. Therefore, the school attaches great importance to students' knowledge and skills in using computer-related equipment. In particular, the Department of Technology Management has established a course called Introduction to Computer Science as a compulsory basic professional course. In addition to strengthening the computer operation skills of the students in the department, this course improves the students' computer literacy level to comply with the rapidly developing information society.

In Introduction to Computer Science, teachers use multimedia systems to apply information and communications technology (ICT) applications to provide course content as digital audiovisual materials. They then place these materials on online teaching platforms so that students can learn autonomously. The benefits of online learning have been confirmed empirically. One of the most notable benefits is that asynchronous online teaching provides fast information dissemination and student learning is not limited by time and space. As long as students have internet access, they can study at different locations and times according to their preferences. Thus, online learning respects individual privacy and provides fair learning opportunities. However, if these students have insufficient self-discipline and opportunities for face-to-face communication (e.g., between teachers and students), they may feel lonely and helpless and begin to skip class, hindering there learning. Thus, OUK's online courses are paired with face-to-face teaching activities where the students attend an in-person class four times per semester.

Introduction to Computers also has an online discussion area where students can communicate about the content of the course with teachers and other students. The four teaching activities back to school are mainly for teachers to provide students' guidance in online learning. However, these activities must be accompanied by students asking questions, or the teachers cannot understand what students need to strengthen their learning. Because the students are adults and usually not in class together, they are unfamiliar with each other. Each student's learning progress is unique. Additionally, Oriental students do not like to ask questions; thus, teachers have difficulty gleaning relevant information from the classroom website. Thus, despite the discussion forum, the problems encountered by students in their studies cannot be fully understood, and if it is impossible to understand students' learning difficulties, it is difficult for teachers to provide effective teaching content. In addition, the content of online teaching is designed by teachers according to their own profession. Table 1 shows the pre-design subjects that are taught in this course. However, the students' computer background experience is scattered. In order to increase students' learning effectiveness, teachers must understand what students lack and need. Places to adjust teaching content or strengthen teaching during the course. In order to achieve this goal, we must conduct research at the beginning of the course to gain students' background knowledge.

Table 1. *Pre-design subjects that are taught in computer introduction course.*

Subjects
Fundamentals of computers
History of computers
Structure of computers

Digital systems and conversion
Data representation
Capacity and size of computers
Hardware
Processing unit
Mainboard
Central Processing Unit
Ports
Memory and storage unit
Input Units
Output Units
Power Supply
Software
operating system
System software
Software Package and App
Programming Language
Introduction to the Internet
Internet applications
Internet of Things
Wireless network
Mobil communication
Introduction to e-commerce
Information system
Information Security
Viruses and hackers
Data and backup
Information Ethics and Law

1.2. Teaching Experience and Problem Description

Introduction to Computers is a basic course of OUK, which aims to improve students' computer literacy. Based on the previous teaching experience of observing student behavior, many older female students want to improve computer skills compared to boys, but often feel frustrated when using computers. Moreover, in order to overcome the decentralization of the students' computer background experience and understand what the students lacked in the background knowledge before learning, it is used as the adjustment of the teacher's teaching content in the class to improve teaching effectiveness. And in order to improve teachers' understanding of the content problems encountered by students in online learning in the computer introductory course, these problems need further research. Therefore, the purpose of this study is to evaluate and understand the status and differences of male and female computer literacy, and use this as a reference to provide guidance for the design of teacher teaching content and student guidance. The research results will also provide information for course design decision makers and become the basis for their in-depth planning of computer literacy courses.

2. Theoretical Perspectives

2.1. Computer Literacy

ICT refers to all the technologies used for locating and processing information, and communicating and producing digital media, such as computer technology, smartphones, the internet, and multimedia [1.2,3]. ICT literacy could be defined as the ability to use digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information to function in a knowledge society [4]. Nowadays, understanding the internet and its services, for example, search engines and communication platforms (e.g., email and social media), is the basic ability necessary to improve computer literacy and achieve a higher level of ICT literacy.

ICT use in higher education has been increasing, and this increased use has reformed the approaches of teachers to teaching and students to learning and the communication and interaction within education environments [5]. As a distance learning school, OUK uses ICT in teaching. Students can access teaching materials, submit assignments, take exams, and leave messages for their classmates and teachers on the virtual platform.

Online information literacy instruction has become common because online teaching has flourished since its inception. In addition to distance learning, it has been used in many other fields, for example, business and industry, military and the government, higher education, and PK–12 schools, to provide learners with training and other educational opportunities [6].

Because of the increasing application of ICT in education, students must acquire new skills and competencies to study and perform research. Currently, there are many online services, and the content of these services is continually increasing. Generally, students often use online services, for example, blogs, social networks, hobby sites, and shopping sites [7]. As an educational and entertainment tool, ICT allows students to learn about almost any topic and browse websites that help them learn. However, students must have the necessary computer literacy competencies to use ICT resources effectively.

The term computer literacy has long been used to describe the skills and tendencies to use computers and information technology. Computer literature is a major strand of educational literature, and because of the link between computers and culture, communication skills are gradually becoming more popular [8]. Mitra [9] regarded computer literacy as the amount of computer knowledge and computer use time. Idowu et al. [10] defined computer literacy as the ability to use computer systems to operate word processing files, analyse data, develop small computer programs, browse the internet, and install software. Loyd and Gessard [11] understood computer literacy in terms of the amount of time spent on computers, the ownership of computers, and the number of courses taken related to computers. Francis and Katz [12] argued that computer literacy is related to the experience and use of computers, programming skills, and abilities to use software. Simonson et al. [13] proposed an operational definition of computer literacy, “An understanding of computer characteristics, capabilities and applications, as well as an ability to implement this knowledge in the skilful and productive use of computer applications suitable to the individual roles in society.” Smith and Necessary [14] demonstrated that variables such as computer experience, familiarity, use, and ownership affect the self-reported computer literacy level. Kegel et al. [15] proposed that computer literacy includes four main aspects: computer experience, computer knowledge, computer skills, and computer attitudes.

2.2. Computer Literacy and Gender

Most research has observed a significant difference between males and females in computer literacy, and the computer literacy level of males is much higher than that of females. The research of Zin et al. [16] indicated a significant difference in computer literacy between male and female students. Males rate higher than females in factors such as computer experience and computer ownership, which affect the level of computer literacy. Smith and Necessary [14] observed that the computer literacy level of males is higher than that of females but that the gender difference in computer literacy decreases with the increase in computer experience (e.g., years of use and weekly use). Tella and Mutula [17] observed that compared with female students, male students have higher computer literacy and more computer experience. Female users' insufficient of computer experience is considered a critical factor in determining their attitudes and anxiety about computers [18]. Jackson et al. [19] compared computer literacy of males and females and observed that females reported more computer anxiety disorders, lower computer self-efficacy, and negative stereotypes about computers. Maxwell et al. [7] argued that although females' access to computers has increased because through Western education, female students in universities continue to have noticeable gender differences in their use of computers. Idowu et al. [10] had the same finding.

However, regarding students' test achievements, studies have observed changes in the previously reported gender differences. Fraillon et al. [20] explored the average computer and information literacy (CIL) scale scores of males and females in many countries and observed that the average score of female students was significantly higher than that of male students in all countries except in Turkey and Thailand. Aesaert and Braak [3] demonstrated differences between male and female ICT competence: The general trend was in favor of females, and in primary schools, females outperformed males. Hatlevik et al. [21] observed that in many of the countries that they studied, females performed better than males in all countries in CIL test performance. Therefore, further research is necessary on gender differences in computer literacy, to obtain more information and understand the possible impact of gender on school teaching.

3. Methodology

This study aims to investigate gender differences in computer literacy among students in the Introduction to Computers course at the Department of Technology Management, OUK. A questionnaire comprising demographic variables and three computer ability subscales—computer literacy, computer attitudes, and computer self-efficacy—were used for analysis. This research offers the following contributions to the literature:

An understanding of the gender differences in computer literacy, computer attitude, and self-efficacy.

An analysis of the correlation among students' computer literacy, computer attitude, and self-efficacy.

An exploration of the differences in students' computer literacy, computer attitudes, and self-efficacy for other demographic variables.

To verify the research questions, the following null hypothesis are assessed:

There are no statistically significant differences at the level of (0.05) between computer literacy and gender (and other demographic variables).

There are no statistically significant differences at the level of (0.05) between computer attitudes and gender (and other demographic variables).

There are no statistically significant differences at the level of (0.05) between computer self-efficacy and gender (and other demographic variables).

There are no statistically significant correlations at the level of (0.05) between computer literacy and computer attitudes.

There are no statistically significant correlations at the level of (0.05) between computer literacy and self-efficacy.

There are no statistically significant correlations at the level of (0.05) between computer attitudes and self-efficacy.

3.1. Design of Research Experiment

The computer literacy subscale comprised 20 items: 14 from Lin's [22] research, four from the internet, and two written by the author.

Among the four problems from the Internet, three problems come from one website, and one problem comes from another website. These three issues are the correct use of computer data security protection, the meaning of ".com" on the website and the correct description of free software. Another problem is the correct description of online learning. As for the correct description of cloud computing and what should be confirmed before installing commercial software on multiple computers, the author added one question for each of these topics. The total number of questions on computer literacy in this research was 20. After a detailed analysis, the Cronbach α was.707.

The computer attitude scale for this study had 20 questions, mainly from Lin [23] Lin's thesis mainly studied the relationship between seniors' computer experience and attitudes. The objects of his research are similar to the attributes of this research object, and they are the participants were adults. Lin's computer attitude scale was divided into four parts: computer anxiety, computer confidence, computer preference, and computer usefulness. Each part had five questions. This study also used this scale, except that the five topics of computer anxiety were presented in positive narrative grammar. For example, "I'm in a bad mood when I think of using a computer." was changed to "I'm in a good mood when I think of using a computer." After analysis, the Cronbach α of the computer attitude scale for this study was.948, higher than the coefficient of.904 in Lin's original thesis.

The computer self-efficacy scale also comprised 20 items: 14 items were from Zhang [24], and six items were written by the author. The original scale in Zhang [24] had 15 questions. Notably, Zhang researched middle and senior-grade students in primary school, and this study researched adult students. The course used in Zhang's research was an elementary school course, and based on the experience of previous students, the participants deleted one item concerning editing in image-processing software. In this study, in addition to the questions on the widespread use of ICT and smartphones, four items were added: using social networking sites (e.g., Facebook), using Google Maps to plan driving directions, using Google's map lookup function, and downloading from a Line file to the computer. To understand the basic computer

operation ability of students, two questions on using the mouse to shut down and inputting Chinese punctuation marks from the keyboard were used to form 20 self-efficacy scale questions. The Cronbach α of this scale was 9.44 in this study, and this metric from the scale is higher than the.91 in Zhang.

3.2. Evaluation Questionnaires

The information literacy scale (Table 2) comprised multiple-choice questions. Each question had four options, of which one was the correct answer. Each correct answer received 1 point, and each wrong answer received zero points. The computer attitude scale (Table 3) and self-efficacy scale (Table 4) were measured by a Likert scale from 1 strongly disagree to 5 strongly agree. The normal range of the Cronbach's alpha reliability coefficient is between 0 and 1. George and Mallery [25] cited by Gliem et al. [26], provide the following rules: "_ >.9–Excellent, _ >.8–Good, _ >.7–Acceptable, _ >.6–Questionable, _ >.5–Poor, and _ <.5–Unacceptable." In this study, the questionnaire subscales for computer literacy, computer attitude, and computer self-efficacy had Cronbach α values of.707, .948, and.944, respectively. According to the aforementioned rules, the computer literacy scale indicates an acceptable level of reliability, and that the computer attitude and computer self-efficacy are at an excellent level. The internal Cronbach α value for all 60 items of the survey instrument in this study was.888, which is considered a good level of reliability. In addition to gender, demographic variables, including age, education, computer ownership, years of computer experience (<1, 3, 5, and > 5 years), and daily computer use time (<1, 3, 5, 7, and >7 hours per day).

Table 2. *Computer literacy test.*

Questions
1. On which of the following websites is it impossible to find information about Christmas?
2. Which of the following is not an online learning community site?
3. What is the most appropriate way to organize data?
4. Which way cannot tell whether the network information is trustworthy?
5. Which of the following methods cannot save your favorite website so that you can view it next time?
6. Someone on the internet asks you to provide your basic information (e.g., phone number, address) so that you can receive a present. How would you manage this situation?
7. Which is the correct source citation?
8. Which is the correct online etiquette?
9. A stranger on the internet said that he wanted to meet and make friends with you. What should you do?
10. Which is the correct email address format?
11. I cannot print after typing in word processing software. Which is not the cause?
12. If I accidentally delete a hard disk file, how can I restore it?
13. Which extension on the right is a video file?
14. Which device can scan photos?
15. Which of the following is the data security protection for the correct use of a computer?
16. What is the meaning of "com" in the URL?
17. Which of the following statements about cloud computing is wrong?
18. If the user wants to install commercial drawing software on multiple computers, what should be confirmed before installing this software?
19. Which of the following statements about "internet learning" is wrong?

20. Which of the following statements about free software is correct?

Table 3. *Computer attitude subscale.*

Questions
1. I do not feel stressed when others talk about computers.
2. When using a computer, I do not worry about breaking the computer.
3. I am not nervous at all when operating the computer.
4. I think I have the talent to learn computer skills.
5. I am in a good mood when I think of using a computer.
6. I have the ability to learn about computers.
7. My computer skills are better than those of other people of my age.
8. I am confident that I can handle things in my life with my computer.
9. I think it is easy to learn about computers.
10. I think I am cable of using a computer.
11. When I see the computer, I would like to use it and get close to it.
12. I like to talk about computers with others.
13. I seize any opportunity to learn about computers.
14. I think the more you get in touch with the computer, the more benefits you obtain.
15. I try to use my computer to deal with stuff as much as possible.
16. Computers will help me in the future.
17. Computers are closely related to my life.
18. The computer allows me to get a lot of information in a short time.
19. I think it is necessary to learn to use computers.
20. If I can improve my computer skills, I would like to take a computer course.

Table 4. *Computer self-efficacy subscale.*

Questions
1. Use the Chinese input method to key in data.
2. Understand the use of keyboards and special keys.
3. The opening, storage, and copying of files.
4. Self-installation of computer software (i.e., install or setup).
5. Simple troubleshooting for computer failure.
6. Use computer software to make cards.
7. Write letters or create forms by using word processing software.
8. Use computer presentation software to create slides or reports.
9. Use online community sites (e.g., Facebook).
10. Use any type of computer software to complete computer operations.
10. Enter a web address to connect to the internet.
12. Search for learning materials by using the internet.
13. Talk to or discuss things with others online.
14. Find the picture and text you want from the internet and download them.
15. Use a free mailbox (yahoo, Gmail) to write and receive letters.
16. Enter Chinese punctuation marks by using the keyboard.
17. Use your mouse to shut down the computer.
18. Use Google Maps to plan your driving route.
19. Use Google's Reverse Image Search function.
20. Download files sent through Line from friends to a computer.

3.3. Evaluation Questionnaires

Introduction to Computers was a three-credit course completed one semester. Teachers produced 54 lectures as the course's audiovisual material, which was available on digital platforms. Students learned online and participated in discussion forums. In the students' first face-to-face class, the teacher guided them as they filled out the questionnaire on the platform and reminded them to fill out the questionnaire online after the event. The students filled out the questionnaire online within one week after the face-to-face class. The duration of the investigation was approximately 30 minutes. One hundred students volunteered to fill out the questionnaire online, approximately 81.3% of the students in the course. There are 50 male and 50 female students.

3.4. Data Analysis

Data analysis of the questionnaire results was performed using R free software and Excel. The reliability analysis used Cronbach's α coefficient and the instructions for its R custom function are as follows:

```
reliability.function <- function(data)
{
 n <- ncol(data)
 p <- sum(apply(data, 2, var)) / var(apply(data, 1, sum))
 alpha = n / (n-1) * (1-p)
 cat("alpha=," alpha, "\n")
}
```

The ANOVA test used in this study used the R command aov(), the Pearson correlation test used the R command cor.test(), and the remainder of the screening statistical analysis used Excel.

4. Discussion

4.1. Demographic Analysis

4.1.1. Age Versus Gender

The age of the sample were from 18 to 75 years old. Table 5 and Figure 1 present the distribution of respondents' age versus gender. Most respondents are aged less than 50 years. For males, the 26 to 35 age group was the largest. For females, the 18 to 25 age group was the largest, and the number of respondents decreased with age. The average age of the males and females was 33.64 and 33.12 years old, respectively; thus, a difference in their ages was not obvious.

Table 5. *Distribution of age versus gender.*

Age	Male	Female
18–25	11	18
26–35	21	12
36–45	12	11
46–55	4	8
56–65	1	1

66–75	1	0
Average Age	33.64 years old	33.12 years old

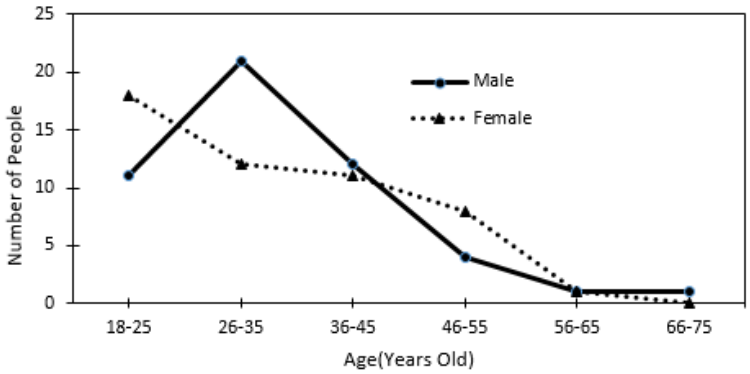

Figure 1. *Distribution of age versus gender.*

4.1.2. Education versus gender

Introduction to Computers was primarily taught online, and students were encouraged to participate in lifelong learning. As aforementioned, the course had no restrictions on the academic qualifications of students. The education level of students in this course was secondary school, high school, college, and university. The number of who had completed high school was the highest. The education versus gender distribution of the respondents is presented in Table 6 and Figure 2. In Figure 2, the distribution of the education level of males and females was similar.

Table 6. *Distribution of education versus gender.*

Education	Male	Female
Secondary school	1	3
High school	35	32
College	11	12
University	3	3

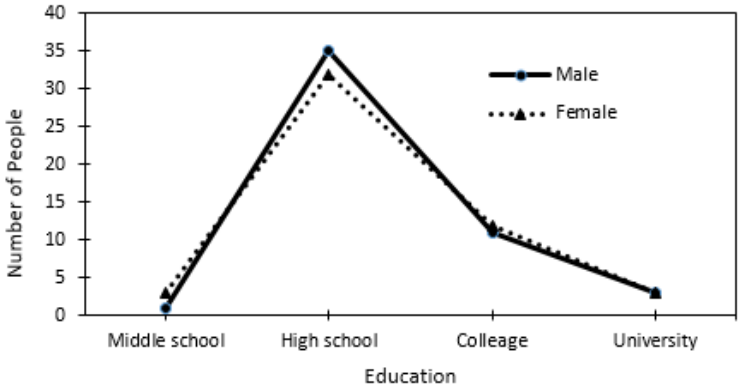

Figure 2. *Distribution of education versus gender.*

4.1.3. Years of Computer Experience Versus Gender

Because most courses at OUK are delivered online, students must use computer-related equipment for online learning. Most students from OUK have good experience with computers, and so do the students in Introduction to Computers. Table 7 and Figure 3 present the distribution of respondents' years of computer experience versus

gender. The respondents' computer experience ranged from 1 to 5 years. Most respondents had more than 5 years of computer experience: 80% and 76% of males and females, respectively, had been using computers for more than 5 years. In Figure 3, the difference in the distribution of male and female numbers in years of computer experience is not significant.

Table 7. *Distribution of computer experience versus gender.*

Years	Male	Female
<1	4 (8%)	2 (4%)
<3	4 (8%)	7 (14%)
<5	2 (4%)	3 (6%)
>5	40 (80%)	38 (76%)

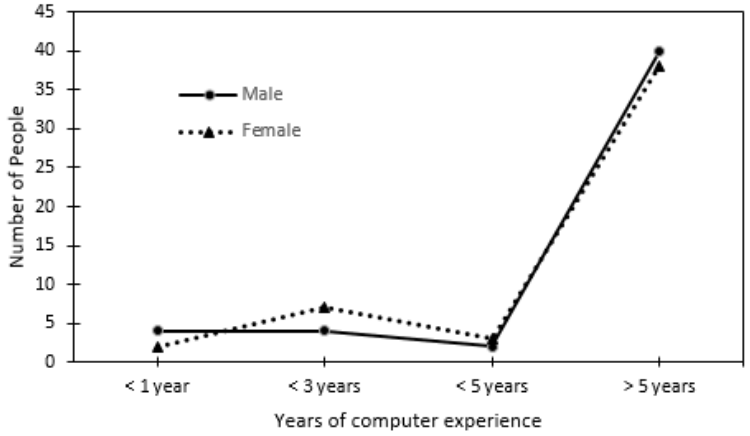

Figure 3. *Distribution of computer experience versus gender.*

4.1.4. Daily Computer Use Time Versus Gender

The respondents spent 1 to 7 hours per day using computers. The time spent on using computers versus gender distribution is presented in Table 8 and Figure 4. Most respondents used computers for approximately 5 hours per day. In Figure 4, for the time spent on computers per day, there was little difference in the distribution of males and females. The average use time of males and females was 5.58 and 5.42 hours per day, respectively.

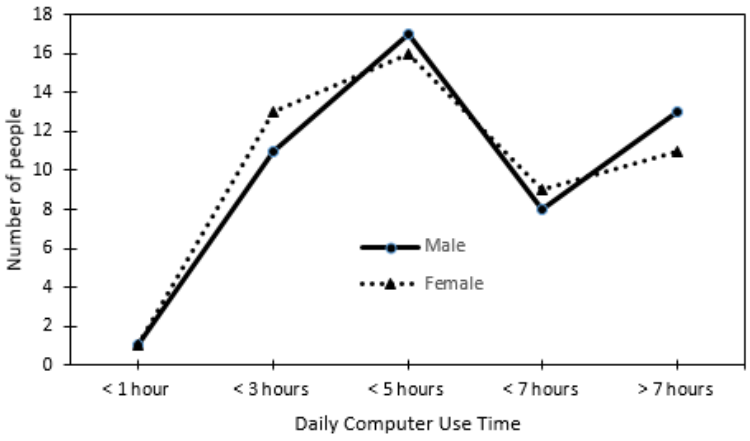

Figure 4. *Distribution of daily computer use time versus gender.*

Table 8. *Distribution of daily computer use time versus gender.*

Hours	Male	Female
< 1	1(2%)	1(2%)
< 3	11(22%)	13(26%)
< 5	17(34%)	16(28%)
< 7	8(16%)	9(18%)
> 7	13(26%)	11(22%)
Average daily use time	5.58 hours	5.42 hours

4.1.5. Computer Ownership

The proportion of respondents who have personal computers is 82% for males and 72% for females (Table 9).

Table 9. *Computer ownership.*

Have?	Male	Female
Yes	41 (82%)	36 (72%)
No	9 (18%)	14 (28%)

4.2. Descriptive Statistics and Correlation

4.2.1. Age Computer Literacy Subscale

The proportion of correct answers and gender distribution of each item are presented in Figure 5. The proportion of males and females with correct answers are more than 70% for both groups, except for Items 10, 13, 16, and 20. The rate of correct answers by females was significantly lower than that of males for item 10, which inquiries about the format of emails. The correct ratio of males is 80% and that for females is 66%. Thus, males are more familiar with email than females.

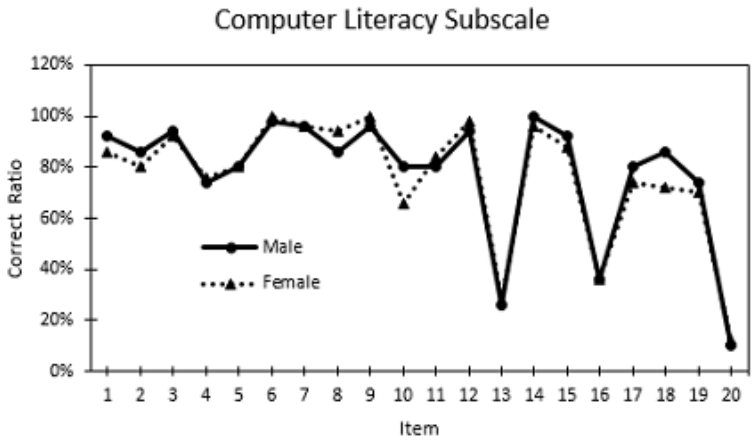

Figure 5. *Correct answer proportion of each item in the computer literacy subscale.*

Items 13, 16, and 20 had a low correct answer rate for males and females. Item 13 asked the respondents to identify the extension of the video file, Item 16 asked the meaning of ".com," and Item 20 asked about free software. The content of these three items was obviously unknown to most of the respondents. The results of these four items can provide a reference for teachers when they create lesson plans and student-tutoring courses.

The average score is presented in Table 10. The overall average score was 15.44: 15.6 for males and 15.28 for females. These results indicate that the information literacy level of males is slightly higher than that of females.

Table 10. *Computer literacy average score.*

Average Score	Overall	Male	Female
Mean	15.44	15.6	15.28
Std. Deviation	0.6754	2.7	2.39

4.2.2. Computer Attitude Subscale

The average score and gender distribution of each item are presented in Figure 6: The average score of each item on the attitude scale is higher for males than for females. Table 11 presents the average score of the subscale. The overall average score was 4.0165: 4.169 for males and 3.864 for females. These results indicate that compared with females, males' attitudes about computers are significantly more positive.

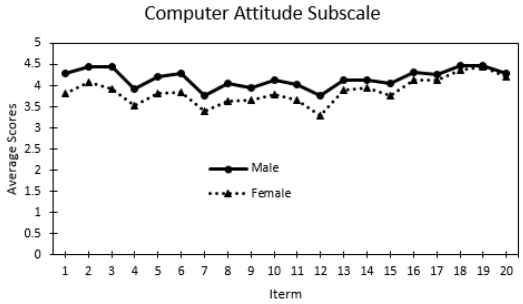

Figure 6. *Average scores for each item on the computer attitude subscale.*

Table 11. *Computer attitude subscale average score.*

Score	Overall	Male	Female
Mean	4.0165	4.169	3.864
Std. Deviation	0.5793	0.5383	0.5837

4.2.3. Self-efficacy Subscale

The average score and gender distribution of each item is presented in Figure 7: The average score of each item on the self-efficacy subscale was higher for males than for females. The average score of this subscale is presented in Table 12: 4.144 overall, 4.249 for males, and 4.039 for females. Thus, compared with females, males have higher computer self-efficacy. Figure 7 shows that compared with males, the average score of females for Items 4, 5, 6, 8, and 10 was significantly lower, and the score of each item was less than four points. Additionally, for Items 4, 5, 6, 7, and 8, males also scored lower than four points.

Item 4 is on the installation of computer software. The average score of females was 3.42, which was far lower than the score of 4.02 for males. Thus, females rarely install software by themselves. Likewise, the average score of Item 10, using any type of computer software to complete computer work, was 3.64 for females, whereas 4 for males. Item 5 asked about the simple troubleshooting of computer failures. Items 6, 7, and 8 asked about the application of word processing and presentation software. The overall average scores for these items were relatively low. The results of these three items are similar to those found by Ngo-Ye [27]. Ngo-Ye [27] found that adult

students do not frequently use Office and Windows file operations, and the newly acquired simple Web skills will not be transferred to the basic skills of Windows (file operations and Office). Based on these perspectives, teachers can strengthen teaching plans and counseling.

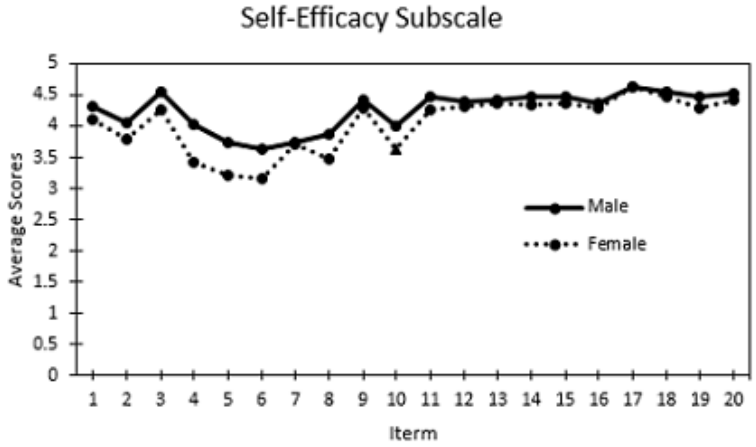

Figure 7. *Average scores for each item in the computer self-efficacy scale.*

Table 12. *Average score of the computer self-efficacy subscale.*

Score	Overall	Male	Female
Mean	4.144	4.249	4.039
Std. Deviation	0.5451	0.4837	0.5864

4.2.4. ANOVA Test

The ANOVA test was conducted to examine the effects of demographic variables on computer literacy, computer attitude, and self-efficacy, respectively. Table 13 presents the results of computer literacy, and gender (F = 0.38, P = 0.556), education (F = 0.436, P = 0.728), and computer ownership (F = 0.39, P = 0.534), because their P value was > 0.05, couldn't reject the null hypothesis. Thus, these three variables have no statistically significant difference in computer literacy. Age (F = 2.953, P = 0.0161), years of computer experience (F = 3.816, P = 0.00343), and daily use time (F = 3.725, P = 0.00735), because their P value was <0.05, reject the null hypothesis. Thus, these two variables have statistically significant differences in computer literacy.

Table 14 presents the results of computer attitudes. Gender (F = 7.377, P = 0.00781) had statistically significant differences in computer attitudes. Table 15 presents the results of self-efficacy. Gender (F = 3.816, P = 0.0536), although the P value was greater than 0.05, was close to 0.05, with a slightly significant difference at the 95% confidence interval. These results are similar to the findings of Jackson et al. (2001): with men, women have more computer anxiety disorders and lower computer self-efficacy. In addition, years of computer experience (F = 3.367, P = 0.00767) and daily computer use time (F = 3.709, P = 0.00753) had significant differences in self-efficacy. Other demographic variables had no statistically significant differences in computer attitudes and self-efficacy.

Figure 8 presents the average score of years of computer experience for computer literacy of fewer than 5 years versus more than 5 years. Regardless of gender, respondents with at least 5 years of experience had better scores. Notably, compared with their male counterparts, females with more than 5 years of experience still had slightly lower scores. The results are consistent with the findings of Maxwell et al.

(2014): Although females increased their use of computers, significant gender differences remain.

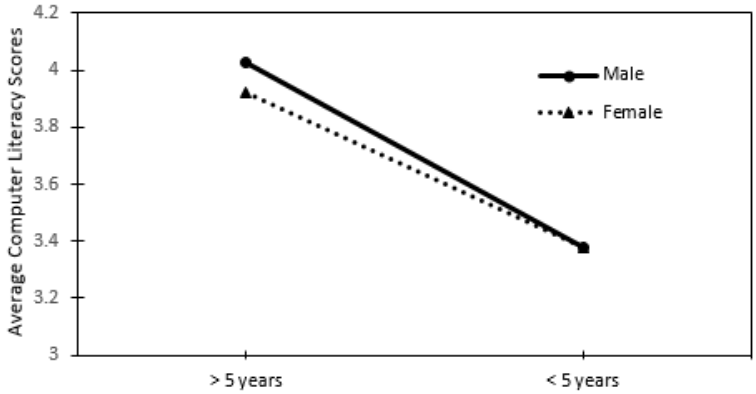

Figure 8. *Average computer literacy scores for less than 5 years and more than 5 years.*

Table 16 presents the average scores for computer literacy, computer attitude, and self-efficacy versus computer ownership. Compared with individuals without a personal computer, those with a personal computer had higher average scores on computer literacy, computer attitude, and self-efficacy subscales, and male's average scores were higher than those of the females, regardless of personal computer ownership.

Table 13. *Results of the analysis of the ANOVA test for computer literacy versus demographic variables.*

	Sum sq.	F value	P(>F)
Gender	0.16	0.348	0.556
Age	6.13	2.953	0.0161
Education	0.61	0.436	0.728
Computer ownership	0.18	0.39	0.534
Years of computer experience	7.62	3.816	0.00343
Daily computer use time	6.12	3.725	0.00735

Table 14. *Results of the analysis of the ANOVA test for computer attitude versus demographic variables.*

	Sum sq.	F value	P(>F)
Gender	2.326	7.377	0.00781
Age	0.78	0.45	0.813
Education	0.42	0.407	0.748
Computer ownership	0.19	0.561	0.456
Years of computer experience	3.144	1.965	0.091
Daily computer use time	1.47	1.101	0.36

Table 15. *Results of the analysis of the ANOVA test for self-efficacy versus demographic variables.*

	Sum sq.	F value	P(>F)
Gender	1.103	3.816	0.0536
Age	1.243	0.829	0.532
Education	1.118	1.264	0.291
Computer ownership	0.436	1.565	0.214
Years of computer experience	4.468	3.367	0.00767
Daily computer use time	3.973	3.709	0.00753

Table 16. *Average scores for computer literacy, computer attitude, and self-efficacy versus computer ownership.*

Own Computer		Computer literacy		Computer attitude		Self-Efficacy	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Yes	All	3.88	0.69	4.04	0.60	4.18	0.53
	Male	3.90	0.79	4.19	0.54	4.24	0.47
	Female	3.86	0.56	3.87	0.62	4.11	0.58
No	All	3.78	0.64	3.94	0.52	4.02	0.60
	Male	3.89	0.55	4.08	0.57	4.27	0.56
	Female	3.71	0.70	3.84	0.49	3.86	0.59

Table 17 presents the Pearson correlation test results of computer attitudes and self-efficacy on computer literacy. Computer attitudes (r = 0.04, P = 0.6892) and self-efficacy (r = 0.179, P = 0.07402) had a P > 0.05; thus, the null hypothesis was not rejected. This finding indicates no significant correlation between computer attitudes and self-efficacy and computer literacy in this study's sample.

Table 17. *Results of the analysis of the Pearson correlation test for computer literacy versus computer attitude and self-efficacy.*

	t	r coefficient	p
computer attitude	0.40119	0.04049318	0.6892
self-efficacy	1.8058	0.179452	0.07402

For Pearson correlation test results between computer attitudes and self-efficacy (y = 0.69, p = 2.103e-15), the P value is much less than 0.05, and the null hypothesis is rejected. This finding indicates that in this study's sample, a significant statistically correlation between computer attitudes and self-efficacy was observed.

5. Results

In Introduction to Computers, male and female students had differences in computer literacy. Based on the average score, the males performed better than females, and this result is similar to much of the literature [14,16,17]. The result also corroborates the findings of papers that demonstrated that if male and female undergraduate students are given equal access to the usage of the computers, female students in universities continue to have noticeable gender differences in their use of computers [7,10,28].

Regarding the computer attitude scale, results similar to those in [29] were obtained. There was a significant difference in anxiety levels between males and females in the sample, and the average anxiety score was higher for females. Jackson et al. [19] also observed that females had more computer anxiety disorders than did males. Shashaani [30] observed that students had different attitudes and that females were less interested in computers and less confident than were males. This study demonstrates the same results, compared with females, males scored significantly higher on the overall computer attitude scale.

Jackson et al. [19] observed that females had lower computer self-efficacy than that of males. Fraillon et al. [20] showed larger gender differences: On average, males' scores on the advanced ICT self-efficacy scale were higher than the females' average scores. This study also obtains a fairly consistent situation: Each item for males was higher than that of females in the computer self-efficacy scale (Figure 7).

6. Limitations

This study has limitations. The computer literacy scale had an acceptable level of reliability; thus, all the items provide reliable results when testing the students in this course. This reliability might be due to the following reasons. First, most of the subjects of the computer literacy scale were from Lin's [22]; notably, Lin's research object was middle school students aged 13 to 15 years, whereas the average age of the subjects in this study was more than 33 years (age range: 18 to 75 years). Additionally, the two samples comprised different ethnic groups. Second, although most of the students in Introduction to Computers had a high school education or higher, their age distribution demonstrates that they are not fresh graduates. Notably, they had all been away from the school education environment for a long time. The students were workplace workers, homemakers, or retirees who had no solid computer education or rusty skills. However, with the widespread application of information and communication technology, all the students had smartphones. Thus, they could browse, search for information, chat, leave messages, take photos, go to websites, and use mobile payment applications. They might even have used all the functions of ICT in smartphones. However, the students were not as familiar with operating personal computers and computer knowledge and concepts. They were different from the computer stimuli received by the undergraduates. Because the students' samples are so different from students in general, this scale is insufficient to provide a comprehensive meaning.

In further research, to design course content, a computer literacy scale more suitable for the attributes of OUK students should be designed and tested. Then, results with increased reliability might be possible. Nonetheless, the results of this study are significant for OUK and provide a reference for teachers currently teaching online courses.

7. Conclusions

Today, information and communication technology has penetrated daily life, and people enjoy the benefits of these technologies; thus, they should improve their computer literacy to better adapt to this rapidly changing society. OUK provides satisfactory courses to improve computer literacy and is an institution committed to this vision.

This study, based on computer performance indicators, observed differences between males and females in computer literacy, computer attitude, and computer self-efficacy. Additionally, according to this research, the students were relatively unfamiliar with free software and commonly used office software and considered them necessary. Based on the results of this study, a recommendation is that OUK launch LibreOffice free software-related courses, such as Writer, Impress, and Calc software. In these courses, students learn the operation of professional software and must download and install the software to the computer they use, understand the meaning of free software, and keep up with world trends. Notably, free software is becoming increasingly popular worldwide. Furthermore, the government of the Republic of China (Taiwan) is promoting open document format (ODF) through its ODF-CNS15251 policies. In this manner, the students of OUK can better fulfill the expectations and goals of the government and society, improve their computer literacy and ability, and make themselves more competitive in the workplace and adaptable to society.

8. Further Research

In the future, qualitative research methods can be used to understand the differences in the computer background experience and the lack of knowledge and needs of male and female students before learning. After all, understanding the background of the students before studying is an important task to improve the learning effect of the students.

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