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Junior high school students' Internet usage and self-efficacy: A re-examination of the gender gap

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ABSTRACT

This paper investigated the gender differences in junior high school students' Internet self-efficacy and their use of the Internet. A total of 1080 eighth graders were randomly selected from all junior high school students in Taiwan. The Internet Self-Efficacy Scale (ISES) was developed and used to examine students' Internet self-efficacy in two dimensions: *online exploration* (*explorative ISE*) and *online communication* (*communicative ISE*). A survey including the ISES instrument was administered to all the subjects and finally 936 valid questionnaires (from 466 males and 470 females) were returned for data analyses. No significant gender difference was found in students' total ISE and explorative ISE; however, a significant gender difference was found in students' *communicative* ISE. Surprisingly, the girls had significant higher communicative ISE than had the boys. In addition, there was no significant gender difference in students' Internet using experience and computer ownerships; however, there were significant gender differences in their Internet using purpose and intensity. In spite of the boys showed a significantly higher Internet use intensity than did the girls, the boys were more exploration-oriented Internet users and the girls were more communication-oriented Internet users. And this orientation played a significant role in their Internet self-efficacy. These results suggested that the gender gap may no longer exist in young students' confidence in using the Internet. However, boys and girls used the Internet for significantly different purposes suggesting that the Internet played different roles for boys and girls in Taiwan. With a large scale examination by using a valid and reliable instrument, this study provided representative results for further related studies.

1. Introduction

Gender issues in technology use has been noticed and emphasized in computer and education research in the last two decades. Before the 1990s, computer technology seemed incompatible with women because the language and ways of thinking associated with it reflected a culture of masculine domination (Turkle, 1997). Prior research persistently reported that the males had more positive attitudes, more confidences and more competencies than the females in using the computers and further in participations of technology-related works (AlJabri, 1996; Fountain, 2000; Robertson, Calder, Fung, Jones, & O'Shea, 1995). This gender gap has been attributed to gender stereotypes, parent supports, amount of role models, male-oriented computer games and boys' early socialization with computers (Fountain, 2000; Janssen Reinen & Plomp, 1997; Levin & Gordon, 1989). The computer was not a welcoming environment for women in computing until the mid-1990s due to the advent of the World Wide Web and multimedia technology (Turkle, 1997). Successfully integrating the graphical user interface and the interconnectivity features of computer networks, the Web made the Internet user friendly for the female users. In the early 2000s, schools at all levels in many countries began to prepare all students' for Internet literacy and to promote Internet-based learning for life-long learning (McCarthy, 2000). Therefore, more and more studies began to emphasize the gender issues in relation to the Internet (Durndell & Haag, 2002; Hargittai & Shafer, 2006; Joiner et al., 2005; Papastergiou, 2009; Sieverding & Koch, 2009; Tsai, 2006; Tsai, Lin, & Tsai, 2001; Wu & Tsai, 2006).

The traditional gender gap was no longer consistently reported in recent research for students' use and confidence of the Internet. It showed that gender difference still existed in college students or adult users in terms of access to and use of the Internet, attitudes towards the Internet, frequency of Internet use and self-assessment of Internet competency (Durndell & Haag, 2002; Hargittai & Shafer, 2006; Joiner et al., 2005; Li & Kirkup, 2007; Peng, Tsai, & Wu, 2006; Tsai et al., 2001; Wu & Tsai, 2006). However, some other studies provided evidences

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of a change in next generation regarding the traditionally social cultural bias which views technology as a typical male activity. The results of these studies (Rainer, Laosethakul, & Astone, 2003; Schweingruber, Brandenburg, & Miller, 2001; Tsai & Lin, 2004; Volman, van Eck, Heemskerk, & Kuiper, 2005) suggested that the gender gaps in elementary and secondary school students seem to be narrowing or even disappearing. Schweingruber et al. (2001) reported that, for middle school students in the US, the gender gaps are narrowing significantly regarding access to and use of the Internet and students' self-perceived expertise. Rainer et al. (2003) investigated and compared the gender gaps of college students' Internet use and Internet attitudes between 1995 and 2002 with a conclusion that both gaps were lessoning or disappearing altogether in 2002. Results of Tsai and Lin's (2004) study showed that although high school male students still had better Internet attitudes in some aspects, the girls had significantly higher Internet self-efficacy than the boys in Taiwan. Volman et al. (2005) indicated a significantly smaller gender difference existed in elementary schools than in secondary schools in Netherlands. On the other hand, Internet usage between genders was not all found to be as male dominated as in traditional findings. Several studies reported that playing games were the most popular Internet activity for the boys (Mumtaz, 2001; Papastergiou & Solomonidou, 2005; Volman et al., 2005; Vekiri & Chronaki, 2008) while emailing friends or online communication was found to be the most popular Internet activity for the girls (Mumtaz, 2001; Volman et al., 2005). Tsai (2006) also reported a similar finding in Taiwanese high school students' perceptions of the Internet. These recent findings may suggest that boys view the Internet as an entertainment medium while the girls view the Internet as a communication medium. This could result in another form of gender gap in technology, not the difference in exposure on the Internet but the difference in types of Internet experience. The inconsistent research results could be due to the generation, however, it could be also due to the research instrument. Some instruments used may have not examined the different new features of the Internet applications especially concerning the self-assessment competency. Therefore, there is a need to further examine the gender difference in young students' use and self-confidence toward the Internet, i.e. the Internet self-efficacy with a valid and reliable instrument.

Social cognitive theory provided a solid theoretical foundation for concept of the Internet self-efficacy. Self-efficacy is an individual's belief in his/her ability to successfully perform tasks of a particular domain (Bandura, 1993) and this belief influences his/her choice of activities, how much effort he/she will expend, and how long he/she will sustain effort in dealing with stressful situations (Bandura, 1993; Schunk, 1989; Zimmerman, 1995). The stronger the students' beliefs in their efficacy, the more occupational options they consider possible, the greater the interests they show in them, the better they prepare themselves educationally for different career pursuits, and the greater their persistence and success in their academic coursework (Lent, Brown, & Hackett, 1994). Computer self-efficacy (Murphy, Coover, & Owen, 1989) referred to individuals' self-efficacy specifically toward using the computers. Similarly, Internet self-efficacy has been defined as individuals' perceptions about their own abilities toward using the Internet (Tsai & Tsai, 2003). Based on the unique features of the Internet, Tsai (2004) attempted to develop an instrument for assessing students' Internet self-efficacy under two dimensions of online exploration and online communication. Some recent studies have examined the Internet self-efficacy of college students or high school students (Wu & Tsai, 2006; Tsai & Lin, 2004); however, little study has examined junior high school or middle school students' Internet self-efficacy.

When more and more young females feel comfortable and gain more experiences in using the Internet, what are their perceptions about their own capabilities in using the Internet? Do young male students still have significantly higher confidence in using the Internet than did young female students? That is, do male students spend more time on using the Internet than the female students in all Internet activities? Do male students still have higher Internet self-efficacy in all dimensions than female students? These questions should be answered before we apply Internet-based learning or web-based learning to all students in all learning domains. Therefore, this study was aimed to reexamine if the gender gaps regarding Internet self-efficacy and Internet usage still existed in young students in Taiwan in a large scale with more a valid and reliable instrument.

2. Purpose

The purpose of this study was to investigate the possible gender differences in junior high school students' Internet self-efficacy and in their use of the Internet (including experience, frequency, ownership, and purposes). And if there is any significant difference found in students' Internet self-efficacy and Internet use, this study would further examine the significances of different Internet self-efficacy due to factors categorized in the use of the Internet. Therefore, research questions in this study include: Is there any significant gender difference in junior high school students' overall, explorative and communicative Internet self-efficacy? Is there any gender difference in junior high school students' Internet using experience, computer ownership, time spent on using the Internet and purposes to use the Internet? And, if necessary, is there any significant impact of students' use of the Internet on their Internet self-efficacy? In order to answer the above research questions, three hypotheses were proposed as the following:

$H_0$1: There is not any significant difference in junior high school students' *overall*, *explorative* and *communicative* Internet self-efficacy between genders.

$H_0$2: There is not any significant gender difference in junior high school students' Internet using experience, computer ownership, weekly time spent online and online purposes.

$H_0$3: There is not any significant impact in junior high school students' Internet self-efficacy due to their Internet using experience, computer ownership, weekly time spent online and online purposes.

In order to examine the above hypotheses, a survey including a modified instrument was used in this study.

3. Method

This study tried to investigate gender issues in junior high school students' Internet self-efficacy and their use of the Internet. Therefore, a survey with a questionnaire and an instrument was used in this study to answer the research questions.

3.1. Sample

Based on the percentages of the population distributions of the junior high school students in all city/county districts of Taiwan (Ministry of Education [MOE], 2007), a total of 1080 eighth graders intact in 28 classes were randomly selected as subjects of this study.