The Relationship between Enactive Mastery Experiences and Online-course Self Efficacy (OCSE)

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The purpose of the study is to examine the relationship between enactive mastery experiences (with computers, the Internet, training, online courses, and hybrid course experiences) and online course self-efficacy (OCSE). A total of 94 mid-Illinois university students participated in the research. Pearson's correlation and multiple regression analyses were employed. Among the experiences, only online course experiences were found to be significantly and positively related to OCSE (t=2.593, β=287*, p=.011).*

Key words**:** O*nline course self-efficacy, Enactive mastery experience, Online course experience*

Along with the astonishing growth of computer and/or Internet-integrated instruction, advanced, user-friendly, computer applications and computer mediated communication (CMC) technologies have been developed and integrated in online learning. However, many online students still run into difficulties when using communication software as an effective learning tool, indicating a difficulty in communicating online (Chyung, Winiecki, & Fenner, 1998). Quite a few students tend to drop out of online courses because they do not feel confident in the online environments (Chacon-Duque, 1987; Chyung, 2001). Students less experienced with online courses, for example, tend to feel anxious about using CMC technologies and the Internet, which impedes interaction with the instructor, peers and course content and prevents success in the online course. Those who are not as confident in using online technologies tend to spend more time trying to figure out how to use them. This is especially true for tasks needed in online coursework, such as interaction with instructors, teamwork, or downloading course content (Beauvois & Eledge, 1996; Marios & Yu, 2000). Considering that online self-efficacy is significantly and positively related to students' performance, enhancing knowledge or confidence levels to do necessary tasks for online courses might be very critical.

Self-efficacy is defined as one's belief that one is capable of creating and accomplishing an activity (Bandura, 1977). In the context of online courses, online course self-efficacy (hereafter OCSE) is defined as one's belief in one's ability to do tasks needed for online courses as if they were actually participating in an online course (Randall, 2001).

To boost self-efficacy, people need repeated task-related experiences, the so-called "enactive mastery experience," which is the most powerful source of efficacy. Repeated success in a particular task raises one's self-efficacy level (Bandura, 1977, 1983). In the same vein, repeated task-related experiences are crucial to increase OCSE. The literature review identifies three major channels of enactive mastery experiences that increase OCSE: computer/Internet experiences, training, and online/hybrid courses.

Much research has examined the relationship of enactive mastery experiences with computer self-efficacy (hereafter, CSE), but not with OCSE. It is critical to explore this relationship considering the substantial expansion of online courses as mentioned in the beginning of the paper. Few previous studies, if any, have examined the relationship between the two, but they did not specify enactive mastery experiences. Enactive mastery experiences vary depending on the context (online, training, or individual activities with a computer or the Internet). It is necessary to examine the extent to which each type of experience can influence OCSE. In this study, each of the several major types of enactive mastery experiences (computer/Internet, training for software, training for online technologies, online course, and hybrid course experiences) was compared while controlling for the others.

Theoretical Framework

Bandura (1977) contends that human behavior is determined by a person's belief that he or she is capable of formulating and accomplishing an activity (i.e. self-efficacy). People's belief that they can do a specific task leads them to better performance. Thus, the construct of self-efficacy has been a significant variable for predicting an individual's behavior. Self-efficacy can be enhanced by four sources of information: enactive mastery experience, vicarious experience, verbal persuasion, and physiological state.

First, an enactive mastery experience is the experience of completing an activity successfully, which will increase the self-efficacy related to the activity. Observing others succeed or fail in an activity is the second source (i.e., vicarious experiences). Getting encouragement, reassurance, or motivational speeches (i.e., verbal persuasion) is another source, and finally, reducing psychological signs of anxiety can further enhance self-efficacy (i.e., the physiological state) (Bandura, 1977; Jackson, 2002).

It is essential to examine the relationship between enactive mastery experience and self-efficacy since among the four sources, enactive mastery experience is the most powerful source of efficacy information (Bandura, 1977, 1982; Gist, 1987; Potosky, 2002)**.** People come to believe that they can do a specific task better through the mastery of knowledge achieved by repeated, task-related, *hands-on* experiences. These experiences can decrease fear and increase confidence levels for what was previously feared and avoided (Bandura, 1982).

Since few studies take into account the different types of enactive mastery experiences in an online environment, the researcher examined which types of experiences (i.e., computer/Internet, training, and online/hybrid course experiences) lead to higher online course self-efficacy.

Literature Review

Online course self-efficacy (OCSE) and Computer self-efficacy (CSE)

OCSE is defined as one's judgment or belief in one's own ability to do tasks needed for an online course, as if they were actually participating in an online course (Randall, 2001). OCSE is a relatively new term, and little is known about OCSE. There are plenty of studies done about CSE, but it is not clear whether the findings on CSE can be extended to OCSE.

CSE is defined as a judgment of, or belief in, one's own ability to use a computer to perform a task successfully (Lim, 2001). CSE can be divided into task-specific computer self-efficacy and general computer self-efficacy. Task-specific computer self-efficacy refers to an individual's perception of efficacy when performing specific computer-related tasks within the domain of general computing, while general computer self-efficacy refers to an individual's judgment of efficacy across multiple computer application domains (Marakas, Yi, & Johnson, 1998). They consider general computer self-efficacy as a collection of both task-specific, computer self-efficacy and enactive experiences.

Much research has shown that CSE is indeed important for many desirable educational outcomes (Compeau & Higgins, 1995; Lim, 2001; Potosky, 2002). For example, Lim's (2001) research findings showed that CSE is significantly related to a learner's satisfaction with their web-based, distance education courses as well as with their intent to participate in future web-based courses. Furthermore, CSE is an important factor in student's computer-related performance (multiple computer applications, Marakas, Yi, & Johnson, 1998; final exam scores, Wang & Newlin, 2002). For example, students' perceived self-efficacy is predictive of their final exam scores in the course (Wang & Newlin, 2002) and a task-specific CSE is associated with a specific task performance (Marakas, Yi, & Johnson, 1998). CSE has been found to relate to the use of complex technologies and the adoption of computers for instruction (Compeau, & Higgins, 1995; Faseyitan, Libii, & Hirschbuhl, 1996; Hill, Smith, & Mann, 1987; Landino & Owens, 1988). For instance, faculty with a high CSE are more motivated to use computers in instruction (Fasyitan et al., 1996). The antecedents of CSE are discussed in the following sections.

Enactive mastery experience

This section reviews ways to enhance self-efficacy. The literature has fully shown that enactive mastery experiences are the major source of self-efficacy. The enactive mastery experience is essential because it promotes behavioral accomplishments, reduces fear arousal, and thus boosts self-efficacy (Bandura, 1977). It is influential because it is based on personal mastery experiences through repeated task performance.

Several channels for enactive mastery experience in online learning were found in the literature: the computer, the Internet, training for computer software, training for online technologies, online courses, and hybrid course experiences. Similar experiences are grouped together and presented in the following sections.

Computer and Internet experiences Direct computer experience is theoretically presumed to influence an individual's development of self-efficacy (Bandura, 1977; Lewis, 1985; Oliver & Sapiro, 1993). Conforming to this rationale, significant and positive relationships between computer experience and CSE have indeed been found (Harrison & Rainer, 1992; Hasan, 2003; Henry & Stone, 1994; Hill, Smith, & Mann, 1987; Houle, 1996; Igbaria & Iivari, 1995; Kinzie, Delcourt, & Powers, 1994; Potosky, 2002).

In general, the more time spent on computers or the Internet, the higher computer self-efficacy is perceived (Henry & Stone, 1994; Igbaria & Iivari , 1995). Furthermore, previous experience working with computers or the Internet also has an effect on students' perceptions of self-efficacy, both for computer-related tasks and toward using the Internet (Eastin, 2000; Joo, Bong, & Choi, 2000; Moroz, & Nash, 1997; Ren, 2000). More specifically, prior Internet experience and Internet use are significantly and positively correlated to Internet self-efficacy judgments

(Eastin, 2000). For example, prior Internet experience and the frequency of Internet use are significantly and positively correlated with pre-training and post-training self-efficacy for electronic information searches (Ren, 2000).

Several previous studies have specified types of computer experiences associated with CSE. Experiences with programming and computer graphics applications, which are difficult and unfamiliar task experiences, have the strongest effects on CSE beliefs (Hasan, 2003). Busch (1995)'s study showed that female students, who have less computer experience in programming and computer games, were found to have less self-efficacy with regard to complex computing tasks than their male counterparts. Self-efficacy for word processing, electronic mail, spreadsheets, database programs, statistical packages, and CD-ROM databases are also all positively related to experience when using computer technologies (based on frequency of use and course experience) (Kinzie, Delcourt, & Powers, 1994).

Training program experience Prior research has also showed that computer training enhances CSE (Faseyitan, Libii, & Hirschbuhl, 1996; Gist, & Mitchell, 1989, 1992; Martocchio & Dulebohn, 1994; Martocchio & Judge, 1997; McWhirter, Crothers, & Rasheed, 2000; Potosky, 2002; Webster & Martocchio, 1992). For example, Faseyitan et al. (1996) found that in-service programs, especially workshops, which provide an opportunity for direct experiences, have a strong influence on computer self-efficacy. Houle (1996)'s study showed that high school spreadsheet courses, high school database courses, and working experience with computers at a job are also positively correlated to CSE. The setting was a face-to-face college computer skills course**.**

Research on university students also suggests that positive affect can be encouraged through educational experiences with computers (Gilroy & Desai, 1986; Lambert & Lenthall, 1989). Experience, either through courses or frequent use of applications (word processing, email, and CD-ROM data bases), along with a positive attitude, is predictive of self-efficacy for computer technologies (Delcourt & Kinzie, 1993). For example, a 14-week web page design course significantly improved the CSE of pre-service teachers (Chu, 2003).

Online course experience Little research has been done to examine the relationship between online course experiences and online course self-efficacy. Randall (2001) is one exception. With a sample size of 762 electrician instructors participating in his study, he found that the online course learning experience was significantly and positively related to self-efficacy beliefs. However, his main focus was to test the instrument that measures online instruction self-efficacy.

Lee and Witta's (2001) study showed that self-efficacy for both course content and for online technologies increased during the semester. However, while the initial self-efficacy for course content was a significant predictor of students' satisfaction with the course, neither self-efficacy for the course content or for online technologies was a significant predictor of performance. In this study, the relationship between each of the several prevailing types of enactive mastery experiences (computer/Internet, training, and online course experiences) and online course self efficacy was examined and compared while controlling for the others.

Statement of the Problem

Prior research has showed that there is a significant relationship between computer experience and computer self-efficacy (Eastin, 2000; Harrison & Rainer, 1992; Hasan, 2003; Hill, Smith, & Mann, 1987; Igbaria & Iivari, 1995; Kagima, & Hausafus, 2000; Potosky, 2002). However, little is known about the relationship between enactive mastery experience (which is defined as repeated task-related experiences through performance accomplishments, Bandura, 1977) and online course self-efficacy (OCSE) (defined as one's belief in one's capability to do tasks online, Randall, 2001).

The results of the findings could inform online course providers of ways to improve student retention in online courses by improving online course self-efficacy. Taking a course might lead to more familiarity with computer software and online technologies, such as discussion boards, instant messenger, downloading files, and so on. If the findings show that a task-specific experience has an effect on self-efficacy in online courses, the administrators of online courses should offer hands-on workshop sessions for the specific online technologies that will mainly be used for online courses.

Purpose of the Study

The purpose of the study is to examine the relationship between enactive mastery experiences (computer/ Internet, training, online/hybrid course experiences) and online course self-efficacy (OCSE).

Research Questions

1. Do computer and Internet experiences have a relationship with OCSE?
    a. Is the amount of computer use associated with OCSE?
    b. Is the amount of Internet use associated with OCSE?
2. Do training experiences for online technologies have a relationship with OCSE?
    a. Are hands-on training experiences for specific online technologies associated with OCSE?
    b. Are hands-on training experiences for any computer software associated with OCSE?
3. Do online course experiences have a relationship with OCSE?
    b. Are pure online course experiences associated with OCSE?
    c. Are hybrid course experiences associated with OCSE?

Methods

Research design

To examine the relationship between computers, the Internet, training for online technologies, training for computer software, hybrid courses, online course experiences and OCSE, a one time questionnaire was employed. Neither a control group nor an experimental design was employed. Through survey, the perception of OCSE was measured and their experiences were measured by the hour.

Population and sample

The research population for this study consists of graduate students from one department of the college of education (both online and on-campus) and of an online master's degree program for practicing teachers and administrators at a mid-Illinois university.

Participants were recruited through the list serve of both departments during spring 2004 at a mid-illinois university. The researcher put the survey on the web using the web tool (www.questionpro.com). The researcher gave the web survey address to the administrators and asked them to distribute a survey request email to the listserv. A total of 94 students completed the survey (excluding 12 with missing information on independent variables, but including the data with missing information about demographics). Participating students were asked to take the online survey during the period of May 26th – June 24th, 2004. The raw data of the survey results were collected and put into SPSS and analyzed.

The participating students were made up of 65 females and 28 males (including one with missing information about gender). Other demographics such as degree pursued, program, and enrollment status are shown in Table 1.

Table 1. Demographics of the participants

Gender (N= 93)
Female: 65 (69.1%)
Male: 28 (29.8%)
Pursuing degree (N= 92)
Master: 64(68.1%)
Doctoral: 24 (25.5%)
Other: 4 (4.3%)
Program (N=89)
An education department students on campus: 30 (31.9%)
An education department students on campus online: 31 (33.0%)
An online master program students for teachers: 28 (29.8%)
Enrolment status (N=91)
Full-time:27 (28.7 %)
Part-time: 64 (68.1 %)

Instrumentation and procedures

Randall and Petty (2001)'s "Tennessee Online Instruction Scale" (TOIS) was used to assess online course self-efficacy. Randall (2001) focused on the development of the instrument and examined the relationship between computer, internet and online course experience and online instruction self-efficacy in order to test his instrument. TOIS has a total of 40, 7-point Likert-scaled items (1=never, 7=always). The overall reliability of the instrument was found to be satisfactory (Cronbach's coefficient alpha = .97). The study used 40 items to measure OCSE as it was. The researcher altered the background information part to conform to the purpose of the study. Therefore, the instrument for the study was composed of (1) a consent form to ensure confidentiality of the participants; (2) 40 items to rate OCSE; and (3) background information. The background information questions included demographic

information (age, gender, degree pursued, enrollment status) and information about the major channels of enactive mastery experience - computer, Internet, training, online course and hybrid course experiences. The participants were asked to fill in hours in order for the researcher to get as exact a measurement of each experience as possible, unlike in other previous studies that only measured the extent of the experience (very low to very high).

Data analysis

To examine the relationship between enactive mastery experience and OCSE, two statistical analyses were employed in this study. Pearson's correlation and multiple linear regressions were used to examine if computer, Internet, online, or training experiences are significantly related to online course self-efficacy.

The independent variables were split into six: computer, Internet, training for computer software, training for online technologies, online course, and hybrid course experiences. The dependent variable was online course self-efficacy.

Results

Preliminary Analysis

The ANOVA test suggested that significant differences existed between experiences, F (6, 87) = 2. 39, p<.05. The experiences can account for OCSE by 14% (R^2 = .14). The mean of OCSE is 6.27and its range is 2.75. Its standard deviation is .59 as shown in Table 2. The other descriptive statistics and correlations of the independent variables are shown in the following Table 2 and Table 3, respectively. Table 3 indicates that the Internet experience(r = -.26, p <.01) was highly and negatively related to OCSE, and the online course experience (r = -.24, p <.05) was highly and positively related to OCSE, while the rest of the experiences were not related at all (these results were obtained while other variables were not controlled mutually).

Table 2. Descriptive Statistics (N=94)

Variables	Mean	Range	Standard Deviation
OCSE	6.27	2.75	.59
Computer	20.34	49	12.46
Internet	12.02	48	9.00
Training (computer)	31.18	320	65.67
Training (online)	13.19	160	26.23
Online course	3.97	25	4.65
Hybrid course	2.19	15	3.12

Note: the unit of each experience was hours. Training (computer) = training for computer software; Training (online) = training for online technologies.

Table 3

Pearson Correlation Coefficients for each type of enactive mastery experience and OCSE

Type of experience	computer	Internet	Training(computer software)	Training(online technologies)	Online	hybrid
r	-.14	-.26**	-.03	-.02	.24*	-.13
p	*ns*	.007	*ns*	*ns*	.01	*ns*

*p <.05, **P < .01

Main analysis

The results of research question 1 through 3 were given in Table 4.

Research question 1: Do computer and Internet experiences have a relationship with OCSE?

Neither computer experience (β =-.04, t=-.34, p = *ns*) nor Internet experience (β =-.20, t=-1.9, p = *ns*) was found to be significantly related to OCSE, as shown in Table 4.

Research Question 2: Does training (i.e., workshop or orientation program) experience for online technologies or for computer software have a relationship with OCSE?

Neither training experience for online technologies (β =-.07, t=-.62, p = *ns*) nor for computer software (β =-.06, t=-.48, p = *ns*) was found to be significantly related to OCSE, as shown in Table 4.

Research question 3: Does online course experience have a relationship with OCSE?

Online course experience was found to be statistically significantly related to OCSE (β =.29*, t=2.6, p <.05) as shown in Table 4, but hybrid course experience was not found to be significantly related (β =-.11, t=-1.02, p=*ns*).

Table 4
Summary of Linear Multiple Regression Analysis for Variables predicting OCSE (N=94)

Variable	*B*	*SE B*	β	*t*	p
Computer	-1.696E-03	.005	-.036	-.341	.734
Internet	-1.302E-02	.007	-.198	-1.865	.065
Training (com)	-5.159E-04	.001	-.057	-.479	.633
Training (online)	-1.668E-03	.003	-.074	-.623	.535
Online course	3.644E-02	.014	.287*	2.593*	.011
Hybrid course	-2.027E-02	.020	-.107	-1.020	.31

*$p < .05$

Conclusions and Discussion

Based on the results from the study, the following conclusions can be drawn: *Research Question* 1: prior computer experience is not related to OCSE. Unlike previous research on the relationship between computer experience and CSE (Hasan, 2003; Hill, Smith, & Mann, 1987; Houle, 1996; Igbaria & Iivari, 1995; Potosky, 2002), the present study found no significant relationship between computer experience and OCSE. This is also not the same as Randall's (2001) results that computer experience is related to online instruction self-efficacy. In addition, prior Internet experience is not related to OCSE. The finding is not congruent with the previous research (Eastin, 2000; Ren, 2001).

The study shows that prior computer and Internet experiences are not related to OCSE. Students with many computer and Internet experiences do not have a higher OCSE. It seems that online technologies have different characteristics from computer and Internet experiences. Even though students have a high level of computer or Internet skills, they might not be confident and even might even be afraid to take online courses.

Research Question 2: prior training experiences both for online technologies and for computer software are not related to OCSE. These findings are different from those of the previous research (Gist, & Mitchell, 1989, 1992; Faseyitan, Libii, & Hirschbuhl, 1996; Martocchio & Dulebohn, 1994; Martocchio & Judge, 1997; Potosky, 2002; Webster & Martocchio, 1992), which showed that training experience is related to computer self-efficacy. This study shows that OCSE is different from CSE, and that the students who have a lot of computer experience or higher computer skills might have just as much difficulty taking online courses.

The study also shows that training experience for online technologies is not related to OCSE. It seems that even though students have training experience for general online technologies, they may still have a problem taking online courses.

Research Question 3: prior online course experience is related to online course self-efficacy (OCSE). This finding provides support for Bandura's self-efficacy theory in that it identifies an online course experience as a mastery experience, the most influential source of self-efficacy. This finding is consistent with the results of Randall's (2001) study and Loboda's (2002) study. Thus, it is obvious that students with more online course experience have a higher online course self-efficacy.

On the other hand, hybrid course experience is not related to OCSE. This seems to be due to the different characteristics of hybrid courses and those of online courses. The experience of using discussion boards or uploading/downloading files might not be enough to enhance OCSE.

Implications for Practice

Given the findings of this study, the following implications can be drawn.

Implication 1: based on the findings of this study that prior computer and Internet experiences are not related to OCSE, the administrators of online courses should prepare the learner by either offering orientations tailored to a specific online course, or by giving continuous support according to their level of OCSE.

Implication 2: considering that the results that training experience for computer software is not related to OCSE, even students who have a lot of computer experience or higher computer skills might have difficulty taking online courses. The training or orientation programs should be designed or planned to focus more on the specific online course before online students take the course in order to increase their OCSE.

Implication 3: the finding that training experience for online technologies is not related to OCSE indicates that students might need an orientation for the specific online technologies needed for a specific online course. The present study suggests that each online course may be benefit from using different online technologies and different

frameworks. The administrators of online courses should design individual orientation programs for specific online courses.

Implication 4: It seems reasonable to say that prospective online students should be exposed to the environment closest to online courses in order to enhance their online course self-efficacy, based on the findings of the study that most online course experience (except for hybrid courses) is not related to OCSE. They could be offered orientation programs either before or during online classes according to their OCSE. The orientation programs should be tailored for a specific online course and should include the specific online technologies that a specific online course uses.

Suggestions for further research

First of all, this study should be replicated using a different sample or population to see if the same findings can be generalized to different settings, since some of the findings of the study are not consistent with previous research (e.g., computer and Internet experience were found not to be related to OCSE in this study unlike previous studies).

Second, research using an experimental design should be done to examine the relationship between intervention for a specific online course and OCSE. Because the study shows that online course experience is related to OCSE, the research on the effectiveness of intervention for a specific online course should be examined by giving intervention to this particular group (e.g., an orientation program).

According to Lee and Witta (2001), in a web-based course (for example, WebCT used in this survey), students' success or failure to master online technologies fluctuates throughout the semester; thus, measuring self-efficacy only one time can reduce the accuracy of predicting the impact of self-efficacy on student learning. Future research should measure self-efficacy at multiple time points.

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