Gender Difference in the Use of Computer Software:
Computer Self-Efficacy and Stereotype of Computer Software

By

Cheng Weng Si
07015828
Information Systems Management Option

Sin Ka Man
07012071
Information Systems Management Option

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Abstract

Nowadays, both male and female students have equal chance to acquire IT knowledge and learn computer skills. However, until recently, some people still perceive that female have less ability, compared to male, to perform IT job. Some people may still think that IT belongs to the job of male. The research focused on finding out how people stereotype difference computer tasks and whether the stereotype of computer tasks moderate the gender difference in the use of computer software and computer self-efficacy. We also wanted to investigate whether the tasks complexity moderate the computer self-efficacy and gender. We hope to encourage female to engage more in IT tasks.

A total of 147 questionnaires were collected. The result showed that most of the tasks were perceived as neither masculine nor feminine. Only a few were perceived as masculine. The moderating effects of stereotype of computer software on gender and computer self-efficacy and on gender and use of computer software were significant in a number of tasks while the moderating effect of tasks complexity on gender and computer self-efficacy is significant. Also, the positive relationship between computer self-efficacy and use of computer software was significant. It was found that the stereotyping in computer tasks was decreasing and it was expected that the gender difference is declining also.
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1. Introduction

1.1 Problems

Nowadays, female are thought of having less knowledge of computer and the ability to use IT than male. According to Beyer (2004), only 22% of people working in the IT sector are female. We think that it may be true that the number of male who have more IT knowledge is greater than female. However, some of those female may be as proficient as those male. We believe that the reasons for the less number of female who possess proficient IT skills and knowledge are mainly external factors, like stereotype of the nature of computer, which in turn affect the computer self-efficacy of female. If such effects can be eliminated, there would be more female have the ability to acquire IT knowledge and have more confident to use them. As Gerver (1989) mentioned that female have her gender-specific skills, for example, mastery of language for programming, propensity to screen out irrelevancies, we think that female can also give contribution in the IT area with their specific skills.

1.2 Objectives

We aim at studying the difference in the use of computer software by male and female from the perspectives of computer self-efficacy and gender stereotype of computer software by examining how they affect the use of IT by male and female.
We hope to draw the attention of the society so that it can give supports and encouragement to female and eliminate the stereotype effects. Besides, the development of computer software on the ease of use had made a great difference comparing to the past 50 years. The development of computer software with simpler interface, easier coding made it easier to develop a webpage or a computer programming. It is only a drag and paste action to design an interface. Compared to the old system, the programmer had to use coding from design to programming. This significant improvement had opened the door of information technology to all people, no matter male or female. Apart from that, equal chance of education on information technology also erases the effect of stereotype and made a different concept in which information technology should be no longer defined as “masculine”.

2. Literature Review and research framework

Fig. 1 shows the model of our research. Two aspects will be discussed, namely stereotype of computer software and computer self-efficacy, and see how they influence the use of computer software. On the perspective of stereotype of computer software, we will look at how it moderates the impact on the relationship between gender and computer self-efficacy, and between gender and use of computer software. On the other hand, we will also look at how the relationship
between computer self-efficacy and gender will be affected by the complexity of tasks which acts as a moderator in between. We attempt to investigate the difference of male and female in the use of computer software with the influence of computer self-efficacy and stereotype of computer software.

Fig. 1 shows summarized the research model and shows the relationship between each factors.

Fig. 1 Research framework showing the hypothesis
2.1 Gender stereotype on computer software

In the view from the society, gender stereotype presents a conventionally simplified and standardized conception or an image concern for male and female domestically and socially. The stereotype effect is largely affected by the gender role. A gender role is defined as a set of perceived behavioral norms associated particularly with males and females. Gender role refers to the attitudes and behaviors that class a person's stereotypical identity, e.g. to associate oneself as either masculine or feminine is identifying with gender. According to the gender role, males and females should be acted as masculine and feminine respectively. Therefore, when the jobs are defined as masculine or feminine, different gender will react differently toward these perceptions, where “fewer men are entering fields such as psychology, journalism, and foreign languages, while fewer women are entering fields such as computer science, physics, and engineering.” (Matheus, 2009)

Meanwhile, in the traditional stereotype, information technology is on masculine side in which IT is associated with male. Therefore, people always perceive that IT is the work of male and male have higher ability to perform IT than female. As mentioned in Lamont (2009), even though women evaluated within the social context of the organization but less technical job are often viewed as feminine. This
perception creates a picture that female are not capable of performing IT job and cannot complete the job in IT area as good as male because IT is the job of male due to the perception that IT is masculine in nature.

We believe that the stereotype of IT, including computer software, do affect the use of computer software of male and female and cause a difference between them. Whether a task is stereotyped as masculine or feminine largely depends on how people perceive the nature of the task. People always perform more tasks which were perceived as correspondent with their gender role. Therefore, we think that the interaction between the stereotype of computer software and gender will create different impacts. As a result, we hypothesize that:

**H1: Stereotype of computer software moderates the effect of gender on use of computer software. To be more specific, for male, their use of computer software will be higher if the tasks are stereotyped as masculine.**

From the traditional perception of the society, male should perform more masculine job and as IT is stereotyped as masculine, male should and will do more IT job. With the time being and the higher education level of female, there are more
opportunities for both male and female to learn computer skills. We will test if the computer software is perceived as masculine as in the past and see if the stereotype of computer software still affects both genders in deciding to use computer software.

2.2 Computer Self-Efficacy

Self-efficacy is defined as “people’s judgment of their capabilities to organize and execute courses of actions required to attain designated types of performance. It is concerned not with the skills one has but with judgment of what one can do with whatever skills one possessed” (Bandura, 1986). In other words, computer self-efficacy means that the judgment of a person’s ability to use computer and computer software in order to perform successfully. According to Bandura (1986), there are three dimensions of self-efficacy judgments, namely magnitude, strength and generalizability. Magnitude of self-efficacy refers to the level of task difficulty one believes is attainable. For those who have high magnitude of computer self-efficacy, they will perceive themselves to accomplish more difficult tasks. Self-efficacy strength refers to the level of conviction about the judgment, or the confidence an individual has regarding to his/her ability to perform various tasks well. Generalizability of self-efficacy indicates extent to which perceptions of self-efficacy
are limited to particular situations. For those with high computer self-efficacy
generalizability, they would expect to be able to use more and different systems and
software well while those with low generalizability would perceive themselves be
only good at a few software or systems.

Deborah & Christopher (1995) found evidence from several empirical studies that
computer self-efficacy would positively affect the adoption of information technology
and innovations. Recall from the three dimensions of self-efficacy judgments
suggested by Bandura (1986), people with high magnitude of computer self-efficacy,
they will perceive themselves that they can accomplish more difficult tasks and those
with high computer self-efficacy strength will have more confident to successfully
and well perform the tasks with their abilities. Therefore, those people will try to use
more and different level of computer software as they have confidence to accomplish
them with their abilities. Also, Compeau et al. (1999) suggested that people with high
computer self-efficacy will use IT more frequently. Hence, the second hypothesis is
developed:

H2: The higher the computer self-efficacy, the more use of computer software.
Busch (1995) stated that female have significantly lower self-efficacy than male regarding math-related and traditionally male dominated subjects, including computer science while Beyer (2004) also found that male students have higher computer self-efficacy than female students. It was believed that the stereotype of a particular task do influence the self-efficacy of performing that task. Same as the effect on use of computer software, people will have more confidence in performing tasks which were perceived as corresponding with their gender role. The interaction between gender and stereotype of computer software will affect the computer self-efficacy differently. The moderating effect of stereotype of computer software is present in between of gender and computer self-efficacy and thus we hypothesize that:

\textbf{H3: Stereotype of computer software moderate the effect of gender on computer self-efficacy. To be specific, for male, their computer self-efficacy will be higher if the tasks are stereotyped as masculine.}

We also hope to investigate whether stereotype of computer software is still present and influencing the computer self-efficacy between male and female.
On the other hand, Murphy, Coover & Owen (1989) and Busch (1995) discovered that the difference in self-efficacy between male and female become larger when the advanced level of computer use increases while the difference is small or no difference in the use of simple tasks. That means the complexity of tasks will affect the difference in computer self-efficacy between male and female. When the complexity of tasks increases, the difficulty of use will increase. People’s judgment of their capabilities to use computer software would be different and expect higher capabilities are needed to perform those tasks. It was expected that the difference will become obvious that the computer self-efficacy of male will be greater than that of female. Therefore, we hypothesize that:

**H4: Complexity of tasks has moderating effect on the relationship between computer self-efficacy and gender. To be more specific, the difference in computer self-efficacy between male and female will be very small or no difference if the tasks are at general level. However, the difference in computer self-efficacy between male and female will be larger if the tasks are at advanced level.**
3. Methodology

3.1 Subjects

Students, especially secondary and university students were targeted to complete a questionnaire since students have many chances to use computer and the computer software. A total of 147 valid questionnaires were received.

3.2 Method

Questionnaire was used to test students’ computer self-efficacy and their perception in stereotype of computer tasks and see how their computer self-efficacy and use of computer software would be affected. The questionnaire consisted of 4 parts. The first part tested students’ computer self-efficacy with different level of complexity of tasks. The second part tested on their stereotype on computer software. The third part tested students’ use of computer software by giving some tasks and asked them how often they are doing those tasks and their intension to do those tasks. The last part was their personal information.

3.2.1 Computer self-efficacy

With reference to Murphy et al. (1989)’s 32-item instrument for computer self-efficacy which were developed based on the work of Bandura (1986), they
presented a three-factor solution for the items of computer self-efficacy, i.e. “beginning-level computer skills”, “advanced-level computer skills” and “mainframe computer skills”. Later, Torkzadeh and Koufteros (1994) recommended a four-factor solution for 30-item after examining factorial validity of the instrument of Murphy et al. (1989), in which, “file and software skills” was added to the factor solution. However, since we are only focus on the use of computer software and want to test the moderating effect of tasks complexity between computer self-efficacy and gender, we developed the two-level of tasks complexity and selected some relevant items with slight modification of wordings from the three-factor and four-factor solution and some other items were self-developed also. The two-level of complexity of tasks includes the simple level and advanced level (refer to Table 1). For simple level of task, items include using the computer software to write a letter or essay, using the searching engines to search for the information needed, downloading and uploading files. For the advanced level of tasks, tasks include writing simple program for the computer, understanding words/terms relating to computer software and using multimedia software to edit photos and videos.

In our survey, we used the approach suggested by Bandura (1986) to measure the computer self-efficacy since this approach included the dimension of magnitude and
strength of computer self-efficacy. Marakas & Johnson (1998) argued that the measure of computer self-efficacy must account for both magnitude and strength of self-efficacy if it is to be valid. Students were asked whether they think they would be able to complete different tasks. There were two ways to measure. First, students needed to circle “Yes” or “No”. The total number of “Yes” answers represented the magnitude of computer self-efficacy of an individual. Second, if the answer was “Yes”,

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Tasks</td>
<td></td>
</tr>
<tr>
<td>To make a simple personal webpage</td>
<td>Self-developed</td>
</tr>
<tr>
<td>To use e-mail to send and receive email</td>
<td>Self-developed</td>
</tr>
<tr>
<td>To use multimedia software to design or draw</td>
<td>Self-developed</td>
</tr>
<tr>
<td>simple graphic</td>
<td></td>
</tr>
<tr>
<td>To use software to play songs or videos</td>
<td>Self-developed</td>
</tr>
<tr>
<td>To use communication software to communicate</td>
<td>Self-developed</td>
</tr>
<tr>
<td>with friends</td>
<td></td>
</tr>
<tr>
<td>To use search engines to search for the</td>
<td>Self-developed</td>
</tr>
<tr>
<td>information needed</td>
<td></td>
</tr>
<tr>
<td>Advanced Tasks</td>
<td></td>
</tr>
<tr>
<td>To write simple programs for the computer</td>
<td>Torkzadeh and Koufteros (1994)</td>
</tr>
<tr>
<td>To use the user’s guide when help is needed</td>
<td>Torkzadeh and Koufteros (1994)</td>
</tr>
<tr>
<td>To use the computer to organize information</td>
<td>Torkzadeh and Koufteros (1994)</td>
</tr>
<tr>
<td>To learn advanced skills with a specific program</td>
<td>Torkzadeh and Koufteros (1994)</td>
</tr>
<tr>
<td>To use multimedia software to edit photos and</td>
<td>Self-developed</td>
</tr>
<tr>
<td>videos</td>
<td></td>
</tr>
<tr>
<td>To make websites</td>
<td>Self-developed</td>
</tr>
<tr>
<td>To use multimedia software to design or draw</td>
<td>Self-developed</td>
</tr>
<tr>
<td>commercial posters</td>
<td></td>
</tr>
</tbody>
</table>
students needed to rate their confidence level to complete the task by 10-point scale where 10 indicated “Totally confident” and 1 indicated “Not at all confident”. If the answer was “No”, their score in the confidence level would be zero. The sum of the confident rating was used to measure the strength of computer self-efficacy. The results were compared and we could find out whether computer self-efficacy has positively relationship with the use of computer software and the difference of computer self-efficacy between male and female with different levels of task complexity.

3.2.2 Gender stereotype on computer software

As suggest by Oswald (2008), we listed 20 items with the two level of task complexity used as suggest in testing the self-efficacy. For each task, participants would choose from “male” “female” and “no difference” to indicate their perception of the task whether it is masculine, feminine or neither masculine nor feminine in the stereotyping. The results were compare with what we found in computer self-efficacy and compared with the participant’s gender to see if this stereotype has any influence as a moderator on people’s computer self efficacy and use of computer software.
3.2.3 **Use of computer software**

In order to test the use of computer software of students, this part comprised of two parts, the first part was to find out how often they are doing the given tasks and the second was to test their intention to do those tasks. For the first part, Tasks were given and they were asked to tick how often they are doing those tasks, for example, rarely, frequently, occasionally, often and always. For the second part, they were asked to rate their intention to do the tasks in 5-point scale where “1” indicated “Strongly Disagree” and “5” indicated “Strongly Agree” and each sentence began with “If I have the need, I will”. The tasks were the same as those tasks in measuring the computer self-efficacy, like using software to play songs or videos, using search engines to search for the information needed, etc.
4. Analysis and Result

One hundred and forty-seven valid questionnaires were received. Out of the 147 respondents, 41.5% were male and the remaining 58.5% were female. The Statistical Package for Social Science (SPSS) for Windows was used to analyze the data.

4.1 Reliability Test

Cronbach’s Alpha was used to measure the internal consistency, that is, the reliability of the construct. A reliability coefficient of 0.7 or above is considered reliable.

Table 1 summarized the Cronbach’s Alphas for the computer self-efficacy. As the Cronbach’s Alphas were 0.843 and 0.907 which were greater than 0.7, it could be concluded that computer self-efficacy for both general and complex tasks was said to be reliable and consistent.

*Table 2. Reliability Analysis-Cronbach’s Alpha

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alphas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Self-Efficacy</td>
<td></td>
</tr>
<tr>
<td>General Tasks</td>
<td>0.843</td>
</tr>
<tr>
<td>Complex Tasks</td>
<td>0.907</td>
</tr>
</tbody>
</table>
4.2 Multiple Regressions

Multiple regressions were used to predict the relationships between computer self-efficacy and use of computer software, and between gender and use of computer software with stereotype of computer software acted as the moderator. Stereotype of computer software was classified into “Masculine”, “Feminine” and “No Difference” which meant that the task was neither masculine nor feminine. Regressions were run for each task so as to compare the result of different tasks and the overall trend. We used “No Difference” as the comparison group and was coded as S1=0, S2=0; “Masculine” was coded as S1=0, S2=1; “Feminine” was coded as S1=1, S2=0. Table 3 showed the coding of dummy variables for stereotype of computer software. On the other hand, Gender was coded as “0” for male and “1” for female.

*Table 3. Coding of dummy variables for stereotype of computer software

<table>
<thead>
<tr>
<th>Stereotype</th>
<th>S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No difference</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Masculine</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Feminine</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The general regression equation for the use of computer software is as follow:
UOC (Task) = β₀ + β₁Gender + β₂CSE(task) + β₃S1(task)*Gender + β₄S2(task)*Gender

Where

UOC = Use of Computer software

CSE = Computer self-efficacy

Hypothesis 1 (H1) stated that stereotype of computer software moderate the effect of gender on use of computer software. Referring to Table 4 which summarized the P-value of all the variables for each task, the moderating effect was significant in only five tasks - “Use email”(S2*Gender, p=0.001), “Use communication software”(S2*Gender, p=0.007), “Learn advanced skills within a program”(S2*Gender, p=0.002), “Make simple program”(S2*Gender, p=0.016) and “Make website”(S2*Gender, p=0.000) - out of the 14 tasks. The p-values of those tasks were less then 0.05 and they were said to be significant and were affected by the moderating effect of stereotype of computer software.
### Table 4. P-value of all the variables of each task for use of computer software

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Gender</th>
<th>CSE</th>
<th>S1*Gender</th>
<th>S2*Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make personal webpage</td>
<td>0.016*</td>
<td>0.000*</td>
<td>0.226</td>
<td>0.771</td>
</tr>
<tr>
<td>Use email</td>
<td>0.063</td>
<td>0.000*</td>
<td>0.677</td>
<td>0.001*</td>
</tr>
<tr>
<td>Draw simple graph</td>
<td>0.018*</td>
<td>0.000*</td>
<td>0.065</td>
<td>0.724</td>
</tr>
<tr>
<td>Play songs and video</td>
<td>0.644</td>
<td>0.000*</td>
<td>0.373</td>
<td>0.317</td>
</tr>
<tr>
<td>Use communication software</td>
<td>0.172</td>
<td>0.000*</td>
<td>0.597</td>
<td>0.007*</td>
</tr>
<tr>
<td>Use search engine</td>
<td>0.043*</td>
<td>0.000*</td>
<td>0.230</td>
<td>0.497</td>
</tr>
<tr>
<td>Upload and download files</td>
<td>0.807</td>
<td>0.000*</td>
<td>0.194</td>
<td>0.559</td>
</tr>
<tr>
<td>Write simple program</td>
<td>0.017*</td>
<td>0.000*</td>
<td>0.289</td>
<td>0.016*</td>
</tr>
<tr>
<td>Use user guide</td>
<td>0.564</td>
<td>0.000*</td>
<td>0.140</td>
<td>0.091</td>
</tr>
<tr>
<td>Organize information</td>
<td>0.138</td>
<td>0.000*</td>
<td>0.266</td>
<td>0.328</td>
</tr>
<tr>
<td>Learn advanced skills within a program</td>
<td>0.921</td>
<td>0.000*</td>
<td>0.555</td>
<td>0.002*</td>
</tr>
<tr>
<td>Edit photos and videos</td>
<td>0.321</td>
<td>0.000*</td>
<td>0.793</td>
<td>0.838</td>
</tr>
<tr>
<td>Make website</td>
<td>0.005*</td>
<td>0.000*</td>
<td>0.294</td>
<td>0.000*</td>
</tr>
<tr>
<td>Draw commercial poster</td>
<td>0.617</td>
<td>0.000*</td>
<td>0.503</td>
<td>0.170</td>
</tr>
</tbody>
</table>

*P<0.05
CSE=Computer self-efficacy
Table 5 revealed the equations of each task in the three stereotype levels. For those 5 tasks which were affected by the moderating effect of stereotype of computer software, the equations for the task stereotyped as “No difference” and “Feminine” were identical for each task. That meant the level of use of computer software would be the same if the tasks were stereotyped as “No difference” and “Feminine”. However, when the tasks were perceived as masculine tasks, male had higher level of use of computer software than female at the same level of computer self-efficacy as the Y-intercept was higher for male (refer to Table 6). Therefore, the moderating effect of stereotype of computer software on gender and use of computer software was supported in those 5 tasks and male would have more use of computer software if they perceived the tasks as masculine. H1 is supported.

Hypothesis 2 (H2) stated that the higher is the computer self-efficacy, the more use of computer software. In Table 4, the test of computer self-efficacy produced a p-value of less than 0.05 for every task and it showed a positive relationship between use of computer software and computer self-efficacy. Therefore, it could be concluded that computer self-efficacy was a significant predictor of use of computer software and H2 is also supported.
<table>
<thead>
<tr>
<th>Tasks</th>
<th>No difference</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make personal webpage</td>
<td>(UOC = 3.133 + 0.522\text{Gender} + 0.285\text{CSE})</td>
<td>(UOC = 3.133 + 0.522\text{Gender} + 0.285\text{CSE})</td>
<td>(UOC = 3.133 + 0.522\text{Gender} + 0.285\text{CSE})</td>
</tr>
<tr>
<td>Use email</td>
<td>(UOC = 2.926 + 0.643\text{CSE})</td>
<td>(UOC = 2.926 - 0.087\text{Gender} + 0.643\text{CSE})</td>
<td>(UOC = 2.926 + 0.643\text{CSE})</td>
</tr>
<tr>
<td>Draw simple graph</td>
<td>(UOC = 6.431 + 0.284\text{CSE})</td>
<td>(UOC = 6.431 + 0.284\text{CSE})</td>
<td>(UOC = 6.431 + 0.284\text{CSE})</td>
</tr>
<tr>
<td>Play songs and video</td>
<td>(UOC = 3.421 + 0.497\text{CSE})</td>
<td>(UOC = 3.421 + 0.497\text{CSE})</td>
<td>(UOC = 3.421 + 0.497\text{CSE})</td>
</tr>
<tr>
<td>Use communication software</td>
<td>(UOC = 2.693 + 0.689\text{CSE})</td>
<td>(UOC = 2.693 - 2.825\text{Gender} + 0.689\text{CSE})</td>
<td>(UOC = 2.693 + 0.689\text{CSE})</td>
</tr>
<tr>
<td>Use search engine</td>
<td>(UOC = 3.760 + 0.39\text{Gender} + 0.581\text{CSE})</td>
<td>(UOC = 3.760 + 0.39\text{Gender} + 0.581\text{CSE})</td>
<td>(UOC = 3.760 + 0.39\text{Gender} + 0.581\text{CSE})</td>
</tr>
<tr>
<td>Upload and download files</td>
<td>(UOC = 3.643 + 0.547\text{CSE})</td>
<td>(UOC = 3.643 + 0.547\text{CSE})</td>
<td>(UOC = 3.643 + 0.547\text{CSE})</td>
</tr>
<tr>
<td>Write simple program</td>
<td>(UOC = 3.009 + 1.046\text{Gender} + 0.372\text{CSE})</td>
<td>(UOC = 3.009 - 0.017\text{Gender} + 0.372\text{CSE})</td>
<td>(UOC = 3.009 + 1.046\text{Gender} + 0.372\text{CSE})</td>
</tr>
<tr>
<td>Use user guide</td>
<td>(UOC = 4.292 + 0.290\text{CSE})</td>
<td>(UOC = 4.292 + 0.290\text{CSE})</td>
<td>(UOC = 4.292 + 0.290\text{CSE})</td>
</tr>
<tr>
<td>Organize information</td>
<td>(UOC = 2.505 + 0.607\text{CSE})</td>
<td>(UOC = 2.505 + 0.607\text{CSE})</td>
<td>(UOC = 2.505 + 0.607\text{CSE})</td>
</tr>
<tr>
<td>Learn advanced skills within a program</td>
<td>(UOC = 3.768 + 0.427\text{CSE})</td>
<td>(UOC = 3.768 - 1.201\text{Gender} + 0.427\text{CSE})</td>
<td>(UOC = 3.768 + 0.427\text{CSE})</td>
</tr>
<tr>
<td>Edit photos and videos</td>
<td>(UOC = 3.308 + 0.487\text{CSE})</td>
<td>(UOC = 3.308 + 0.487\text{CSE})</td>
<td>(UOC = 3.308 + 0.487\text{CSE})</td>
</tr>
<tr>
<td>Make website</td>
<td>(UOC = 3.278 + 0.808\text{Gender} + 0.311\text{CSE})</td>
<td>(UOC = 3.278 - 0.529\text{Gender} + 0.311\text{CSE})</td>
<td>(UOC = 3.278 + 0.808\text{Gender} + 0.311\text{CSE})</td>
</tr>
<tr>
<td>Draw commercial poster</td>
<td>(UOC = 4.189 + 0.378\text{CSE})</td>
<td>(UOC = 4.189 + 0.378\text{CSE})</td>
<td>(UOC = 4.189 + 0.378\text{CSE})</td>
</tr>
</tbody>
</table>

Original Equation:  
\[UOC (\text{Task}) = \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{CSE(task)} + \beta_3 S_1(\text{task})*\text{Gender} + \beta_4 S_2(\text{task})*\text{Gender}\]
### *Table 6. Equations of tasks perceived as masculine.*

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Use email</td>
<td>$UOC = 2.926 + 0.643 \text{CSE}$</td>
</tr>
<tr>
<td>Use communication software</td>
<td>$UOC = 2.693 + 0.687 \text{CSE}$</td>
</tr>
<tr>
<td>Write simple program</td>
<td>$UOC = 3.009 + 0.372 \text{CSE}$</td>
</tr>
<tr>
<td>Learn advanced skills within a program</td>
<td>$UOC = 3.768 + 0.427 \text{CSE}$</td>
</tr>
<tr>
<td>Make website</td>
<td>$UOC = 3.278 + 0.311 \text{CSE}$</td>
</tr>
</tbody>
</table>

$UOC = \text{Use of computer}$

$CSE = \text{Computer self-efficacy}$

**Coding of Gender:**
- Male = 0
- Female = 1

### 4.3 Two-way ANOVA

Two-way ANOVA was used to compare the means of computer self-efficacy of male and female with the stereotype of computer software as the moderator. Hypothesis 3 (H3) stated that stereotype of computer software moderate the effect of gender on computer self-efficacy.

In Table 7, only the p-values of the moderating effect for “Make personal webpage” (p=0.014), “Play songs and video” (p=0.033), “Use communication software” (p=0.028), “Write simple program” (p=0.008), “Use user guide” (p=0.000) and “Make website” (p=0.001) were less than 0.05 which was proved to be significant. Therefore, the relationship between gender and computer self-efficacy was influenced by the moderating effect of the stereotype of computer software for those 6 tasks only.
Table 7. P-value of the moderating effect of stereotype of computer software on gender towards computer self-efficacy (Gender*Stereotype)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make personal webpage</td>
<td>0.014*</td>
</tr>
<tr>
<td>Use email</td>
<td>0.479</td>
</tr>
<tr>
<td>Draw simple graph</td>
<td>0.242</td>
</tr>
<tr>
<td>Play songs and video</td>
<td>0.033*</td>
</tr>
<tr>
<td>Use communication software</td>
<td>0.028*</td>
</tr>
<tr>
<td>Use search engine</td>
<td>0.278</td>
</tr>
<tr>
<td>Upload and download files</td>
<td>0.299</td>
</tr>
<tr>
<td>Write simple program</td>
<td>0.008*</td>
</tr>
<tr>
<td>Use user guide</td>
<td>0.000*</td>
</tr>
<tr>
<td>Organize information</td>
<td>0.206</td>
</tr>
<tr>
<td>Learn advanced skills within a program</td>
<td>0.239</td>
</tr>
<tr>
<td>Edit photos and videos</td>
<td>0.103</td>
</tr>
<tr>
<td>Make website</td>
<td>0.001*</td>
</tr>
<tr>
<td>Draw commercial poster</td>
<td>0.856</td>
</tr>
</tbody>
</table>

Referring to Table 8, for those 6 tasks which were affected by the moderating effect of stereotype of computer self efficacy, only “write simple program” and “make website” showed that when male perceived the tasks were masculine, they had higher computer self-efficacy than when it was perceived as feminine or no difference while only “write simple program” showed that when female perceived the task was feminine, they had higher computer self-efficacy than when the task was perceived as masculine or no difference. However, for “use communication

Table 8. ANOVA Descriptive statistics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Stereotype</th>
<th>Mean</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make personal webpage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>Masculine</td>
<td>3.55</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No difference</td>
<td>8.32</td>
<td>50</td>
</tr>
<tr>
<td>Female</td>
<td>Masculine</td>
<td>5.13</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Feminine</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>No difference</td>
<td>6.15</td>
<td>73</td>
</tr>
<tr>
<td>Play songs and video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>Masculine</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>No difference</td>
<td>9.42</td>
<td>55</td>
</tr>
</tbody>
</table>
Female | Masculine | Feminine | No difference |  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>7.5</td>
<td>9.08</td>
</tr>
<tr>
<td>Male</td>
<td>6.75</td>
<td>10</td>
<td>9.39</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>8.33</td>
<td>9.28</td>
</tr>
</tbody>
</table>

Use communication software

Male | Masculine | Feminine | No difference |  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.75</td>
<td>10</td>
<td>9.39</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>8.33</td>
<td>9.28</td>
</tr>
</tbody>
</table>

Write simple program

Male | Masculine | Feminine | No difference |  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.72</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Female</td>
<td>2.98</td>
<td>8</td>
<td>3.46</td>
</tr>
</tbody>
</table>

Use user guide

Male | Masculine | Feminine | No difference |  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.35</td>
<td>1.17</td>
<td>7.78</td>
</tr>
<tr>
<td>Female</td>
<td>4.86</td>
<td>6.29</td>
<td>7.19</td>
</tr>
</tbody>
</table>

Make website

Male | Masculine | Feminine | No difference |  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.05</td>
<td>5.43</td>
<td>5.69</td>
</tr>
<tr>
<td>Female</td>
<td>3.61</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

software”, it showed an extreme contradictive result. For male, their computer self-efficacy was higher when the task was perceived as feminine while for female, their computer self-efficacy was higher when the task was perceived as masculine. For other tasks, both male and female had higher computer self-efficacy when they perceived the tasks as no difference than when they perceived the tasks as feminine or masculine. Therefore, H3 is true only to “write simple program”.

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4.4 **T-Test**

T-test was used to compare the means of computer self-efficacy of male and female in doing simple and complex tasks. We hypothesized that there is a moderating effect between the computer self-efficacy and the gender difference by the presence of complexity of tasks. When doing simpler tasks, the computer self-efficacy between male and female is small or no difference. However, the difference will increase if the tasks are at advanced level.

Two t-tests were run in this case. The first one was for measuring the means of computer self-efficacy of male and female in completing simple tasks to see whether there was a difference. Table 9 showed the result of the t-test. As the p-value reported under Levene's Test for Equality of Variances was 0.308 which was greater than 0.05, it was assumed that the population variances were equal and therefore the values from the first row of the table, labeled Equal variances assumed, was considered. Because the p-value under the t-test for equality of means was 0.115 which was greater than 0.05, it was concluded that the difference in means of computer self-efficacy of male and female in doing simple tasks was insignificant. The result shows that there was no difference in the computer self-efficacy of male and female in doing simple tasks.

The second one was for comparing the means of computer self-efficacy of male and female in doing complex tasks. Table 9 showed the result of the second t-test. Since the p-value of 0.769 was greater than 0.05 under Levene’s Test for Equality of Variances, the value in the first row was considered. The p-value under the t-test for
Equality of Means was less than 0.05 which was 0.012. We could conclude that the computer self-efficacy of male and female was significantly different in doing complex tasks. Therefore, the result showed the difference in computer self-efficacy of male and female become larger when completing complex tasks. Therefore, it was supported that the gender difference in computer self-efficacy was insignificant when doing simple tasks while the difference became larger and significant when doing complex tasks. It could be concluded that the tasks complexity acts as a moderator affecting the relationship between computer self-efficacy and gender. Hypothesis 4 is supported.

Table 9 T-tests for the CSE of doing simple and complex tasks of male and female

<table>
<thead>
<tr>
<th>Complexity of Tasks</th>
<th>Levene’s Test for Equality of Variances</th>
<th>T-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P-value</td>
<td>P-Value(2-tailed)</td>
</tr>
<tr>
<td>Simple Tasks</td>
<td>0.308</td>
<td>0.115</td>
</tr>
<tr>
<td>Advanced Tasks</td>
<td>0.769</td>
<td>0.012*</td>
</tr>
</tbody>
</table>

*P<0.05

5. Discussion

The principle objective of this research is to study the difference in the use of computer software between males and females from the perspective of computer self-efficacy and stereotype of computer software and see how the complexity of task moderates the effect on the computer self-efficacy and gender, and how gender stereotype of computer software moderates the effect on use of computer software and gender, and effect on gender and computer self-efficacy. We also look at how computer self-efficacy affects the use of computer software. In this section, the
5.1 Effect of stereotype of computer software as a moderator

According to the finding in this study, there was a moderating effect of stereotype of computer software but the effect was smaller than before. The effect of stereotype of computer software on gender and the use of computer software were significant only in five of the tasks. The effect of the stereotype of computer software was diminishing. However, the finding showed that, although the stereotype of computer software in affecting the use of computer software is smaller than before, all male still perceived some tasks like “make personal webpage”, “play songs and video”, “write simple Program” and “make website” as “masculine”. None of them perceived those tasks as “feminine” as show in appendix table E. For most of the tasks, most of the respondents perceived them as “no difference”. Nevertheless, only for “write simple program”, most of the male and female perceived that it is a masculine task.

Since computer software is more popular than ten years before, the stereotype of computer software is not that influential on the use of computer software between male and female.

For computer self-efficacy, the same situation appeared and showed that the effect of stereotype of computer software was decreasing. Only the stereotype of “write simple program” showed a larger effect on the computer self-efficacy of male and female. It is because both male and female receive education about computer and they have more knowledge about it, thus they use more than it is in the past. Nowadays, most of the families own at least one computer at home. Children learn
how to use computer even in kindergarten, therefore, people would choose “no difference” in most of the tasks as those tasks are common to use in the society.

5.2 The effect on computer self-efficacy with the complexity of task as a moderator

In this study, as we expected, it showed that the relationship between computer self-efficacy and gender was moderated by the tasks complexity when the tasks were at the advanced level. For male, their computer self-efficacy was higher than female, although the difference was not very much. It was still obvious that, for those tasks in the advanced level, their confidence in managing the computer software was higher than female as those tasks may be still too difficult for female to do. However, the result also showed that the important of gender was no longer as important as before. As shown in appendix table B, gender was an insignificant factor in most of the tasks. It was because use of computer was no longer a luxury for most of the family and both male and female have equal opportunity to use and learn computer. As both male and female receive the same education nowadays, it is expected that the difference in self-efficacy on computer software between male and female will become smaller.

6. Limitation and future research

The research consisted of a number of limitations. Firstly, the sample size was not large enough to present the whole populations. The number of male and female should be more in order to have an effective comparison. Besides, the research targets were mainly university students, therefore the result could not reflect the situation of the other age groups. Secondly, as use of computer becomes more
common in the world, the tasks in the advanced level should be more complex and difficult. For example, “learn advanced skills with a specific program” is an advanced task in the past 10 years but for now, it may be a daily activity for people. The testing items should update with the development of the computer software and the trend of using computer software by people. As the development of computer software is very fast nowadays, it is important to go with the trend for the testing item to get an effective result.

7. Implication and recommendation

From the finding, it showed that the effect of gender stereotype on use of computer software was decreasing and it is expected to decrease or eliminate in future. Also, gender is no longer a factor affecting the use of computer. The phenomenon of male’ dominating role in the information technology industry will be rewrite in the future. Employer should have fair assessment on both male and female as computer software is neither masculine nor feminine. Both sexes should receive the same wages and welfare in the information technology industrial. Female should also have more confidence toward advanced computer software as the fact shows that information technology does not belong to male only.

8. Conclusion

This study aimed at finding out how complexity of task moderates the computer self-efficacy on both gender and how stereotype of computer software moderates the effect on computer self-efficacy and gender, and the effect on the use of
computer software and gender, as well as the relationship between computer self-efficacy and use of computer software. The result showed that the moderating effect of tasks complexity on computer self-efficacy and gender was significant and male have higher computer self-efficacy in doing complex tasks. Also, most of the tasks were perceived as neither masculine nor feminine. Only a few were perceived as masculine. Moreover, the moderating effects of stereotype of computer software on gender and computer self-efficacy, and on gender and use of computer software were significant in a number of tasks. The result also proved the positive relationship between computer self-efficacy and use of computer software. It was confirmed that the gender stereotype of computer software was reducing while the gender difference in computer self-efficacy is becoming smaller.
References:


10. Appendix
Questionnaire sample
Questionnaire About Gender Difference in Use of Computer Software

Part 1: Computer self-efficacy

In this part, several computer tasks are given. Please first circle “Yes” or “No” to specify whether you think you are able to complete the tasks. If your answer is “Yes”, please rate how confident you are to complete the tasks, where 10 indicate “totally confident” and 1 indicate “Not at all confident”.

<table>
<thead>
<tr>
<th>Task</th>
<th>Rating</th>
<th>Confident</th>
<th>Not at all Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I think I am able to make a simple personal webpage.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>2. I think I am able to use e-mail to send and receive email.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>3. I think I am able to use multimedia software to design or draw simple graphic</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>4. I think I am able to use software to play songs or videos</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>5. I think I am able to use communication software to communicate with friends.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>6. I think I am able to use search engines to search for the information needed.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>7. I think I am able to download and upload Files.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>8. I think I am able to write simple programs for the computer.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>9. I think I am able to use the user’s guide when help is needed.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>10. I think I am able to use the computer to organize information.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>11. I think I am able to learn advanced skills with a specific program.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>12. I think I am able to use multimedia software to edit photos and videos.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>13. I think I am able to make websites.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
<tr>
<td>14. I think I am able to use multimedia software to design or draw commercial posters.</td>
<td>Yes</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td>No</td>
</tr>
</tbody>
</table>

Part 2: gender stereotype on use of computer software

Please choose whether you think the following task is better for men or women to do, tick in the box if you think the task is better for “men”, “women” or “no difference” (nothing to do with gender).
1. Make a simple personal webpage. □ Men □ Women □ No Difference
2. Use e-mail to send and receive email. □ Men □ Women □ No Difference
3. I think I am able to use multimedia software to design or draw simple graphic. □ Men □ Women □ No Difference
4. Use software to play songs or videos. □ Men □ Women □ No Difference
5. Use communication software to communicate friends. □ Men □ Women □ No Difference
6. Use search engines to search for the information needed. □ Men □ Women □ No Difference
7. Download and upload files. □ Men □ Women □ No Difference
8. Use write simple programs for the computer. □ Men □ Women □ No Difference
9. Use the user’s guide when help is needed. □ Men □ Women □ No Difference
10. Use the computer to organize information. □ Men □ Women □ No Difference
11. Learn advanced skills with a specific program. □ Men □ Women □ No Difference
12. Use multimedia software to edit photos and videos. □ Men □ Women □ No Difference
13. Make websites. □ Men □ Women □ No Difference
14. Use multimedia software to design or draw commercial posters. □ Men □ Women □ No Difference

**Part 3: Use of computer software**

A. In this part, please tick how often you will do the following tasks.

1. How often do you make a simple personal webpage?
   - □ Rarely
   - □ Occasionally
   - □ Frequently
   - □ Often
   - □ Always

2. How often do you use e-mail to send and receive email?
   - □ Rarely
   - □ Occasionally
   - □ Frequently
   - □ Often
   - □ Always

3. How often do you use software to play songs or videos?
   - □ Rarely
   - □ Occasionally
   - □ Frequently
   - □ Often
   - □ Always

4. How often do you use multimedia software to design or draw simple graphic?
   - □ Rarely
   - □ Occasionally
   - □ Frequently
   - □ Often
   - □ Always

5. How often do you use communication software to communicate with friends?
   - □ Rarely
   - □ Occasionally
   - □ Frequently
   - □ Often
   - □ Always
6. How often do you use search engines to search for the information needed?

- Rarely
- Occasionally
- Frequently
- Often
- Always

7. How often do you download and upload files?

- Rarely
- Occasionally
- Frequently
- Often
- Always

8. How often do you use write simple programs for the computer?

- Rarely
- Occasionally
- Frequently
- Often
- Always

9. How often do you use the user’s guide when help is needed?

- Rarely
- Occasionally
- Frequently
- Often
- Always

10. How often do you use the computer to organize information?

- Rarely
- Occasionally
- Frequently
- Often
- Always

11. How often do you learn advanced skills with a specific program?

- Rarely
- Occasionally
- Frequently
- Often
- Always

12. How often do you use multimedia software to edit photos and videos?

- Rarely
- Occasionally
- Frequently
- Often
- Always

13. How often do you make websites?

- Rarely
- Occasionally
- Frequently
- Often
- Always

14. How often do you use multimedia software to design or draw commercial posters?

- Rarely
- Occasionally
- Frequently
- Often
- Always

B. In this part, please rate your intention to do the following tasks. “1” would be “strongly disagree” and “5” would be “strongly disagree”

<table>
<thead>
<tr>
<th>Task</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If I have the need, I will make simple personal</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
webpage by myself.

2. If I have the need, I will use e-mail to send and receive email.

3. If I have the need, I will use multimedia software to design or draw simple graphic.

4. If I have the need, I will use software to play songs or videos.

5. If I have the need, I will use communication software to communicate with friends.

6. If I have the need, I will use search engines to search for the information needed.

7. If I have the need, I will download and upload files.

8. If I have the need, I will write simple programs for the computer.

9. If I have the need, I will use the user’s guide when help is needed.

10. If I have the need, I will use the computer to organize information.

11. If I have the need, I will learn advanced skills with a specific program.

12. If I have the need, I will use multimedia software to edit photos and videos.

13. If I have the need, I will make websites by myself.

14. If I have the need, I will use multimedia software to design or draw commercial posters.

---

**Part 4: Personal Information**

Please provide your information by ticking the appropriate box or filling in the blank.

**Gender:**

- [ ] Male
- [ ] Female

**Age:**

- [ ] Under 18
- [ ] 18-24
- [ ] 25-30
- [ ] 31-35
- [ ] 36-40
- [ ] Above 40

**Education Level:**

- [ ] Primary
- [ ] Secondary
- [ ] Bachelor Degree
- [ ] Associate Degree
- [ ] High Diploma
- [ ] Others

**Major Study:**

__________________________________________________________