THE RELATIONSHIP BETWEEN LEARNER CONTROL AND ONLINE LEARNING SELF-EFFICACY

A thesis presented in partial fulfilment of the
requirements for the degree of

Doctor of Philosophy
in
Education

at Massey University, Manawatu Campus,
New Zealand

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(2014)

ABSTRACT

Online learning has been growing rapidly in recent years, providing increased opportunities for tertiary institutes to reach out to learners who previously may have had limited access to a traditional university. Although students frequently use information technologies in their daily life, online learning requires considerably more competencies than basic computer skills. Many students are unsuccessful in their learning without face-to-face contact and collaboration with lecturers and peers. They can feel isolated and doubt their ability to succeed in the online course. To increase online learner success, support is needed, especially to improve learner self-efficacy. Very few studies have focused on student self-efficacy in an online learning environment and especially those conducted in an authentic setting. Learner control is thought to facilitate students in online learning, but the relationship between learner control and learner self-efficacy is still unclear. Therefore, this study intends to examine this relationship using an embedded-correlational mixed method design to answer the research question, what is the relationship between learner control and online learning self-efficacy? The quantitative approach was used to find the correlations among learner control, online learning self-efficacy, and related variables such as age, gender, prior online experience, and computer skills. An online Learning Self-efficacy Scale (OLSES) was constructed and validated with an internal consistency of 0.895. Open-ended questions were added to the questionnaire to gain a greater level of insight of online learning experience in relation to self-efficacy and learner control. Seventy-five students in a four year teaching online programme at a New Zealand tertiary institute participated in the online survey. Data analyses revealed that the relationship between learner control and online learning self-efficacy was confirmed, $r = .526$, $p < .01$. Age and gender had no effect on the relationship while prior online experience, computer skills for social and academic purposes did. The multiple linear regression showed that learner control and computer skills for academic purpose are good predictors of online learning self-efficacy. Analyses of the qualitative data not only confirmed the quantitative findings, but also provided insight into the nature of self-efficacy and importance of feedback in the online setting. As a result of this study, the embedded framework for successful line learners (SUCCESS) was developed and is recommended as a set of guidelines for online learning developers.

DEDICATION

I would like to dedicate this thesis to my dad who gave me my blood and soul. He was the one who showed me the great strength of self-efficacy which inspired and led me into a long lonely but the enjoyable PhD journey. Though we did not spend quality time during the past years, I was touched by his love.

Learning is a never-ending process. Those who wish to advance in their work must constantly seek more knowledge, or they could lag behind and become incompetent.

(H.M. Bhumibol Adulyadej, 1961)

ACKNOWLEDGEMENTS

First of all, I wish to express my sincere gratitude for my research supervisors, Associate Professor Sally Hansen, my main supervisor, and Professor Mark Brown, my co-supervisor. You both have been particularly kind and supportive throughout the process. This thesis is completed with your professional guidance and tirelessly insightful critiques. The opportunities you have given me to present my works on several occasions, both nationally and internationally, have made my PhD journey very rich, precious, and pleasant.

I also wish to express my appreciation to Dr. Benjamin Kehrwald, my first main supervisor, Dr. Lone Jorgenson and Dr. Brian Finch, my previous co-supervisors, for helping me get started with my study, develop my research proposal, and get through the confirmation process. My appreciation also goes to Professor Christine Stephens, the Convenor, and the doctoral oral examiners, Dr. Maggie Hartnett, Associate Professor Mary Simpson, and Dr. Panos Vlachopoulos, who read every line of my thesis and provide valuable comments.

Special thanks to Mrs. Lois Wilkinson at the Centre for Teaching and Learning who help me improve my academic writing skills. I really appreciate your willingness to read through my broken English patiently, help me develop the idea, and provide very helpful feedback to my work. This thesis would not be possible without you. My appreciation also goes to Dr. Julia Rayner at the Graduate Research School who help me develop writing skills from the writing group and gave me opportunities to share my perspectives and PhD experiences with others on several occasions.

My appreciation also goes to the paper co-ordinators of my sample groups. Thanks to the academic staff who helped me with the distribution of my questionnaire during the pilot study and remind me about the ethical issues. Many thanks to all participants who give valuable reflections of the online learning experience. Your responses were truly appreciated. I also grateful for Mrs. Carita Yalden and Mrs. Julie Sakai who helped me juggle in between my supervisors' busy schedule, and coordinated many tasks related to my PhD process. Many thanks to my MOMs here, Mrs. Josie Griffiths, Mrs. Sharon Simmons, and Mrs. Roseanne MacGillivray, who took care of our postgraduate room

and all functions related to us, the PhD students in the Institute of Education. I would like to say thank you to Mrs. Phillippa Butler, the Research Officer at the Institute of Education who affirmed me about the statistical technique and went through my thesis at the final stage of my writing. My thankfulness also goes to the people at the International Student Support who extremely supportive. You have helped me resolve all the hiccups along my path, thus, made my journey smoother.

I am really appreciative of Associate Professor Siriwan Sereesat, my previous boss, who encouraged me to get into this profession and gave me a small grant to set up my life in New Zealand. Many thanks to my PhD Colleagues; Ms. Shutiwan Purinthrapibal, who shared all kinds of fun and valuable experiences in various activities we had together, including many trips around New Zealand and the support we gave to each other during up-and-down moments at Massey. I would like to thank Assistant Professor Quantar Banthip and Dr. Catootjie Nalle, who helped me during the first few months in Palmerston North. A million thanks to my PhD friends at the Institute of Education who walked with me during the PhD journey, especially Mrs. Marie-Pierre Fortier. Without you guys, my journey would be really lonely and boring.

Special thanks to my yoga teachers, Mrs. Ruth Hodgson, for your training that helped keep my mind and body balance so I could move well along the PhD route. Also, thanks to the delightful class members who kindly gave me some writing and oral examination tips. I would also like to give my sincere thanks to the people at the Centre, especially Ms. Victoria Sibley, for providing English classes, exchanging our beliefs, and being friends with me.

Most of all, my appreciation goes to my mom, Mrs. Suda Taipjutorus, who was taking care of my financial matters and my two little monkeys. Special thanks to my beloved husband, Mr. Sorawit Kiatsrisiri, who helped out all the legal matters and supported me emotionally. I would not have this chance if you did not allow me to walk on this journey. Last but not least, I would like to thank my four children, Weena (Mai), Sasitorn (Fai), Pattama (Pear), and Nanta (Pan) Wangspa. I am really grateful for your understanding of what I was doing. You are growing maturely and doing amazingly well during my four years studying overseas. I am very proud of you all.

กิตติกรรมประกาศ

ขอขอบคุณมหาวิทยาลัยเทคโนโลยีราชมงคล พระนคร ที่ให้ทุนการศึกษาตลอดระยะเวลา ๔ ปี ทำให้ผู้รับทุนมีโอกาสไปพัฒนา ไปศึกษาหาความรู้ และเก็บเกี่ยวประสบการณ์ในประเทศนิวซีแลนด์ จนสำเร็จการศึกษาระดับปริญญาเอก

ขอกราบขอบพระคุณท่านคณบดี คณะเทคโนโลยีสื่อสารมวลชน รองศาสตราจารย์ วิมลพรรณ อาภาเวท ที่ได้เห็นศักยภาพของผู้รับทุน และเสนอชื่อผู้รับทุนต่อทางมหาวิทยาลัยฯ ขอกราบขอบพระคุณท่านอดีตอธิการบดี รองศาสตราจารย์ ดวงสุดา เตโชติรส และ ผู้ช่วยศาสตราจารย์ ดร. นุชลี อุปภัย รองอธิการบดี ด้านวิจัยและบริการวิชาการในขณะนั้น ที่ให้การสนับสนุน และให้ความสะดวกในการมาศึกษาที่ประเทศนิวซีแลนด์ในครั้งนี้

ขอขอบคุณเจ้าหน้าที่กองบริหารงานบุคคล โดยเฉพาะอย่างยิ่ง คุณวันใหม่ สุกใส ขอขอบคุณเจ้าหน้าที่การเงิน กองคลัง และเจ้าหน้าที่สายสนับสนุน คณะเทคโนโลยีสื่อสารมวลชนทุกท่าน ที่ช่วยเหลือในการส่งหนังสือ ทำเรื่องเบิกจ่าย และอื่นๆ ในขณะที่ผู้รับทุน ศึกษาอยู่ที่ประเทศนิวซีแลนด์ ผู้รับทุนเดินมาได้จนถึงจุดหมาย ด้วยการสนับสนุนของบุคคลากรทุกฝ่าย ขอขอบคุณอีกครั้งมา ณ ที่นี้ด้วย

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LIST OF ABBREVIATIONS

RMUTP	Rajamangala University of Technology Phra Nakhon
PISA	The Programme for International Student Assessment
OECD	The Organisation for Economic Co-operation and Development
NEA	National Education Act
LC	Learner control
OLSE	Online learning self-efficacy
OLSES	Online learning self-efficacy scale
CSAP	Computer skills for academic purpose
CSSP	Computer skills for social purpose
PCA	Principle Component Analysis
ANOVA	Analysis of variance

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CHAPTER 1

INTRODUCTION TO THE STUDY

Believe you can and you're halfway there.

(Theodore Roosevelt)

1.1 Introduction

In the last decade, online learning has become increasingly common in higher education and many tertiary institutes now perceive online learning as the educational trend for the future. Online learning can be cost effective and can reach more learners (Welsh, Wanberg, Brown, & Simmering, 2003). In some senses, it is seen as a sustainable way for learning. Though many studies report successful stories of online learning in terms of retention and effectiveness (e.g., Means, Toyama, Murphy, Bakia, & Jones, 2009), findings still show online learners have difficulties in dealing with their learning environment (e.g., Cavanaugh, 2005; Cook & Jenkins, 2010; Levy, 2007). Despite using computers and other technologies in their daily life, not all students are confident and do well in online courses. Some students still find the absence of face-to-face interaction challenging. Thus, technical and psychological support is often needed for online students. Therefore, this thesis is the researcher's quest to find a way to help these not-so-confident online learners.

1.2 Impetus for the Study

Although Connolly, MacArthur, Standfield, and McLellan's (2007) quasi-experiment confirms Means, Toyama, Murphy, Bakia, and Jones' (2009) report which suggested that online learners performed better than students in a traditional classroom, a number of other studies show that student retention rate of online courses were still lower than face-to-face courses (e.g., Boston, Ice, & Gibson, 2011; Flood, 2002). Such findings indicate that educational institutes still face challenges in keeping their online students (Carr, 2000; Royer, 2006). Thus, many studies have tried to find the way to reduce attrition rates by examining factors associated to learners' decisions to withdraw from

online courses (Angelino, Williams, & Natvig, 2007; Herrington, Oliver, & Reeves, 2003; Nash, 2005; Tyler-Smith, 2006).

Despite the lack of research on understanding online learners (Oncu & Cakir, 2011; Yang, Tsai, Kim, Cho, & Laffey, 2006), high drop-out rates can be a result of many factors. Some factors are external such as insufficient support, poor course design, inadequate feedback, and lack of instructor presence in the online learning environment (Park & Choi, 2009). Many studies identify internal factors such as academic and technology skills, student engagement, cognitive style, satisfaction, and self-efficacy as predictors of online learning success (Dagger & Wade, 2005; DeTure, 2004; Seiver & Troja, 2014). In addition, research in this area indicates that adequate support from lecturers, online course developers, and educational institutes can help these students to "overcome the hardships" (Hart, 2012, p. 19) and complete an online learning course. Moreover, findings from Park and Choi (2009) point that the drop-out rate can be reduced if lecturers and online course developers improve the course design in order to enhance student engagement and satisfaction. For these reasons, this study focuses on the course design embedded with elements that can support online learners.

The reviewed literature in Chapter Two suggests that self-efficacy of online learners has a strong link to student engagement and satisfaction (e.g., Artino, 2007; Hill & Hannofin, 1997; C. K. Lim, 2001; Scott & Walczak, 2009). Additionally, self-efficacy is closely related to students' motivation, persistence, and decision-making processes (e.g., Bandura, 1997b; Hurley, 2006; Pintrich & Groot, 1990; Tzeng, 2009). Moreover, research has shown that self-efficacy is a good predictor of academic success (Gore, 2006; Zajacova, Lynch, & Espenshade, 2005). Theoretically, learners with high self-efficacy cope, adapt, and persevere better than inefficacious learners. Efficacious learners, thus, put in more effort when they encounter difficulties and find better ways to deal with challenges. Consequently, these learners have a better chance at successfully completing an online course. As a result, the drop-out rate can be reduced. With that information, the online course should be designed to help learners improve their self-efficacy. However, literature on learner self-efficacy in an online learning environment is still limited. Addressing this gap in the literature is why online learning self-efficacy is a focus of this present study.

Additionally, this present study considers the embedded elements of learner control in online learning that can enhance learner self-efficacy. A study by Lawless and Brown (1997) indicates that the ability to control one's instructional sequence can enhance learning, heighten attitudes and increase self-efficacy. According to Kay (2001), "we can improve learning effectiveness by giving the learner control over, and responsibility for, their own learning" (p. 114). Some researchers attest that high levels of learner control can improve learner performance (e.g., S. W. Chou & Liu, 2005). At higher levels of learner control like collecting and generating, learners are engaged in greater levels of interaction. These interactions, especially with their classmates and instructors, can make learners feel more efficacious from activities they and their classmates have accomplished as well as feedback from peers and instructors. Emotional states such as satisfaction and a sense of belonging can further increase a sense of efficacy (Piccoli, Ahmad, & Ives, 2001). For these reasons, an online course embedded with learner control should be able to help learners develop a better sense of self-efficacy while studying. This study sets out to test this assumption. The findings of this research may shed some light on how to improve support for online learners with a suitable course design that assists in building online learning self-efficacy and learning success.

1.3 Research Aims

This research aims to find the way to support online learners by improving their self-efficacy since self-efficacy is important for the decision to stay or drop-out from the online course (T. Huang, 2009). According to the literature review, research on increasing learner self-efficacy in the traditional classroom has been carried out, less attention has been focused on this area for online learners (Hodges, 2008). Many studies have focused on the relationship between online learner self-efficacy and technology abilities. Few studies have focused on online learner self-efficacy in relation to curriculum or course design. Therefore, this study pays more attention to course design level, especially an embedded element – learner control, since learner control is reported to benefit learners (e.g., M. Chang & Ho, 2009; S. W. Chou & Liu, 2005; Mills, Herron, & Cole, 2004). However, few studies have investigated learners with different levels of learner control in an authentic online class setting (Jaffe, 1997). In addition, research findings on the effect of learner control on self-efficacy are mixed.

Hence, this PhD study is an attempt to fill in these research gaps and to gain more understanding of online learning self-efficacy from the students' own voice and experience.

1.4 The Researcher

Knowing more about my role as the researcher may help readers to understand the context and rationale underpinning the motivation behind this study. Formerly, I worked in the area of hard science; a field where trying to determine fact from reality using experimental designs is the norm. After graduating from Chulalongkorn University, Thailand's most prestigious tertiary institution, with a bachelor's degree in Microbiology, I shifted my area of study to Business Information Systems while I was studying at Utah State University because information technology was emerging and growing rapidly at that time. In 1996, I gained a Master of Science in Management Information Systems and Education and then started working in the field of Information and Communications Technology and held a number of positions, including a database designer, system analyst, technical writer, web page designer, network administrator, and information technology consultant. In addition to this work, I was also involved in assisting other researchers to conduct their research in various fields such as human resources management, marketing, and literacy. In 2004, I worked with the Programme for International Student Assessment (PISA), under the cooperation of Thailand's Ministry of Education and the Organisation for Economic Co-operation and Development (OECD) assessing youth literacy using a survey method. That was a great experience and gave me insight into a number of the issues that affected Thai youth. In 2007, I was appointed as a lecturer at the Rajamangala University of Technology Phra Nakhon (RMUTP), one of the newborn university groups, teaching in the department of mass communication technology.

1.5 Distance and Online Learning in Thai and New Zealand Contexts

At RMUTP, online learning was adopted for two main reasons. Firstly, the educational reform empowered by the National Education Act (NEA) 1999 mandates distance learning as an alternative educational form within Thailand's educational system giving more opportunities for Thai citizen who live in the remote areas to access education in

all levels (Ministry of Education, 1999). Later, Thailand's national policy, IT2010, set e-Education as one of its future flagships (National Information Technology Committee Secretariat, 2003). Thai public universities have since been required to implement some form of distance or online learning programmes.

Similarly, New Zealand's online learning implementation has been a government policy-driven process to a large extent (Stein, Shephard, & Harris, 2011). The development of New Zealand's distance education in higher education has been relatively slow but it is an increasing area of research interest (e.g., Marshall, 2005; Rosenberg, 2007). Highways and Pathways (Ministry of Education, 2002) and the Interim e-learning Framework (Ministry of Education, 2004) are two studies that had a significant influence on shaping distance and online learning in New Zealand today. This slow but systematic approach appears to have assisted the implementation of online and distance learning in New Zealand to a greater extent than has occurred in Thailand. So far, Thailand has only one open-university, Sukhothai Thammathirat University, offering online/distance degree programmes. The other universities, including RMUTP, use blended approaches or online learning as a tutorial or learning – assisted tool (Pagram & pagram, 2006).

Secondly, teaching and learning difficulties are caused by the remote physical location of the five RMUTP university sites: Thewes, Chotiwej, Panichayakarn Commerce, Choomporn Ket-Udomsak, and Phra Nakhon. These sites were former technology institutes that united to become RMUTP. Since the merger, completing degrees has become more difficult and restricted for students and lecturers as some papers are only taught internally on one campus. Students may have to commute between sites to attend lectures. Therefore, the incorporation of online or distance programmes is that they are seen as a viable alternative to moving between campuses. However to maintain and even increase the reputation of the university, it is imperative that these offerings are high quality. In light of this, more research is needed for the development of online learning in Thailand.

This is particularly the case of RMUTP which aims to provide opportunities for those wanting to graduate and work professionally in fields such as mass media communication, culinary art, accounting, architecture, engineering and mechanics.

However, at present RMUTP is less popular with high achieving students because it still retains an image as a vocational institution. Therefore, students who enrol at RMUTP are generally average academic achievers. Despite being relatively lower achievers, these students have abilities and potential, but little confidence. These students generally require much support in traditional classrooms. Thus, it is likely that they will need to receive even greater levels of support in order to achieve in online learning environments when they are studying at a distance. Therefore, support needs to be built-in to help them both technically and psychologically. Research from a variety of studies (e.g., Maathuis-Smith et al., 2011; Mullen & Tallent-Runnels, 2006; T. C. Reeves, Herrington, & Oliver, 2002) shows that carefully constructed support can assist students to be efficacious enough to complete their study as well as helping them to become more autonomous, independent, and self-directed learners. Hopefully, these students will graduate with an increased sense of efficacy which will enable them to select from a wide range of careers and become lifelong learners.

This aspiration fits with another goal of the That National Educational Act 1999 – a mandate to educational institutes to produce students with more autonomy and to equip them with abilities to be lifelong learners (Vanijdee, 2003). Despite the fact that Thai students have different learning styles from New Zealand students (Siritongthaworn, Krairit, Dimmitt, & Paul, 2006), this research is conducted in a New Zealand university context which has a long history of supporting distance students and which has been using online learning for over 10 years. The goal is to find a fruitful way to design an online learning course so that these Thai students will graduate with an increased sense of efficacy which will enable them to become potential workforce members and good citizens. Optimistically, the knowledge that the researcher gains from this study will add to RMUTP's online learning policy leading to the creation of effective online courses that promote student success.

1.6 Delimitations

This cross-sectional study was bounded by time, geography, and a discipline-specific focus. Data gathering took place in the second Semester of 2011 at a New Zealand tertiary institute. The sample group comprised predominately white European learners with some Maori and Pasifika students. The findings of this study were restricted by

beliefs, norms, and culture of the participants. Caution should be taken when applying the study to online learners elsewhere.

The online teacher education degree programme used as the context for this study was designed specifically in a New Zealand setting. This online programme was custom designed for both internal and distance students, and therefore the applicability of the findings to other online courses and programmes with different pedagogical designs might be limited. This study was confined to undergraduate students enroled in an online learning programme with high learner control as embedded feature. Both internal and distance students in this programme were taught the same content knowledge. The main difference between the two learner groups was the amount of time they engaged in the online platform. While distance students were learning fully online, internal students accessed the online components at their choice. In this way, students were given a lot of control over their online learning environment. For example, they could access the online website whenever they were ready and they had more choices as to when they did their assigned activities.

The independent variable in this study was *learner control*. The dependent variable examined in this study was *online learning self-efficacy*. Other variables, including *gender*, *age*, *prior online learning experience*, *computer skills for social purpose* and *academic purpose* also formed part of this investigation.

1.7 Significance of the Study

The findings of this research have wider significance to the design of online learning courses. The study might shed some light on how to make online learners settle into an unfamiliar and complex learning environment, feel motivated and engaged during their study, and persist until they complete their online classes. Novice and inexperienced online learners who possess low confidence in their ability might find it easier to interact, collaborate, and thus succeed in online courses when learner control is integrated into the online learning environment. Tertiary institutes may find this strategy useful for building efficacious online graduates that have the potential to be sustainable lifelong learners.

1.8 Thesis Overview

This thesis is composed of eight chapters. Chapter One introduces the study. This chapter describes the context for the study, including the researcher's background, research aims, the motivation for this study, the comparison of online learning between Thai and New Zealand contexts, research significance, delimitations of this study, and the thesis overview.

Chapter Two reviews the literature on self-efficacy theory, the concept of learner control, and the existing research body on the relationship of self-efficacy and learner control in online learning environments. This chapter also provides an overview of how and where to find the relevant literature and definitions of the key terms used in this research.

Chapter Three presents the hypotheses. This chapter is structured around the rationale for this research and the aims of the study. The theoretical framework, research approach, and the research questions are also explained in this chapter, followed by the anticipated outcomes, and ethical issues.

Chapter Four details the development of the data collection instrument and the pilot study. This chapter begins with how the data collection tool was constructed and then discusses the pilot process. The preliminary results of the pilot study are also presented in this chapter. The validation and reliability of the data collection instrument are also discussed.

Chapter Five discusses and describes the methodology. The chapter starts by describing the participants. Then, it outlines the data collection procedure, and the data analysis.

Chapter Six presents the research findings from both quantitative and qualitative data in relation to the research question and hypotheses. The results of the correlation analysis and hypothesis testing are reported, with emerging themes from the qualitative data.

Chapter Seven discusses the results of this study. This discussion is structured around the research question, which is about the relationship between *learner control* and

online learning self-efficacy of learners in the investigated online learning environment. In addition to the synthesis of the findings, the triangulation of both sets of data is presented along with reference to the literature. After that, synthesis of the findings rounds up this chapter.

Chapter Eight completes the thesis with the conclusions and implications of this study. The contribution made by the thesis, the limitations of this study, and recommendations for future research are also identified. This chapter concludes with the researcher's final thought.

CHAPTER 2

REVIEW OF THE LITERATURE

People who believe they have the power to exercise some measure of control over their lives are healthier, more effective and more successful than those who lack faith in their ability to effect changes in their lives.

(Bandura, 1997b, p. 279)

2.1 Introduction

The overall aim of this study is to find ways to enhance the efficacy of online learners. In line with this aim, this review of literature describes self-efficacy theory and how important it is to the learners, particularly to online learners. The concept of learner control is also introduced as a way to support learners in an online learning environment. The relationship between learner control and online learning self-efficacy is then identified and explored. Definitions of research terms as they are used in this study are given in this chapter as well as in the glossary section at the end of this thesis. The sources of literature and keywords are also given in the next sections for other researchers to use.

2.2 Sources Searched

There were two main sources for the literature search. The first source was Massey University's online database, Encore, which provided a wide range of textbooks, handbooks, journals and subscribed online databases. This library is allied with other libraries in Australia and New Zealand via BONUS+ through which required books and theses could be borrowed at no cost. If the required material was not available from either catalogues, it could still be acquired via the inter-loan library service. The second source of literature came from an Internet search. Google Search and Google Scholar were the most important web search engine giving up-to-date information.

At first, the search topic was broad and then was gradually narrowed down as the researcher focused more and more on specific aspects of the research area. At the same time, the volume of the literature was growing using "the snowball technique" (Ridley, 2008, p. 40). While reading, keywords and keyword combinations were generated by the aforementioned method resulting in more search terms (See Table 2.1).

Table 2.1 *Keywords Used in Literature Search*

Categories	Keywords and keywords combination
Online learning	Online learning, e-learning, distance learning, distributed learning, technology-enhanced learning (TEL), technology-based learning, computer-assisted instruction (CAI)
Online learners	Online learners, digital native, digital immigrants
Self-efficacy	Confident, confidence, motivation, self-efficacy, online learning self-efficacy
Learner control	Learner control, learner-controlled, system-controlled multimedia learning, degree of learner control, agency, self-directed, self-direction, autonomy, self-paced learning, agency
Interaction	Interact, interaction, interactive, interactivity, networking, learning community, learning presence, social presence
Multimedia/Hypermedia	Multimedia, multimedia learning, multimedia effect, hypermedia

The information in this literature review was extracted from a wide range of research materials such as text books, reports, reviews, article journals, conference proceedings, and online articles. Among these, the key information sources came from the Journal of Educational Multimedia and Hypermedia, Journal of Educational Computing Research, Journal of Educational Psychology, Computer & Education, Journal of Computer-Based Instruction, and Psychology reviews.

2.3 Definitions of Key Terms

Some key terms in this study have multiple meanings which vary from one context to another. To eliminate confusion, the definitions of key terms used for the purpose of this study are provided in Table 2.2.

Table 2.2 *The Definitions of Research Terms Used in this Study*

Terms	Definitions
Learner control (Kraiger & Jerden, 2007)	The extent to which learners can choose what and how to learn
Online learning self-efficacy	One's determination of his/her own ability to study and succeed in an online learning environment
Online learning (Means et al., 2009)	Learning that takes place partially or entirely over the Internet
Asynchronous online learning (Hiltz & Goldman, 2005)	One category of online learning in which learners from anywhere get online at anytime and set up communication networks among themselves as well as with their teachers
Online learners	Students who are studying an online course in a formal setting. In this study, the setting is higher educational institutes such as universities, colleges, institutes of technology, and polytechnics
Hypermedia (Jaffe, 1997)	Computer-based documents composed of hyperlinks and media in various symbol sets including texts and graphic icons to give information and serve as an index that allows users to access further information in a non-linear fashion
Multimedia (Chapman & Chapman, 2009)	The result of combining two or more digitized media, usually with interactivity
Interactivity (Kiousis, 2002)	The degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchronously, and participate in reciprocal message exchanges

2.4 Self-efficacy

The term *self-efficacy* was defined by Bandura (1997b) as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Self-efficacy is a future-focused construct (Bandura, 1977). It is a future-oriented self-judgment of one's confidence to performance a specific task (Lorsbach & Jinks,

1999). Bandura and Locke (2003) argue that individuals develop particular beliefs about their ability to handle a specific situation. Indeed, self-efficacy is the personal determination of one's own ability to deal with a certain task. Once established, enhanced self-efficacy is generalised to other situations with the strongest effect taking place in activities that are closest to those in which self-efficacy has been improved (Bandura, 1977).

Bandura (1982, 2006b) considered self-efficacy important as a foundation of human agency because it can affect people's thoughts, feelings, and actions through cognitive, emotional, motivational, and decisional processes. Generally, people are more likely to take actions that they believe they can handle well and usually avoid taking risky actions that they think exceed their ability. It is not surprising then that highly efficacious people set more challenging goals and have a firmer commitment to their goals than inefficacious people (Bandura, 1994). When faced with difficulty, efficacious people are optimistic and envisage how to overcome the obstacle. In contrast, inefficacious people doubt their ability to succeed despite the fact that they may have adequate skills and abilities to surmount the challenge.

Secondly, self-efficacy beliefs affect people's affective states. In the face of difficulty, people with high self-efficacy usually manage their stress and anxiety well (Bandura, 1997a). They also have the ability to cope and turn off disturbing thoughts. Thus, they can deal with challenges calmly. However, inefficacious people tend to become distressed with perceived challenges, cannot cope with an unfamiliar situation, and are more disturbed by their anxiety and negative thoughts.

Self-efficacy and motivation are also strongly related (Chowdhury & Shahabuddin, 2007; Kozlowski & Salas, 2010; Vancouver & Kendall, 2006). Self-efficacy is the central variable of motivation in social cognitive theory. Bandura (1994) explains that self-efficacy influences motivation in many ways such as the determining of one's target or aspiration, the amount of effort one puts into a task, the length of time one perseveres in the difficult situations, and resilience to failures. Bandura (1997b) also clarifies that motivation is cognitively generated. Efficacious people can visualise their future success and that motivates them to execute an action and continue improving their skills to achieve their goals (Schunk, Meece, & Pintrich, 2008). Inefficacious

people are less motivated and tend to avoid participating in any tasks that they perceive as beyond their abilities.

Self-efficacy also impacts on people's choice and selection across many contexts. People with high self-efficacy have a wider range of selection regarding types of activities and even careers. According to Reeve (2009), people are more likely to do tasks that they feel capable of achieving and avoid taking on activities that exceed their perceived ability. Inefficacious people tend to stay away from troublesome activities. Thus, their choice of activities is less and less in the long run. Reeve also noted that efficacious people are more focused and can use past experience to assess, analyse, and solve taxing situations efficiently, while inefficacious people cannot deal with such situations.

However, one's self-efficacy is not constant throughout their life; it can be obtained, changed, and shaped (Haddoune, 2009). Self-efficacy can be manipulated through four means: enactive mastery experiences, that is, hand-on experiences; vicarious experiences, that is, other persons' experiences; social persuasion, that is, appraisal or feedback from others; and physiological and affective states, that is, emotion, mood, pain and fatigue (Bandura & Locke, 2003). Mastery experiences are considered to be the most significant source of efficacy since "they provide the most authentic evidence of whether one can muster whatever it takes to succeed" (Bandura, 1997b, p. 80). Notably, this determination is not based entirely on actual past experience or existing ability and skills but also on learner perceptions of their own knowledge and ability relative to the task or situation (DeTure, 2004). As mentioned earlier, self-efficacy is specific to the context of a situation. When the situation changes, it must be considered cautiously as experience increases one's perceived self-efficacy, whereas failures lower self-efficacy level, especially when the task was not accomplished repeatedly (Hodges, 2008). For example, the transition from a secondary school to a university or a change in learning method from traditional face-to-face to online learning might affect learner self-efficacy (Maathuis-Smith et al., 2011). In some situations, this can be mediated if learners know of someone like themselves who made the transition and/or they are supported by feedback. Self-efficacy levels can be enhanced by vicarious experience or observing other people's successful experiences. Hodges and Murphy (2009) explain that seeing others successfully carrying out a similar task helps learners determine if

their own future task is likely to be achieved. That is why the similarity between the role model and the model observer is important since it affects self-efficacy formation (Wood, 1989). Performance that exceeds the model boosts self-efficacy level and failure to meet the model's performance lowers self-efficacy (Hodges, 2008).

Social or verbal persuasion can also contribute to one's perceived self-efficacy. The critical key is that the persuader must be trusted by the receiver. By been offering constructive and genuine feedback, one can accomplish a task that they had previously assumed to be beyond their abilities. However, Bandura (1997b) warns that unrealistic comments may lead one to fail and consequently lower self-efficacy level. He also states that self-efficacy built from social persuasion is weaker than that gained from mastery experience.

Lastly, physiological and affective states such as stress, mood, pain, fatigue, and emotion have an effect on self-efficacy (Hodges & Murphy, 2009). For example, anxiety that arises when one faces a taxing situation can have a negative effect on one's self-efficacy. Fatigue can also lower one's effort and engagement with a task, resulting in a greater chance of failure and lowered self-efficacy.

2.4.1 Self-efficacy and learning

In education, self-efficacy is a key contributing factor to learner success because self-efficacy "influences the choices learners make and the courses of action they pursue" (Pajares, 2002, p. 116). Self-efficacy influences several aspects of performance that are important to learning in terms of the effort put forth and the persistence in accomplishing a task (Multon, Brown, & Lent, 1991; Pajares, 1996; Zimmerman, Bandura, & Martinez-Pons, 1992). Students with higher self-efficacy are more cognitively engaged with their learning (Pintrich & Groot, 1990) and likely to use more constructive strategies while learning than students with low learning efficacy (Stipek, 2002). Furthermore, self-efficacy influences students' aspiration and motivation (Alivernini & Lucidi, 2011; Beier & Kanfer, 2010) and acts as a cognitive and motivational foundation of learner empowerment (Reeve, 2009). The results of the meta-analysis of 109 studies in the area of psychosocial and post-secondary study skills have shown that self-efficacy is a strong predictor of academic outcomes (Robbins,

Lauver, Le, Davis, & Langley, 2004). This study also found that self-efficacy and academic goals are correlated. Thus, students with stronger learning self-efficacy beliefs are more likely to pursue higher academic goals (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). In addition, high self-efficacy fosters self-regulation skills in students which is also one of essential factors for adult learner success (Bouffard-Bouchard, Parent, & Larivee, 1991).

Multon et al. (1991) specify that self-efficacy can alter learner perceptions of their learning environment. In other words, efficacious learners can perceive their learning environments either positively or negatively since self-efficacy is related to the ability to manage academic stress and cognitive proficiency (Schunk, 2006; Schunk & Pajares, 2005). Learners who have low self-efficacy are more likely to give up easily when faced with frustration and difficult tasks. Indeed, Lorsbach and Jinks (1999) noted that "low self-efficacy probably leads to less effort, which in turn leads to lower success, resulting in even lower self-efficacy" (p. 160). However, self-efficacy and persistence increase when learners accomplish activities or tasks. Despite that, efficacious learners still might not be motivated to put forth their effort if they feel that little is being learnt about the topic or what is left to learn has small value compared to what is already known (Nilsen, 2009).

Learners with low self-efficacy can still be rescued and make progress, if teachers "are able to provide them with sufficient instructional support" (Brophy, 2010, p. 102) and enable such learners to persevere and start to develop a sense of their own success and control. More specifically, teachers can then play a significant role in helping students to develop a higher level of self-efficacy (McInerney & Liem, 2008). Brophy (2010) proposes the strategy called efficacy training that is carried out through teaching practices and strategies that maintain a positive and constructive learning environment. Research in the area of teaching and learning verifies that self-efficacy can be improved and manipulated by such methods (Margolis, 2005). Failing to successfully complete academic tasks can lower students' confidence. Thus, teachers should plan for success by structuring tasks into small steps that can be readily achieved (Margolis & McCabe, 2006). Viewing a classmate's achievement can also boost a student's sense of efficacy, especially when they share similar characteristics such as abilities and age. McInerney and Liem (2008) suggest that realistic and positive encouragement will help

inefficacious students who have adequate abilities to attempt an activity they perceived as challenging to succeed in that activity. With the same goal of increasing the perceived self-efficacy beliefs of inefficacious learners, Schunk (2006) provides some guidelines such as providing feedback to correct performance and correct errors, supplying rewards on task accomplishment, using modelling to encourage persistence, and setting challenging goals based on their own prior performance, but not comparing these to others. Nonetheless, Multon et al. (1991) advocate for more research to understand how self-efficacy influences academic outcomes, especially in different learning contexts.

2.4.2 Online learning self-efficacy

Self-efficacy is considered one of the key factors for online learner success in online learning environments (Thomson & Lynch, 2003). Drawing on Bandura's (1997b) self-efficacy theory, this study defines online learning self-efficacy as learners' determination of their own ability to study and succeed in an online learning environment. Self-efficacy in online learning contexts is closely linked to intrinsic motivation and self-regulated learning skills (J. Zhang, Li, Duan, & Wu, 2001). A study conducted at China's Open University also confirmed the link between the self-efficacy of online learners and motivation (Xiao, 2012). Xiao found that successful distance learners (the top 15% of the programme in terms of academic achievement) had higher self-efficacy and were more motivated as they gained their proficiency during the course of study.

Findings from Hill and Hannofin's (1997) multiple case studies show that self-efficacy in online learning influences student engagement and the strategies used in learning. High self-efficacy learners use a greater variety of strategies in finding the required information than those with lower self-efficacy. In addition, self-efficacy affects online learner interaction and perceived control. Moreover, self-efficacy is found to have a positive link to satisfaction as shown for example by Kuo, Walker, Belland, and Schroder's (2013) recent investigation of university student in the west of the United States. In their study, an online survey was sent to participants who were taking 12-week summer courses. Participant self-efficacy was measured using Eastin and LaRose's (2000) Internet self-efficacy scales. Online learner interaction and

satisfaction were also measured using an instrument modified from Kuo et al.'s existing instrument for blended courses. The correlation analysis indicated that the relationship between Internet self-efficacy and satisfaction was significant and positive, $r = .437$, $p < .01$.

Another empirical study by Joo, Lim, and Kim (2013) confirms positive links between self-efficacy and satisfaction, as well as between self-efficacy and academic achievement. This larger study involved 973 students enroled in a three-credit elective course, the introduction to computer and related technology usage, at a large Korean online university. Two online surveys were launched in the fall semester, 2009. The first survey was distributed during the first week of that semester to measure students' locus of control and self-efficacy. The second survey was conducted during the last two weeks of this 16-week long course in order to assess students' task value, learner satisfaction, and persistence. After the quantitative data analysis and structural equation modelling (SEM) were conducted, Joo et al. concluded that self-efficacy was a good predictor of satisfaction and academic achievement. Though the relationship between satisfaction and achievement was not identified, both satisfaction and achievement acted as mediators of the relationship between student self-efficacy and persistence.

Like learner self-efficacy in traditional face-to-face settings, the self-efficacy of learners in online learning comes from the four main sources: performance experience, social modelling, verbal persuasion, and physiological states (Maddux, 1995). Though Beier and Kanfer (2010) argue that online learning might not provide vicarious experience (modelling) and verbal persuasion, Bates and Khasawheh (2007) found that self-efficacy in online contexts is influenced by previous success with online learning systems, online learning technology anxiety, instructor feedback and pre-course training.

These online terms are the equivalents for the cognitive and motivational learning factors that Bandura's (1997b) addressed (See Table 2.3). Bates and Khasawheh (2007) also noted that the relationship among self-efficacy, academic outcomes, and other variables such as learners' ability, acquired skills, online anxiety, instructor feedback, training and previous success are complex.

Table 2.3 *Sources of Online Learning Self-efficacy in Comparison*

Bandura (1997b)	Bates and Khasawheh (2007)
Enactive mastery experience	Previous success in online learning
	Pre-course training
Vicarious experience	N/A
Social persuasion	Instructor feedback
Physiological and affective states	Online learning anxiety

In accordance with Bates and Khasawheh, Xiao (2012) found the differences among the affective factors – motivation, beliefs, anxiety – between successful and unsuccessful undergraduate students of China's open universities. His interview findings showed that students in both groups liked positive criticism. Xiao concluded that positive feedback might be an effective strategy to enhance student efficacy.

Since the learning environment is complex, understanding the relationship between online learners and their self-efficacy poses a complex challenge (Hodges, 2008). Existing studies of online learning contexts often focus on self-efficacy of online learning in association with the ability and perceived confidence to use computers and other technologies (e.g., Hill & Hannofin, 1997; Hodges, 2008). Papasratorn and Wangpipatwong's (2006) empirical study of undergraduate students in an online learning environment at Bangkok University employed computer self-efficacy as a representative of learner online learning self-efficacy. In this case, Papasratorn and Wangpipatwong implied that computer self-efficacy alone could explain online learner perceived success in their studied context.

Some studies pay more attention to a factor labelled *confidence to succeed in learning* and use academic self-efficacy as the indicator for this perceived confidence to learn online. Some researchers also think about the complexity of the online learning environment. Thus, they consider more than one category of self-efficacy plays an important role in online learner success. Joo, Bong, and Choi (2000), for instance, measured academic self-efficacy, self-regulated learning self-efficacy, and Internet self-efficacy in order to understand online learner motivation in a web-based instructional context.

Despite the exponential increase in online learning, studying in this way can still pose "a challenge or threat" (Chemers, Hu, & Garcia, 2001, p. 56) to learners. Self-efficacy theorists (e.g., Bandura, Pajares, and Zimmerman) claim that efficacious learners tend to persist, cope and adapt well, even when they have no prior experience of a learning situation. However, learners who have low self-efficacy with regard to online study can be frustrated, overwhelmed, de-motivated, and are more likely to give up their study before completing the course. Research has also shown that self-efficacy not only influences course completion (Multon et al., 1991; Pajares, 2002; Zimmerman, 2000; Zimmerman et al., 1992), but also directly influences academic outcomes (H. W. Chou & Wang, 2000; Usher, 2009; Usher & Pajares, 2009; Zimmerman & Kitsantas, 2005). Therefore, self-efficacy is an important consideration for educators, including those involved with online learning.

2.4.3 Measuring online learning self-efficacy

As reviewed by Hodges (2008), self-efficacy studies in online learning are relatively new and inconsistent. Constructing a global measure of self-efficacy in online learning is complex and it is a challenge that is considered in many recent studies (e.g., T. Huang, 2009; Liu, Chuang, & Huang, 2008; Mungania & Reio, 2005). However, those measurements tend to focus on one dimension of online learning such as computer efficacy (Cassidy & Eachus, 2002; Compeau & Higgins, 1995). Simmering, Posey, and Piccoli (2009), for example, measured learner self-efficacy in a self-directed online course in terms of computer self-efficacy, and Hayashi, Chen, Ryan, and Wu (2004) examined computer self-efficacy in predicting learner persistence in an online learning environment. Some studies considered online technologies self-efficacy (Miltiadou & Yu, 2000), web user self-efficacy (Eachus & Cassidy, 2006; Nahm & Resnick, 2008), and Internet self-efficacy (Chu, 2010; Chu & Chu, 2010; Livingstone & Helsper, 2009) when measuring learner self-efficacy in online environments. The assumption of these studies is based on the fact that computer skills and internet skills are needed for online learning but they overlook other aspects of online learning such as learning style, self-direction, and collaborative skills. These aspects should be considered seriously when constructing a measurement scale for the online learning context.

A few studies focus on self-efficacy in online learning environments from a multi-dimensional perspective. Artino and McCoach (2008), for example, have developed and validated an online learning value and self-efficacy scale (OLVSES) which employed a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree). Their 28-item OLVSES includes four categories: attainment value/importance, intrinsic interest value, extrinsic utility value, and self-efficacy for learning within self-paced online training. Fletcher (2005) has focused on ways to build learner online learning self-efficacy. His instrument contains 65 items on a 7-point Likert scale which were divided into five groups: online course activities, self-regulation, collaboration, communication, and learning methods/preferences.

Likewise, Watson (2005) focused on understanding effects on online learning self-efficacy of graduates in a counselling major. His self-efficacy instrument was adapted from the Online Technology Self-Efficacy Scale (OTSES) (Miltiadou & Yu, 2000) and was composed of 29 items with a four-point Likert scale. Similarly, Watson's OTSES still include four components: internet competencies (web browsing and searching), synchronous interaction like online chat, asynchronous communication such as e-mail, and asynchronous interaction. Though these mentioned instruments are different in the number of items, the scale of measurement, and their components, they were all constructed based on Bandura's (1997b) guidelines for constructing self-efficacy scales. Similarly, they aim to measure online learner expectations of their ability in three aspects: teaching/learning style, technology skills, and collaborative skills. These three aspects have played an important role in learner satisfaction, persistence, and success. That is why measurement of online learning self-efficacy should contain all of these aspects.

2.5 Online Learners

Traditionally, online learners have been characterised as more mature, independent, and often time-constrained due to the responsibilities of work and family (Rovai, 2003). Studying in a traditional face-to-face class may have been impossible for this learner group, or they may have needed more education for particular reasons such as upgrading their work related knowledge, earning a degree in order to get a higher salary, or having a genuine interest in that course. Currently, more and more online

programmes are offered by tertiary institutions to increase study flexibility, with some online courses now being compulsory within programmes of study. Consequently, the characteristics of online learners have changed to include a higher proportion of high school graduates who are younger and more familiar with computer technology (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Despite their greater familiarity, these students still face challenges in online learning as the evidence show that the attrition rates from online learning are still higher than from the traditional face-to-face courses (Boston et al., 2011; Flood, 2002). In some countries, such as New Zealand, tertiary institutes offering online courses have set learner drop-out or retention as a top priority issue (Maathuis-Smith et al., 2011). Many researchers are attempting to understand online learners and find the ways to improve completion rates (e.g., Nash, 2005; Yukselturk & Inan, 2006). Another group of researchers is paying attention to how to build effective online courses that encourage learner engagement and increase the chances of succeeding in the online course (e.g., Miller, Rainer, & Corley, 2003; Seiver & Troja, 2014; Vanijdee, 2003). One important emerging finding is the advantages of courses that offer learners various levels of control or incremental levels of difficulty and authentic tasks. This study too is focused on the role and effects of built-in learner control in an online course that help support at risk online learners whom are described in the next section.

2.5.1 At risk online learners

First-time online learners, including first-year university students, mature aged students returning to study, postgraduate students who got their undergraduate degrees before online learning was introduced, and older students who are not familiar with information technologies can all find learning online a challenge. Some learners struggle to cope with the complexity of an online environment and often have doubts about their own learning performance (Saadé & Kira, 2009). Even high school graduates who have grown up with networked computing technologies can still find it hard to adapt and perform well in the university online classes because of the demands and stress of the transition they make from secondary schools to tertiary education (Chemers et al., 2001).

There has been a perception or belief that high school graduate cohort should do better in online courses than older adult learners as through their earlier use of digital technologies such as personal computers, video games, mobile phones, and the Internet, they are more familiar and confident in using and applying such technology in various aspects of their lives. Adult learners, especially the generations born before 1980, on the other hand, are less likely to be familiar with the current range of technology. The differences between these two groups have alerted researchers and educators that there is a need to modify the educational system in order to serve recent learners' distinctive nature (See Palfrey & Gasser, 2008; Prensky, 2010; Smith, 2013; M. Thomas, 2011). Such modifications could include using game-based learning, interactive multimedia, collaborative learning, and edutainment (Prensky, 2005). However, there is still debate around the extent that this should occur as the characteristic of recent online learners and the existence of the generation gap as a real problem are not supported by any concrete evidence (Helsper & Enyon, 2009). Bennett, Maton, and Kervin (2008) call this phenomenon an "academic moral panic" (p. 782).

In reality, online learners may still lack the essential learning and technology skills for higher education (Kennedy et al., 2008; Mandernach, Donnelli, & Dailey-Hebert, 2006; Ratliff, 2009; Wojciechowski & Palmer, 2005). The result of a survey by Ratliff (2009) showed that even though most young online learners are familiar with computer and technology usage for daily life, "a significant number of them are less than adequately prepared for a technology-rich learning environment" (p. 700). They often lack the technology skills to compose essays, prepare presentations, analyse data, and do research work within the online learning environment.

Loos' (2012) research verifies Ratliff's argument. In Loos' first study, 133 participants were interviewed to see if old and young participants favour the same media sources in choosing their health insurance providers. The result shows that choice of media used for both older and younger participants varied and Loos concluded that a digital divide did not exist regarding use of digital media. In Loos' (2012) second study, an eye-tracking system was employed to collect navigation patterns on a number of websites from 29 older and 29 younger participants. The results showed that these two groups had different behaviours while browsing through the websites, yet their overall browsing patterns were similar. Loos again concluded that digital competency varied

among old and young people and for that reason it was difficult to claim there was a clear digital divide in the Netherlands. A survey study in Britain with 2350 participants (age > 14 years old) indicated that adults could become good at computer technology if they were trained and had some experience with information technology (Helsper & Enyon, 2009). Despite that, because of the rapid proliferation of digital technologies and the enthusiasm with which these have become part of youth culture, the generation gap problem remains an issue requiring further empirical study.

Some studies indicate that novice online learners might feel uncertain about whether they will be able to learn online, or fear that they lack the necessary technical skills (Guy & Lownes-Jackson, 2010; Jun, 2005). Some studies show that learners with higher confidence in themselves or higher self-efficacy are more likely to perform well and persist in online courses (e.g., Swan, 2004). However, not all learners have the high self-efficacy needed to deal with an unfamiliar online environment, especially learners in their first year of learning (Berge & Huang, 2004).

Retaining students in an online class is not an easy task because several factors are involved. Previous research by Berge and Huang (2004) has shown three types of factors associated with dropouts: personal, institutional and circumstantial factors. According to Berge and Huang, personal factors include learner age, gender, ethnic group, socioeconomic status, academic background, family background, learning skills, styles and strategies, motivation and self-efficacy. Institutional factors include structures, beliefs, and values of each tertiary institution. Circumstantial factors are the interactions between learners and their universities, learning environments, peers, and instructors including their life, family, and work.

First-time online learners often experience cognitive overload during the first few weeks of their studies due to disorientation, new teaching/learning methods, unfamiliar subjects, and the challenge of working with unfamiliar technology (S. L. Chang & Ley, 2006; Whipp & Chiarelli, 2004). This overload can be the reason why many feel uncertain, frustrated, and anxious as they try to adjust themselves to the learning environment. In some cases, learners can become de-motivated and procrastinate because they feel overwhelmed, nervous, and worried about a teaching approach that

requires more self-regulated learning (Kekkonen-Moneta & Moneta, 2002; C. P. Lim, 2004).

The recent study by Chen and Tseng (2012) verifies that learners' mood and emotion affect their online learning performance and willingness to take part in an online course. In their study using the Technology Acceptance Model (TAM) as their theoretical framework, 402 junior high school teachers in central Taiwan were recruited to participate in a survey. The correlation analysis showed that anxiety had a significantly negative effect on teachers' perception of ease of use. In other words, anxious learners thought that the online courses were difficult to study. With this feeling, they might not put in effort and avoid being an online student. An empirical study by Tempelaar, Niculescu, Rienties, Gijselaers, and Giesbers (2012) also confirmed an important role of learner emotion in online learning. The findings from 730 first year university students in blended mode online learning showed that emotions had a moderate impact on the preference of their learning environment. Tempelaar et al. conclude that students with positive feelings are more likely to learn in the online environment intensively, but students with negative learning experiences are less likely to adapt to the online environment.

In order to keep these not-so-confident students in online classes, sufficient support is needed (Brophy, 2010). A study by Sawang, Newton, and Jamieson (2013) sustains the former statement. In their study to find factors related to Australian rail-sector employees' adoption of online training courses, an online survey was employed to gather information from 683 workers who had participated in such a course in the last three years. Openness to change, technology efficacy, course authenticity, course complexity, organisational support, intention to adopt future online courses, and satisfaction with previous online courses were among the measurable variables. Findings from the quantitative analyses showed that participants were comfortable and satisfied with the e-learning course if they got adequate support from the organisation. Despite their low technology self-efficacy, participants were more likely to take online training courses if the course offered activities that could make learners apply course concepts to real life situations. Therefore, low technology efficacy was not an obstacle for employees to do an online course if they received adequate organisational support. In addition to findings from Sawang, Newton, and Jamieson , Xiao (2012) concluded

that positive feedback might be an effective strategy to enhance student efficacy. Xiao conducted a qualitative study at one of China's open universities to find the differences among the affective factors – motivation, beliefs, anxiety – between successful and unsuccessful undergraduate students. His interview findings showed that students in both groups liked positive criticism.

2.5.2 The factors needed for successful online learners

Since online learning delivery to learners differs from the traditional teaching and learning classroom, the skills required for learning and learner characteristics might be distinctive. Buchanan (1999) noted that online learners should be mature, self-confident, and have self-discipline. Effective learners must have good management skills and have an ability to work in collaboration with other learners, as well as good communication, academic writing, and critical thinking skills (Harrell, 2008). In addition to the skills, they must be able to apply those skills when needed independently. Moreover, these students must be efficacious in dealing with a learning environment that is different from the traditional class setting in which they have previously studied.

Succeeding in a complex online learning environment is not easy as many factors are involved. In addition to the generation gap mentioned earlier, learners' adaptation to and participation in online learning can be influenced by factors such as delivery mode, gender, prior online learning experience, and computer skills performance. Delivery mode is often explored (e.g., Mullen & Tallent-Runnels, 2006; Pirila, 2009; D. Zhang, Zhao, Zhou, & Nunamaker-Jr., 2004) because online learning can be delivered in several formats: blended, fully online, as well as asynchronous or synchronous modes. The most common investigation about delivery mode is the comparison of learning outcomes between students in traditional face-to-face and ones in online classes. A quasi-experiment by Wang and Newlin (2002) is one of such studies providing evidence about the differences. Their research was conducted with 112 psychology university students who studied as internal students. These students were given a choice to enrol in either traditional or online course sections. These sections were taught by the same instructors and had the same course content and materials. Wang and Newlin found that self-efficacy was one factor that related to the decision to take an online course. They

noted that students who took online courses had higher self-efficacy than those that opted for the traditional sections. This result suggested that their higher efficacy gave them the courage to try something new and different. Additionally, these learners were more motivated to enrol in the new learning environment. These students tended to adapt well, find positive solutions when faced with taxing situations, and were more likely to succeed in online learning courses. Findings from Wang and Newlin confirm other research on self-efficacy that shows that students with higher efficacy levels tend to adapt well, find positive solutions when face with taxing situations, and are more likely to succeed in new learning contexts, including an online learning course.

On the contrary, Palmer (2012) found no differences between internal and distance students in terms of engagement. The study was conducted at Deakin University in Australia where the online learning courses were developed to provide the same knowledge content to both internal and distance students. In this study, 1,322 participants completed the online questionnaire that contained questions to gather both quantitative and qualitative data. From statistical analyses, Palmer concluded that internal and distance students had a similar pattern in accessing and using the online learning system, Despite the fact that distance students reported that the online learning was important and valuable to them, their satisfaction with the online system was not significantly different from that of the internal students. Palmer also eliminated new students from his study which significantly altered the sample group in terms of online learning experience.

Regarding the gender issue, Pajares (2002) noted that student self-efficacy was different between males and females. In line with Pajares, Shen, Cho, Tsai, and Marra's (2013) study of the online learning experience of American university students found that gender had a significant influence on student self-efficacy to complete online courses. In order to better understand the characteristics of online learners, Zhang et al. (2001) launched a survey to 112 distance students at Tsinghua University in China. Their findings comply with previous research which suggests that males are better at using technology than females (e.g., Hoffman & Vance, 2007; Ilomaki, 2011). According to this claim, the self-efficacy of male participants toward their online learning should be significantly higher than that of female students (Cassidy & Eachus, 2002).

However, some studies have found no difference in gender role with regards to preference or self-efficacy in online learning courses in both asynchronous and synchronous modes (M. Chen, 2008; S. Y. Lin & Overbaugh, 2009). In contrast to that claim, a study in a Taiwan university found that females were more positive about learning in the online learning environment than males despite the fact that female students perceived online learning as a manly type of activity (R. Chen & Tsai, 2007). A recent study in the south-western United States of America provided similar findings. Ozogul, Johnson, Atkinson, and Reisslein (2013) were interested to see whether choice over animated peer-model influenced students' learning outcomes, perceived difficulty, and their attitude toward online learning. They built four different animated peer-models using data collected from 334 Year 6 to Year 8 students. Students were then divided into a control group and an experimental group. The control group was not allowed to choose their animated peer-model but the experimental group was offered four choices of animated peer-models. Results show that the experimental group had higher academic outcomes than the control group and female students who had a gender-matched animated peer-model had a positive attitude toward their learning environment. Thus, Ozogul et al. proposed that students' perceived self-efficacy, satisfaction, motivation, and autonomy can be boosted by allowing them to choose their computer generated peer model (learner control over choice of animated peer model). In short, females responded more positively than males.

Existing research has claimed that self-efficacy can be gained from one's own success (Maddux & Lewis, 1995; Schunk, 2006). For that reason, the more positive online learning experience learners gained, the higher their self-efficacy level. Yantraprakorn, Darasawang, and Wiriyakarun (2013) confirm that incremental success in online courses helps increase learner self-efficacy. They used a mixed method design with 114 learners in an online language writing course that was designed with scaffolding at macro and micro levels. Despite the learners' low writing self-efficacy, they still indicated that the scaffolding helped them gain more understanding and mastery experiences of the subject leading to gradually increasing self-efficacy.

Conversely, research by Zhang et al. (2001) reported that first year online students had a higher sense of efficacy about their learning than the second and third year online students. This contrasting result might have occurred because of the second and third

year course activities have more complex content and require more complex academic and critical-thinking skills.

Furthermore, previous experience in online learning course also affects learners' decision to enrol in the next online class. Artino (2007) was interested in this issue and conducted a correlational study. The findings concluded from responses of 204 personnel at the US Navy showed that participants' prior online learning experience was positively related to self-efficacy. These two variables were also positively correlated to satisfaction, perceived learning, and future enrolment in online courses. This finding implies that learners with positive learning experiences are satisfied, confident, and more likely to enrol in future online courses. In contrast, learners with negative experience are not happy and are less confident about their ability to succeed in future online courses.

In addition, learners with previous positive experience are more willingly to choose difficult tasks. Hughes et al.'s (2012) experimental study examined learners' prior experience in a specific task to see if there was a link to learner-controlled practice difficulty. In their study, a complex video game, UT2004, was used as the learner-controlled learning environment. In this experiment, 118 male undergraduate students aged between 18 and 23 years old studying at the University of Oklahoma volunteered to participate. Their prior experience in video game playing was assessed before the experiment. In the experiment, these participants were allowed to choose the level of difficulty. Videogame experience, task knowledge, practice performance, adaptive performance, and learner-controlled practice difficulty were gathered via student self-report. Student self-efficacy was measured twice (pre- and post-training) by 12 task-specific self-efficacy items using a 5-point Likert scale. Hughes et al. found that participants who had greater prior experience were more likely to choose more difficult learner-controlled levels.

Computer skills are also vital to online learner success because learning online must be done via a computer using Internet and World Wide Web technology (J. Zhang et al., 2001). Though online learning requires many skills, learners with good computer skills have a better chance at succeeding. The meta-analysis of experimental research in distance education by Bernard et al. (2009) confirmed that information technology skills

were strongly associated with learning achievement. The recent study by Callum (2012) supports the preceding statement. In order to find out how information and technology skills affect a student's decision to adopt mobile learning, 413 tertiary students in three New Zealand tertiary institutes responded to a questionnaire. Callum concluded that general computer experience played a significant role in the adoption of mobile learning rather than specific or advanced skills. The ability to use online learning tools effectively empowers learners to explore the online learning environment and make them capable of interacting with their instructors, peers, and learning content. Thus, the learning space is created to support these learners.

2.6 Learner-Controlled Online Learning

Learner control is found to have a direct benefit for online learning. Research by Means et al. (2009) verified that online learning can be enhanced by giving learners control of their interactions. This finding is supported by Mayer's (2003) *Pacing principle*, one of the twelve principles for multimedia learning, which posits that learners can learn better if they are allowed control over their own learning pace. Aligned with this principle, Mayer and Chandler (2001) found that a group of learners with learner controlled animation understood the concepts presented better than another group with linear animation (Tabbers & Koeijer, 2009). Hence, learner control can "promote a deeper or more long lasting effect on memory" (Williams, 1996, p. 960).

2.6.1 What is learner control?

Learner control is a concept previously employed in classrooms to enhance the learning process. This concept was first introduced by Mager and his colleagues (Mager, 1961; Mager & Clark, 1963; Mager & McCann, 1962) to technology-assisted instruction as a way to improve learning performance (Carrier & Williams, 1988; Corbalan, Kester, & Merrienboer, 2006; Merrill, 1984; Milheim, 1990; Swaak & Jong, 2001; Williams, 1993). Later, the concept was applied to distance and online learning by many theorists in this field. For example, Michael Moore (1973, 1997) founded the theory of transactional distance concerning distance learners' communication space. According to Moore (1993), Transactional distance is a psychological and communication space that can cause misinterpretation between distance learners and their instructors. Moore's foundational theory is critical to research in the area of distance learning

(Reyes, 2013). In this theory, three components are involved; structure, dialogue, and autonomy, that interact to each other. Moore (2007) emphasises that distance courses need to be designed in ways that maximise the communication between teachers and learners. He also asserts that high levels of learner autonomy are required in order to reduce transactional distance. Additionally, a high degree of dialogue is needed to improve their autonomy and teachers can also manipulate this within distance and online learning contexts.

Extending on the research of Moore (1973), Garrison and Baynton (1987) suggested that control can be achieved with collaboration between learners and instructors. They postulate that "control is composed of three major dimensions: independence, power, and support. Control of the learning process is determined by the dynamic balance of these three components" (p. 3). In this conceptualisation, independence means learners can choose the way to learn from the available alternatives; power is the learners' ability to study; and support is the resources that learners can access in order to help them learn smoothly. These components have to work in concert with each other in order for the student to achieve the optimal degree of control which can be determined by two-way communication or interaction between learners and their instructors (Garrison, 1992).

Candy (1988) centred his attention on self-directed learning (SDL), a concept he applies to both adult and distance learning. The central idea is that to be effective in learning, the learning needs four components: learner autonomy; self-management ability; independence; and learner-controlled instruction (Candy, 1991). Building on Moore's transactional distance theory, Garrison and Baynton's (1987) notion of control in distance learning, and Candy's (1991) concept of control for self-direction, Dron (2006, 2007) proposed the model of transactional control that focused on the balance between control and constraint of online learners. Three components in the model of transactional control derives from three elements of Moore's (2007) transactional distance in that teacher control is the same as structure, negotiated control is equal to dialogue, and learner autonomy is now learner control.

Despite the fact that learner control has been an issue in education for such a long time, no one gives a clear definition of this concept (Merrill, 1984). Brown and Ford (2002) define learner control as "learners, in partnership with computer programs, become their

own trainers through the choices they make on the content they focus on, the sequence of their learning, and the learning strategies they invoke" (p. 204). In a broader definition, learner control is "a mode of instruction in which one or more key instructional decisions are delegated to the learner" (Wydra, 1980, p. 3). Reeves (1993) verified that learner control is the degree to which learners are allowed control over a range of instructional features during a learning session. However, this present study focuses on the learner as an online learner. Thus, a suitable definition of learner control for this study is provided by Kraiger & Jerden's (2007) who propose that learner control is the extent to which learners can choose what and how to learn. Applying this definition, learner control related to online learners being given the opportunity to make their own choices and be in charge of their learning pace, sequence, and content (Milheim & Martin, 1991). Candy (1991) recognises learner control as one of self-direction's four dimensions. He explains that learner control is a continuum and multidimensional. Therefore, learner control can differ depending on the technique used and background theory applied (Goforth, 1994). According to DeRouin, Fritzsche, and Salas (2005), there are several types of learner control including learner control of: pacing, sequence, task difficulty, optional content, method of presentation incentives, learner control with advisement, and learner control and hypermedia.

2.6.2 Learner control and hypermedia

Hypermedia are computer-based documents composed of hyperlinks and media in various symbol sets including texts and graphic icons to give information and serve as an index that allow users to access further information in a non-linear fashion (Jaffe, 1997; Marchionini, 1988). They can be seen as the product of hypertext and multimedia (Scheiter & Gerjets, 2007). With hypermedia, online learners can easily have access to learning contents and interact with their peers and instructors. Researchers have found that hypermedia also give learners a sense of control (Gerjets, Scheiter, Opfermann, Hesse, & Eysink, 2009), which in turn affects their level of self-efficacy and motivation (S. W. Chou & Liu, 2005; Hurley, 2006; Moos & Azevedo, 2008). Findings from Wang and Beasley (L. C. Wang & Beasley, 2002) affirm that hypermedia works significantly well together with learner control in an online learning environment by positively affecting learners' performance.

Su and Klein (2006) asserted that online course developers should use hypermedia to facilitate learners even if the effectiveness of hypermedia usage in higher education is still in question (Hasebrook, 1997; Jaffe, 1997; B. Lin & Hsieh, 2001). Maag (2004) in a study of nursing students demonstrated the similarity of students outcomes in terms of scores and self-efficacy after studying in a one-hour course that contained the same knowledge content but presented in four different formats: text-based, text-based with image, text-based with multimedia, and text-based with interactive multimedia. Findings revealed that students were most satisfied with the interactive multimedia learning method. However, the benefit that learners receive from learner control and hypermedia varies depending on an individual's ability (Dillion & Gabbard, 1998). Jaffe (1997) also noted that hypermedia or interactive multimedia must be carefully applied to instructional material since poor navigational design reduces learner self-efficacy. Lawless and Brown (1997) asserted that online learning with learner control and hypermedia is unique; not only can learners navigate through their learning environment as they wish, but they can also interact more.

2.6.3 Learner control and interaction/interactivity

In online learning, learners normally interact with the online learning environment to some degree, such as searching for course materials, posting their opinions to the discussion board, or submitting written assignments. These interactions can "play an important role in fostering effective learning" (Piccoli et al., 2001, p. 409) and be good predictors of academic achievement (Abulibdeh & Hassan, 2011).

Interaction, a two-way communication process (M. Chen, 2008), is one of the critical success factors in online learning (Volery & Lord, 2000). Bernard et al. (2009) classify interaction to three categories: student-to-student, student-to-teacher, and student-to-content interaction. Reichert and Hartmann (2004, as cited in M. Chen, 2008), however, categorise interaction into two types: human-human and human-computer interactions. Similar to Reichert and Hartmann, Siritongthaworn and Krairit's (2004) study confirmed that interaction includes human-to-human and human-to-non-human interaction plus 'access duration', time students spent in an online learning session.

Human-human interaction occurs via computer-mediated communication tools such as chat rooms and discussion boards whereas human interaction with computers happens according to specific designed commands or codes which are embedded in online lessons. These interactions aim to communicate information either to humans or machines, thus "the degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchronously, and participate in reciprocal message exchanges" (Kiousis, 2002, p. 372) is defined as interactivity.

From this given definition, therefore, interactivity consists of three factors: structure of a medium, communication context, and learner perception of interaction. For Scheiter and Gerjets (2007), the term learner control can be used interchangeably with the term interactivity. As online learning focuses more and more on interaction, interactivity has become "almost synonymous with the learning itself" (Mayes, 2006, p. 9). Ensuring both kinds of interactions are occurring simultaneously in an online learning process is essential.

In a large scale survey study at State University of New York, Swan (2001) found that interaction with teachers, peers, and course contents influenced satisfaction and perceived learning of online learners. The results from 1,108 online students in 73 courses showed that the interaction between students and teachers is more important than the interaction among students themselves. These students believed that their interaction with teachers happened via feedback and forum discussions. Despite the amount of feedback and frequency of forum discussions being an indicator of the strength of interactivity, Swan noted that the quality of interaction was far more important than the quantity.

A qualitative case study by Boling, Hough, Krinsky, Saleem, and Stevens (2012) confirmed the critical role of interaction for online learning success. In the study, ten online students and five teachers, from different disciplines, universities, and online course designs, were interviewed. Boling et al. found that students who had more interaction were more comfortable and satisfied with their online courses. Katz, Feigenbaum, Pasternak, and Vinker (2005) also affirm a positive link between interaction and self-efficacy. Their study consisted of 29 family practitioners enroled in

an interactive course that was designed to provide current information on obesity management. Self-efficacy was measured at the start and the end of the course session. The statistical analysis showed that the self-efficacy of participants increased significantly after learning in the interactive course.

In addition to the self-efficacy levels, persistence also appeared to increase as a result of the interactivity. Croxton (2014) confirms that an online course with high interactivity can be a good remedy for high attrition rate since the interaction, especially learner-to-instructor, not only satisfies learners but also raises learner motivation which results in increasing persistence. Croxton explains that learner interactivity with others via activities and feedbacks brings about an active learning process that engages learners. Thus, they feel that they belong to the learning community and are more likely to succeed in the course.

Siritongthaworn and Krairit (2004) emphasises the important role of instructor in encouraging human-to-human interaction in the online course design and delivery. They also added that the course with high interactivity should be designed with optimal length to engage students. Too longer sessions, however, could cause learners excessive fatigue and strain. Lastly, they pointed out that hypermedia and web technology should be employed in ways that facilitate human-to-computer interactions.

2.6.4 Degree of learner control in learner control with hypermedia

According to Lawless and Brown (1997), hypermedia offers learner control at five levels: browsing, searching, connecting, collecting, and generating. Browsing and searching are similar in that learners seek information, but searching is more systematic because learners intend to get a specific piece of information. In the same way, connecting and collecting give learners the ability to link related concepts but collecting allows learners to create an "artifact to represent their understanding" (Gall, 2006, p. 2). Lastly, the generative activity not only allows learners to control learning pace and sequence, but also lets learners contribute to the learning database system. As shown in Figure 2.1, these levels are "hierarchically ordered on the basis of learner control and level of learner interaction" (Lawless & Brown, 1997, p. 123). These levels are not

distinct to each other but rather a continuum of control. That means browsing is the level of least learner control and generating is the most interactive level.

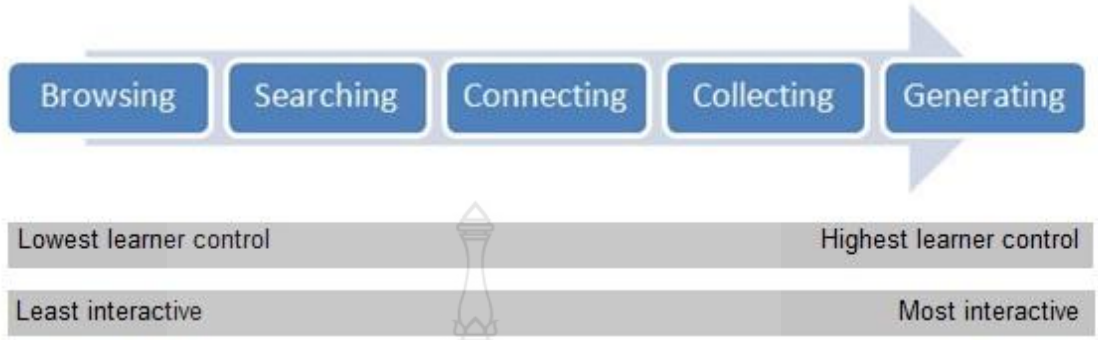

Figure 2.1. Levels of learner control and interactivity

2.6.5 Learner control and courseware design

Researchers in the field of online learning have explored ways to design effective online courses. Existing theories like Moore's (1997) theory of transactional distance and educational frameworks like Technology Acceptance Model or TAM (Davis, 1989) are popular and widely used by online research fellows. Falloon (2011), for example, used Moore's theory of transactional distance as the research framework in a study to examine postgraduate online teacher educations' self-efficacy in a web-based course that was designed to promote learner autonomy. Mishra and Koehler's (2006) technological pedagogical content knowledge (TPCK or TPACK) is also another prominent conceptual framework used in online course design at all educational levels. TPACK accentuates the link of three components of educational technology: content, pedagogy, and technology. Online teachers can apply this framework to their practices at theoretical, pedagogical, and methodological levels. Some models and frameworks focus on the aspect of control, such as Dron's (2007) transactional control, and Mayes' (2001) framework for the design of learning technology.

The concept of learner control aligns well to Mayes' framework for the design of learning technology (Mayes, 2001). His framework contains three main elements: conceptualisation, construction, and dialogue, which are implemented to be primary, secondary, and tertiary courseware respectively. In his courseware learning cycle, conceptualisation refers to the stage where learners initially get to know others' concepts. Construction happens when learners build and combine concepts by doing

designated learning tasks. At the end, dialogue is used as the reflection of learners' understanding.

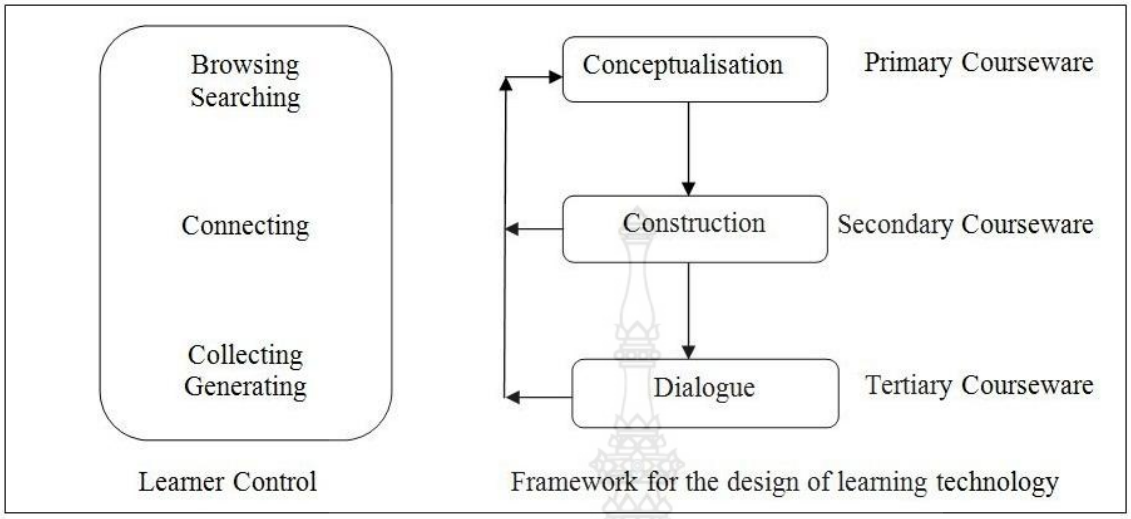

Figure 2.2. The comparison of learner control and Mayes' courseware (adapted from Mayes & Fowler, 1999, p. 490).

As illustrated in Figure 2.2, primary courseware is designed mainly to present course materials and normally supports learners' browsing and searching. It has a comparatively low level of learner control. In secondary courseware, tools for learning tasks are provided, thus an additional control, connecting, is built into the learning environments. Assessment of learner knowledge and learning concepts are the objective of tertiary courseware; therefore, learners are allowed full control of their learning environment. Therefore, collecting and generating are incorporated with the learning environment giving learners the ability to reflect their understanding and contribute their part to others. In short, learners tend to be more engaged when they have higher levels of control (Kinzie, 1990).

2.7 Learner Control and Online Learner Self-efficacy

Research on learner control in distance and online learning environments has increased during the past decade. However, the effect of learner control on online learners, as mentioned in the earlier section, varies due to the multidimensional nature of learner control itself (Candy, 1991) plus the complexity of the online learning contexts (Saade´, He, & Kira, 2007). A recent experiment by Fulton, Ivanitskaya, Bastian, Erofeev, and Mendez (2013) is an example that demonstrates this complexity. The 62 participants in

their study were students (average age 45 years old) enroled in a 12-week online statistics course. The participants were randomly assigned to three levels of learner control over study pace: low (weekly deadline), moderate (monthly deadline), and high (one deadline at the end of the course). Variables such as experience with online learning, prior knowledge, technology self-efficacy, locus of control, perceived control, and time on task were measured. The three groups showed a high level of autonomy but no variation in their perceived control over how, when, and in which order they learned. The researchers in this case admit that the use of small sample groups may have had an influence on their findings. In addition, learner preference over deadline frequency could not be assumed to be the same within the sample group. Despite a mixed result of learner control on online learning self-efficacy, learner control is still promising for online learning course design development. Thus, this present study is intended to examine the effect of learner control on self-efficacy of students in an authentic online learning programme.

2.7.1 Positive gain of self-efficacy in learner-controlled online learning environments

A number of empirical studies have shown that the sense of control learners have while interacting with instructional media and content can result in increased satisfaction, enjoyment, and confidence (e.g., S. W. Chou & Liu, 2005; Hall & Hall, 2010; Luskin & Hirsen, 2010; Orvis, Fisher, & Wasserman, 2009). Recent research by Ste-Marie, Vertes, Law, and Rymal (2013) supports this claim that a link between learner control and self-efficacy exists. In their experimental study of 60 participants aged seven to 12 years old practising trampoline skills, the experimental or the learner control group was allowed to have full control over their self-observation video playback. The control group had no control over the video playback. At the end of the three day experiment, participants' self-efficacy, intrinsic motivation, perceived success, and skill performance were measured. Statistical analyses indicated that self-efficacy of participants in the learner control group rose significantly. Learner control was also found to have a positive influence on intrinsic motivation and perceived autonomy. Therefore, Ste-Marie et al. proposed that learner control was important during the early stage of learning because it helped learners strengthen their self-efficacy, which may then enhance intrinsic motivation and autonomy, as well as a gain in learning outcomes.

While Ebner and Holzinger (2007) found that playing games did enhance learning, motivation, and self-efficacy with a factor that they called joy, and Chang and Ho (2009) found that students with the learner control version of English language interactive online program had higher test scores and self-efficacy levels than those in the programme-control version. With the intention of improving learners' listening ability in second language learning, Graham (2011) established the idea of increasing learners a sense of control using scaffolding in form of feedback. He found that learner self-efficacy increased when students had a sense of control over their learning process. Graham's finding aligns with Keller's (1983; Keller & Suzuki, 2004) ARCS model of e-learning design in that learners' motivation can be retained by maintaining learners' *attention*, giving lessons *relevance* to learners' goals, improving learners' *confidence*, and gaining learners *satisfaction*.

Just as with learner control in the traditional class setting, a number of studies report an improvement in learner self-efficacy in a user-controlled online environment. Ng's (2012) empirical study, for example, verified that the efficacy beliefs of distance learners were positively correlated to control beliefs (learning pace) with the correlation coefficient, $r = .51$, at a significant level of $p < .01$. Ng's findings were based on a cohort of 334 distance students in an educational psychology course at a Hong Kong University. The questionnaire was built to measure research variables such as achievement goals and learning strategies as well as self-efficacy and control beliefs. Among Ng's significant findings, learner attitude, self-efficacy, and control beliefs were found to be positively related. Behrend and Thompson's (2012) experimental study which measured the relationship between learner control (a choice of animated tutors) and self-efficacy had similar findings. The study examined the influence of online learners' choice over their computer generated personalised tutors. In this study, 183 learners (age average 23.80 years old) in the south-eastern United States of America were recruited to take part in a one hour online Microsoft Excel training course. These participants were then randomly divided into a control group and four experimental groups. While individuals in the former group could not choose their tutor's characteristics, individuals in the latter groups could choose their animated tutor's appearance, personality, and/or feedback styles. In order to see if the amount of learner control affected learner knowledge, declarative knowledge was measured using an assessment from the Microsoft Online Training Programme. A comparison using

ANOVA showed the declarative knowledge of the group given more selection types increased significantly. Subsequently, Behrend and Thompson concluded that giving learners more control over choice of their tutor's characteristics enhanced knowledge learning. The findings also showed that even choice of tutor appearance had a positive effect on self-efficacy and the number of tasks that were completed.

However, designing embedded learner control in an online learning course is a challenge since easy tasks might put off some students (Bandura, 1997b). The study by Hardin, Looney, and Fuller (2013) supports this notion. Using social cognitive theory and adaptive structuration theory, they conducted an experimental study of 207 undergraduate students learning in a high learner control environment. The results of this study after a two-week software training exercise showed that students with high pre-training specific software self-efficacy less frequently used the embedded tools available in the training environment than the students with low pre-training specific software self-efficacy. In addition, the self-efficacy of students with low pre-training specific software self-efficacy increased more than those who had high pre-training specific software self-efficacy.

2.7.2 Inconsistency effect

In contrast, there are findings that show no differences in learner self-efficacy between non-interactive multimedia and interactive multimedia classes. For example, Maag (2004) found that learners in an interactive multimedia online lesson showed no knowledge and self-efficacy gain compared to a control group but they were more satisfied with the interactive tools. Similarly, Jaffe's (1997) findings show that allowing students to choose their degree of interaction did not significantly affect learner self-efficacy in an online class. In addition, Meyer and Sternberger's (2007) quasi-experiment of 178 tertiary students using interactive CDs with rich multimedia and learner-controlled over their learning pace and content showed that students were satisfied but their self-efficacy levels varied.

The discrepancy among findings may occur because the user-controlled online learning environment is complex, the effects of online environments on learner self-efficacy are not consistent, and changes in learner self-efficacy could be caused by many factors

other than levels of learner control. Most of these studies have measured confidence or self-efficacy against only one aspect of learner control and because of the individual nature of learners and learning, having a small sample size could have an impact on the significance of results. Student perception of what constitutes control may also vary. For this reason, a different approach is taken by some studies to understand self-efficacy of learners in online learning contexts (e.g., Dalston & Turner, 2011; McDiarmid, 2006; Simons, Baron, Knicely, & Richardson, 2011), including learner-controlled online learning courses. A study by Poellhuber, Chomienne, and Karsenti (2008), for instance, used a mixed methodology approach to understand how peer collaboration affected learner self-efficacy and persistence in a self-paced online course. Its quasi-experimental design provided quantitative data and semi-structured interviews gave qualitative data that were used to triangulate the quantitative findings and provide useful additional information. For a deeper understanding of the intricate nature of self-efficacy in this present study, this contemporary research approach is adopted and its design described in the next chapter.

2.8 Chapter Summary

This chapter highlights the importance of self-efficacy to the success of learners in both traditional and online learning class settings. The review of literature has shown a well constructed knowledge of self-efficacy and its influence on human behaviour and development. However, research on self-efficacy in online learning environments is still limited. Online learners and the desired characteristics for success were illustrated. Despite the fact that online learning is reported as effective as traditional education in terms of completion and retention rates, educational institutes should not overlook unsuccessful online learners that need more support.

Much of the research suggests that offering learner control is one of the ways to help learners gain their self-efficacy in the online learning environment by embedding choices in online activities or courses. The concept of learner control has links to learner autonomy, self-direction, and empowerment. Though learner control is a benefit to learners, its effect on learner online learning self-efficacy is unclear due to the lack of study in authentic online learning contexts.

From the reviewed literature, quantitative approaches predominate in the research area of self-efficacy and learner control. Generally, experimental and quasi-experimental methods are suitable for comparing the effect of the studied variables on learners in academic settings. However, an empirical finding alone cannot give enough information to understand learner self-efficacy in a learner-controlled online learning environment because the concept is multidimensional and complex. Studies with a more contemporary approach, a mixed method design, are limited in number but on the rise. By adopting this approach, the findings of this study not only provide two kinds of evidences on the connection between learner control and online learning self-efficacy, but also constructive information that is useful for the design of online courses.

CHAPTER 3

RESEARCH FOCUS

The important thing is not to stop questioning. Curiosity has its own reason for existing. ... It is enough if one tries merely to comprehend a little of this mystery every day. Never lose a holy curiosity.

(Albert Einstein)

3.1 Introduction

This chapter sums up the focus of this study. The aim of exploring the relationship between learner control and online learning self-efficacy is established. The research approach is elaborated in the next chapter followed by the research framework. The research question, hypotheses, and variables are clearly stated in this chapter and the research design is described. The chapter concludes with a statement of expected outcomes and a section on research ethics.

3.2 Research Approach

To answer the research question, *what is the relationship between learner control and online learner self-efficacy*, this study was originally located within the research tradition of previous literature around self-efficacy that draws heavily on quantitative forms of data analysis. However, in keeping with more contemporary literature and in recognition of the complexity of the field, a more integrated research approach was adopted using a mixed methodology drawing on both quantitative and qualitative methods and data.

From the design stage of the research process, the study utilised an embedded-correlational mixed method design as discussed by Harrison (2009). In line with suggestions from Creswell and Clark (2011), in this design, the qualitative component was nested and implemented concurrently with the quantitative phase to maximise the researcher's time and resources. In addition to providing for data triangulation, the

qualitative data helped to affirm and better understand the uniqueness of online learning self-efficacy from learner viewpoints in an authentic setting of a learner controlled online learning programme. At the time it was believed that this design should provide a richer picture of how learner control influences online learning self-efficacy.

The quantitative data were given the first priority, primarily because research literature in the area of self-efficacy is well established and self-efficacy scales are quantitatively constructed. In the context of this study, a correlational research design was the most suitable since it was considered that using an intervention might cause risk or harm to participants by affecting their learning performance and self-efficacy. By using statistical significance, the relationship between two variables, *online learning self-efficacy* and *learner control*, could be scientifically identified (Mertens, 2010).

3.3 Research Aims of the Study

As research on online learning has concentrated its focus on the creation and support of effective online courses, learner support has emerged as an important consideration (Thorpe, 2002) and has become a key aspect in online course design. However, few studies have explored the effect of learning design on online learner self-efficacy. In order to address this gap in the research, this study aims to explore whether particular aspects of learning design related to learner control have an effect on learner self-efficacy. Findings from this study may assist online educators, instructors, and developers to design online courses that enhance online learner self-efficacy.

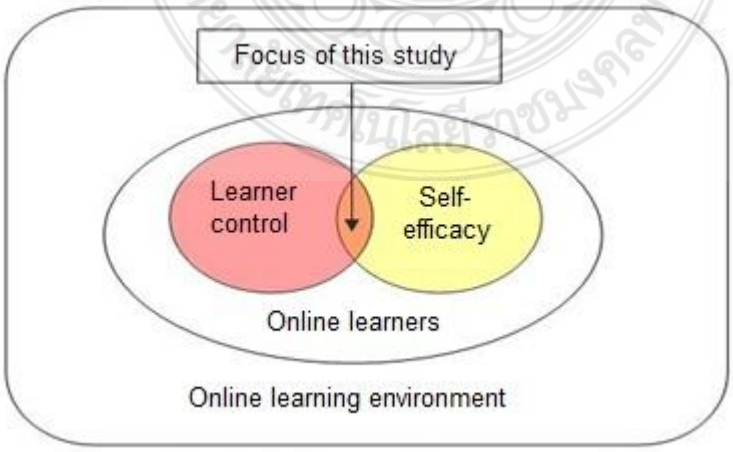

Figure 3.1. The focus of this study

This study centres on learners in the formal setting of a university online learning class where the online course has been purposefully designed to encourage learner control. Most interactions and support from the institution and instructors are computer-mediated. Online learning in an asynchronous mode, where learners are free to choose where and when they would like to study, is explored. The relationship between learner control and learner self-efficacy within an authentic context is the focus of this investigation (See Figure 3.1).

3.4 Theoretical Framework

The present study is framed by Bandura's (1977) self-efficacy theory. According to Bandura, self-efficacy is influenced by four main factors: previous experience, motivated feedback, emotions, and success or failure of others; however, several other factors are also known to affect self-efficacy. For example, it is likely that online learning self-efficacy is affected by learner age, gender, computer skills, and previous online learning experience. Hypothetically, online learning self-efficacy should change after studying in online courses embedded with various levels of learner control. Both negative and positive changes in online learning self-efficacy is likely to affect learner perceptions of subsequent online courses and other situations close to the one where their efficacy has been developed.

Theoretically, if the relationship between learner control and online learning self-efficacy is positive, online learning self-efficacy of learners in online courses with learner control should improve (See Figure 3.2). Moreover, the self-efficacy of novice online learners is presumed to increase more than those of experienced online learners.

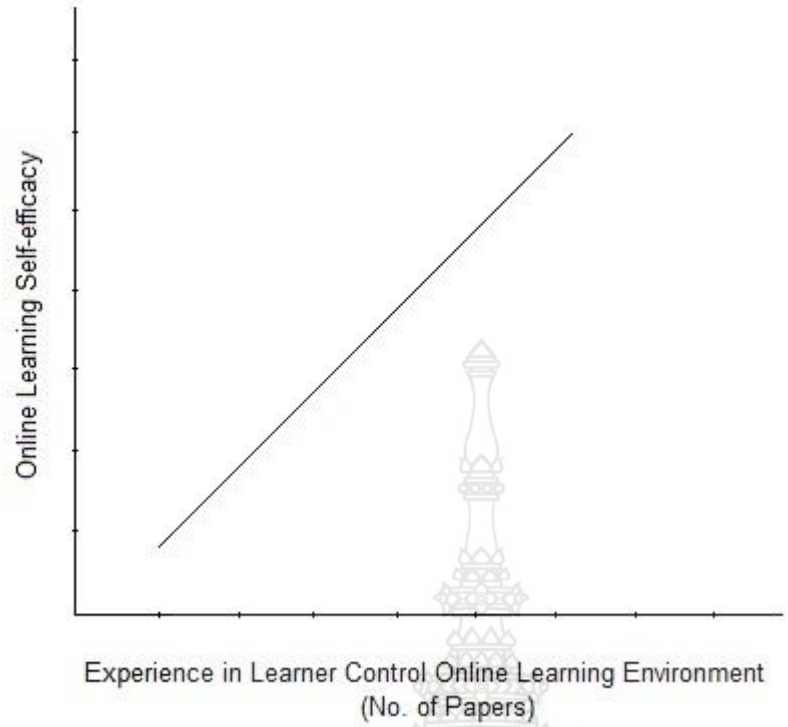

Figure 3.2. The theoretical illustration of the relationship between learner control and online learning self-efficacy

3.5 Research Questions and Hypotheses

Derived from the theoretical framework and reviewed literature, this study aims to answer one main research question:

What is the relationship between learner control and online learner self-efficacy?

In order to answer this question, four hypotheses are tested:
Theoretically, the level of learner control is directly related to learner confidence and self-efficacy. Therefore, the higher the control learners have in an online environment, the more online learner self-efficacy should increase.

Hypothesis 1: There is a positive relationship between learner control and online learning self-efficacy.

If this is upheld,

Hypothesis 2: Online learning self-efficacy of learners in online courses with high levels of learner control is higher than those in online courses with lower levels of learner control.

And,

Hypothesis 3: Online learning self-efficacy of learners who have more experience with high levels of learner control is higher than those who have less experience.

Since the characteristics of contemporary online learners are diverse, the effect of learner control on the self-efficacy of each learner might not be the same. Some studies have shown that manipulating other variables such as learner ability, acquired skills, online anxiety, instructor feedback, training, previous success, and academic outcomes (e.g., H. W. Chou & Wang, 2000; Multon et al., 1991; Usher, 2009; Usher & Pajares, 2009; Zimmerman & Kitsantas, 2005), can alter learner self-efficacy. However, these variables are not the focus of this study since findings from many studies confirm the effect of these variables on online learning self-efficacy in the same way. Therefore, this present study focuses only on variables that remain controversial or have inconclusive effects on learners' online learning self-efficacy. Some of these variables are age, gender, computer skills, and previous online experience.

In line with the literature, learners who were born before the digital age beginning in the early 1990s (Prensky, 2001), can find high levels of learner control an obstacle whereas younger learners are more confident (Kennedy et al., 2008). Despite that, literature also showed that young learners used computer skills for social life more than older learners who often used these skills for studying (Hosein, Ramanau, & Jones, 2010). In addition, males perceive technology differently from females (R. Chen & Tsai, 2007). This gender difference is further supported by findings of Cassidy and Eachus (2002) showing that, for online learning, male university students have more confidence than females.

Different levels of computer technology skills and informal online experience also contribute to first-time learners' competency and ability to learn well in an online environment (Mitchell, Chen, & Macredie, 2005; Su & Klein, 2006). Moreover, he

computer skills and previous online learning experience of these students has been shown positively correlate to their self-efficacy in online learning environments (Artino, 2007; Guy & Lownes-Jackson, 2010). Even though existing research shows these factors might affect online learning self-efficacy, the question is, do they also influence the relationship between learner control and online learning self-efficacy?

If so,

Hypothesis 4: The relationship between learner control and online learning self-efficacy is influenced by the age, gender, computer skills for academic purpose (CSAP), computer skills for social purpose (CSSP), and prior online learning experiences of online learners.

Hypothesis 4.1: The relationship between learner control and online learning self-efficacy is influenced by the age of online learners.

Hypothesis 4.2: The relationship between learner control and online learning self-efficacy is influenced by the gender of online learners.

Hypothesis 4.3: The relationship between learner control and online learning self-efficacy is influenced by computer skills for academic purpose (CSAP) of online learners.

Hypothesis 4.4: The relationship between learner control and online learning self-efficacy is influenced by computer skills for social purpose (CSSP) of online learners.

Hypothesis 4.5: The relationship between learner control and online learning self-efficacy is influenced by prior online learning experience of online learners.

3.6 Research Variables

As a norm of the correlational design, research variables are identified and introduced in this section.

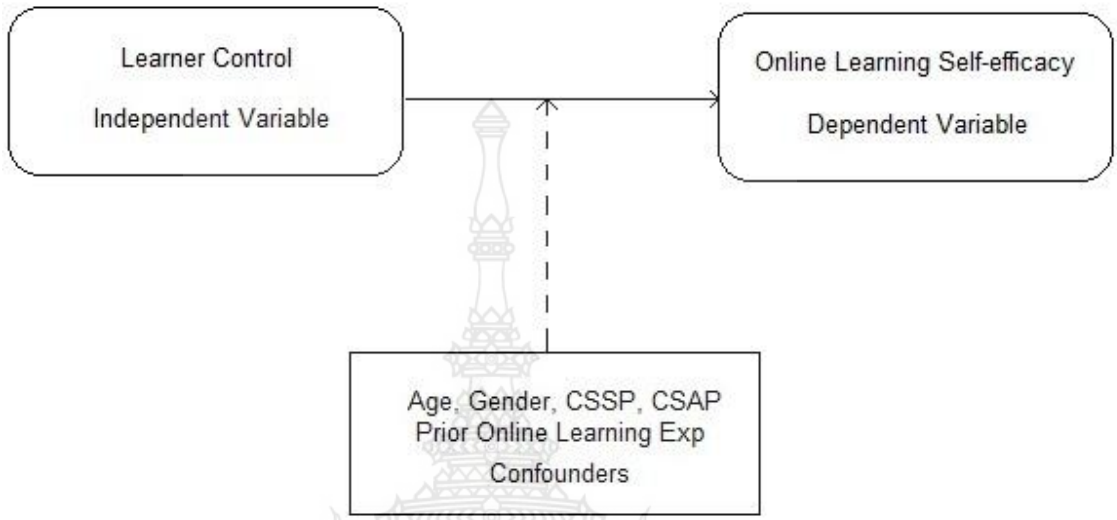

Figure 3.3. Research variables: the independent, dependent, and confounding variables

In order to study the relationship between *learner control* and *online learning self-efficacy* (OLSE), the following independent, dependent, and confounders were identified based on the reviewed literature (See Figure 3.3). The independent variable was *learner control*. The dependent variable was *online learning self-efficacy* of online learners. *Age*, *gender*, *computer skills for academic purpose* (CSAP), *computer skills for social purpose* (CSSP), and *prior online learning experience* were the confounding variables as these were expected to influence the relationship between *learner control* and *online learning self-efficacy*.

3.7 Anticipated Outcomes

This study has a number of anticipated outcomes. Novice learners should have lower online self-efficacy than experienced learners. A change in the online learning self-efficacy of online learners should be found after studying an online course with embedded levels of learner control. Moreover, their online learning self-efficacy should increase after they have studied with high levels of learner control for a period of time. Learner confidence to learn online should correspondingly increase as they cope, adapt

and continue to study. This effect should be greater in an online course that allows higher levels of learner control than in those with lower levels of learner control. Therefore, participants in courses offering high levels of learner control should have more positive attitudes toward their learning environment, they should spend more time studying and doing their assigned tasks, and they should show a more positive sense of self-efficacy.

The findings of this study might help educators in the area of instructional design and lecturers who teach asynchronous online courses to understand the effect of learner control on learner self-efficacy and even the role of self-efficacy in tertiary learning success. Online courses with high levels of embedded learner control might assist those learners to cope with the unfamiliar online learning environment and to feel less alienated, more comfortable, and more confident about their study.

3.8 Ethical Considerations

This study complied with the Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants (See Appendix A) for the University in which the programme used for this present study was offered. With regard to ethical considerations, the research methodology was designed to minimise any potential harm to participants, stakeholders of the online programme, and the institution. Whenever possible the study was framed to promote critical reflection that might help to enhance the experience of participants.

After the draft questionnaire was constructed, permission to conduct research was granted by the head of the institute and the programme coordinator for piloting the instrument and data collection (See Appendix B). Anonymity was ensured throughout the process. With respect to the right of privacy, the data collection period was set to the time that had the least interference to the participants' studying schedule. The invitation and reminders were posted on the online community websites instead of direct email message. The survey was also launched on the website that willing participants could access easily via a link posted with the invitation and reminder messages. This process ensured that the participants were not forced to take part in the study and they could do it within a suitable time and place. Consent was implied when

participants accessed the questionnaire through the link provided in the invitation letters. The participation in this research was completely on a voluntary basis. The right to withdraw from participation at any time was explicitly written in the Information Sheet (See Appendix C).

The data were treated as confidential throughout the collection process. Access to the data was limited to the researcher and her supervisors only. In addition, data were analysed as a whole and the name of the programme and the institute were concealed when findings were reported.

3.9 Chapter Summary

The relation between learner control and self-efficacy was identified as a research gap in this chapter. Using Bandura's (1977) self-efficacy theory is applied as the framework for this research. A mixed method approach was designed with the qualitative phase embedded within a quantitative correlational study. Therefore, both quantitative and qualitative data were collected at the same time to answer the overarching research question. As a norm for a correlational study, hypotheses were presented and research variables were identified. Expected outcomes were stated in this chapter in that the findings of this study should give some light to understand the effect of learner control on online learners' self-efficacy. Then, the chapter concluded with ethical considerations that were applied throughout the study from the start of this research, the pilot study, the main data collection, and the result reporting.

CHAPTER 4

SCALE DEVELOPMENT AND PILOT STUDY

Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.

(Thomas A. Edison)

4.1 Introduction

This chapter describes the construction of the data collection tool and implementation of the pilot process. The data collection tool is a questionnaire designed according to Czaja and Blair's (2005) guidelines. It comprises four sections designed to assess the research variables. These four sections are: (1) demographic data; (2) a self-report of learners' CSAP, CSSP, prior online learning experience, and learner control (LC); (3) Online Learning Self-efficacy Scale (OLSES); and (4) open-ended questions for qualitative data.

4.2 Drafting the Questionnaire

In the early stage of the questionnaire construction, the key variables to be measured were identified: the independent variable, *learner control*, the dependent variable, *online learning self-efficacy*, and confounders. Items were then generated for each variable from existing validated questionnaires. The questionnaire was then adjusted to include four sections as mentioned earlier in the previous section.

Demographic data were gathered in response to questions asking participants to provide information on age, gender, and perceived computer skill. *Age* was divided into five age groups, 16-24, 24-34, 35-45, 46-54, and > 55. Participants were not required to identify their *gender*; rather it was a matter of choice. For *perceived computer skill*, the participants could indicate their skill as *beginner*, *intermediate*, or *advanced*. These

data were important to describe the characteristics of the sample group and also used as potential confounders in the quantitative analysis.

For the self-report section, there were four main questions. Only *prior online learning experience* was a multiple choice question. Participants were asked to report their prior online learning experience from four categories: *none*, *a little*, *some*, and *a lot of*. *CSAP*, *CASP*, and *learner control* employed summated rating scales. These scales were constructed according to Spector's (1992) guideline. All of these scales employed a 4-point Likert scale ranging from *never*, *hardly ever*, *some of the time*, and *frequently*. Both *CSAP* and *CSSP* were composed of 15 items which consisted of five items in three categories (*beginner*, *intermediate*, and *advanced*).

The independent variable, *learner control* (LC), was measured in terms of the learners' perception of their experience. Learners were also asked whether they completed tasks at different levels of learner control from browsing, searching, connecting, collecting and generating in their previous online courses. The participants could report their experience with these tasks on a 4-point Likert scale. The original LC scale consisted of 15 items with three items measuring each *learner control* level. Later, the LC scale was adjusted to have two items for each *learner control* level and three more items were added to the scale to measure learner control over pace, time, and enhanced knowledge.

The online learning self-efficacy scales (OLSES) were developed to measure the dependent variable based on Bandura's (2006a) guide for constructing self-efficacy scales. All items in the measure needed to precisely reflect perceived capability to complete tasks specific to the context. All items were phrased in terms of 'can do'. Items varied in terms of task difficulty and included both positive and negative oriented items which were distributed randomly to avoid a cluster response. According to Bandura's guidelines, a 0-100 interval scale is more sensitive and more reliable than a smaller number of scales. Therefore, an interval scale was used for this study and the score of each item could be 0 to 100. The OLSES items were pooled from proven existing instruments: the Online Learning Technologies Self-Efficacy (OTSES) Scores (DeTure, 2004), the Online Learning Value and Self-efficacy (OLVSES) Scale (Artino & McCoach, 2008), and Fletcher's (2005) online learning self-efficacy measurement.

The OLSES, then, comprised three subscales: Learner Control (LC): Learning with Others (CL), and Computer and Internet Skills (IT), with a total of 25 items.

A set of open-ended questions was added to gather qualitative data that would give in-depth information related to this study. The first question was an extension of the previous question about participants' previous online learning experience. Participants were given an opportunity to explain any formal online course experience they had before enroling in this online course. The second question asked participants to provide online tasks or activities that the LC scale did not have. The confidence of the learner to succeed in the study programme was asked in the third question. The responses to this question were useful for data triangulation and for better understanding the nature of online learning self-efficacy. The last question, *do you have anything else to say about being an online learner*, gave learners a broad opportunity to articulate their experience in the study programme. The data from this section were used to support the quantitative data. Emerging themes from these qualitative responses assisted in providing increased understanding about learners in the learner-controlled online learning context.

After the items were organised in these sections, the questionnaire was reviewed by two online paper coordinators and three postgraduate students who were previously enroled in the same online papers to check for content and face validity. The items were revised and reviewed again in light of the received feedback. The final draft questionnaire was then ready for the pilot study.

4.3 The Pilot Group

For the pilot process, the population frame was online learners in an online programme at a tertiary institution in New Zealand. The purposive sample group comprised learners in an online programme where levels of learner control were embedded within the course design. Students studying for a graduate diploma in an initial teacher education programme were selected as the pilot group, since this programme had three compulsory online papers that met the research criteria. Applicants for this programme were required to undergo a selection process to determine suitability and fitness for teaching.

In 2011, when this pilot was conducted, 112 candidates (52 distance students and 60 internal students) were selected to the programme through a process of application and interview. The programme consisted of five compulsory core papers, two practicum papers, and three subject specific papers. The three core papers were designed to be delivered in a blended mode. More importantly, these online papers were intentionally designed to maximise the learner-control approach. For example, students were encouraged to complete a group project in their own way, or they were allowed to complete different selected tasks, choosing their own order within a flexible time frame. The students were assigned tasks and assignments as posted on online learning websites. Even though the online learning environment was text-based, most tasks were constructed to give students a variety of learner control ranging from low to high. For example, students were assigned to work in groups to create a teaching and learning scenario. Another task required that they created a teaching and learning artefact using video and audio. Some work required them to make a flash animation, while some tasks required learners to simulate an online interactive setting.

The sample group for the main study was similar to this pilot group in most aspects. Both groups comprised both internal and distance students. These students were also pre-selected to the programme. Though they were graduate students, the characteristics of this pilot group were similar to the main sample group such as the proportion of genders, age groups, and ethnicity. In addition, both online programmes for the pilot and main study were designed to employ similar online teaching strategies and pedagogies. The major difference between the two programmes was that the graduate programme was a one-year graduate diploma requiring an undergraduate degree before entry, while the programme for the main study was a comprehensive four year degree programme. Nevertheless, it was considered that differences in programme length and content would have minimal impact on the research findings since the measure for the study was constructed specifically to assess online learning self-efficacy, rather than other types of efficacy generally associated with teacher learning and readiness to be a teacher.

4.4 The Pilot Process

This pilot study was performed for three main reasons: validating and refining the data collection tool, testing data collection process and analysis, and checking the preliminary findings. Details of the pilot study are described in the following sections.

The questionnaire was distributed online to the pilot group at the end of Semester two, 2011. The invitation to participate in the questionnaire was posted on the pilot group's community website by the programme co-ordinator. Students could access the link given from the invitation to the pilot questionnaire on the SurveyMonkey website. A clear explanation of research objectives and research instructions were given to all participants in the letter of invitation and in the questionnaire.

The survey was opened for collecting responses from May 26 to July 24, 2011. On the first invitation, ten students filled in the questionnaire. The second invitation was posted a week later and nine responses were collected. Later, fourteen responses were collected after the third invitation in mid July; no one responded to the last invitation on July 22, 2011.

Participants were asked to give their self-report on *previous online learning experience*, *computer skills for academic* and *social purpose* (CSAP and CSSP), and experiences of *learner control* while they were studying in the recent online programme, and their confidence toward online learning.

After that, the survey was closed and raw data were downloaded to the researcher's computer. The data were then screened, cleaned and tested for outliers and errors. Cronbach's Alpha was employed to maintain internal reliability. Item analysis was used and items with corrected item-total correlation less than 0.3 were eliminated (Pallant, 2011). A Principal Component Analysis (PCA) was then performed on OLSES to verify the OLSE subscales.

4.5 Reliability and Consistency

The CSAP original scale consisted of 15 items measuring computer skills for academic purpose. It was categorised using three levels: *beginner*, *intermediate*, and *advanced*, with five items in each level.

Table 4.1 *Corrected Item-total Correction Value of Items Measuring CSAP*

CSAP Components	Items	Corrected item-total correlation value
Beginner Level	Logging on to the school network	0.292
	Searching for a book using a library catalogue	0.317
	Adding text to describe an image	0.643
	Creating a presentation using software such as Microsoft PowerPoint	0.695
	Selecting shapes or graphics to present ideas	0.745
Intermediate Level	Importing a digital image into a document or presentation	0.697
	Using the spell check, grammar check, and thesaurus	-0.015
	Modifying background and layout of presentation slides	0.728
	Making a digitized image from a hard copy	0.634
	Making and selecting appropriate graphs and elements to display data	0.644
Advanced Level	Performing statistical analysis using statistical software	0.396
	Using track changes and comment tools	0.667
	Using navigation buttons and non-linear design for your presentations	0.679
	Refining web searches using Boolean operators	0.520
	Creating and editing table layouts	0.650

Note. Items with a corrected item-total correlation value less than 0.3 (as highlighted) were eliminated.

Descriptive statistics showed that one participant did not respond to the item, *creating a presentation using software such as Microsoft PowerPoint*. As shown in Table 4.1, most items had a corrected item-total correlation value of greater than 0.30. Two items, *logging on to the school network* and *using the spell check, grammar check, and thesaurus*, had their corrected item-total correlation value less than 0.3 and were eliminated (See Table 4.4). As a result, the CSAP final scale contained 13 items.

Table 4.2 *Corrected Item-total Correction Value of Items Measuring CSSP*

CSSP Components	Items	Corrected item-total correlation value
Beginner Level	Using/adjusting volume control when listening to music or watching a video clip	-0.101
	Playing a computer game	0.527
	Reading and composing an e-mail	-
	Copying images or documents from a website	-0.042
	Participating in chat rooms on popular topics	0.723
Intermediate Level	Using MSN to chat with your friends	0.569
	Booking a ticket, purchasing or selling items online	0.334
	Playing an online game	0.489
	Attaching files or audios to your e-mails	0.157
	Sharing your favourite songs or video clips with your friends on Facebook or Twitter using hyperlinks	0.562
Advanced Level	Connecting peripheral devices such as a modem, scanner, digital camera and etc to the computer	0.237
	Developing a website using a web authoring	0.644
	software such as Adobe Firework or Macromedia	
	Linking a database to use on an e-commerce website	0.557
	Creating or editing movies and animations	0.533
	Converting image files or audio files to various formats	0.527

Note. Items with a corrected item-total correlation value less than 0.3 (as highlighted) were eliminated.

The CSSP scale was designed in a similar way to the CSAP scale in that it was divided into three levels with five items for each level. According to the data, all respondents gave one item, *reading and composing an e-mail,* a maximum score of 4.00. Therefore, its variance was 0.00 and it was automatically eliminated from the scale (See Table 4.2). After Cronbach's Alpha was calculated, four items in this scale (*Using/adjusting volume control when listening to music or watching a video clip, copying images or documents from a website, attaching files or audios to your e-mails,* and *connecting peripheral devices such as a modem, scanner, digital camera and etc. to the computer*), reported a corrected item-total correlation value less than 0.3 (See Table 4.4). These items were thus eliminated. Another item (*Booking a ticket, purchasing or selling items online*) had one missing response but its corrected item-total correlation was 0.334 (See Table 4.2). Thus, this item was retained. The CSSP original scale of 15 items was reduced to a final scale of 10 items.

The original LC scale comprised 14 items. The first eleven items were assigned five levels of learner control: *browsing, searching, connecting, collecting,* and *generating*. The last three items were created to measure *learner control* over pace, time and enhanced learning. As shown in Table 4.3, the items, *doing an assignment using knowledge independently gained from other sources, learning at your own pace from wherever you want,* and *doing an assigned task in your own time,* had one missing response but their corrected item-total correlations were greater than 0.3. Therefore, these items were retained. Only one item (*Using the library's online database to find books and articles for assignments*) was eliminated from the LC scale because its corrected item-total correlation was 0.219 (See Table 4.4). Therefore, the final scale comprised 13 items.

Table 4.3 *Corrected item-total Correction Value of Items Measuring Level of LC*

Learner Control Components	Items	Corrected item-total correlation value
Browsing	Getting familiar with the programme of study by going to an orientation or viewing introductory video clips	0.594
	Going through [the studying website] to get familiar with the learning environment	0.365
Searching	Finding course materials posted by lecturers	0.474
	Using the library's online database to find books and articles for assignments	0.219
Connecting	Asking help from administrators by posting a query on [the studying website]	0.320
	Helping others to understand key concepts by contributing links	0.367
Collecting	Doing an assignment using knowledge independently gained from other sources	0.320
	Contributing to a group project or report	0.663
Generating	Posting your opinions or ideas on the discussion board or forum	0.591
	Completing a task (e.g., teaching module) expressing your ideas and concepts from the course	0.499
	Presenting a result from an assignment in [the studying website] by writing a report or posting to the discussion forum	0.462
Pace	Learning at your own pace from wherever you want	0.377
Time	Doing an assigned task in your own time	0.375
Better understanding	Enhanced understanding of a concept from reviewing online studied materials and [the studying website]	0.692

Note. Items with a corrected item-total correlation value less than 0.3 (as highlighted) were eliminated.

Table 4.4 *The Summary of Items Eliminated from CSAP, CSSP, and LC Scales*

Variables	Items	Corrected item-total correlation value
CSAP	Logging on to the school network	0.292
	Using the spell check, grammar check, and thesaurus	-0.015
CSSP	Using/adjusting volume control when listening to music or watching a video clip	-0.101
	Copying images or documents from a website	-0.042
	Attaching files or audios to your e-mails	0.157
	Connecting peripheral devices such as a modem, scanner, digital camera and etc., to the computer	0.237
LC	Using the library's online database to find books and articles for assignments.	0.219

Note. Items with a corrected item-total correlation value less than 0.3 were eliminated.

Table 4.5 shows that the Cronbach's Alpha of CSAP, CSP and LC scales were improved to 0.898, 0.847, and 0.819 respectively after items with their corrected item-total correlation value less than 0.3 were eliminated.

Table 4.5 *Original and Improved Cronbach's Alpha of CSAP, CSSP, and LC Scales*

Scales	Original internal reliability	Improved internal reliability
CSAP	0.889	0.898
CSSP	0.810	0.847
LC	0.813	0.819

The original OLSES had three subscales: Learner Control (OLSE_LC), Learning with Others (OLSE_CL), and Computer and Internet Skills (OLSE_IT). Participants could rate their perceived confidence in relation to the items on a scale from 0 to 100. After the initial data were coded and screened, descriptive statistics showed some items had missing values as shown in Table 4.6.

Table 4.6 *The Summary of Items with Missing Responses in OLSES*

Subscales	Items	Frequency of Missing value
Learner Control (LC)	Managing your time to complete all assigned tasks in the programme	1
	Planning and managing your own learning needs	2
	Staying involved with the course without face-to-face interaction with the lecturer	1
Learning with others (CL)	Working well with my group for a task required in any online courses	1
	Organising and leading a course project involving other participants	2
	Participating in group decision making	1
	Criticising your lecturer's performance in teaching the subject matter	3
	Doing an online role-play activity if one is assigned	3
	Communicating effectively when my responses will be read by many people.	1
Computer and Internet skills (IT)	Putting an audio clip or video clip on a presentation programme	1

For the scale's internal consistency, Cronbach's Alpha of the total OLSES was 0.900. Two items, *criticising your lecturer's performance in teaching the subject matter* and *finding my way (navigate) around website*, had low corrected item-total correlation values of 0.154 and 0.198. Therefore, they were deleted from the scale (See Table 4.7). Cronbach's Alpha of the refined 23-item scale was slightly improved to 0.901. The internal consistency of the subscales was also calculated. Cronbach's Alpha of subscale Learner Control (LC), Learning with Others (CL), and Computer and Internet skills (IT) were 0.847, 0.887, and 0.818 respectively.

Table 4.7 *Corrected Item-total Correction Value of Items in OLSES and Internal Consistency of OLSES Subscales*

Items	Corrected item-total correlation value	Original Cronbach's Alpha	Improved Cronbach's Alpha
Learner Control (LC)		0.847	0.847
Getting access to the course wherever and whenever I want	0.497		
Assessing your progress in a programme	0.683		
Doing well in this programme with little help online from your lecturer	0.706		
Managing your time to complete all assigned tasks in the programme	0.510		
Planning and managing your own learning needs	0.731		
Staying involved with the course without face-to-face interaction with the lecturer	0.693		
Learning with Others (CL)		0.867	0.887
Working well with my group for a task required in any online courses	0.748		
Organising and leading a course project involving other participants	0.736		
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	0.591		
Participating in group decision making	0.792		
Criticising your lecturer's performance in teaching the subject matter	0.154		
Doing an online role-play activity if one is assigned	0.471		
Communicating effectively when your responses will be read by many people	0.557		

Table 4.7 (Continued)

Items	Corrected item-total correlation value	Original Cronbach's Alpha	Improved Cronbach's Alpha
Computer and Internet Skills (IT)		0.828	0.818
Having enough computer skills to complete this online component	0.487		
Uploading my project to the website successfully	0.367		
Finding my way (navigate) around website	0.198		
Viewing an attachment from an incoming e-mail message	0.453		
Using online database such as one at the library or Google to find information needed	0.532		
Saving files from the Internet to my computer	0.467		
Using a word processing programme such as Microsoft Word to do my report	0.446		
Converting a Word file to a .pdf file	0.380		
Manipulating a picture and putting it in my report	0.380		
Using e-mail to communicate with my lecturer or classmates	0.454		
Putting an audio clip or video clip on a presentation programme	0.411		
Using a spreadsheet to do an assignment	0.313		
Total Internal Consistency		0.900	0.901

Note. Items with a corrected item-total correlation value less than 0.3 (as highlighted) were eliminated.

The OLSE subscales were then examined. Drawing from the literature review, the OLSE scale was created based on the assumption that online self-efficacy is multidimensional and three subscales were predicted. To confirm this assumption, a Principal Component Analysis (PCA) was used. PCA with Eigenvalues exceeding one extracted six subscales. Items that loaded on more than one component were eliminated resulting in only six items on component one (See Table 4.8). Varimax rotation was then used to get different results with more components.

Table 4.8 *The Result of PCA with Eigenvalues Exceeding One*

Items	Components					
	1	2	3	4	5	6
Participating in group decision making.	.801	-.379				
Planning and managing your own learning needs	.769				.428	
Organising and leading a course project involving other participants	.743	-.372				
Working well with my group for a task required in any online courses	.733	-.452				
Doing well in this programme with little help online from my lecturer	.693	-.484				
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	.650	-.431	.303		-.302	
Using online database such as one at the library or Google to find information needed	.623	.432				
Assessing your progress in a programme.	.608		-.379	.422		
Managing your time to complete all assigned tasks in the programme	.607		.327	-.349	.430	
Communicating effectively when my responses will be read by many people	.594		-.365			
Staying involved with the course without face-to-face interaction with the lecturer	.564	-.377				-.374
Getting access to the course wherever and whenever I want	.564		-.513			.332
Doing an online role-play activity if one is assigned	.472			.462	-.416	
Viewing an attachment from an incoming e-mail message	.447	.721				
Using a word processing programme such as Microsoft Word to do my report	.553	.702				
Using e-mail to communicate with my lecturer or classmates	.515	.694				
Saving files from the Internet to my computer	.542	.681				
Uploading my project to the website successfully	.381	.586	.548			
Having enough computer skills to complete this online component.	.516	.557	.476			
Using a spreadsheet to do an assignment	.	.435	.617			.328
Converting a Word file to a .pdf file.	.366			.775		
Putting an audio clip or video clip on a presentation programme	.408			.575	.574	
Manipulating a picture and putting it in my report	.391	.346	-.473	.343		.530

Note. Items loaded on more than one component are highlighted.

After Varimax rotation with Kaiser Normalization was performed, seven items loaded on more than one component (See Table 4.9). After eliminating items with low values and items that loaded on more than one component, the final result showed five items

on component one and two, three items on component three, one item on component four and five, and two items on component six. According to Field (2009), each component should contain at least three items. Component six was therefore deleted.

Table 4.9 *The Result of PCA with Eigenvalues Exceeding One and Varimax Rotation with Kaiser Normalization*

Items	Component					
	1	2	3	4	5	6
Using a word processing programme such as Microsoft Word to do my report	.933					
Viewing an attachment from an incoming e-mail message	.893					
Using e-mail to communicate with my lecturer or classmates	.876					
Saving files from the Internet to my computer.	.865					
Using online database such as one at the library or Google to find information needed	.694					
Having enough computer skills to complete this online component	.619			.574		
Participating in group decision making		.853				
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants		.843				
Working well with my group for a task required in any online courses		.795				
Doing an online role-play activity if one is assigned.		.774				
Organising and leading a course project involving other participants		.675	.468			
Planning and managing your own learning needs.			.837			
Managing your time to complete all assigned tasks in the programme			.759			
Doing well in this programme with little help online from my lecturer		.487	.735			
Staying involved with the course without face-to-face interaction with the lecturer			.598	-.415		
Using a spreadsheet to do an assignment.				.853		
Uploading my project to the website successfully.	.505			.756		
Converting a Word file to a .pdf file					.875	
Putting an audio clip or video clip on a presentation programme			.406		.730	
Manipulating a picture and putting it in my report.						.827
Getting access to the course wherever and whenever I want						.692
Assessing your progress in a programme.		.500			.409	.553
Communicating effectively when my responses will be read by many people		.459				.531

Note. Items loaded on more than one component are highlighted.

A further PCA with Eigenvalues exceeding two was calculated to reveal three components, explaining 32.9%, 19.9%, and 10.2% of the variance respectively, as shown in Table 4.10. A number of items still loaded on more than one component. These items were deleted, leaving only 13 items remaining on component one.

Table 4.10 *The Result of PCA with Eigenvalues Exceeding Two*

Items	Component		
	1	2	3
Getting access to the course wherever and whenever I want	.564		-.513
Assessing your progress in a programme	.608		-.379
Doing well in this programme with little help online from my lecturer	.693	-.484	
Managing your time to complete all assigned tasks in the programme	.607		
Planning and managing your own learning needs	.769		
Staying involved with the course without face-to-face interaction with the lecturer	.564	-.377	
Working well with my group for a task required in any online courses	.733	-.452	
Organising and leading a course project involving other participants	.743	-.372	
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	.650	-.431	.303
Participating in group decision making	.801	-.379	
Doing an online role-play activity if one is assigned	.472		
Communicating effectively when my responses will be read by many people	.594		
Having enough computer skills to complete this online component	.516	.557	.476
Uploading my project to the website successfully	.381	.586	.548
Viewing an attachment from an incoming e-mail message	.447	.721	
Using online database such as one at the library or Google to find information needed	.623	.432	
Saving files from the Internet to my computer	.542	.681	
Using a word processing programme such as Microsoft Word to do my report	.553	.702	
Converting a Word file to a .pdf file	.366		
Manipulating a picture and putting it in my report	.391	.346	-.473
Using e-mail to communicate with my lecturer or classmates	.515	.694	
Putting an audio clip or video clip on a presentation programme	.408		
Using a spreadsheet to do an assignment		.435	.617

Note. Items loaded on more than one component are highlighted.

Varimax rotation with Kaiser Normalization was then performed. Four items (*Using a spreadsheet to do an assignment*, *uploading my project to the website successfully*, *having enough computer skills to complete this online component*, and *getting access to the course wherever and whenever I want*) loaded on both components two and three (See Table 4.11). Therefore, these items were eliminated and only two components were retained.

Table 4.11 *The Result of PCA with Eigenvalues Exceeding Two and Varimax Rotation with Kaiser Normalization*

Items	Component		
	1	2	3
Participating in group decision making	.908		
Organising and leading a course project involving other participants	.866		
Working well with my group for a task required in any online courses	.862		
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	.831		
Doing well in this programme with little help online from my lecturer	.793		-.303
Planning and managing your own learning needs	.765		
Managing your time to complete all assigned tasks in the programme	.697		
Doing an online role-play activity if one is assigned	.607		
Staying involved with the course without face-to-face interaction with the lecturer	.588		-.418
Assessing your progress in a programme	.534		-.470
Communicating effectively when my responses will be read by many people	.518		-.451
Using e-mail to communicate with my lecturer or classmates		.904	
Saving files from the Internet to my computer		.901	
Using a word processing programme such as Microsoft Word to do my report		.901	
Viewing an attachment from an incoming e-mail message		.839	
Using online database such as one at the library or Google to find information needed		.729	
Manipulating a picture and putting it in my report		.627	-.320
Converting a Word file to a .pdf file		.384	
Putting an audio clip or video clip on a presentation programme		.335	
Using a spreadsheet to do an assignment		.308	.726
Uploading my project to the website successfully		.510	.715
Having enough computer skills to complete this online component		.587	.633
Getting access to the course wherever and whenever I want	.398	.378	-.545

Note. Items loaded on more than one component are highlighted.

As shown in Table 4.12, the final OLSE scale had 19 items: 11 items in component one and eight items in component two. The OLSE subscales, Learner Control and Collaboration Skills, were collapsed into a new subscale called Learner Control and Interaction (LCI).

Table 4.12 *The Summary of Items Retained in OLSES and Their Loading Factors*

Variables	Items	Component 1	Component 2
OLSE_LC2	Assessing your progress in a programme	.534	
OLSE_LC3	Doing well in this programme with little help online from my lecturer	.793	
OLSE_LC4	Managing your time to complete all assigned tasks in the programme	.697	
OLSE_LC5	Planning and managing your own learning needs	.765	
OLSE_LC6	Staying involved with the course without face-to-face interaction with the lecturer	.588	
OLSE_CL1	Working well with my group for a task required in any online courses	.862	
OLSE_CL2	Organising and leading a course project involving other participants	.866	
OLSE_CL3	Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	.831	
OLSE_CL4	Participating in group decision making.	.908	
OLSE_CL6	Doing an online role-play activity if one is assigned	.607	
OLSE_CL7	Communicating effectively when my responses will be read by many people.	.518	
OLSE_IT4	Viewing an attachment from an incoming e-mail message		.839
OLSE_IT5	Using online database such as one at the library or Google to find information needed		.729
OLSE_IT6	Saving files from the Internet to my computer		.901
OLSE_IT7	Using a word processing programme such as Microsoft Word to do my report		.901
OLSE_IT8	Converting a Word file to a .pdf file		.384
OLSE_IT9	Manipulating a picture and putting it in my report		.627
OLSE_IT10	Using e-mail to communicate with my lecturer or classmates		.904
OLSE_IT11	Putting an audio clip or video clip on a presentation programme		.335

The refined OLSES was rechecked for its internal consistency. The Cronbach's Alpha of the total scale was 0.895, while the Alpha value of the subscales Learner Control and

Interaction (LCI) and Computer and Internet skills (IT) were 0.917 and 0.785 respectively (See Table 4.13).

Table 4.13 *The Refined OLSES and Subscales' Internal Consistency*

Old variable name	New Variable names	Items	Cronbach's Alpha
Learner Control and Interaction Subscale			0.917
OLSE_LC2	OLSE_LCI1	Assessing your progress in a programme	
OLSE_LC3	OLSE_LCI2	Doing well in this programme with little help online from my lecturer	
OLSE_LC4	OLSE_LCI3	Managing your time to complete all assigned tasks in the programme	
OLSE_LC5	OLSE_LCI4	Planning and managing your own learning needs	
OLSE_LC6	OLSE_LCI5	Staying involved with the course without face-to-face interaction with the lecturer	
Learning with Others			
OLSE_CL1	OLSE_LCI6	Working well with my group for a task required in any online courses	
OLSE_CL2	OLSE_LCI7	Organising and leading a course project involving other participants	
OLSE_CL3	OLSE_LCI8	Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants	
OLSE_CL4	OLSE_LCI9	Participating in group decision making	
OLSE_CL6	OLSE_LCI10	Doing an online role-play activity if one is assigned	
OLSE_CL7	OLSE_LCI11	Communicating effectively when my responses will be read by many people	
Computer and Internet Skills Subscale			0.785
OLSE_IT4	OLSE_IT1	Viewing an attachment from an incoming e-mail message	
OLSE_IT5	OLSE_IT2	Using online database such as one at the library or Google to find information needed	
OLSE_IT6	OLSE_IT3	Saving files from the Internet to my computer	
OLSE_IT7	OLSE_IT4	Using a word processing programme such as Microsoft Word to do my report	
OLSE_IT8	OLSE_IT5	Converting a Word file to a .pdf file	
OLSE_IT9	OLSE_IT6	Manipulating a picture and putting it in my report	
OLSE_IT10	OLSE_IT7	Using e-mail to communicate with my lecturer or classmates	
OLSE_IT11	OLSE_IT8	Putting an audio clip or video clip on a presentation programme	
Total internal consistency			0.895

After the questionnaire was adjusted and validated, data were then analysed.

4.6 Preliminary Findings

Of the 112 students enroled in the selected programme, 31 students responded to the pilot questionnaire, making the response rate just under 30%. The pilot group comprised 24 females (77.4%), the rest were seven males and one unidentified gender. Approximately 75% were between 25 and 45 years old. No response age was greater than 55 years old (See Figure 4.1).

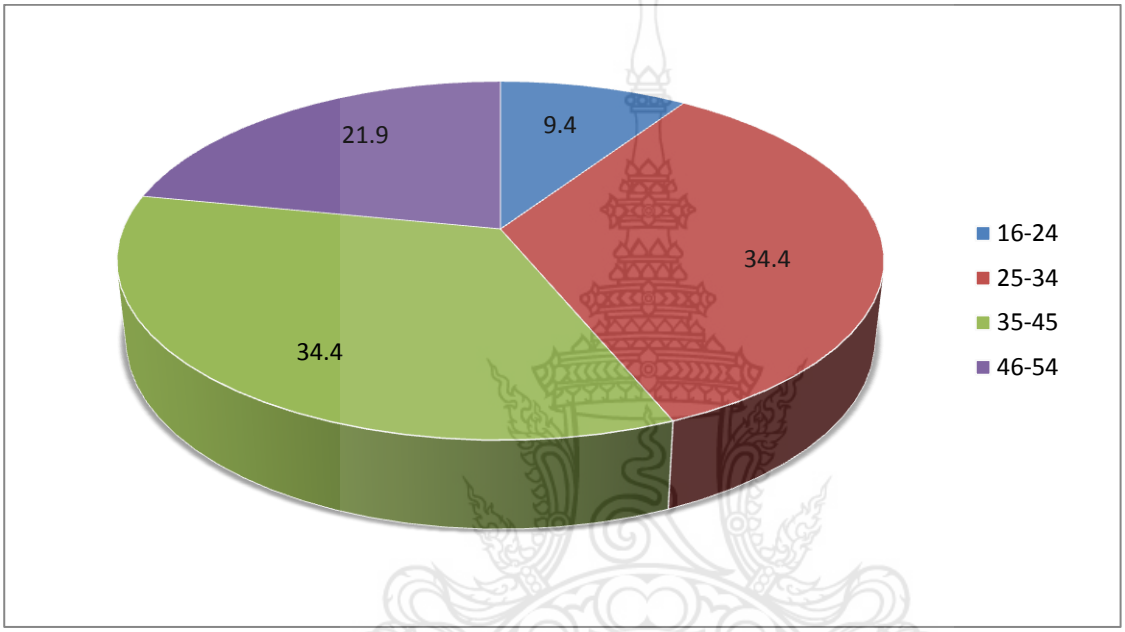

Figure 4.1. Proportions of the pilot group by age groups

Twenty-one students (75%) reported that they had intermediate computer skills and the rest self-reported as advanced users. Regarding prior online learning experience, most participants had undertaken some form of online learning before studying in this recent online programme. Only two participants had never studied online previously. Although three students had *a little* experience, 15 and 12 respondents indicated *some* and *a lot of* previous online learning experience, respectively (See Figure 4.2). Among students that had previous online learning experience, half of them reported that they had attended a short online course, a diploma online programme, and/or an undergraduate online programme.

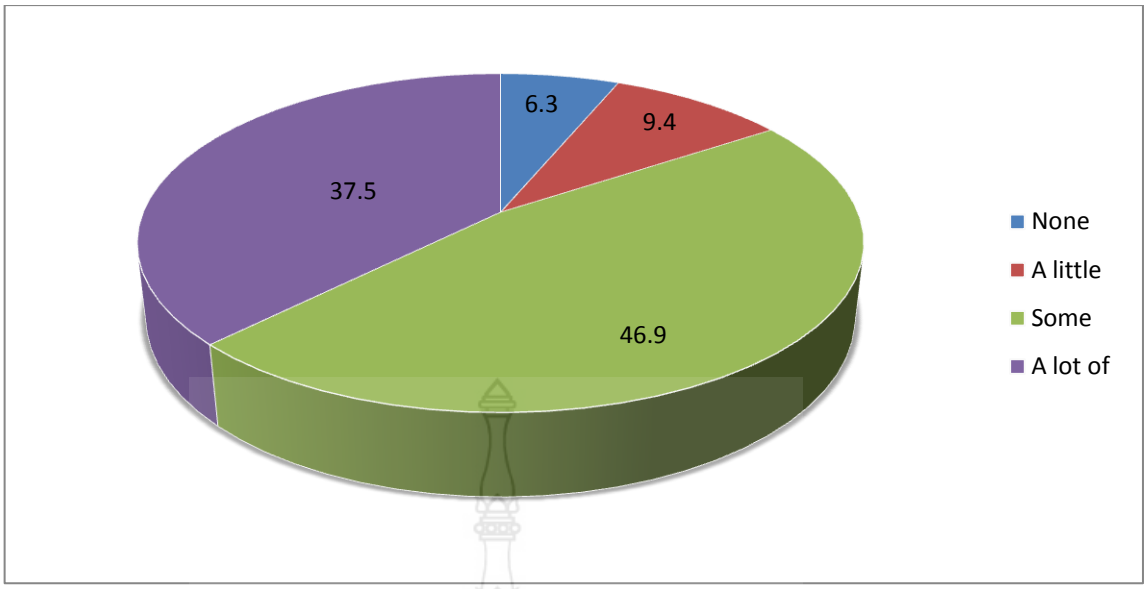

Figure 4.2. Proportions of the pilot group by previous online learning experience

For CSSP and CSAP, scores were weighted, calculated, and recoded. CSSP was grouped into *basic*, *intermediate*, and *advanced* with scores ranging from 23-45, 46-68, and 69-92 respectively. The scores showed that almost half of the respondents had computer skills for social usage at a basic level; only 10% had advanced level (See Table 4.14).

Table 4.14 *Actual Computer, CSAP, and CSSP Skill Levels*

Skill Levels	CSSP		CSAP		IT Skills	
	Frequency	%	Frequency	%	Frequency	%
Basic	15	48.4.1	5	16.1	6	20.0
Intermediate	13	41.9	16	51.6	21	70.0
Advanced	3	9.7	10	32.3	3	10.0

CSAP was also regrouped according to three categories: basic, intermediate, and advanced with a score range of 27-53, 54-80, and 81-108 correspondingly. The data showed that around 16% of participants had *computer skills for academic purpose* at the basic level and half of them had intermediate skills (See Table 4.14).

CSSP and CSAP scores are also added and regrouped as basic, intermediate, and advanced actual computer skill levels with range score of 50-99, 100-149, and 150-200. As shown in Table 4.14, 20% had basic skill and 70% had intermediate skill.

Experience with different levels of LC was calculated from weighted items with the possible minimum score of 51 and the possible maximum score of 204. The result showed that participants scored in the range of 124-204 with a mean of 166.31 and standard deviation of 25.26.

The dependent variable, OLSE, was also calculated with scores given to each item on the scale. For the pilot group, the OLSE mean was 74.89 with a range score of 46.84-100. No outlier was found.

Both LC and OLSE were tested for normality. Histograms and Kolmogorov-Smirnov *Z* tests confirmed that LC and OLSE were normally distributed. A scatter plot was used to determine the relationship between LC and OLSE. An upward trend was revealed, suggesting that a positive relationship between these two variables did exist (See Figure 4.3).

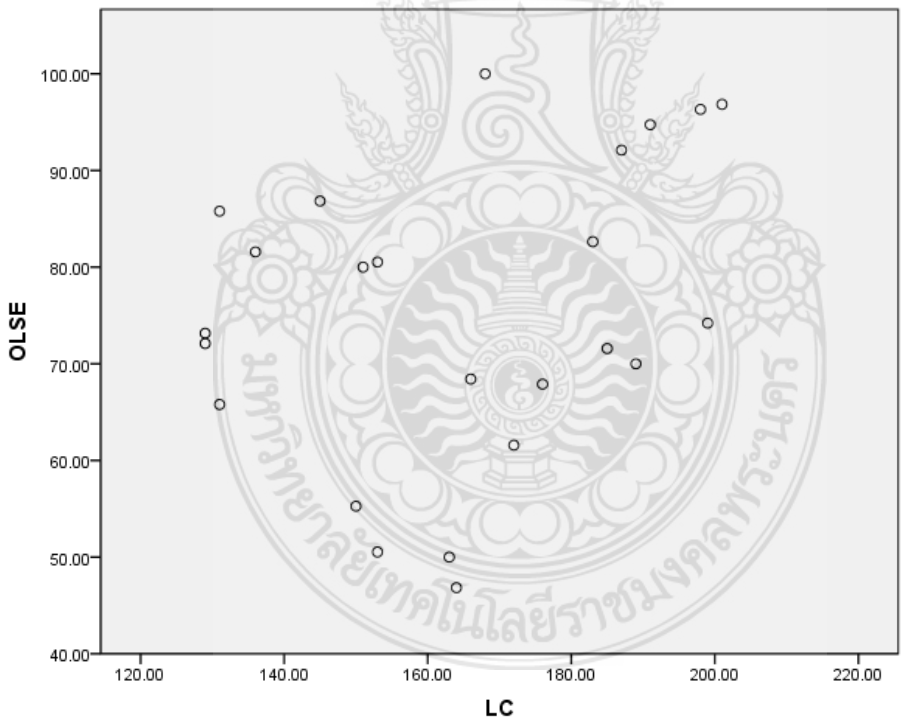

Figure 4.3. The scatter plot between LC and OLSE scores

After assumptions for inferential statistics were met, a Pearson product-moment correlation coefficient was performed to test the first hypothesis, *there is a positive relationship between learner control and online learning self-efficacy*. Although the

coefficient showed a positive relationship, with $r(24) = .287$, it was not statistically significant.

The analysis technique was modified to improve the coefficient. To do so, LC scores were summed by each item without weight. Several missing values were also noted from the previous analysis. To determine if there was any effect due to these, missing values were substituted as recommended by de Vaus (2002). With this increase in sample size, the coefficient was improved to $r(32) = .393$, $p < .05$. This coefficient figure showed that the effect size was moderate. The correlation coefficient was squared to find the coefficient of determination (r^2), which showed that $r^2 = 15.44\%$. This figure meant that LC caused only 15.44% of OLSE variance, which suggested that other variables were having an influence on the measure.

The qualitative data indicated that most participants were confident about their ability to succeed in the study in the online programme. Their answers were expressed as *confident*, *pretty confident*, *very confident*, and *very successful*. A few participants were *less confident*, *not 100% certain*, and *not confident* because they felt *overwhelmed* and thought that their learning was *hard* and *difficult*. Some reported that they would not take online learning courses in the future.

4.7 Chapter Summary

The questionnaire was developed and validated through a robust pilot process. The questionnaire was composed of four sections: demographic data; a self-report of CSAP, CSSP, and LC; OLSES; and open-ended questions. The preliminary findings indicated that *learner control* was not statistically correlated with *online learning self-efficacy*. It was thought that this result might be a consequence of the small sample size of the pilot group and thus a larger sample size and more diversity in terms of *learner control* might produce a more significant result. Thus, the pilot process indicated that a larger and more diverse sample in terms of the key variables was required for the main study.

CHAPTER 5

METHODOLOGY

That which we persist in doing becomes easier for us to do; not that the nature of the thing itself is changed, but that our power to do is increased.

(Ralph Waldo Emerson)

5.1 Introduction

This chapter explains the preparation for data collection for the main study. The sample group and the data collection process are described in detail. The steps after data collection and data analysis procedures are also then presented.

5.2 The Sample Group

For this study, the focus was on online learners in asynchronous online learning courses. The population frame was online learners in an online programme where learner control was embedded within the course design. The sample group comprised learners within an online programme at a university in New Zealand. A programme with embedded online learner control components was purposively selected.

This four-year undergraduate initial teacher education qualification was a selected-entry programme where students were selected against a range of criteria, including academic performance and confidence through a panel interview process. Computer competency was also a prerequisite for selection. This programme offered two online delivery modes: blended mode for internal students and fully online for distance students. Of the 346 students, 204 were internal and 142 were distance students. All students, regardless of delivery modes, were required to access and engage with the online learning components for each paper. All learning tasks were designed using a scaffolded learning progression with gradually increasing difficulty levels. Students were also encouraged to actively participate in the online website and to actively build their

learning networks. For the online component, learner control was also encouraged by well-designed tasks. In addition, this programme was designed with authentic activities such as a built-in professional practice session in a real classroom setting or an online group working together to produce an artefact using various kinds of strategies and educational technologies. In addition to learner control and scaffolding, full technical support was an embedded feature of the programme.

5.3 The Data Collection Process

Following feedback from the pilot process, the questionnaire was adjusted and validated. Three more questions were added to gather data about participant year groups, completed papers, and paper enrolments (See the questionnaire in Appendix D). Then, the sample group was initially contacted in their classes. An online invitation to partake in this study was distributed to learners enroled in the selected programme. A clear explanation of research objectives and research instructions were provided to all participants in the sample group.

The data collection process commenced on September 27, 2011 after permission was received from the programme coordinator. The data collection instrument was distributed online via SurveyMonkey at the end of Semester Two (2011). The survey was opened for students to respond for 30 days from October 27 to November 25, 2011. Reminders were posted weekly in the community forum (See Appendix E). Following the first invitation, 30 students filled in the survey. Fifteen days later, a second invitation was sent and 29 more students participated. On November 17, the last invitation was posted and 16 more students responded. In summary, 75 participants from the sample group of 346 students submitted their responses during the 30-day data collection period, resulting in a response rate of 21.7%.

After the data collection period was closed, survey responses were downloaded to the researcher's working computer. All surveys were examined to check for levels of completion and missing data. Responses with less than 30% completion were excluded from the analysis. The data were then screened, cleaned for missing values, and coded before being imported into the statistical software programme, IBM SPSS Statistics 20, for data analysis.

5.4 Data Analysis

The data consisted of two types, quantitative and qualitative data. The datasets were analysed separately and the qualitative data were used to triangulate and reinforce the findings of the quantitative study.

5.4.1 Quantitative data analysis

Prior to analysis, the data were checked for correct data types. Then, data were explored using descriptive statistics such as mean, median, mode, frequency, and range. These were used to describe the sample group and to provide a general view of each variable. Crosstabulation was used to see the links between variables such as *gender-computer skills* and *age-computer skills*. In this study, inferential statistics were employed even though the sample was not randomly selected. Empirical studies have confirmed that inferential statistics can be used even if the assumptions were not fully met (Ravid, 2005). The types of statistics used in this study are shown in Table 5.1.

In this study, variables were measured with different levels of measurement. For example, *gender* was nominal data since it was defined by categories like males and females. *Age* was originally measured in an ordinal scale so that the value of the data could be compared. However, *age* was regrouped later during further analysis to be a nominal scale. *Delivery mode* was identified from the qualitative data set and measured in a nominal scale. CSAP, CSSP, LC, and OLSE were measured in Likert scales that yielded ordinal data. However, the summation of these data could be treated as interval data. These scales of measurement are important as the type of data determines the choice of statistics used in the analysis (P. Connolly, 2007). For example, a Pearson correlation coefficient is suitable for examining a linear relationship between two interval data like *learner control* and *online learning self-efficacy*. However, when finding the relationship between data that were measured with different scales such as *gender* (nominal) and *perceived computer skill* (ordinal), the statistic used generally depends on the lowest level of measurement (Argyrous, 1997). Therefore, the appropriate statistical technique to inspect the relationship as recommended by Connolly (2007) in this case is a Spearman's *rho* (*r*).

Table 5.1 *Statistical Analyses Used for this Study*

	Hypotheses	Statistics used to analyse quantitative data*	
H_1	There is a positive relationship between learner control and online learning self-efficacy.	Pearson product-moment correlation coefficient (r) (one-tailed)	Simple linear regression
H_2	Online learning self-efficacy of learners in online courses with high levels of learner control is higher than those in online courses with lower levels of learner control.	Pearson product-moment correlation coefficient (r) – compare 2 groups Independent *t*-test (one-tailed)	
H_3	Online learning self-efficacy of learners who have more experience with high levels of learner control is higher than those who have less experience.	Pearson product-moment correlation coefficient (r) – compare 2 groups One-way ANOVA	
$H_{4.1}$	The relationship between learner control and online learning self-efficacy is influenced by the age of online learners.	One-way ANOVA Partial Correlation	
$H_{4.2}$	The relationship between learner control and online learning self-efficacy is influenced by the gender of online learners.	Independent *t*-test (one-tailed) Pearson product-moment correlation coefficient (r) – compare 2 groups Partial Correlation	
$H_{4.3}$	The relationship between learner control and online learning self-efficacy is influenced by Computer skills for academic purpose (CSAP) of online learners.	One-way ANOVA Partial Correlation	Multiple linear regression
$H_{4.4}$	The relationship between learner control and online learning self-efficacy is influenced by Computer skills for social purpose (CSSP) of online learners.	One-way ANOVA Partial Correlation	Multiple linear regression
$H_{4.5}$	The relationship between learner control and online learning self-efficacy is influenced by prior online experiences of online learners.	One-way ANOVA Partial Correlation	

*Non-parametric tests such as Chi-square goodness-of-fit test, Mann-Whitney U test, Kruskal-Wallis one way analysis of variance, and Spearman rank-order correlation coefficient were used, if the assumptions were not met.

Interval data for CSAP, CSSP, LC, and OLSE, were checked for missing values and they were replaced by estimated values using the regression analysis or expectation-maximization (EM) method (de Vaus, 2002). By using a box plot, outliers were also checked and eliminated if it was necessary. CSAP, CSSP, LC, and OLSE were also tested for normality using histograms and stem-and-leaf plots as well as a Kolmogorov-Smirnov test. During the analysis, CSAP and CSSP were also regrouped to CSAP and CSSP levels (ordinal). In addition, CSAP and CSSP were summed and regrouped to be *actual computer skill levels* (ordinal) in order to compare to *perceived computer skill* later in the analysis.

To establish whether there was a correlation between *learner control* and *online learning self-efficacy*, a scatter plot was used to check for a possible correlation. Since *learner control* and *online learning self-efficacy* were interval data and their relationship was assumed to be linear, a bivariate correlation, Pearson product-moment correlation coefficient (r), was then carried out. Field (2009) recommended that a pairwise approach was used when performing a bivariate correlation because fewer cases were dropped from the analysis. With the correlation coefficient value, the direction, strength, and effect size of this relationship were established. The correlation coefficient was tested for statistical significance in order to confirm or reject the hypothesis. The statistical significance of the coefficient determined whether the relationship between observed variables was unlikely to happen by chance and could generalise to other sample groups within the same population. The coefficient of determination (r^2) was also calculated by squaring the correlation coefficient and converting it to a percentage. This value of r^2 specifies the common variance that *learner control* and *online learning self-efficacy* share (Coladarci, Cobb, Minium, & Clarke, 2004). In other words, r^2 tells the percentage of the association between the two variables. A simple linear regression was performed to see the predictive power of the independent variable, *learner control*, on the dependent variable, *online learning self-efficacy*.

The relationship between *learner control* and *online learning self-efficacy* was then investigated further to test Hypotheses 2 and 3. The relationship was examined in the sample group with two *delivery mode*s to see whether *online learning self-efficacy* of learners in *high* and *low learner control* were different. A scatter plot of the

relationship between *learner control* and *online learning self-efficacy* in two *delivery modes* was plotted. Correlation coefficients of the relationship in these two *delivery modes* were calculated. The correlation coefficients were compared using Field's (2009) equation to see if they were statistical different. An independent *t*-test was also performed to confirm the difference of learner *online learning self-efficacy* in these two *delivery modes*.

Hypothesis 3 was also tested using a scatter plot and a correlation coefficient to see if there was a difference in *online learning self-efficacy* of learners with more and less *learner control* experience. The correlation coefficients were then compared using Field's (2009) equation to test if these coefficients showed statistical difference. An analysis of variance (one-way ANOVA), a parametric test, was used when comparing the differences of *online learning self-efficacy* in the sample group with different *year groups* since *online learning self-efficacy* was interval data (Edwards, 2008).

In examining the effect of cofounders in Hypothesis 4, *gender*, *age*, *perceived computer skill*, *prior online learning experience*, CSAP, and CSSP, on the relationship between *learner control* and *online learning self-efficacy*, partial correlations were performed. Independent *t*-tests were performed to test the differences of *online learning self-efficacy* in the sample group of two genders and digital generations. One-way ANOVA was used when comparing *online learning self-efficacy* of the sample group with different *perceived computer skill*, *prior online experiences*, CSSP, and CSAP *levels*. If one-way ANOVA showed differences of *online learning self-efficacy* in these subgroups, a post-hoc test was then performed to identify the group that was significantly different. A correlation matrix was also performed to see the overall relationships of these variables. Finally, a multiple linear regression was used to determine the best predictors of *online learning self-efficacy* in addition to *learner control*.

5.4.2 Qualitative data analysis

The qualitative data were analysed following 'the coding manual for qualitative researchers' (Saldaña, 2009) and details of the analysis are shown in Figure 5.1. Firstly, data were coded into the themes set by each open-ended question such as *perceived*

computer skill, *online learning self-efficacy*, and *learner control*. *Perceived computer skill* and *prior online learning experience* were counted and converted back to frequency. Later, the data were analysed as a whole. Thematic analysis was used to determine certain themes that were consistent with learner control and Bandura's (1997b) self-efficacy theory, such as sources of online learning self-efficacy, the relationship between *learner control* and *online learning self-efficacy*, and the effect of self-efficacy on online learners through cognitive, motivational, emotional, and decision-making processes. Open coding was also employed to identify and organise the emerging themes. Emerging themes are reported separately in Chapter Six.

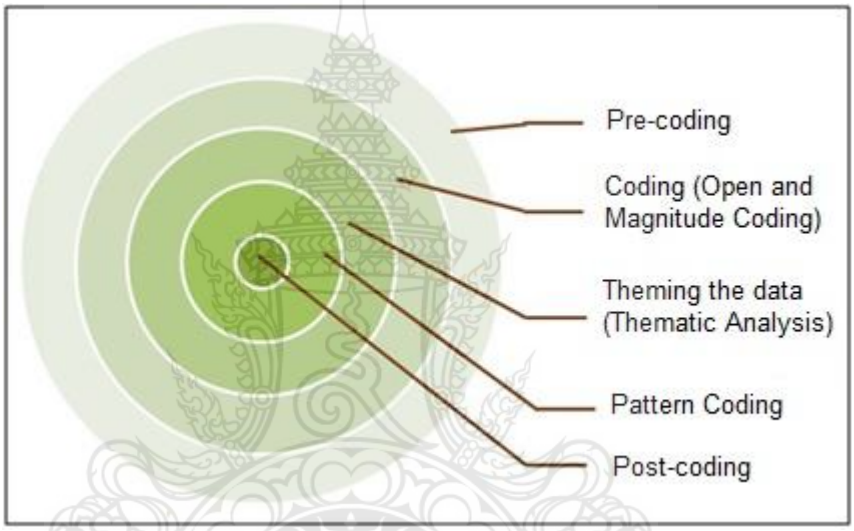

Figure 5.1. Qualitative data analysis process (adapted from Saldaña, 2009).

Later, quantitative and qualitative data were analysed together following Onwuegbuzie and Teddlie's (2003) framework as a guideline for mixed method data analysis. To answer the research question, *what is the relationship between learner control and online learning self-efficacy*, data correlation, data comparison, and data integration were recommended as the most appropriate techniques for merging two kinds of data together (Onwuegbuzie & Leech, 2006).

5.5 Chapter Summary

This chapter provides an explanation of the sample group and the data collection process. The data analysis was divided into two categories: quantitative and qualitative analysis. For the quantitative analysis, four main hypotheses were tested using

inferential statistical analysis. The qualitative data analysis was performed in two ways: theme binding and holistic analysis. Then, both types of data set were analysed together for better understanding the relationship between *learner control* and *online learning self-efficacy*. The results of these analyses are reported in Chapter Six and discussed in Chapter Seven.

CHAPTER 6

RESEARCH FINDINGS

Data is not information, information is not knowledge, knowledge is not understanding, understanding is not wisdom.

(Stoll & Schubert, 2006, p. 112)

6.1 Introduction

This chapter contains ten sections presenting the analyses of both quantitative and qualitative data. The four main hypotheses, as stated in Chapter Three, are tested in order to answer the main research question, *what is the relationship between learner control and online learner self-efficacy?* In the first section, the sample group is described using descriptive statistics such as frequency, mean, range, minimum, maximum, and standard deviation. The test of normality is included.

The second section presents the results of the statistical analyses investigating the relationship between the independent variable, *learner control*, and the dependent variable, *online learning self-efficacy*. As well as answering the main association (Hypothesis 1), the results of subsequent analyses are used to probe this relationship with different levels of *learner control* (Hypothesis 2) and different amounts of *online learning experience* (Hypothesis 3).

The third section reports the outcome of the simple regression carried out to clarify the power of prediction that *learner control* has on *self-efficacy*. The fourth section, then, displays the results of independent *t*-tests used to examine the self-efficacy differences between participants that belonged to two independent groups divided by *delivery modes* (internal/distance students), *age groups*, and *gender* (males/females).

Section five reports on the findings of partial correlation analyses. This technique statistically controls the effects of confounding variables on the observed relationships.

Thus, the results were used to answer Hypothesis 4, *the relationship between learner control and online learning self-efficacy is influenced by the factors: age, gender, computer skills for academic purpose (CSAP), computer skills for social purpose (CSSP), and prior online learning experience*.

Section six reports the results of a correlational matrix that provides a general picture about the relationship of other variables to the relationship between *learner control* and *online learning self-efficacy*. After that, section seven presents the results of the multiple regression that show which variables could be the best predictors of *online learning self-efficacy*.

Section eight presents the results from the analysis of variance (ANOVA), the inferential statistical tests used to compare more than two subgroups such as *prior online learning experience, perceived computer skill*, CSSP *level*, CSAP *level*, and *actual computer skill levels*. The findings from qualitative data generated from four open-ended questions are reported in the last section. The chapter then concludes with a summary.

6.2 The Participants

In this section, the participants are described by descriptive statistics showing the characteristics of the sample by *gender*, *age group*, *year group*, *previous online experiences*, *computer skills*, and *learner control* experiences.

6.2.1 Gender

The total sample (n = 75) comprised 11 males, 61 females, and three participants who did not identify gender (See Figure 6.1).

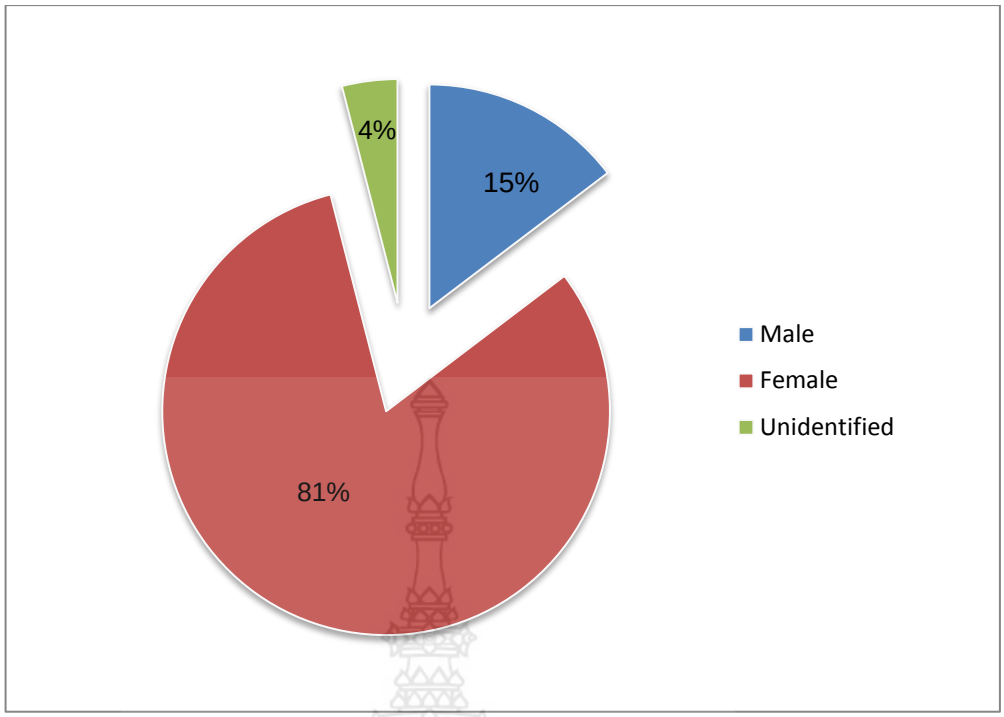

Figure 6.1. Proportions of participants by gender

6.2.2 Age group

Most participants (91.7%) were aged between 16 and 45. About half of the participants (51.4%) were 16-24 years old and one quarter was in the 35-45 *age*-group. Only one participant was older than 55 years old (See Figure 6.2 for details).

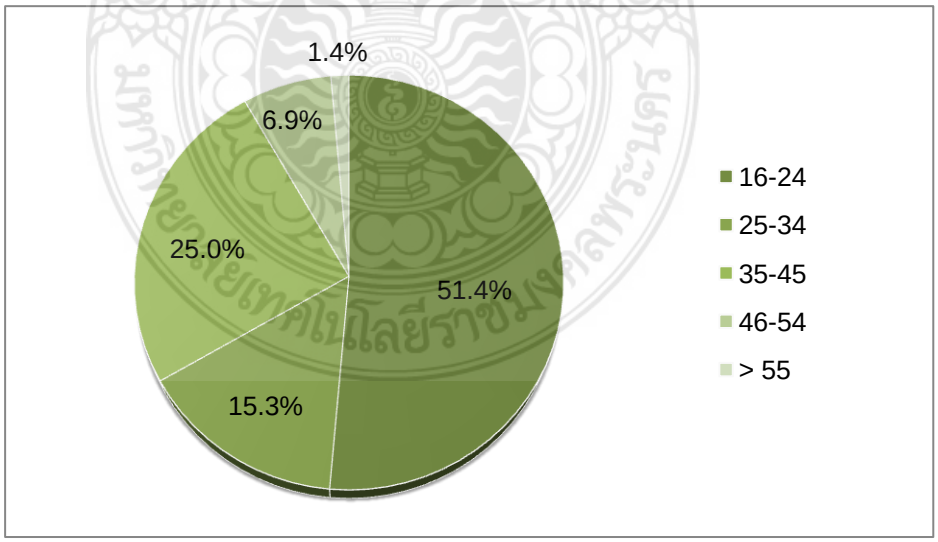

Figure 6.2. Proportions of participants by age group

As described in the reviewed literature regarding the generation gap, younger online learners are assumed to be more confident and familiar with digital technology than the

older generation (Prensky, 2001). However, research findings on this issue are inconclusive and more studies have tried to test this claim in different contexts (e.g., Helsper & Enyon, 2009). For this reason, this study also focuses on exploring this issue. To do so, participants were regrouped into two groups using Palfrey and Gasser's (2008) criteria that identifies online learners who were born after 1980 as technology savvy. So, *age* groups 16-24 and 25-34 were coded as younger online learners. *Age* groups 35-45, 46-54, and >55 were coded older online learner. About two-thirds of the participants (48:24) were younger online learners, the rest were grouped as older online learners.

6.2.3 Age groups and gender

A large portion of participants were female in the 16-24 *age* group (29 responses), followed by females aged between 35-45 years old (17 responses) as illustrated in Figure 6.3.

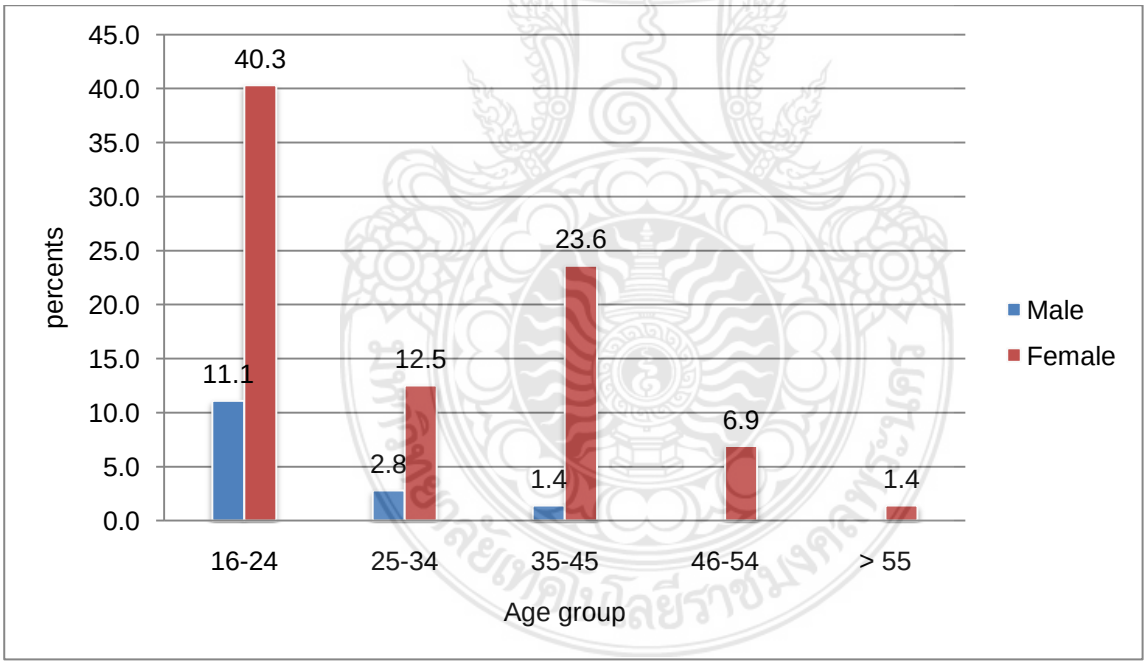

Figure 6.3. Participants categorised by age group and gender

6.2.4 Year levels

All participants were enroled in a comprehensive four-year degree programme. Responses were relatively equally distributed across the four year levels, with 15 year-one, 22 year-two, 23 year-three, and 12 year-four students as shown in Figure 6.4.

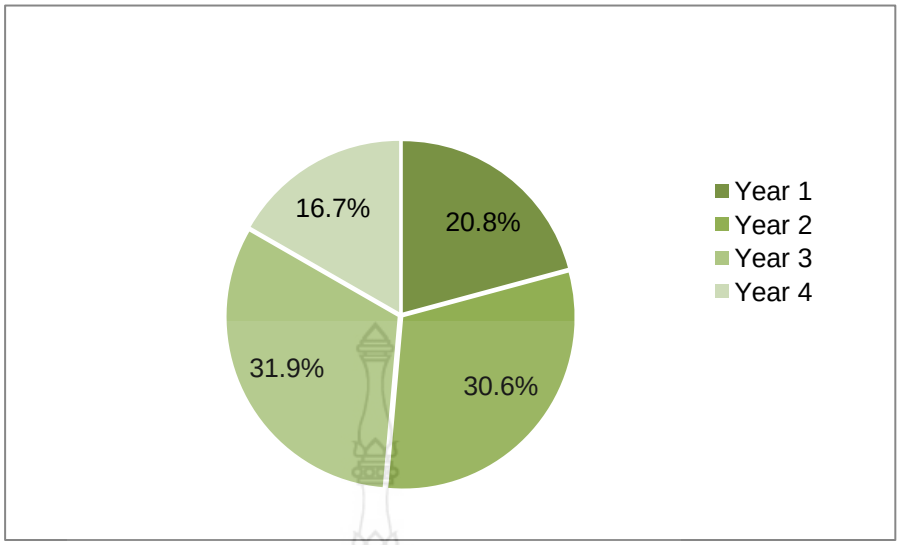

Figure 6.4. Proportions of responses by year groups

6.2.5 Computer skills

Three sets of questions were asked to measure participants' computer skills. Set one and three were designed with Likert-scale items to assess participants' actual CSSP and CSAP respectively. The second question, *which term is the best to describe your computer skill?*, was a self-evaluation of participants' overall computer skills.

6.2.5.1 Perceived computer skill

Perceived computer skill was derived from a self-reported question, *which term is the best to describe your computer skill?* Fifty-one students (81.0%) identified themselves as intermediate users while nine students said they were advanced users (14.3%). Only three participants (4.8%) said that they had basic computer skills.

With regard to *perceived computer skill* by *gender*, male participants reported themselves having intermediate and advanced computer skills but three female participants (3.3%) said they had basic skills. However, most females (70.5%) reported that they had intermediate skill level (See Figure 6.5).

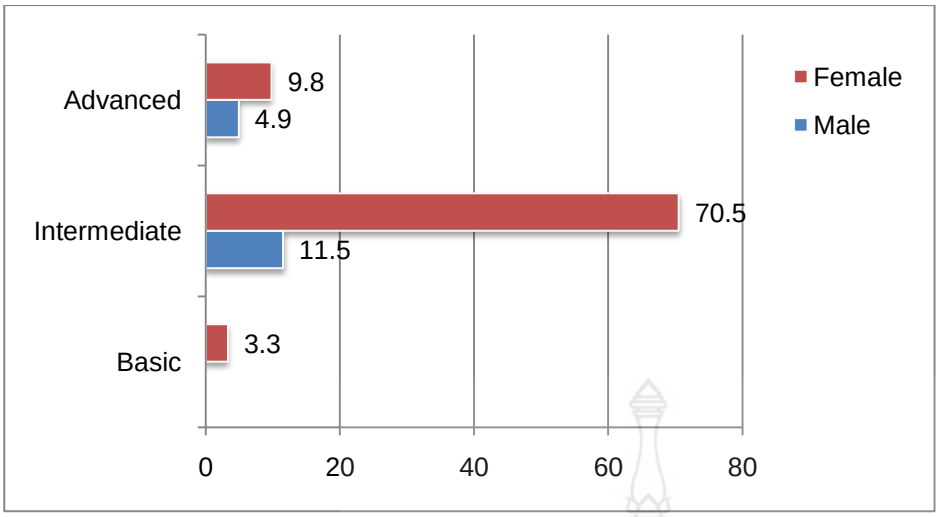

Figure 6.5. Perceived computer skills by gender

The majority of participants in each *age* group reported they were intermediate users. Most participants (45.9%) who reported themselves as advanced users were in the 16-24 age group. Only three participants, two in 25-34 and one in 35-45 *age* groups, responded as basic users (See Figure 6.6).

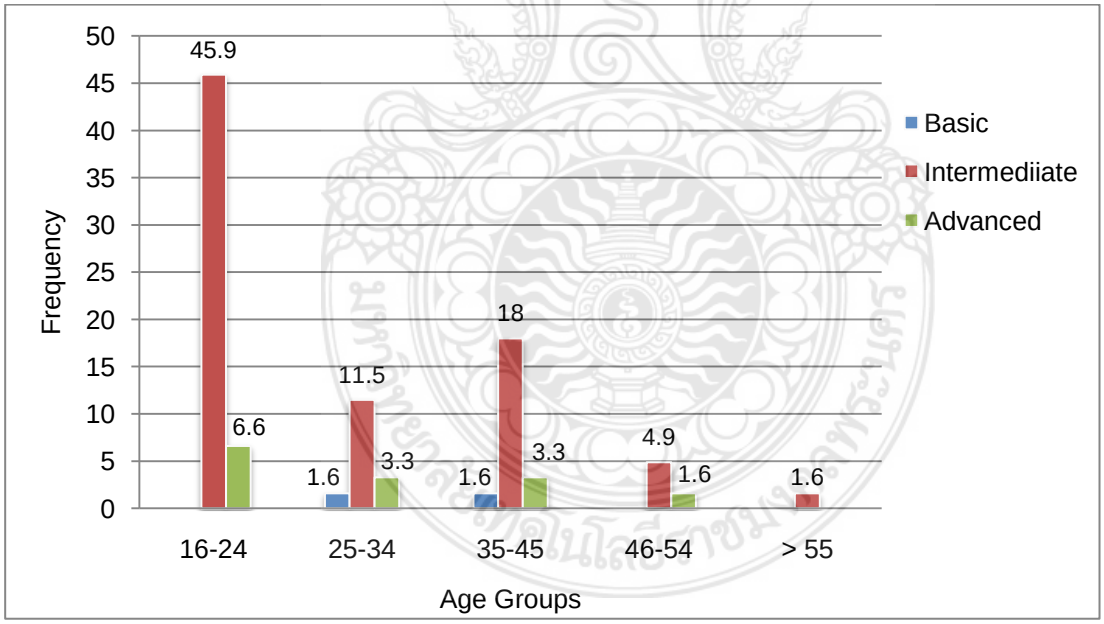

Figure 6.6. Computer skills by age groups

6.2.5.2 Computer skills for academic purpose

Computer skills for academic purpose (CSAP) raw data were screened for missing values which were replaced by estimated values from a regression analysis or expectation-maximization (EM) method (de Vaus, 2002). Since CSAP was measured

using a summated rating scale, responses for items of each participant were summed up to become CSAP. The possible minimum score of CSAP was 13 and the possible maximum score was 52. Then, descriptive statistics were calculated. CSAP scores had a range of 33 with a minimum score of 16 and a maximum score of 49. The CSAP mean score was 34.4 with a standard deviation of 7.4.

The CSAP scores were then recoded into three categories of competency: *basic*, *intermediate*, and *advanced*. The score range 13-26 was categorised as basic CSAP, the score range between 27 and 40 was grouped as intermediate CSAP and the score range between 40 and 52 was categorised advanced CSAP level. Around one-fourth of participants (24.0 %) had advanced CSAP, whereas the majority (64.0 %) had intermediate CSAP. The remainder (12.0%) had basic CSAP.

CSAP skill levels categorised by *gender* showed that the number of male participants increased as the skill level increased. More than half of male participants had advanced CSAP. However, CSAP scores of female participants were accumulated at intermediate level and a few participants were at basic level (See Figure 6.7).

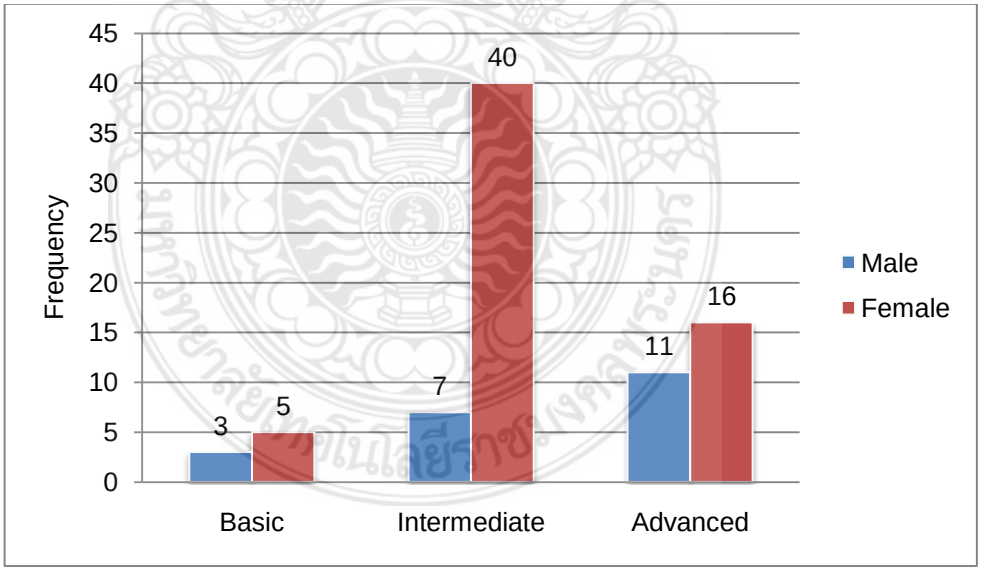

Figure 6.7. Levels of computer skills for academic purpose (CSAP) by gender

When CSAP scores were categorised by *age* group, results showed that the different levels of skills were found across most of the age groups. The majority of intermediate CSAP levels were aged between 16 and 24. As seen in Table 6.1, participants with

basic CSAP levels were aged between 16 and 45 years old. No one older than 45 years old had basic CSAP.

Table 6.1 *Computer Skills for Academic Purpose (CSAP) by Age Groups*

CSAP Levels	Age (%)				
	16-24	25-34	35-45	46-54	>55
Basic	4 (5.6)	1 (1.4)	3 (4.2)		
Intermediate	26 (36.1)	7 (9.7)	9 (12.5)	4 (5.6)	1 (1.4)
Advanced	7 (9.7)	3 (4.2)	6 (8.3)	1 (1.4)	

6.2.5.3 Computer skills for social purpose

Computer skills for social purpose (CSSP) data were also screened for missing values which were replaced by estimated values from a regression analysis or expectation-maximization (EM) method (de Vaus, 2002). Scores from each item were summed up to become CSSP scores. Descriptive statistical analysis showed the minimum score was 14 and the maximum score was 37 on a scale with a possible minimum score of 11 and maximum score of 44. The CSSP mean score for the whole group was 24.5 with a standard deviation of 4.5.

CSSP scores were then recoded into *basic*, *intermediate*, and *advanced* skill level categories. The basic CSSP level included participants who had CSSP scores between 11 and 21, whereas the intermediate CSSP level consisted of participants with scores between 22 and 33. Participants who had scores higher than 33 were in advanced CSSP group. After the grouping, three-fourths of the participants (75.0%) had an intermediate CSSP level whereas around one-fourth (24.0%) had a basic CSSP level. Only, 1.3% had advanced CSSP.

When CSSP levels were grouped by *gender*, the majority of males and females had intermediate skill levels, eight and 47 respectively. Only one female participant had advanced skill. No male had advanced CSSP skill (See Figure 6.8).

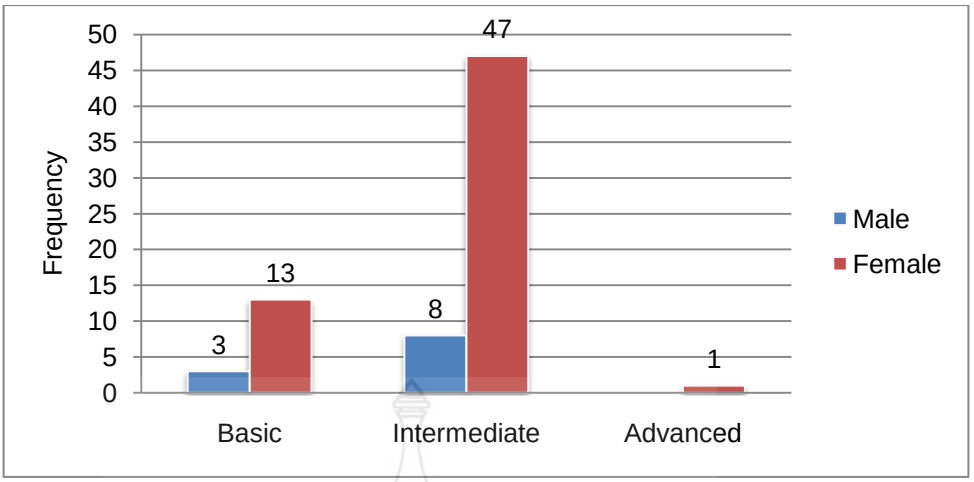

Figure 6.8. Levels of computer skills for social purpose (CSSP) by gender

When CSSP levels were categorised by *age* group, results showed that participants with basic CSSP levels represented four *age* groups 16-24, 25-34, 35-45, and 46-54. Again, intermediate skill level predominated, especially in the 16-24 *age*-group. Surprisingly, only one participant response placed them at the advanced level for *computer skills for social purpose* (See Table 6.2).

Table 6.2 *Computer Skills for Social Purpose Levels (CSSP) by Age Groups*

CSSP Levels	Age (%)				
	16-24	25-34	35-45	46-54	>55
Basic	6 (8.3)	2 (2.8)	6 (8.3)	2 (2.8)	
Intermediate	31 (43.1)	8 (11.1)	12 (16.7)	3 (4.2)	1 (1.4)
Advanced		1 (1.4)			

6.2.5.4 Perceived and actual computer skills in comparison

Students' *actual computer skill levels* were compared to *perceived computer skill* which participants reported in question two (See Figure 6.9).

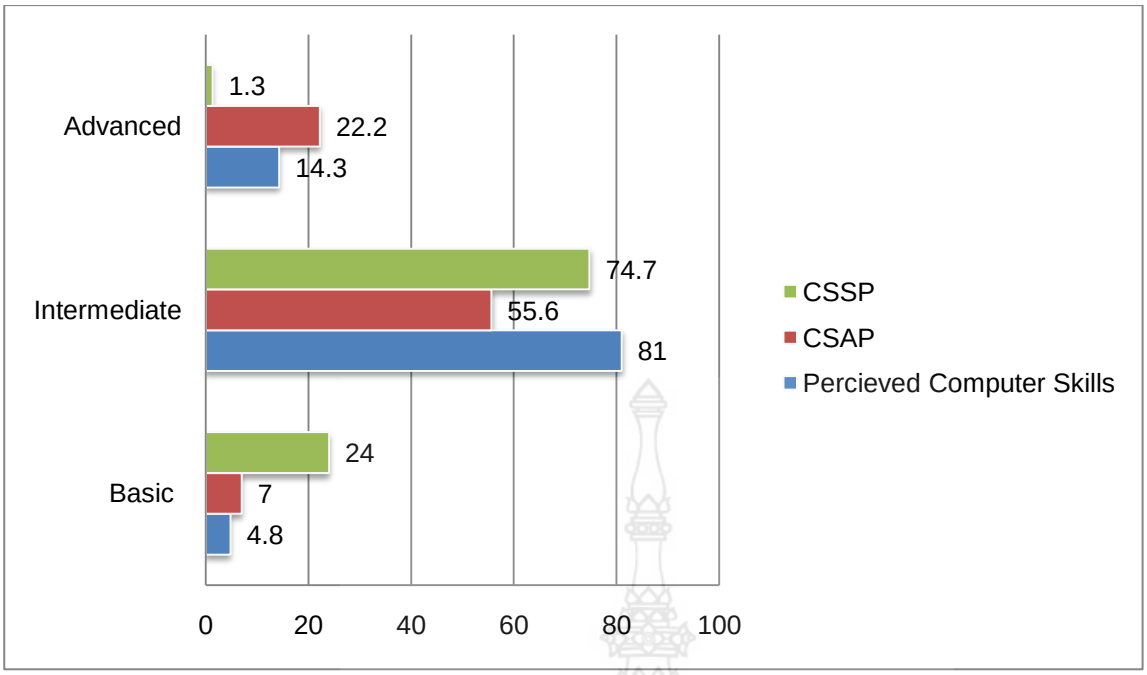

Figure 6.9. Perceived and actual computer skills: CSAP and CSSP (reported in percent)

As seen in Figure 6.9, participants were mainly intermediate users. Only 4.8% reported themselves with basic computer skills, however, 7% had basic CSAP and 24% basic CSSP skills. The self-report question categorised 14.3% as advanced users but the CSAP and CSSP scores showed 22.2% and 1.3% had advanced skills, respectively.

For a better comparison, CSSP and CSAP scores were combined and regrouped as *basic*, *intermediate,* and *advanced* actual computer skills. As shown in Figure 6.10, few participants reported having basic computer skill and tended to report that they had intermediate and advanced computer skills.

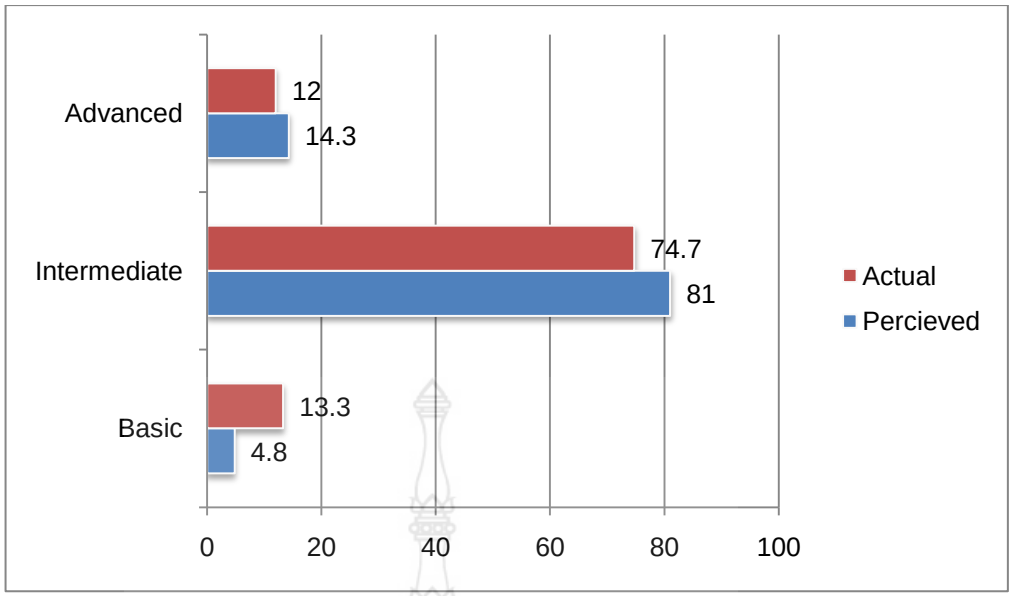

Figure 6.10. Combined scores of CSSP and CSAP in comparison with actual computer skills (reported in percent)

6.2.6 Previous online learning experience

For *previous online learning experience*, most participants (91.8%) reported having experience across three categories of *a little*, *some*, and *a lot of* experience; only six participants reported they had never studied in an online environment before (See Figure 6.11).

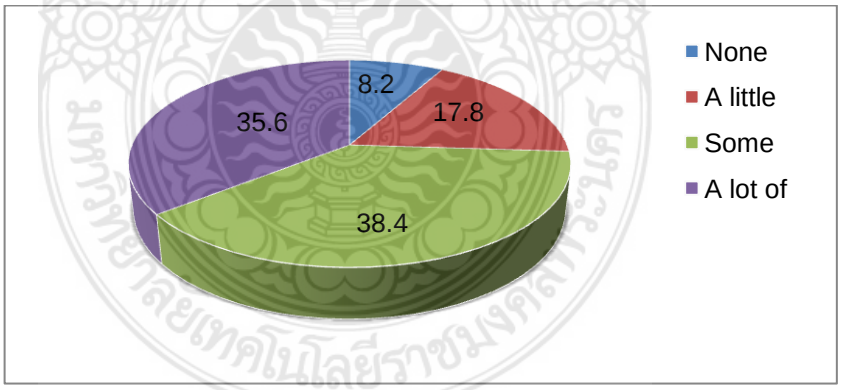

Figure 6.11. Proportions of participants by previous online learning experience

6.2.7 Delivery mode

Participants reported their *delivery mode* with their qualitative data. One-fourth of participants (24.2%) identified themselves as internal students, whereas one-third of the participants (37.9%) were distance students. The rest of the participants (37.9%) did not report their mode of study (See Figure 6.12).

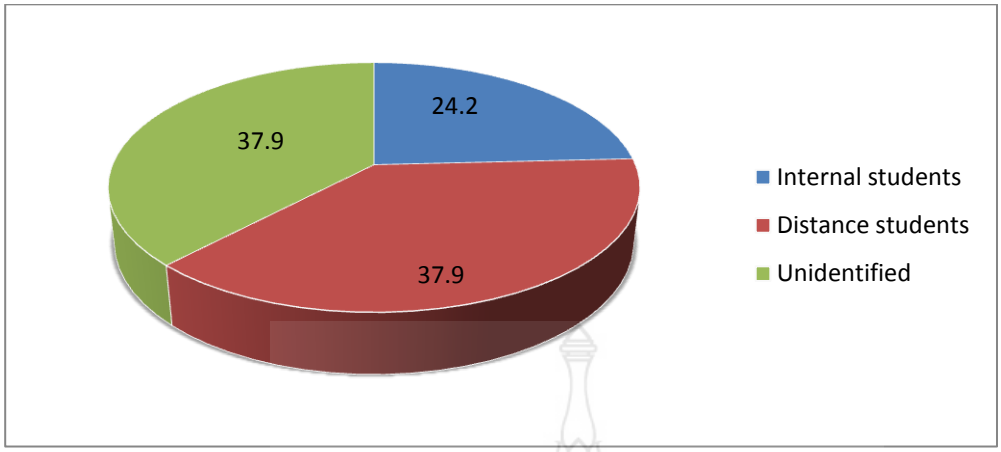

Figure 6.12. Proportions of participants by delivery modes

6.2.8 Number of papers currently enroled when the survey was launched

At the time the study was conducted, two-thirds of participants were enroled in four papers and about one-third was enroled in five papers. Only 4.2% were enroled in three papers or less (See Figure 6.13).

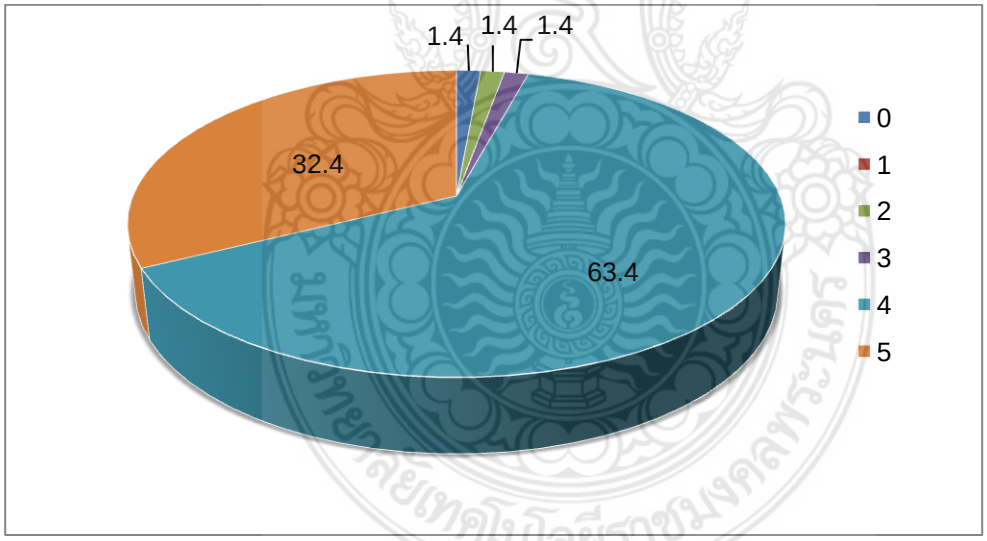

Figure 6.13. Proportions of papers currently enroled by year groups

Most participants in year-one, year-three, and year-four were studying five papers in that semester, while most of year-two participants were studying six papers (See Table 6.3).

Table 6.3 *Participants by Papers according to Year Levels*

Year groups	Number of Courses (%)									
	1		3		4		5		6	
Yr-1					1	(1.4)	11	(15.5)	3	(4.2)
Yr-2	1	(1.4)					4	(5.6)	16	(22.5)
Yr-3			1	(1.4)			19	(26.8)	3	(4.2)
Yr-4							11	(15.5)	1	(1.4)

6.2.9 Number of papers completed when the survey was launched

On average, year-one to year-four participants completed 5, 10, 15, and 25 papers respectively. The majority of year-one participants had completed three papers. One year-two participant had completed two papers; the majority had completed eight papers. One year-three participant had completed six papers while the rest had finished at least 10 papers. For year-four participants, this was their last semester, and the majority had completed 27 papers; one participant had completed 16 papers (See Table 6.4).

Table 6.4 *Number of Papers Participants Completed by the Time of the Survey*

Year	Minimum	Maximum	Mean	Mode
1	3	8	5.3	3
2	2	16	9.7	8
3	6	20	14.7	15
4	16	32	25.2	27

At the time the survey was launched, year-one, -two, -three, and -four participants had studied 10, 15, 20, and 30 papers on average, respectively. According to Table 6.5, most of year-one students studied eight papers. A year-two student was studying three papers while another one had studied 22 papers. While year-three participants had studied different numbers of papers, the majority of year-four participants had studied 32 papers in total.

Table 6.5 *All Papers Participants had Studied up until the Time of the Survey*

Years	Minimum	Maximum	Mean	Mode
1	7	14	10.4	8
2	3	22	15.3	13,14,18
3	12	25	19.8	16,20,21,21,22,25
4	21	38	30.2	32

Figure 6.14 shows year-one and year-two participants included mostly internal students and those who did not want to identify themselves, whereas year-three and year-four participants were mainly distance students. The range of papers taken increased as students moved through the programme of study.

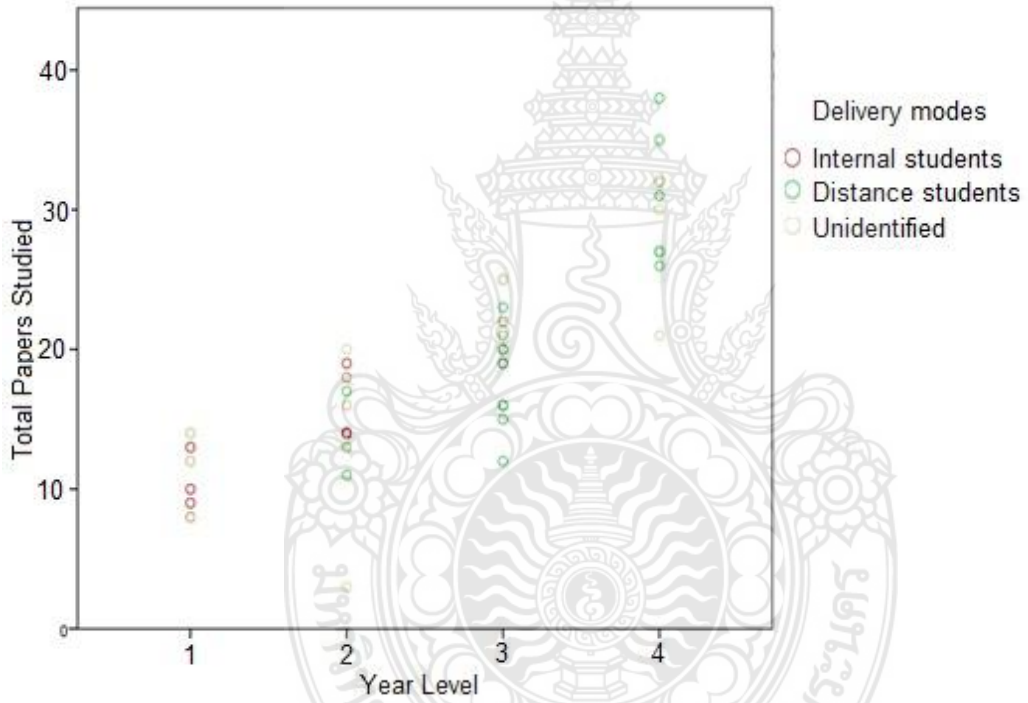

Figure 6.14. Total papers that participants were studying in both delivery modes

Means of the papers currently studied, completed and total studied papers were also plotted showing that all year groups students were studying an average of five papers in that semester. Number of papers completed was increased by five papers as they moved toward the end of the programme (See Figure 6.15).

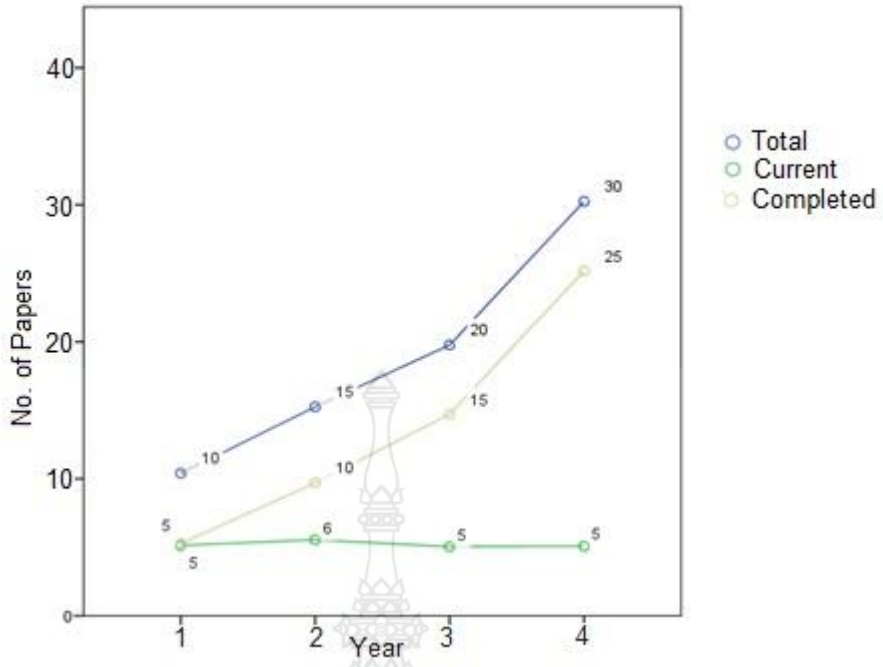

Figure 6.15. Current, completed, and total papers studied in each year group

6.2.10 Learner control: The independent variable

The measure of *learner control* (LC) was obtained from a self-report of experience with activities or assigned tasks in the study (See Appendix D). Participants were asked to rank each item according to their past and present exposure to these activities and tasks using a 4-point Likert scale from *never, hardly ever*, *some of the time,* to *frequently.* The possible total scores of the scale ranged between 13 and 52. Missing values were substituted using predicted values from a regression analysis or expectation-maximization (EM) method (de Vaus, 2002). Two missing value cases and one outlier case were excluded from the analysis and descriptive statistics were calculated for 72 responses. LC scores ranged between 21 and 52 with a standard deviation of 6.8.

For a better interpretation of LC, the scores were transformed to percentages. The frequency distribution was still the same as the previous data set but the mean score was changed to 74.32 with a standard deviation of 17.77. The data range was extended from 39 to 79.49 with a minimum score of 20.51% and a maximum score of 100%.

The frequency distribution of LC was checked to see if further inferential statistical analyses could be used. LC scores were then graphed to show the distribution. The descriptive analysis showed that the skewness was -0.678 and kurtosis was -0.100. The

Kolmogorov-Smirnov *Z* test gave a significant level of 0.82 which was greater than 0.05. Based on these analyses, the LC scores was confirmed to be normally distributed (Field, 2009) and can be analysed using inferential statistics.

6.2.11 Online learning self-efficacy: The dependent variable

The dependent variable, *online learning self-efficacy*, was also measured using the online learning self-efficacy scales (OLSES). The OLSES is composed of two subscales: Learner Control and Interaction (LCI), and Computer and Internet Skills (IT). The first subscale, LCI, comprised 11 items. The second subscale, IT, comprised eight items. Participants scored each item from 0 to 100 according to how confidently they believed they could perform each item, with 0 representing no confidence and 100 representing full confidence. The scores from each item were then summed and expressed as percentages. Descriptive statistics (e.g., mean, mode, and range) were calculated. Calculations showed that OLSE scores for the sample fell between 41.05% and 98.42%. The mean score was 74.65 with a standard deviation of 13.89. OLSE scores were then also tested for normality. The Kolmogorov-Smirnov *Z* test showed a significance level of 0.200 which is greater than 0.05. Therefore, OLSE can be considered as normal distributed.

6.3 The Relationships

The main focus of this section is the testing of the first hypothesis: *There is a positive relationship between learner control and online learning self-efficacy.* After the assumptions were met, the associations between *learner control* (LC), the independent variable, and *online learning self-efficacy* (OLSE), the dependent variable, were tested using scattergrams and correlation coefficients.

6.3.1 The main relationship

To determine the relationship between the observed variables, a scatter plot was initially used. The scatter plot graph showed a positive association between *learner control* and *online learning self-efficacy* (See Figure 6.16). The visual presentation of the scatter plot roughly showed the direction of the relationship and that the association of the observed variables was linear with few outliers.

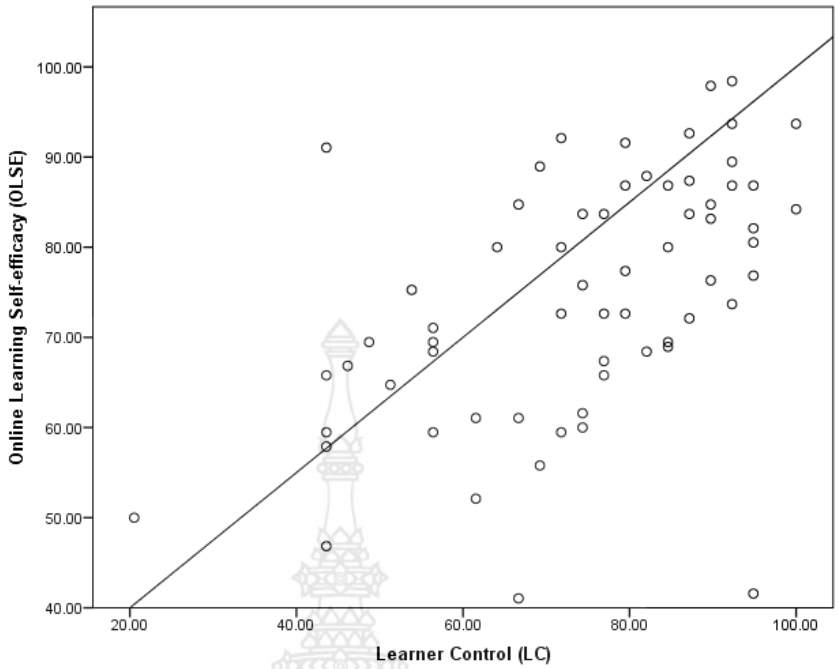

Figure 6.16. The scatter plot between learner control and online learning self-efficacy

Since the above scatter plot showed linearity of the association between the observed variables, *Pearson product-moment coefficient of correlation* or Pearson *r* was considered to be the most suitable technique to measure the strength and direction of this relationship (Coladarci et al., 2004). The OLSE scores were normally distributed without any outliers. Therefore, the correlation between *learner control* and *online learning self-efficacy* was statistically significant with Pearson $r = .526$, p (one-tailed) < .01. The positive sign of the coefficient specified that the direction of the correlation was positive and the value, $r = .526$, showed that the relationship was moderate (Tanner, 2012). Therefore, the first hypothesis was confirmed. Since the correlation was significant, the coefficient of determination (the square of the correlation coefficient) was calculated, $r^2 = .277$, which indicated that 27.7% of the variables' variance was shared (Argyrous, 1997).

6.3.2 The relationship within online learning self-efficacy subscales

The correlation between *learner control* and the online learning self-efficacy subscales was also investigated. For the Learner Control and Interaction (LCI) subscale, the Pearson product-moment correlation coefficient was $r = .602$, p (one-tailed) < .01. The coefficient of determination was 36.24%.

OLSE scores of computer and Internet skills were not normally distributed. Therefore, Spearman's correlation coefficient, a non-parametric statistic, was calculated and yielded the result of $r = .255$, p (one-tailed) $< .05$. The coefficient of determination was 6.5%.

6.3.3 The relationships among the sample subgroups

As a positive relationship did exist, the two hypotheses, o*nline learning self-efficacy of learners in online classes with high levels of learner control is higher than those in online classes with lower levels of learner control*, and *online learning self-efficacy of learners who have more experience with high levels of learner control is higher than those who have less experience*, were then tested.

6.3.3.1 High and low learner control

The scatter plot between *learner control* and *online learning self-efficacy* of participants in two *delivery modes* was plotted (See Appendix F – Figure F.1). The data showed a positive upward trend for both delivery modes. However, the data of the distance students were gathered in an area where *learner control* was high.

The Pearson correlation coefficient of internal students was $r = .503$, p (one-tailed) $< .05$. The coefficient of determination was 25.30%, meaning that *learner control* could explain 25.30% of the variation of internal students' OLSE. The coefficient of distance students was bigger than internal students with $r = .566$, p (one-tailed) $< .01$. The coefficient of determination was 32.04%. Therefore, variability of distance students' OLSE could be explained by 32.04% of *learner control*.

The correlation coefficients between the internal students and the distance students were compared to see the differences using Field's (2009) equation. The result showed that these correlations were significantly different, $z = -.239$, $p = .81$.

6.3.3.2 More and less learner control experience

The levels of LC were measured for three items: year-level, the numbers of total papers studied, and LC scales, to see whether the OLSE of learners who have more experience in high LC is more positive than the ones who have less experience. Data on LC and OLSE for participants in each year group were also plotted separately and all showed a positive upward trend (See Appendix F – Figure F.2).

Pearson correlation coefficients for each group were also calculated, as shown in Table 6.6. The relationship between LC and OLSE of all year groups were positive. While the relationships for first, third, and fourth year participants were statistically significant, the relationship between LC and OLSE for the second year group was not significant and was also weak.

Table 6.6 *The Relationship between LC and OLSE in Each Year Group*

Year Level	n	Pearson *r*	r^2
1	13	.534*	28.52
2	21	.287	
3	22	.557**	31.02
4	11	.747**	55.80

Note: * Correlation is significant at the .05 level (one-tailed), ** Correlation is significant at the .01 level (one-tailed).

The coefficients of third and fourth year participants were greater than first year participants who had less experience with LC. However, the coefficient of the second year participants was not compliant with the others. More tests are needed to examine this relationship.

Using Field's (2009) equation, the coefficients of first, third, and fourth year students were significantly different. Results of the analysis are reported in Table 6.7.

Table 6.7 *Outcomes of the Relationship in Comparison between Year Groups*

Correlations	*z*	*p*
Year 1/ Year 3	-.083	.933
Year 1/ Year 4	-.781	.435
Year 3/ Year 4	-.801	.423

In addition, the correlation between *numbers of total papers* studied and *online learning self-efficacy* was probed by a scatter plot. The data showed an upward trend (See Appendix F – Figure F.3); however, the Pearson correlation coefficient showed the relationship was not significant with $r = .180$.

6.4 Simple Linear Regression

Since findings in Section 6.3.1 showed that *learner control* was correlated to *online learning self-efficacy*, a simple linear regression was performed to determine the ability of *learner control* to forecast *online learning self-efficacy* after assumptions were checked and met. The result of the simple regression performed by SPSS is displayed in Table 6.8.

Table 6.8 *The Summary Result of the Simple Linear Regression*

	B	SE B	β
Constant	44.21	6.39	
Learner Control	0.41	0.08	.526*

Note: $r^2 = .277$, $F=23.774$, * $p < .001$.

The simple regression model showed that $r^2 = .277$ which means *learner control* can explain only 27.7% of the variation in learner *self-efficacy* toward their online learning environment. In other words, 72.3% of the variation in learner *self-efficacy* cannot be explained by *learner control*. Therefore, other variables must have an influence on learner *self-efficacy*.

In the ANOVA table, the SPSS result shows $F = 23.774$ at a significant level ($p < .001$). The significance of the F-ratio indicates that the regression model overall predicts *online learning self-efficacy* significantly well.

Numbers in the coefficient table are important because they are used in the regression equation, $Y_i = b_0 + b_1X_i$. The first B value is 44.21, which is the Y intercept or b_0. The value means that when no *learner control* is applied, the learner *self-efficacy* score will be 44.21%. The next B value indicates the slope of the regression line (b_1), or the change of the outcome with a unit change of the independent variable. In this case, b_1 =

.41 meaning that when learners experience 1% *learner control*, their *online learning self-efficacy* will increase .41%. Both *t*-values are significant with $p < .001$, indicating that *learner control* makes a significant contribution to predicting *online learning self-efficacy*. Therefore, the regression model is written as:

$$\text{Online learning self-efficacy}_i = 44.21 + (.41 \times \text{Learner control}_i).$$

In Figure 6.17, the regression line is plotted in orange with the original reference line in black alongside.

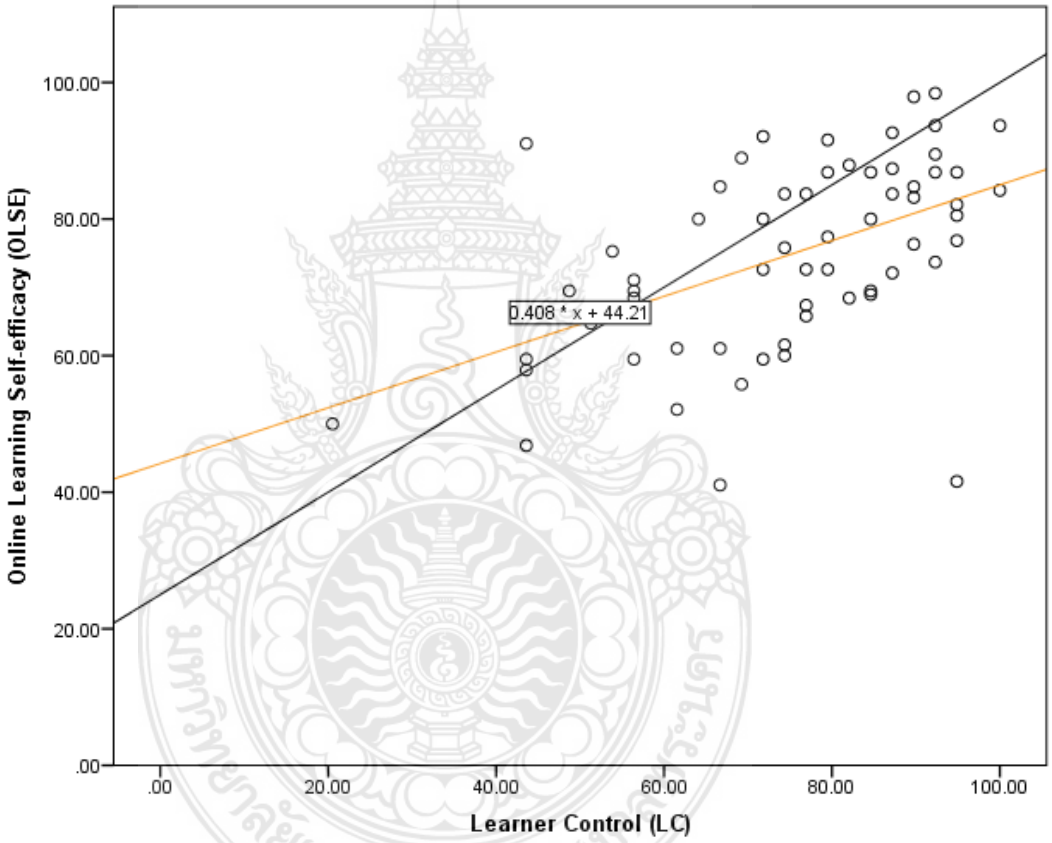

Figure 6.17. The simple regression model (orange line) in comparison to the scatter plot reference line (black line)

6.5 Comparison of Two Groups

OLSE means were compared using an independent *t*-test. The purpose of this test is to see if the differences of OLSE scores between two participant groups are significant and to answer the research hypotheses.

6.5.1 Internal/distance students

An independent *t*-test was used to compare if there were differences in terms of *learner control* and *online learning self-efficacy* between students in these two delivery modes. Regarding *learner control*, distance students experienced higher *learner control* (M = 84.83, SD = 12.51) than internal students (M = 63.08, SD = 17.11). The difference was statistically significant ($t(37) = -4.26$, $p < .05$) and the effect size was strong ($r = .66$).

An independent *t*-test showed that, on average, distance students (M = 81.17, SD = 11.77) had higher *online learning self-efficacy* than internal students (M = 70.84, SD = 12.71). This difference was significant ($t(36) = -2.56$, $p < .05$); in addition, it represented a medium-sized effect with $r = .39$.

6.5.2 Age groups

The *online learning self-efficacy* between these two groups was then compared using an independent *t*-test. The result showed that, on average, *online learning self-efficacy* of younger online learners (M = 74.37, SD = 11.4) was less than older online learners (M = 76.07, SD = 17.23). However, the difference was not significant ($t(29.1) = -.407$, $p > .05$) and the effect size was very small ($r = .07$).

6.5.3 Males/females

Results from an independent *t*-test showed that the *online learning self-efficacy* of male participants (M = 75.74, SE = 4.57), on average, was higher than females (M = 74.46, SE = 1.84). This difference was not significant ($t(65) = 0.27$, $p > .05$) and the effect size was very small ($r = .03$).

6.6 Influence of the Third Variables

This section reports on the testing of the hypothesis that *the relationship between learner control and online learning self-efficacy is influenced by the factors: age, gender, computer skills for academic purpose (CSAP), computer skills for social purpose (CSSP), and prior online learning experience*. To explore whether other variables had an influence on the investigated relationship, a partial correlation was employed in order to control the effect of the variables: *age* group, *gender*, *previous*

online experience, and *computer skills* (*perceived computer skills, computer skills for social purposes* and *computer skills for academic purposes*).

6.6.1 Age

The scatter plot between *learner control* and *online learning self-efficacy* in all *age* groups showed a positive link except for the > 55 age group (See Appendix F – Figure F.4). However, no further correlation analysis within each *age* group was conducted due to a small number of participants in each *age* group.

Regarding the digital gap, the relationship between *learner control* and the *online learning self-efficacy* of both groups was positively significant. A scatter plot of the relationship between the two groups showed a positive trend (See Appendix F – Figure F.5). The correlation coefficients of younger online learners group was $r_{(42)} = .504$, $p = .01$ (one-tailed) and older online learners group was $r_{(21)} = .495$, $p = .05$ (one-tailed). The coefficients of the younger and older participants were also tested for significant difference using Field's (2009) method. The result showed that these two coefficients were not significantly different, $z = .042$, $p = .966$.

6.6.2 Gender

The scatter plot shows positive relationships between *learner control* and *online learning self-efficacy* in both males and females (See Appendix F – Figure F.6). For every level of *learner control*, female participants seemed to have lower *online learning self-efficacy* than male participants. The results of the Pearson correlation calculation showed the relationship between *learner control* and *online learning self-efficacy* of male participants was not statistically significant, with $r = .521$. Conversely, the relationship between *learner control* and *online learning self-efficacy* in female participants was statistically significant, with $r = .545$, $p < .01$ (one-tailed). The coefficient of determination was 29.70%. That result means that *learner control* accounts for 29.70 % of the variation in female learner *self-efficacy*. Therefore, 70.30% of the variation in female learner *online learning self-efficacy* comes from other variables.

6.6.3 Perceived computer skills

A negative trend of the relationship with the basic *perceived computer skills* was shown from the scatter plot, while the relationships within intermediate and advanced computer skills were positive (See Appendix F – Figure F.7). Pearson correlation coefficients for intermediate and advanced were calculated after inferential statistic assumptions were met. The coefficient for intermediate *perceived computer skills* was statistically significant, $r = .590$, p (one-tailed) $< .01$. Nevertheless, the relationship between *learner control* and *online learning self-efficacy* within the advanced *perceived computer skills* group was not significant ($r = .09$). For basic *perceived computer skills*, the frequency distribution was not normal. Therefore, Spearman's correlation coefficient was used and yielded a perfect but negative relationship within this group ($r = -1.0$, p (one-tailed) $< .01$).

6.6.4 Computer skills for academic purpose

The relationship between *learner control* and *online learning self-efficacy* of participants who had basic, intermediate, and advanced CSAP is illustrated in the scatter plot (See Appendix F – Figure F.8). The relationship in basic CSAP shows a negative trend while the relationships in intermediate and advanced CSAP groups show upward trends. Pearson correlation coefficients were calculated for basic and intermediate CSAP groups since assumptions were met. *Learner control* was not significantly related to *online learning self-efficacy* of learners with basic CSAP, $r = -.09$. However, there was a significant relationship between *learner control* and *online learning self-efficacy* in learners with intermediate CSAP, $r = .418$, p (one-tailed) $< .01$. Spearman's correlation coefficient was calculated for the relationship with advanced CSAP because the data distribution of this group was not normally distributed due to the very small number in the advanced CSAP level group. Results showed that *learner control* was significantly related to *self-efficacy* of online learners with advanced CSAP, $r = .548$, p (one-tailed) $< .05$. The relationships of the intermediate and advanced CSAP were then tested using Field's (2009) method, which found that the relationships were significantly different, $z = -.533$, $p = .594$.

6.6.5 Computer skills for social purpose

The advanced CSSP group had only one participant; therefore, there was no further analysis for this group. The scatter plot of the data in the other two groups showed rising trends (See Appendix F – Figure F.9). Assumptions for the Pearson correlation were tested and data distributions of basic and intermediate CSSP were normal. Correlation coefficients were then performed. *Learner control* in the basic CSSP level was found to significantly correlate with *online learning self-efficacy*, $r = .634$, p (one-tailed) $< .01$. For the intermediate CSSP group, there was a significant relationship between *learner control* and *online learner self-efficacy*, $r = .395$, p (one-tailed) $< .01$.

The correlations between basic and intermediate CSSP were then tested for statistical differences. Using Field's (2009) equation, these relationships were found to be significantly different, $z = 1.024$, $p = .306$.

6.6.6 Actual computer skill

Actual computer skill was a sum of CSAP and CSSP. The scatter plot showed a downward trend of the relationship between *learner control* and *online learning self-efficacy* in the basic group while positive trends were illustrated in intermediate and advanced groups (See Appendix F – Figure F.10). Assumptions for Pearson correlation were met for all groups. For the basic computer skill group, *learner control* was not significantly correlated with learner *self-efficacy*, $r = -.09$. *Learner control* of the intermediate and advanced computer skill group was significantly related to *online learning self-efficacy*, $r = .439$, p (one-tailed) $< .01$, and $r = .819$, p (one-tailed) $< .01$, respectively. These correlation coefficients were also tested for differences using Field's (2009) equation. The result indicated that these relationships were significantly different, $z = -1.632$, $p = .103$.

6.6.7 Control the effect of the third variables

Partial correlation was used to control for the effect of third variables on the relationship between *learner control* and *online learning self-efficacy*. As illustrated in Table 6.9, the first-order partial correlation coefficients when controlling for *age* and *gender* were statistically significant ($p < .01$) and similar to the zero-order correlation coefficient.

This result indicates that *age* and *gender* had nothing to do with the relationship between *learner control* and *online learning self-efficacy*.

Table 6.9 *Zero-order and First-order Partial Correlations between LC and OLSE*

Control Variables	Correlation Coefficient (*r*)	Significance (one-tailed)
None	.526**	.01
Age	.525	.00
Gender	.542	.00
Previous Online Experience	.430	.00
Perceived computer skills	.466	.00
Computer skills for social purposes	.481	.00
Computer skills for academic purposes	.408	.00

Note: ** Correlation is significant at the .01 level (one-tailed).

On the contrary, when the variables, *previous online learning experience, perceived computer skills*, CSSP, and CSAP, were statistically controlled one by one, the first-order partial correlation coefficients were weaker than the zero-order correlation coefficient but still statistically significant. According to de Vaus (2002), this means the relationship between *learner control* and *online learning self-efficacy* still remains but is partly spurious (Figure 6.18a) or partly indirect with the variables mentioned above (Figure 6.18b).

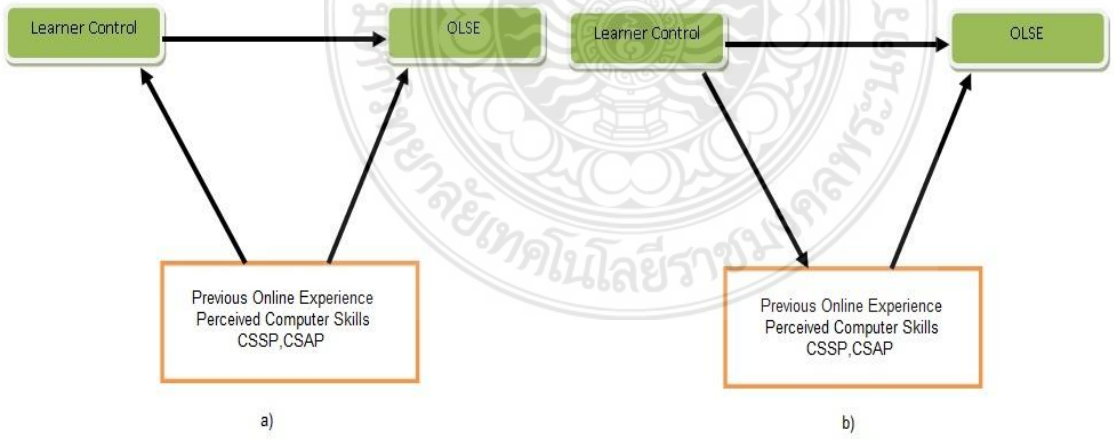

Figure 6.18. Partial correlation models a) Partly spurious and b) partly indirect relationships

When the effect of CSSP and CSAP were both controlled, the second-order partial correlation coefficient was still significantly positive, $r = .424$, p (one-tailed) < .01. This result confirms that CSAP and CSSP influence the relationship between *learner control* and *online learning self-efficacy*. By removing the effect of *prior online learning experience* and *perceived computer skills*, *learner control* was still significantly related to *online learning self-efficacy* but the correlation was weaker, $r = .363$, p (one-tailed) < .01.

The third-order partial correlation was performed to see the nature of the relationship when the effect of three variables was controlled for. *Learner control* was still significantly related to learner *online learning self-efficacy* when removing the influence of CSSP, CSAP, and *perceived computer skills*, $r = .423$, p (one-tailed) < .01. This coefficient was similar to the coefficient of the second-order partial correlation when CSSP and CSAP were controlled. The relationship of *learner control* and *online learning self-efficacy* was much weaker when the effect of CSAP, CSSP, and *prior online learning experience* was eliminated, $r = .374$, p (one-tailed) < .01. The difference of these coefficients (third-order) indicates that *prior online learning experience* had greater influence on the main relationship than *perceived computer skills*. Lastly, when the effect of CSAP, CSSP, *prior online learning experience*, and *perceived computer skills* was removed, *learner control* was still significantly correlated with *online learning self-efficacy*, $r = .405$, p (one-tailed) < .01. The result confirmed that CSAP, CSSP, *prior online learning experience*, and *perceived computer skills* had an influence on the relationship between *learner control* and *online learner self-efficacy*.

6.7 The Relationship among Variables

In order to explain how the third variables influenced the relationship between *learner control* and *online learning self-efficacy*, a correlation matrix was performed. The results are displayed in Table 6.10. The correlation matrix showed that CSSP and CSAP were significantly correlated with both OLSE and LC. However, CSAP had a stronger effect on OLSE than CSSP. CSSP was significantly related to *online learning self-efficacy*'s Computer and Internet subscale but not to *online learning self-efficacy*'s Learner Control and Interaction subscale.

Table 6.10 *The Correlation Matrix of Variables (Pearson's Correlation Coefficient)*

Variable	1	2	3	4	5	6
1 OLSE	1					
2 LC	.526**	1				
3 CSAP	.533**	.392**	1			
4 CSSP	.262*	.351**	.537**	1		
5 OLSE_LCI	.939**	.602**	.387**	.132	1	
6 OLSE_IT	.739**	.184	.603**	.453**	.463**	1

Notes. * Correlation is significant at the .01 level (2-tailed), ** Correlation is significant at the .05 level (2-tailed), OLSE = Online learning self-efficacy, LC = Learner control, CSSP=Computer skills for social purpose, and CSAP= Computer skills for academic purpose, OLSE_LCI=Online learning self-efficacy: Learner Control and Interaction subscale, OLSE_IT= Online learning self-efficacy: Computer and Internet subscale

The correlation matrix of ranking variables is reported in Table 6.11. Results show that *perceived computer skills* was significantly correlated to *actual computer skills* at a significant level ($p < .05$). *Perceived computer skills*, *actual computer skills*, and *prior online learning experience* were significantly related to both *learner control* and *online learning self-efficacy*. In brief, *prior online learning experience*, *perceived computer skills*, CSAP, and CSSP had an influence on the relationship between *learner control* and *online learning self-efficacy*. However, the results were limited and could not explain how these variables are correlated.

Table 6.11 *The Correlation Matrix of Variables (Spearman's Correlation Coefficient)*

Variables	1	2	3	4	5	6	7	8
1 OLSE	1							
2 LC	.544**	1						
3 P_Com	.383**	.256*	1					
4 A_Com	.460**	.390**	.260*	1				
5 Pre_OL	.441**	.461**	.307*	.338**	1			
6 Year	.258	.163	.099	.187	.350**	1		
7 CSSP_L	.162	.368**	.513**	.169	.208	.169	1	
8 CSAP_L	.472**	.309**	.674**	.258*	.265*	.258*	.240*	1

Notes. * Correlation is significant at the .01 level (2-tailed), ** Correlation is significant at the .05 level (2-tailed). OLSE = Online learning self-efficacy, LC = Learner control, P-Com = Perceived computer skills, A_Com = Actual computer skills, Pre_OL = Prior online learning, Year=year of studying, CSSP_L= Computer skills for social purpose level, and CSAP_L= Computer skills for academic purpose level

From the correlation matrices, the visual presentation of the correlations among variables is shown as a correlation model in Figure 6.19. CSAP, CSSP, and *actual computer skills* had direct influences on both *learner control* and *online learning self-efficacy*. The correlational model also indicates that CSAP, CSSP, and *actual computer*

skills indirectly affected *online learning self-efficacy* via *learner control*. *Perceived computer skills* had a direct effect on *actual computer skills, prior online learning experience, learner control*, and *online learning self-efficacy*.

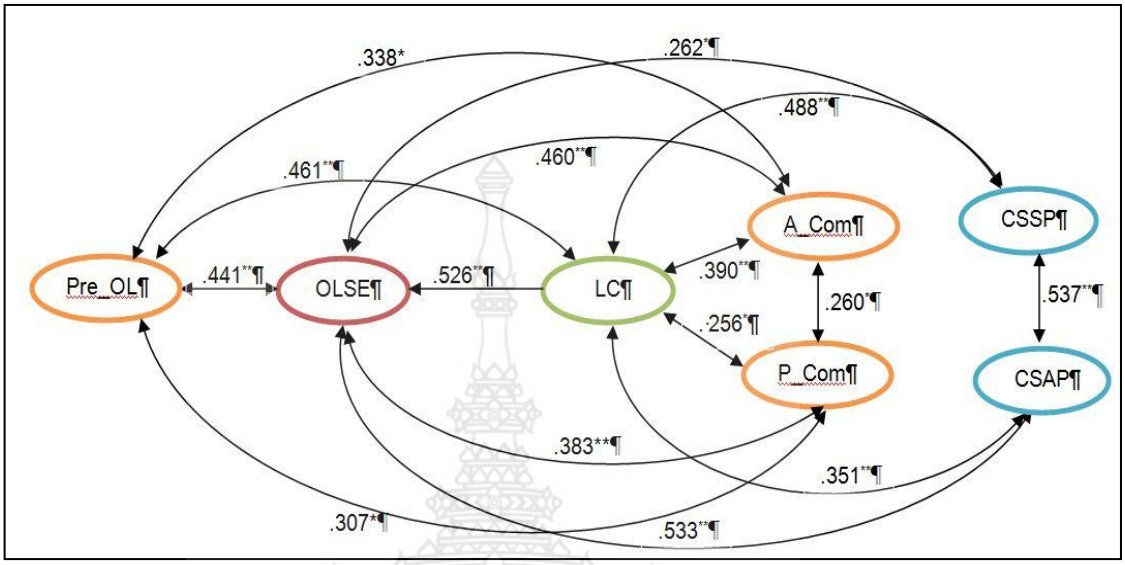

Figure 6.19. The correlational model of variables in this study

6.8 Multiple Linear Regression

A multiple linear regression was performed to determine the ability of *learner control* and other variables to predict OLSE. Assumptions for using the multiple linear regression were checked and showed no violation. According to Healey (2007), variables that can be included in the multiple regression model are assumed to be zero and must be interval data. Therefore, LC, CSSP, and CSAP were eligible for use in this statistical model.

The result of the multiple linear regression indicated that CSSP did not make a significant contribution as a predictor of *online learning self-efficacy* ($p > .05$), but *learner control* and CSAP were both good predictors of *online learning self-efficacy* (See details in Table 6.12). These two variables could explain 40.5% of the variation in *online learning self-efficacy*. As reported in the simple linear regression model, *learner control* alone accounted for 27.7 % of *online learning self-efficacy*'s variation. When CSAP was added to the multiple regression model, the additional 12.8% of *online learning self-efficacy* variability could be explained. Thus, these two variables were included in the multiple regression model.

Table 6.12 *The Summary Result of the Multiple Regression*

	B	SE B	β
Step 1			
Constant	43.83	6.47	
Learner Control	0.41	0.09	.526*
Step 2			
Constant	27.73	7.41	
Learner Control	0.30	0.08	.377*
CSAP	0.72	0.20	.387*

Note: R^2 = .277 for step 1, ΔR^2 = .127 for step 2 (p = .001). * p < .001.

6.9 The Analysis of Variance

An analysis of variance, or ANOVA, was performed to see the differences of the dependent variable, *online learning self-efficacy*, between groups such as learner *year group*, CSAP *level*, CSSP *level*, and *prior online learning experience* in order to further examine the relationships among *learner control*, *online learning self-efficacy*, and other variables.

6.9.1 Year group

Assumptions for ANOVA were tested and no violation was found. Data of each year group were normally distributed. Results of Levene's test showed that the variance of the four groups were not significantly different (p > .05). All significant levels of the F-ratio from ANOVA analysis (See Appendix F – Figure F.11) were greater than .05, meaning that the *year group* did not significantly affect *online learning self-efficacy*.

6.9.2 Prior online learning experience

After assumptions were checked and met, ANOVA was performed to examine the differences of *online learning self-efficacy* of participants with *none*, *a little*, *some*, and *a lot of prior online learning experience*. Results showed a significant effect from *prior online learning experience* on *online learning self-efficacy*, $F(3,63) = 5.79$, $p < .05$. ω = .42. There was also a linear trend, $F(1,63) = 7.76$, $p < .01$, $\omega = .29$, indicating that as *prior online learning experience* increased, *online learning self-efficacy* increased proportionately. Since ANOVA results also indicated a significant difference in the *online learning self-efficacy* among participants in the four *prior online learning*

experiences groupings, Tukey's (1953) Honestly Significance Difference (HSD) post hoc test was performed. The result of the post hoc test showed that the *online learning self-efficacy* of participants with *a lot of prior online experience* was significantly higher than those of participants with *none*, *a little*, and *some prior online experience*. The *online learning self-efficacy* of participants with *none*, *a little*, and *some prior online experiences* were not significantly different.

6.9.3 CSSP level

Assumptions were tested and found that the *advanced* CSSP group only had one member. Therefore, this group was eliminated from the analysis. The ANOVA showed that *online learning self-efficacy* of participants with *basic* and *intermediate* CSSP were not significantly different. In other words, CSSP *level* did not have any effect on learner *online learning self-efficacy*.

6.9.4 CSAP level

After testing assumptions, an ANOVA was performed. The results showed a significant effect of CSAP *level* on learner *online learning self-efficacy*, $F(2,64) = 13.82$, $p < .05$. $\boldsymbol{\omega} = .53$. There was also a linear trend, $F(1,64) = 27.52$, $p < .01$, $\boldsymbol{\omega} = .54$, indicating that as the level of CSAP increased, *online learning self-efficacy* increased proportionately. The post hoc test identified that the *online learning self-efficacy* mean of participants with a *basic* CSAP *level* was significantly different from those with *intermediate* and *advanced* CSAP *level*. There was no difference between the *online learning self-efficacy* means of *intermediate* and *advanced* CSAP.

6.9.5 Actual computer skill level

Actual computer skills were divided into three groups: *basic*, *intermediate*, and *advanced level*. The OLSE scores of these three groups were normally distributed. ANOVA results indicated that there was a significant effect of *the actual computer skill level* on learner *online learning self-efficacy*, $F(2,54) = 13.06$, $p < .01$, $\boldsymbol{\omega} = .51$. There was also a linear trend, $F(1,64) = 22.45$, $p < .01$, $\boldsymbol{\omega} = .49$, indicating that as the level of *actual computer skill* increased, *online learning self-efficacy* increased proportionately. Post hoc tests indicated that the OLSE mean of participants with *basic actual computer skill* was significantly different from those with *intermediate* and *advanced actual*

computer skill. In addition, the OLSE mean of participants with *intermediate actual computer skill* was not significantly different from the OLSE mean of participants with *advanced actual computer skill*.

6.9.6 Perceived computer skills

ANOVA of *perceived computer skills* was also performed after assumptions were checked and met. The results showed that *perceived computer skills* had a significant effect on *online learning self-efficacy*, $F(2,53) = 6.64$, $p < .01$, $\omega = .41$. There was also a linear trend, $F(1,53) = 12.52$, $p < .01$, $\omega = .41$, indicating that as the level of *perceived computer skills* increased, *online learning self-efficacy* increased proportionately. The post hoc test showed that the *online learning self-efficacy* mean of participants who reported *basic perceived computer skill* was significantly different from those of learners who reported *intermediate* and *advanced perceived computer skills*. There was not a significant difference of the learner *online learning self-efficacy* means between *intermediate* and *advanced perceived computer skills* groups.

6.10 Qualitative Findings

During the data collection phase, qualitative data were gathered via four open-ended questions. The analyses of the qualitative data provide additional information about the relationship between *learner control* and *online learning self-efficacy* in this study. The qualitative findings were used to triangulate the quantitative findings

As stated in Chapter Five, qualitative data were analysed using the framework adopted from Saldaña (2009). The analyses consisted of two phases: Reponses of the open-ended questions and emerging themes. The following section is the report of the findings from the analysis of responses from the four open-ended questions.

6.10.1 Part 1: Responses of the open-ended questions

The questionnaire included four open-ended questions that allowed participants to give qualitative data expressing their thoughts and opinions in relation to *learner control*, *online learning self-efficacy*, and studying in an online learning environment. The

analysis of this phase included identification of common themes arising from the responses to each question.

6.10.1.1 Previous online learning experience

The item, *please describe the type of online learning experience you have before,* provided participants with the opportunity to comment on their online experience prior to starting the online programme in this present study. Of the 66 students that responded to this question, 24 identified themselves as distance students. Six students reported that they had no prior online learning experience before enroling in the studied programme. One of these six students stated: "*I have had four years of full time [distant] study. Previous to that, I had never had access to the internet, and could only open and save documents.*"

Among those participants who reported that they had prior online learning experience, two had online training required by their employers, and some had had some form of online learning experience when they were in high school or even primary school. Only two of the participants reported that they had online learning experience at the tertiary level at another university. The rest indicated that they had informal online experience. One such response was "*[w]atch YouTube to learn new skills- playing ukulele, baking, etc. Reading Blogs, learning recipes etc.*"

In addition to the responses above, participants also expressed useful information related to their present online programme. As shown in Table 6.13, some students found studying online was difficult, while others were positive about their online experience.

Table 6.13 *Experience of Students in the Present Programme of Study*

Positive experience	Negative experience
Learning skill improvement	Hard to understand online instruction
Sense of belonging	Confusion with [the online learning website] interface
Satisfaction	Lack of face-to-face among teachers and peers
Gain more confidence over time	Difficult to get collaboration
Good interaction and participation	Lack of instructors' feedback
Good collaboration	Take time to get interaction

6.10.1.2 Learner control experience

The item, *please describe other online tasks you did in your study not mentioned in this questionnaire*, allowed participants to think about the online activities they had experienced in the study programme, other than those listed in the questionnaire. The main reason for this item was to find if there were additional activities that allowed learner control apart from the activities listed with question six, *'how often have you performed these tasks in [the online learning website]?'*

There were 35 responses to the above item. Among these, three responses indicated that the questionnaire had listed all of the activities they had been required to undertake within the programme. The data were themed to levels of learner control: *browsing*, *searching*, *connecting*, *collecting*, and *generating* (See details in Appendix G – Table G.1). The findings showed that activities assigned for students allowed them to choose their own way to learn, collaborate with their peers, and contribute to their own learning community. They used various kinds of software such as Skype, Dropbox, and Google Docs to collaborate and complete their group projects. Students had the option of uploading their work in various ways, such as a video clip or a PowerPoint presentation, or an assignment to the forum. This meant that their peers had an opportunity to see others' work.

6.10.1.3 Perceived online learning self-efficacy

Participants were asked to answer the question, *how confident are you that you can successfully complete the online requirement of this programme?* There were 67

responses to this question. Among these, 50 responses expressed positive perceived self-efficacy, making positive statements such as, "*very confident*", and "*definitely confident*", and "*100% confident*". Phrases such as "*partly confident*", and "*a little bit confident*" reported by seven participants were categorised as a moderate level of self-efficacy. Six students reported that they were inefficacious, with responses indicating they were having difficulties. Details of the responses are listed in Table 6.14 and Appendix G – Table G.2.

Table 6.14 *Self-efficacy Levels among Participants*

High	Moderate	Low
Very confident	A little bit confident	Having difficulty
Confident	Six out of ten	Not very confident
Extremely confident	Moderately	Not at all confident
Totally confident	Semi confident	Not confident
Mostly confident	Not hugely confident	
Quite confident	Somewhat	
Able to successfully complete without any trouble at all	Partly confident	
100%		
Fairly confident		
Definitely confident		

Participants also reported that their self-efficacy had increased over time since they started this online programme. As one wrote, "*the more time I spent in [the online learning class], the more confident I became.*" Another participant who switched from internal to distance learning also said "*I found that the online learning environment was difficult to use and foreign to me*", but now she said, "*I got more confident with [the online learning website] I have started to do more and more online.*" Participants also showed that they felt confident in one task but not another. For example, one participant stated that he/she was "*Totally confident that I can successfully complete*" but he/she felt "*Not so confident that I will receive responses to my postings from other students or tutors.*" In the same way, this participant felt "*[v]ery confident*"; however he/she also felt that "*with minimal online support from lecturers I do not feel that I am going to develop to my full potential in this environment.*" One participant reported having mixed feelings all the way through the programme as he/she said "*Some days I*

am more confident than others. It really depends on what the task is and the workload that we are given."

Though the lack of face-to-face contact made some participants felt not so confident about their learning success, they felt that they could still finish this online programme with peer and lecturer support. Such responses are: "*At this stage I do need help with guidance so I know that I'm going in the right direction. With help from my lecturers and peers I should be able to succeed in this teaching profession*", and "*[i]f I am not sure I can go and ask an expert other*". In fact, the interaction between students and their lecturers was more important, as students reported that "*[m]y most valuable learning comes from the interaction I have with lecturers in class – knowledgeable, skilled people who have 'been there, done that'.*" An inefficacious student felt that the online learning environment was hard and not familiar, "*thus I tended to rely more on my lecturers in person for help and support*". Therefore, a participant suggested that "*[t]utors are accessible and responsive and you get to learn which of your fellow students are on the same page as yourself.*"

Participants also perceived that their computer skills would largely contribute to their online learning success, as indicated by these statements: "*I have the skills to complete any work that is assigned online and can successfully complete and upload it in time*" and "*I am very confident about my skills on a computer and that I have all the skills needed to meet the requirements of the paper*". One participant even said "*[a]s technology is a large part of my life, and I have been brought up with technology, I am very confident using technology in this course.*"

In addition, participants often reported that they felt isolated, sceptical, doubtful, and left out. They demanded far more technical and psychological support from their peers, tutors, and lecturers (See responses in Table 6.15).

Table 6.15 *Statements Indicating Both Types of Supports*

Technical supports	Psychological supports
"*At this stage I do need help with guidance so I know that I'm going in the right direction.*"	"*I found that it was with the support of other [distance] students that I have successfully transitioned to online learning.*"
"*To begin with, I relied quite heavily on email and/or phone calls to lecturers, to get help when I needed it.*"	"*It often feels as though there is minimal support provided from lecturers in this context.*"
"*In the beginning I had no idea what I was doing, and wanted to quit the first week, simply because I lacked the skills in ICT, and could not navigate my way around [the online learning websites].*"	"*I am not at all confident that I could do this without the help of other members of my group or my children.*"
"*I have struggled in the past with a requirement to upload video and audio as we were not supplied with information on how to do so.*"	"*Minimal online support from lecturers I do not feel that [I] am going to develop to my full potential in this environment.*"
"*So lack of instruction in how to manage technology just adds to the workload and is very frustrating.*"	"*Learning can be felt like quite an isolating and intimidating task without having online peers to clarify ideas with.*"
"*Just make me doubt myself about what I need to be doing or how to do it.*"	"*Do not run them down in lectures to on campus classes. It does get back and it is frustrating not having the same amount of time allocated to online students.*"
"*A lot of technology related tasks require help from others. I also seem to struggle with finding and accessing links that are required.*"	"*I don't really understand what is being asked, and when I raise these issues they often go unheard. Which leads me to complete a requirement that I am not sure of?*"
"*So lack of instruction in how to manage technology just adds to the work load.*"	"*Lost motivation and feel demoralised and let down…*"
	"*So lack of instruction in how to … is very frustrating.*"
	"*When the final assignment came up … I was totally lost … and I was unsure on how to tackle this.*"
	"*It is frustrating to do online work then have a class reviewing the online work.*"
	"*Perhaps not having a lecturer to make me feel guilty about not doing my work.*"

6.10.1.4 Online learning programme experience

The last question in the questionnaire, *do you have anything to say about being an online learner*, allowed for participants to make broader comments on how they felt about the online programme.

Thirty-two students answered this question. Eight responses expressed satisfaction with their online learning experience in this programme. Some comments were: "*very effective*" and "*easy hassle free way to study*". It was "*definitely a good option*" that allowed them to "*study around other commitments such as family and work.*" One student said it had "*been a great experience*" and they would "*highly recommend*" this online programme to others. Though they felt positive, these eight students admitted that "*[o]nline learning is hard work – it requires motivation, commitment, perseverance and courage!*" Other than *computer skills* and *prior online learning experience*, they considered that students "*need to have a lot of self discipline*" and high levels of self-efficacy, as one participant noted: "*[i]t also highly depends on how confident we are in understanding what we are learning.*"

The rest of the participants (24) felt dissatisfied and reported that online learning was difficult and hard. One said he/she would "*not recommend it to anyone*." A number of responses referred to feeling isolated and, as one student said, "*missing the human contact.*" One particular aspect that was a focus for these participants was dissatisfaction about the availability of the tutors or lecturers coordinating the papers and the timeliness of responses to queries they raised within the online forums. They felt that "*[l]ecturers need to … answer our forum questions quickly, provide timely feedback.*" Conversely, they expressed that "*[t]he only challenges we face are contacting lecturers and receiving answers to our questions in a timely manner*" and "*be prepared that you will not receive an answer straight away*." They suggested that "*[t]utors need to be more responsive to their requirements and get back to students requests within 24 hours not 2 to 3 days later*." If time was limited, "*[a]ny kind of response from a tutor to a query is appreciated – even if it's just a one-liner saying they're busy at present and will respond later.*" Still, "*[t]he lag between replies via [the online learning website] can halt your flow and leave you continuing to study down the wrong path until a reply is given (sometimes up to a week later).*"

Consequently, they felt isolated, lost, and frustrated. One student said, "*[i]t is frustrating when they do not answer questions.*" In addition, "*[f]eedback and queries were often not given in a timely manner, which could be frustrating.*"

The students reported that lecturers need to be more supportive and expressed that "*[t]he worst of all though is that the instruction can be poor and this can be very obvious when students are asking for more guidance or simply stating 'we do not understand'...*" and "*[i]t is harder to understand a concept because it is harder to have it explained to me and the tutor can't see if I understand or not.*"

They thought their study would be easier and progress faster if prompt feedback was provided. One participant noted that "*[a]bsolutely no response can be disheartening and inhibit understanding, thus prevent you from progressing on until a response is provided.*" Negative feedback "*are not encouraging and it can be easy to tell by the tone of a response when they are annoyed when some are constantly asking questions*."

Additionally, some comments indicated that students preferred face-to-face sessions with their lecturers to studying online. For example, one participant said:

> *By far the most engaging learning experience was one where [lecturer's name] provided weekly Webinars which scaffold us through a complex group assignment. Being able to see him and ask questions were fantastic and we were able to get much deeper understanding of what was needed than just with reading a set of instructions.*

Another participant agreed:

> *I know that there have been online meetings with [the lecturer's name] in the [paper's name] where he has discussed aspects with students 'face-to-face' which was great. I wish that lectures were video so I could experience this more often*.

It is not surprising then that some participants thought that they would be more comfortable and learn better in the online environment if they had more learning, technical, and psychological support from their teachers, tutors, and classmates. One commented that:

> *It is essential that [distance] students are interacting and supporting each other from the beginning through a variety of long and short term projects to ensure that they do not become isolated and despondent about their mode of learning, and by association their overall learning*.

Another participant stated that an orientation course giving instruction and direction to the [online learning web] environment would make students more familiar with the learning environment. Other statements, such as "*[s]ome [lecturers] have struggled to give us a logical learning sequence and this results in chasing our tails a lot with trying to get clarification on show to proceed*", emphasised the need for clearer instructions for a task assignment. Other comments referred to wanting additional information on collaborative software and hardware requirements because "*others who are not as computer-literate will have more difficulties getting used to the environment*." In addition, a more "*supportive tutor*", "*an online learning buddy*", or "*support group*" were ideas that these students put forward as solutions to the difficulties they discussed and which might help future students get through an unfamiliar and isolated learning environment.

6.10.2 Part 2: Emerging themes

In the following sections, qualitative findings that show additional emerging themes that give unique dimensions to the investigated relationship and useful information for the study programme will be discussed (See Appendix G – Table G.3 for coding examples).

6.10.2.1 Delivery mode

Delivery mode, emerging from the qualitative findings, is another factor that can impact the relationship between *learner control* and *online learning self-efficacy*. The quantitative findings show that the relationship between these variables for the internal mode ($r = .503$, $p < .05$) is weaker than for the distance mode ($r = .566$, $p < .01$). The qualitative data, however, could not confirm that internal and distance students were different in terms of online learning self-efficacy. Participation in this study was on a voluntary basis, and only 24 out of 75 participants identified themselves as distance students. Only four students stated that they were internal students. So, the qualitative data were inadequate to analyse students' responses by the two delivery modes and

consequently there is no comparison of internal and distance students presented in this section. Despite that there was an interesting finding uncovered from students who experienced changing their study modes.

The responses showed that three participants changed their learning mode. Two students who made a change from internal to distance learners found online learning a challenge. However, a student who changed from distance to internal mode reported being more comfortable to study with the online components. A second year student who changed his/her learning mode noted that "*My first year of study was conducted as an internal learner, so second year marked a big learning curve for me as I adjusted to learning online*" and "*I found that the online learning environment was difficult to use and foreign to me*". This student reported that: "*it often feels as though there is minimal support provided from lecturers in this context. Thus learning can feel like quite an isolating and intimidating task without having online peers to clarify ideas with*". Another student who became a distance student in his/her third year became stressed because of the workload. As a result, this student's self-efficacy was up and down depending on his/her achievement with the learning tasks and related emotional state. Despite that, both participants said that their transition was made easier with support from their distance student colleagues.

The participant who switched to becoming an internal student found that his/her experience with the online learning environment was of great benefit. This student explained that:

> *So when I use [the online learning website], I usually just check notices from lecturers and save the electronic notes. Sometimes I read what the [distance] students are writing in their forums, and at times, we (internal students) are asked to contribute to the online forums. [The online learning website] is like a support system for my study. The website is easy to navigate and it helps me see what is coming up in my study, so that I can prepare effectively.*

Such findings suggest that a programme should be designed to make the transition between delivery modes easier. Differences in instruction between the two modes

should be minimised as Woo et al. (2008) noted that the boundary between face-to-face and online learning is becoming less distinct as technologies progress.

6.10.2.2 Satisfaction

Learner satisfaction is one of the themes that emerged from the qualitative data analysis. Efficacious learners in this study reported that they were happy with the online learning programme in which they were studying. These students felt that the online learning "*was an extremely effective learning methodology.*" One student said "*[i]t is definitely a good option for*" her. A second year student shared that "*[i]t has been a great experience*" and another student noted that "*[i]t has worked well for*" her. While one student reported that he/she was "*[q]uite enjoying it*", the first year student who was "*100% confident*" even said she would "*[h]ighly recommend [this online programme]!!*" This finding is supported by Shen et al. (2013) who reported that learner satisfaction was directly influenced by self-efficacy within online programmes.

However, not all participants in this present study felt satisfied with their online learning environment. The qualitative findings showed that some participants who had a high sense of online learning self-efficacy still expressed dissatisfaction to some degree. For example, one participant said he/she was "*very confident*" but pointed out that "*I do not think that online learning leads to effective learning*". One explanation for this ambiguity of response may be that the online learning environment is complex. Even if students have a high sense of efficacy toward their online learning environment, they can still be unhappy with aspects of the online course. However, generally these students do not give up easily and try to cope and persist in the less than satisfactory situation because they have high self-efficacy. For example, one third year distant student reported that she was "*very confident I can complete the online components.*" At the beginning her study, she found that:

> *Online work quite fun & easy but as the year progressed and life interfered, [She] …found online work quite difficult especially since we are studying to be teachers but we have no face to face interactions with other students.*

She also found that:

> *It is difficult to interact with students online who do not know you or have already formed their online groups & friends. Some are not inviting to new members and as a newbie to this delivery. It would have made it easier […] if they were more inviting.*"

Despite all the difficulties she encountered, she was still in the programme when the survey was taken and more likely to continue her study to year four as teaching was her "*dream career*."

According to Bandura (2012), self-efficacy affects humans through cognitive, motivational, affective, and decision-making processes. With a high sense of self-efficacy, unhappy online learners are still optimistic about their learning environment (cognitive process) and put more effort into solving the problem (motivation). Because these learners tend to view the challenge they face as an opportunity, they usually have stable emotions and decide to continue with their learning. A year-four student's experience supports the above explanation, with the statement that "*I am very confident I can complete the requirements of my programme. In the beginning I had no idea what I was doing, and wanted to quit the first week*". This student did not give up and decided to continue learning, and putting in a lot of effort. She said that "*[t]hankfully, I am a fast learner, the more time I spent in [the online learning environment], the more confident I became*". As he/she persisted and passed through the initial difficult stage, his/her self-efficacy was eventually increased above the original level by increasing mastery over the online learning programme.

6.10.3 Support

Support is one of the critically important influences for these participants. Both efficacious and inefficacious students expressed the needed for support. Support from friends was reported to be as essential as support from lecturers. A very confident learner stated that she was "*100% confident. This is an extremely effective learning methodology. Tutors are accessible and responsive and you get to learn which of your fellow students are on the same page as yourself*". A student with a low sense of online learning self-efficacy noted that "*I'm a little bit confident, but at this stage [I] do need*

help with guidance so [I] should be able to succeed in this teaching profession". As an internal student, he/she can enjoy the "*benefit from face to face time with tutors[,] lecturers etc*." Without face-to-face support, students might feel left out. An internal student who became a distance learner in the second year gave his/her experience in the following statements:

> *As an internal student in first year though, I found that the online learning environment was difficult to use and foreign to me, thus I tended to rely more on my lecturers in person for help and support. This made the transition to [distance] study difficult. […] To begin with, I relied quite heavily on email and/or phone calls to lecturers to get help when I needed it, but as I got more confident [in the online learning website] I have started to do more and more online. Personally, I found that it was with the support of other [distance] students that I have successfully transitioned to online learning. It often feels as though there is minimal support provided from lecturers in this context, thus learning can be feel like quite an isolating and intimidating task without having online peers to clarify ideas with.*

In addition, the qualitative data analysis also indicated that both technical and psychological supports were needed. Technical support was identified in many cases by participants who had limited Internet and computer technology skills. One student said that "*[p]revious to that, I had never had access to the internet, and could only open and save documents*". Some students had no online experience before enroling in this online programme, as one participant noted: "*before this course I have had none*". In addition, each online learning environment is unique. One might be more complex than another depending on the interface design of online learning providers. A participant expressed his/her experience as "*difficult with [the online learning websites] set up in different ways in many different papers, no consistency*".

Psychological support also appeared to be essential to online learners. While technical support adds to students' sources of efficacy information via mastery experience, psychological support improves student self-efficacy through physiological and affective states (Haddoune, 2009). One student with low confidence still hoped to succeed since he/she said, "*[I] know there are people who can help me*". This statement

confirms that students with low self-efficacy can succeed with support or at least know that support is available when they need it. Psychological support may come in many forms such as encouragement feedback, group support from peers or family members, forums, network building among learners, and personalised messages from lecturers. Psychological support is also generated from learner control itself because learners with a high level of learner control usually have high interactivity (Scheiter & Gerjets, 2007). The more interactivity learners have, the stronger sense of belonging they have. Thus, these learners are more comfortable and not so conscious of the geographic distances that exist between themselves, their peers and lecturers.

6.10.4 Interaction

At high levels of learner control, the course activities usually offer learners more opportunity to contribute and interact with their learning environment, instructors, peers, and learning contents. In other words, learners should have high interactivity in high levels of learner control. The qualitative findings of this study revealed the evidence of this notion. In the online learning environment, the interaction between lecturers and learners happened asynchronously. Generally, learners felt that this interaction was inadequate and often reached out for more contact. One of the third year distance students shared her feeling that she would be "*more confident in [her] content knowledge and that comes from talking to the lecturers*". She mentioned that "*one of the tutors has just held a series of online meeting[s] that we could contribute to and it made the understanding clearer*". The interaction between lecturers or tutors and learners not only eased the feeling of isolation but also increased learners' engagement. One third year student reported that:

> *By far the most engaging learning experience was one where [the instructor] provided weekly Webinars which scaffolded us through a complex group assignment. Being able to see him and ask questions were fantastic and we were able to get much deeper understanding of what was needed than just with reading a set of instructions.*

From this study, the interaction among distance students was valued as necessary. A third year student confirmed this statement, she said that "*[i]t is essential that [distance] students are interacting through a variety of long and short term projects to*

ensure that they do not become isolated and despondent about their mode of learning, and by association their overall learning". Fundamentally, the interaction among online learners is to collaborate for the learning tasks. However, the community that these online students created actually helps support them during their studies. As one respondent said, "*peer support is imperative as an online learner*". This study also found that it is difficult to get connected with other distance students, as a third year participant mentioned:

> *There is no way of ensuring distance students communicate with one another and it is easy for people to make themselves 'unavailable', which further entrenches feelings of isolation. Although, generally, distance students create a community of support among themselves, on a day-to-day and week-to-week basis, most will communicate frequently with a select few in an effort to survive the academic pressures of online learning. This can, however, exacerbate feelings of isolation, particularly if you are not part of a 'select group'.*

In the online learning environment, the interaction between learners and learning management systems happens through the learning website or interface. Students in both delivery modes reported that they used the online learning website to get the learning content, and to interact with their teacher and peers via forums. One internal student with high confidence expressed that she "*usually just check[ed] notices from lecturers and save[d] the electronic notes*". This study also showed that learners who had difficulty getting around the online learning website had low self-efficacy toward the learning programme. One first year student found "*it's hard to understand*" because she "*did not follow the online learning instructions*". She was "*a little bit confident" and* "*at this stage [she] do[es] need help*".

In brief, interaction among learners themselves, lecturers, and the learning management system happens simultaneously and in the online learning environment. In general, learners who can keep these interactions balanced are more comfortable and had higher self-efficacy than learners who lacked interaction.

6.10.5 The relationship between learner control and online learning self-efficacy

The qualitative findings not only confirmed the existence of the relationship between *learner control* and *self-efficacy* of online learners, but also provided insights into how a learner-controlled online environment helps improve student self-efficacy. The findings reflected the influence of Bandura's (1997b, 2012) and Bates and Khasawheh's (2007) sources of self-efficacy mentioned in the literature review in the following ways (See Table 6.16 for summary):

Table 6.16 *Sources of Online Learning Self-efficacy from this Study in Comparison to Existing Research*

Bandura (1997b)	Bates and Khasawheh (2007)	This study
Mastery experience	Previous success in online learning Pre-course training	Previous online learning Scaffolding
Vicarious experience	N/A	Peers modelling and written guidance
Social persuasion	Instructor feedback	Constructive feedback
Physiological and affective states	Online learning anxiety	Satisfaction, anxiety, loneliness

Firstly, mastery experience is the major source of self-efficacy (Bandura, 2006a). Successful learners often have high self-efficacy while less successful learners can be inefficacious (Haddoune, 2009). From the qualitative findings, participants indicated that they gained more confidence over time as they studied within the programme. Some learners made progress from knowing nothing at all about computers and the Internet to the point that they were comfortable learning within an online environment and were going to graduate from the programme soon. These participants showed that their confidence to succeed had increased as they learned to master each learning task. Through scaffolding deliberately incorporated into the programme, learners were offered tasks from low to high levels of learner control. In this way, learners were naturally motivated by moving gradually to more difficult tasks. Failure to get the learning tasks completed actually lowered learner self-efficacy. One year-four student reported that he/she had "*no confident [sic] … know I am failing one paper*". Another inefficacious participant said, "*I'm having difficulties*".

Secondly, learners could get online learning self-efficacy via vicarious experiences or behaviour modelling. This finding is in line with Hodges and Murphy's (2009) study of 99 American undergraduate students in asynchronous online mathematic courses. Their regression analysis showed that vicarious experience was the most important source of self-efficacy for this student group, followed by physiological state. Bandura (2012) explained that individuals can be inspired by seeing achievement from people with similar ability to themselves and these individuals are convinced that they too can succeed. In this study, observing classmates' success was easy for internal students but it seemed to be difficult for distance learners. However, distance learners in this online programme were encouraged to work in collaboration with their online classmates. They might not have a chance to meet face-to-face but other activities such as writing in forums, group work, online chatting, and social network spaces allowed these learners to see and interact with each other. In addition, modelling can be presented in more ways than just seeing a model; it can be pictures or verbal instructions or guidelines (Bandura, 1997b) that their instructors, tutors, or friends posted on the forums or private communication channels. One efficacious first year student, for instance, said about the written instruction in her online programme that "*the work requirements are clear and easy to follow.*" On the contrary, another first year student reported that she "*would like to have a study buddy"* since she was "*having difficulties*". Thus it was possible for online learners to draw on a model from the online learning environment itself. For example, they could be influenced by a peer's informal suggestion on a task or the lecturer's assignment guideline.

Verbal persuasions, not the same as verbal instructions, are the third source of self-efficacy in this online environment. In this study, participants' self-efficacy appeared to be enhanced by the quality of feedback and comments they received from lecturers and peers. Positive comments encourage learners to improve, and boost self-efficacy. Conversely, negative feedback can affect learner feelings and lessen their self-efficacy (Bandura, 2012). One fourth year student who reported he/she felt "*not confident*" said that he/she had found some feedback to be "*not encouraging and it can be easy to tell by the tone of a response when they are annoyed when some are constantly asking questions*". Similar feelings were reported by a second year participant who said online learning might be better by: "*perhaps not having a lecturer to make me feel guilty about*

not doing my work". A lack of response also affected learner self-efficacy in the same way as negative feedback.

Finally, learner self-efficacy can be influenced by an individual's physiological state. According to Bandura (2012), stress and anxiety have a negative effect on one's performance. In this study, participants who were comfortable with their learning environment had high self-efficacy. In contrast, unhappy learners had lower online learning self-efficacy. A participant who was worried about his\her children stated that "*I am not very confident with online requirements. I seem to struggle with the time management involved in being a single parent*". A good example of the effect of stress on learner self-efficacy is reported by a third year student. This student said that:

> *Some days [I] am more confident than others. It really depends on what the task is and the work load that we are given. Sometimes we get copious amounts of work and reading/tasks to do, it feels as though we don't put all the effort into one paper because we worry about the rest of the workload that we have to complete that week too. I stress out a bit because this year [I] still had 4 other papers work to do plus assignments and if [I] was to rush through it then [I] would miss something. But then if [I] took my time, [I] would be behind.*

In short, student self-efficacy can be improved in a learner-controlled online learning programme by scaffolding design, encouraging students to work in collaboration, the provision of quality feedback and comments, and psychological support.

6.10.6 Online learners

As described in Chapter Two, self-efficacy can be critical for learner success. Findings from this study confirm this statement.

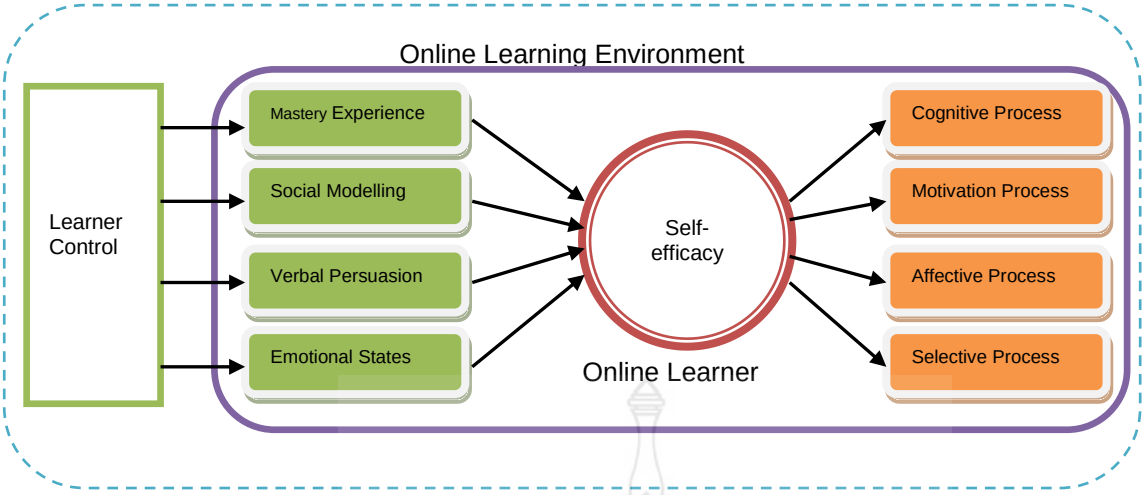

Figure 6.20. Links between learner control, online learner self-efficacy, and its outcome processes

As shown in Figure 6.20, self-efficacy affects the individuals' thought processes. Online learners may perceive their learning environment either positively or negatively depending on their self-efficacy level. Efficacious online learners usually visualise their success; however, inefficacious online learners often doubt their ability to successfully complete the online programme. A first year student who had a relatively low online learning self-efficacy score (41.05%), for example, reported that "*I am having difficulties*". "*I miss the human contact, as staying at home and study isolates you from other people. I would have needed a[n] introduction to the computer and programmes. I lost a lot of time to finding it out*". On the contrary, another first year student who had a relatively high online learning self-efficacy score reported that she was "*100% confident*" to complete this online programme. For her, this online programme was appealing. She explained that, "*This is an extremely effective learning methodology. Tutors are accessible and responsive and you get to learn which of your fellow students are on the same page as yourself. The work requirements are clear and easy to follow*". She had no doubt about her success in this programme and even "*highly recommend[ed]*" this online programme to others.

Findings also showed the impact of online learning self-efficacy through learner motivation, which aligns with Artino's (2012) idea that self-efficacy had a great influence on motivation and student achievement. Generally, efficacious students are highly motivated and more likely to recognise and cope with any challenges in order to pursue the goal they have set.

In the online learning context, Hartnett (2010) notes that motivation is "complex, multidimensional, and situation-dependent" (p. 294). A fourth year student who had a very high online learning self-efficacy score (92.63%) reported that she was "*[n]ot confident*" because she "*kn[e]w I am failing one paper which will stop me from graduating after four VERY long years. Lost motivation and feel demoralised and let down by [the university] and this is affecting how I complete online requirements*". This participant showed that the situation encountered had an impact on motivation even when self-efficacy was high. If learners can get through the online programme with success, their online learning self-efficacy will be increased. Consequently, these learners are motivated and feel in control of their own learning, like this third year student who shared her experience: "*[b]eing an online learner means you have to be organised and self motivated to learn. You need to ensure you ask questions and seek clarification and be prepared that you will not receive an answer straight away*".

In the present study, online learner self-efficacy also appeared to be related to affective processes. According to Bandura (2012), learners with high self-efficacy cope well with difficult or unfamiliar situations while inefficacious learners feel frustrated, stressed and anxious. For example, a third year student who had a moderate online learning self-efficacy score (65.79%) noted that:

> *I stress out a bit because this year [I] still had 4 other papers' work to do plus assignments and if [I] was to rush through it then [I] would miss something. But then if [I] took my time, [I] would be behind.*

This student felt overwhelmed with the situation that she encountered. She felt like she was losing control over her learning environment, thus, her perception about being successful in this online programme became low. She felt stressed and tried hard to cope, fight back, and take control of her learning again.

Bandura (2012) illustrated that efficacious individuals choose more challenging tasks or activities than people with low self-efficacy. These individuals not only select more difficult tasks but also have the belief they have more power to get the task completed. So, learners with high self-efficacy persist more when they pursue an unfamiliar task. Inefficacious learners tend to give up more easily. One good example of this is

demonstrated by the experience of a third year student who had no online experience before enroling in this online programme. After being an internal student for a year, she made a decision to become a distance learner. She admitted that it was a challenge as she reported that "*[a]s an internal student in first year though, I found that the online learning environment was difficult to use and foreign to me*". Despite the difficulty of the transition, she chose to be proactive and find help. In her third year as a distance learner, she said, "*I am confident that I can complete the online requirements of this programme*".

In brief, self-efficacy is very important to online learners because self-efficacy can influence learners' thought, emotion, and action. Thus, the online programme should be designed in ways that help learners maintain and improve their self-efficacy. Findings from this study confirm that providing a learner-controlled online learning environment is one of the important strategies to get online learners efficacious as well as encouraging learner autonomy.

6.11 Chapter Summary

Statistical analyses showed that there was a significant positive relationship between *learner control* and *online learning self-efficacy*. *Age* and *gender* had no influence on the relationship, but *previous online learning experience, perceived computer skills*, CSSP, and CSAP had an influence on the strength of this relationship. However, only *learner control* and CSAP were the best predictors of *online learning self-efficacy*. Qualitative findings also confirmed that students who had been learning in the programme (year-three and year-four) with more experience with learner control had high *self-efficacy* levels. However, many still reported feeling isolated and needing more support from their peers and lecturers in order to do well in the online courses. Findings from this study also showed the improvement of online learning self-efficacy via Bandura's four sources of efficacy information including the influence of online learning self-efficacy through learners' performance, feeling, and thinking process. The discussion of these findings is presented in the next chapter.

CHAPTER 7

DISCUSSION

Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are a part of the mystery that we are trying to solve.

(Planck, 1933)

7.1 Introduction

This chapter presents reflections on the findings in terms of the relationship between *learner control* and *self-efficacy* in an authentic online learning environment. The discussion returns the focus to the main research question and then considers a number of other issues that emerged through the course of study, including the influence of unanticipated variables such as delivery mode, computer skills and learner satisfaction. Finally, the chapter reflects on a number of methodological issues related to this study along with the design and development of data collection tools.

The first section discusses the quantitative findings in relation to the main research question and the relationship between *learner control* and *online learning self-efficacy*. The qualitative findings are used for data triangulation and to reinforce the quantitative findings.

7.2 What is the Relationship between Learner Control and Online Learning Self-efficacy?

The above research question gives rise to the central hypothesis of this study. In order to explain the relationship between *learner control* and *online learning self-efficacy*, this hypothesis was tested. The result of the testing of this hypothesis shows not only the existence of the correlation but also its direction and strength.

7.2.1 Hypothesis 1

There is a positive relationship between learner control and online learning self-efficacy.

The results of the quantitative analysis showed a positive relationship between *learner control* and *online learning self-efficacy* (Pearson $r_{(64)} = .526$, $p < .01$ one-tailed). As predicted, learner control embedded in the online programme positively influenced student self-efficacy. Additionally, a simple linear regression was performed and confirmed that *learner control* is a good predictor of *online learning self-efficacy*. This result denotes that if learners encounter higher levels of *learner control* in their online learning environment, then they are more likely to report more *online learning self-efficacy*. This positive finding is supported by a number of recent related studies (e.g., Behrend & Thompson, 2012; M. Chang & Ho, 2009; Ebner & Holzinger, 2007; Ng, 2012; Ste-Marie et al., 2013).

The qualitative analysis reported in Chapter Six of the present study also supported this positive finding, as most students ($n = 75$) made statements indicating their high self-efficacy level toward their online learning programme. Generally, an online learning environment makes it possible for learners to choose when, where, and how to accomplish their learning tasks. On top of that, learner control can be implemented into the online programme in various forms such as control over learning pace, sequence, content, and method of presentation. For example, Piccoli et al. (2001) showed that learner control with hypermedia gave learners greater control over their learning environment, as well as providing some distinctive ways of showing deep understanding and high interactivity. As described in Chapter Five, the authentic online programme used for this study was embedded with learner control and scaffolding throughout the course. The increase in students' perceived confidence to complete this programme is reflected by the following student comment: "*I got more confident with [online learning environments] I have started to do more and more online*". This is one indicator of this positive relationship.

According to Bandura (1997b), getting each task accomplished results in higher self-efficacy via mastery experience, although learner control by itself is not effective enough to maintain learner online learning self-efficacy. Efficacious learners need a more challenging task after they successfully accomplish one because a similar task or level of learner control can be easily managed with their experience and perceived self-efficacy level. Consequently, they might become bored and not sufficiently interested in carrying out similar tasks anymore. Thus, the improvement of self-efficacy by learner control might not be as high as expected (Hardin et al., 2013). Also, Bandura (2012) recently explained that "[i]f people experience only easy success they come to expect quick results and are easily discouraged by setbacks and failures" (p. 13). Thus, providing a high level of learner control without careful scaffolding of tasks can be counterproductive (Corbalan et al., 2006). Hence, the scaffolding should be an integral part of the course design to ensure that learner-perceived confidence in their ability to graduate from their online course is gradually increased and sustained.

The online programme for this present study was purposefully designed to incrementally build learner control, beginning with learning tasks with low levels of learner control such as asking learners to find a concept or key term definition. More tasks with higher levels of learner control, such as posting comments or questions to the forum, were introduced incrementally. With this design, learners became increasingly confident about their learning once they accomplished a task. In this way, the learner self-efficacy is gradually increased as they progress through the course content in a programme. Yantraprakorn, Darasawang, and Wiriyakarun (2013) explain that mastery experiences leading to gradually increasing self-efficacy and scaffolding helps learners gain deeper understanding. However, learner self-efficacy does not always increase; it appears that learners' perception of the types of learner control being implemented has an effect on self-efficacy, as demonstrated by Fulton, Ivanitskaya, Bastian, Erofeev, and Mendez's (2013) experiment. In their study, the courses were designed with different levels of learner control over learning pace, but participants did not perceive these levels of control differently. In summary, Hypothesis 1 in this present study was upheld by both quantitative and qualitative analyses. Hypotheses 2 and 3 were then examined.

7.2.2 Hypothesis 2

Online learning self-efficacy of learners in online courses with high levels of learner control is higher than those in online courses with lower levels of learner control.

Due to the nature of this online programme (See Chapter Five for detail), participants could be either internal or distance students (delivery mode). These students were studying the same papers with the same instructors and learning objectives. However, internal students were studying in traditional face-to-face classes with some online modules. As described in Chapter Five, this programme was designed for both internal and distance students. For internal students, online learning was not always compulsory, as one participant noted, "*I did ALL of the tasks listed on the list … just not on [the online learning website], and not always online*". The components of the course could be accessed online, if required, but engaging in the learning online was not a requirement. Therefore, the internal students generally had less control over their learning environment. In contrast, the distance students relied totally on the online learning environment and had no face-to-face interactions with their instructors and classmates. These distance students studied with higher levels of learner control than internal students. As the results in Chapter Six showed, distance students' experience with learner control was significantly higher than internal students ($t(37) = -4.26$, $p < .05$, $r = .66$), and it is likely that this was influenced by the requirement to use the online learning environment. For this reason, *delivery mode* was a suitable criteria used to divide participants into two groups in order to examine this hypothesis.

The results of the quantitative analysis show that the relationship between *learner control* and distance learner *online learning self-efficacy* ($r = .566$, $p < .01$ one-tailed) was stronger than that of internal students ($r = .503$, $p < .05$ one-tailed). These relationships were significantly different ($z = -.0239$, $p = .810$). Additionally, a *t*-test confirmed that distance student self-efficacy was significantly higher than internal student self-efficacy ($t(36) = -2.56$, $p < .05$, $r = .39$). As mentioned above, it is possible that these findings relate to students' use of the online environment.

The explanation for the distance student higher self-efficacy could be that the online programme investigated was designed with scaffolding pedagogy beginning with easy tasks and progressing to more difficult tasks. According to Hughes et al. (2012), the degree of difficulty is inherent in the learner-controlled online learning environment. The learners' overall level of control over pace, choice, and content is always related to the degree of difficulty. For example, a faster learning pace is considered to be more difficult than a slower learning pace. As indicated in Hypothesis 1, a higher level of learner control may be more difficult for students than a lower level of learner control. When online learners accomplish an easy task, their self-efficacy is increased through their mastery experience, which usually results in their aiming for a higher goal, or a more difficult level of learner control. In line with this study, Hughes et al. reported that as students attain higher and higher levels of learner control, their self-efficacy levels will increase. Therefore, learners with higher levels of learner control within a scaffolded course design are more likely to end up with higher self-efficacy than online learners with lower levels of learner control in a less structured environment.

Another explanation for this reported higher self-efficacy of distance learners is that distance learners are compelled to engage with the online environment with high learner control that encourages interaction between learner-instructor and learner-learner. As mentioned in section 2.6.3, interactivity can be used interchangeable with learner control because it consists of learner perceived interaction, communication context, and the medium structure (Scheiter & Gerjets, 2007). Mayes (2006) points out that when online learning focuses to a greater extent to interaction, the interactivity is almost equal to the learning process. This interactivity not only benefits learners in terms of success but makes learners engage and feel positive about the learning environment (Croxton, 2014) since students provide self-efficacy information to each other through vicarious experience, verbal persuasion, and physiological and affective states (Bates & Khasawheh, 2007; Katz et al., 2005; Swan, 2001).

However, caution should be taken when implementing learner control into an online learning course since different kinds of learner control might provide unexpected effect to learners (See Palmer, 2012). Further study is needed to understand the impact of *delivery mode* on online students. Notwithstanding the above comments, Hypothesis 2 was supported.

7.2.3 Hypothesis 3

Online learning self-efficacy of learners who have more experience with high levels of learner control is higher than those who have less experience.

To test this hypothesis, *learner control experience* was measured by the *numbers of papers* participants were (or have been) enroled in throughout the programme and their *year of study* (year-one to year-four). Regarding the *numbers of papers* students took while studying in this online programme, the quantitative findings showed that there was no significant relationship between *numbers of papers* enroled throughout the programme and student *self-efficacy* (r = .180).

There are two reasons that could explain this finding. Firstly, the number of papers might not be representative of *learner control* experience because these papers included face-to-face, blended, and online papers. Internal students were enroled in mostly traditional face-to-face or blended papers in which the online components were accessed when required. However, distance students only took online papers. So, the *number of papers* did not necessarily give an accurate indication of the learner experience of *learner control* in the online learning environment of this study. Secondly, the OLSE scale, especially the Learner Control and Interaction subscale, was designed to detect self-efficacy specific to the learner-controlled online learning environment. Therefore, the OLSES might not have detected learner self-efficacy regarding tasks assigned for internal delivery papers.

The relationship between *learner control* and *online learning self-efficacy* in relation to *year group* was positive and significant for three of the four year groups ($r_{(Yr\text{-}1)}$ = .534, p < .05 one-tailed, $r_{(Yr\text{-}3)}$ = .557, p < .01 one-tailed, and $r_{(Yr\text{-}4)}$ = .747, p < .01 one-tailed). The exception was the second year group where the relationship was weak and not significant ($r_{(Yr\text{-}2)}$ = .287). Although all positive, the correlations for the three year groups were also significantly different (See Table 6.6 for details). Pearson correlation coefficients show that the relationship between *learner control* and *online learning self-efficacy* got stronger as participants progressed through the online learning programme. These stronger relationships indicate that experience in a learner-controlled online

learning environment is a strong predictor of students' perceived ability to succeed in this programme of study.

The qualitative findings also support the above finding. Students reported that they felt more confident as they progressed through the course. One participant said that "*the more time I spent in [the online learning programme], the more confident I became*". As described in Chapter Five, the students in this programme were pre-selected using a range of criteria, therefore it is likely that they had higher learning self-efficacy than students in other programmes. Despite that, first year students reported a lack of confidence even though they had had *prior online learning experience*. Their OLSE scores were also relatively low compared to higher year level groups (year-one: M = 69.34). This finding confirmed that self-efficacy is specific to the circumstance (Bandura, 1997b). Although participants were equipped with skills or had some online learning experience before entering this programme, they still felt uncertain about the new learning environment. One participant in this first year group stated that "*I was not at all confident that I could do this*". The second and third year groups reported a mixed confidence response between low, moderate, and high online learning self-efficacy, but their online learning scores on average were still higher than the first year group (year-two: M = 76.43, year-three: M = 73.44). As predicted, the fourth year group reported a relatively high confidence score because they were in the last semester of a four-year programme. Most of the year-four participants expressed their feeling as "*very confident*" (83.3%) to succeed and looking forward to graduate from this online programme. Hence, their OLSE score was relatively high (year-four: M = 79.19). This finding suggested that student perceived self-efficacy increased as they progressed through the degree programme. Even students who started with high self-efficacy still showed an improvement in their self-efficacy as they moved up to higher year levels.

However, *online learning self-efficacy* might also decrease if students fail or are faced with a difficult situation. For example, a fourth year participant reported that he/she felt "*[n]ot confident … know I am failing one paper which will stop me from graduating after four VERY long years. Lost motivation and feel demoralised and let down by [the university] and this is affecting how I complete online requirements*". Learners' levels of self-efficacy can fluctuate depending on the quality and nature of their learning experience. The qualitative findings supported this finding in this present study and

indicated that *online learning self-efficacy* was not stable throughout the programme. As one participant expressed, "*Some days [I] am more confident than others. It really depends on what the task is and the work load that we are given*".

One explanation for this instability is that the level of self-efficacy might drop when students encounter unfamiliar tasks or perceive a lack of support from their peers and teachers. Nonetheless, the levels of self-efficacy can be adjusted back to the previous state or even higher depending on one's sense of self-efficacy. As Bandura (2012) noted, "resilient self-efficacy requires experience in overcoming obstacles through perseverant effort. Resilience is also built by learning how to manage failure so that it is informative rather than demoralizing" (p. 13).

However, not all learners had the ability to regain their self-efficacy on their own. Such a finding suggests that an online learning programme should be designed with both technical and emotional support embedded. Sufficient timely positive feedback or encouragement/provision for networking could be planned in the course design. With these supports, inefficacious online learners might have enough time to cope, adjust their learning strategies, and respond positively to the learning challenges. Consequently, their online learning self-efficacy might increase to the previous same level or even higher. Overall, the findings supported Hypothesis 3.

7.2.4 Hypothesis 4

The relationship between learner control and online learning self-efficacy is influenced by the age, gender, computer skills for academic purpose (CSAP), computer skills for social purpose (CSSP), and prior online learning experiences of online learners.

According to the literature reviewed in section 2.5.2 (e.g., Artino, 2007; Bernard et al., 2009; B. Lin & Hsieh, 2001; Pajares, 2002; Shen et al., 2013), self-efficacy can be influenced by many variables (such as *age*, *gender*, *prior online learning experience*, *computer skills for academic purpose*, and *computer skills for social purpose*). The discussion in the following sections is related to these variables and their relationships.

7.2.4.1 Hypothesis 4.1

The relationship between learner control and online learning self-efficacy is influenced by the age of online learners.

The relationship between *learner control* and *online learning self-efficacy* of the younger online learners group was positively significant, with $r = .504$, $df = 42$, $p < .01$ (one-tailed), as well as of the older online learners group, $r = .495$, $df = 21$, $p < .05$ (one-tailed). As can be seen, the correlation coefficient of the younger participants is slightly stronger than the older participants. However, these coefficients were not found to be significantly different (See detail in Section 6.6.1).

This present study also found that *age* had no influence on the relationship between *learner control* and *online learning self-efficacy*, despite the fact that, "*technology is part of some learners' life*" because "*they have been brought up with technology*". When the effect of age was controlled for, the Pearson correlation coefficient was still significant and similar to the original coefficient ($r = .525$, $df = 61$, $p < .05$). Additionally, the result from the independent *t*-test shows that the sample mean for the *online learning self-efficacy* of the younger online learners group ($M = 74.37$, $SD = 11.44$) was not significantly different from the one for the *online learning self-efficacy* of the older online learners group ($M = 76.07$, $SD = 17.23$), $t(29.1) = -.407$, $p > .05$. This result suggests that younger online students are not different from older online students in term of *online learning self-efficacy* in a learner-controlled online learning environment.

In contrast with Prensky's (2001) original concept of the generation gap, this finding concurs with many recent studies (e.g., Bennett et al., 2008; Helsper & Enyon, 2009; Li & Ranieri, 2010; Loos, 2012; Margaryan, Littlejohn, & Vojt, 2011). Prensky (2012) claims that as we move further into the new millennium, the generation gap in terms of computer usage, are being reduced as technology becomes more prevalent. Results from the analysis for this study showed that Hypothesis 4.1 was not supported.

7.2.4.2 Hypothesis 4.2

The relationship between learner control and online learning self-efficacy is influenced by the gender of online learners.

When the effect of the variable *gender* was controlled for, the partial correlation coefficient was still statistically significant ($r = .542$, $p < .01$ one-tailed) and slightly higher than the coefficient when no effect was controlled for ($r = .526$, $p = .01$ one-tailed). The relationship between *learner control* and *online learning self-efficacy* of male participants was positive but not statistically significant ($r = .521$). However, the relationship between *learner control* and *online learning self-efficacy* of female participants was statistically significant and positive ($r = .545$, $p = .01$ one-tailed). Results from the independent *t*-test revealed no difference between males' ($M = 75.74$, $SD = 14.47$) and females' *online learning self-efficacy* mean ($M = 74.46$, $SD = 13.91$), $t(65) = .266$, $p > .05$. The small number of male participants in this sample may have influenced this result.

Findings from this study also concur with previous studies. Chen's (2008) quasi-experiment, for example, found that male and female learners performed similarly in a high interactivity online learning environment. Likewise, Lin and Overbaugh's (2009) results verify that gender is only weakly correlated to students' performance in both asynchronous and synchronous blended online learning modes.

However, in contrast to this study, some research (e.g., Cassidy & Eachus, 2002; R. Chen & Tsai, 2007; Hoffman & Vance, 2007; Ilomaki, 2011; Ozogul et al., 2013; Pajares, 2002; Shen et al., 2013; J. Zhang et al., 2001) has shown that males and females perform differently in the online learning environment. One possible reason for the contradictory finding of the present research is that the sample group of this study was dominated by females (males = 11, females = 61). The comparatively small number of male participants might not have been large enough to show an effect on the *online learning self-efficacy*. The results of the analyses for this study show that Hypothesis 4.2 was not supported.

7.2.4.3 Hypothesis 4.3

The relationship between learner control and online learning self-efficacy is influenced by computer skills level for academic purpose (CSAP) of online learners.

The partial correlation coefficient was still significant and positive when the effect of CSAP was not controlled for. However, the coefficient value was smaller (r = .408, p < .01 one-tailed) than the zero-order correlation coefficient (r = .526, p = .01 one-tailed). The weaker value indicated that the relationship between *learner control* and *online self-efficacy* still exists and CSAP could have an effect on the relationship either partly spuriously or partly indirectly. If the relationship is partly spurious, it means CSAP has an influence on both *learner control* and *online learning self-efficacy*. If the relationship is partly indirect, it means *learner control* had an effect on CSAP, and then CSAP passes on the effect to *online learning self-efficacy*. In other words, CSAP partially mediates the relationship between *learner control* and *online learning self-efficacy*. This finding was in line with research reported in the literature review in Chapter Two section 2.5.2, which suggested that necessary computer skills for studying are important and can influence the students' perceived capability to succeed in the online programme (Jun, 2005). One participant reported that she had enough computer skills for academic purposes "*such as writing emails, looking up databases and searching the web*". With these skills, she felt positive that she would be "*able to successfully complete*" the online programme "*without any trouble at all*".

Later, CSAP was grouped into *basic*, *intermediate*, and *advanced*. The correlation between *learner control* and *online learning self-efficacy* of participants with basic CSAP was not significant and negative due to a very small number of participants in this group (two members). *Learner control* of participants with intermediate and advanced CSAP was positive and significantly correlated to their self-efficacy. The correlations of these two groups were then compared and found to be significantly different (See details in Section 6.6.4). In essence, this study verified that CSAP had an influence on the relationship between *learner control* and *online learning self-efficacy*. Yet, the findings could not provide a full explanation on how CSAP affected this

relationship due to the limitations of the research design. This is an area for future study. Nevertheless, Hypothesis 4.3 was supported.

7.2.4.4 Hypothesis 4.4

The relationship between learner control and online learning self-efficacy is influenced by computer skills level for social purpose (CSSP) of online learners.

CSSP was also found to have an effect on the relationship between *learner control* and *online learning self-efficacy*. When the effect of CSSP was controlled for, the correlation coefficient was still positive and significant ($r = .481$, $p < .01$ one-tailed). This coefficient value means that the relationship between *learner control* and *online learning self-efficacy* still remained when the effect of CSSP was statistically eliminated. The smaller value of the coefficient indicated that CSSP had an effect on the relationship between these observed variables. The influence of CSSP could be either partly spurious or partly indirect to the main relationship. This finding concurs with other studies (e.g., Mitchell et al., 2005; Su & Klein, 2006) reported in Chapter Three which found that computer skills can influence student online learning self-efficacy. Daily computer usage not only influences the confidence of learners to succeed in online learning but also helps novice learners to easily adapt to new kinds of technology-assisted learning. Callum (2012) noted that general computer skills were important for the adaptation of online learners to a new learning environment.

Consistent with CSAP, CSSP was also grouped into *basic*, *intermediate*, and *advanced*. There was no analysis of the basic CSSP group due to a very small participant group (one member). Within the group of participants with intermediate and advanced CSSP, *learner control* was significantly and positively related to *online learning self-efficacy*. The correlation of the intermediate CSSP ($r = .634$, $p < .01$) was stronger than the advanced group ($r = .395$, $p < .01$). However, the coefficients of determination (r^2) of these two groups were not much different, r^2 of the intermediate CSSP group was 40% and r^2 of the advanced CSSP group was 37.5 %. The correlations of these two groups (intermediate and advanced CSSP) were then compared and found to be significantly different (See details in Section 6.6.5). This result aligns with the qualitative findings,

suggesting that learners with general daily computer usage are confident to succeed when attending online courses. One student's response affirmed this view: "*I am very confident about my skills on a computer and that I have all the skills needed to meet the requirements of the paper*". In summary, Hypothesis 4.4 was supported.

7.2.4.5 Hypothesis 4.5

The relationship between learner control and online learning self-efficacy is influenced by prior online experiences of online learners.

The result of ANOVA showed a significant positive effect of *prior online experience* on learner *self-efficacy*. This finding means that *online learning self-efficacy* increased in proportion to their *prior online learning experience*. Learners with a lot of *prior online experience* had significantly higher *self-efficacy* than learners who had *none, a little,* and *some prior online learning experience*.

The result of a partial correlation showed *that prior online learning experience* has an influence on the relationship between *learner control* and *online learning self-efficacy* ($r = .430$, $p < .01$ one-tailed). This means when *prior online experience* was statistically controlled the relationship between *learner control* and *online learning self-efficacy* is still positive. The second, third, and forth-order partial correlation confirmed the major effect of *prior online experience* on the relationship while the correlation matrix showed the association among *prior online learning experience*, *learner control*, and *online learning self-efficacy*. According to de Vaus (2002), the variable *prior online experience* can be related to the investigated relationship in two ways: partly spurious or partly indirect. However, findings analyses for this study could not confirm if *prior online experience* was partly spurious or partly indirect. Further research is needed to examine this relationship.

According to Bandura (2013), efficacious people set their goals higher than people with low self-efficacy level. A recent study by Hughes et al. (2012) also showed that online students who have high self-efficacy are willing to engage with difficult tasks than lower self-efficacy learners. Findings from this present study suggest that there is

evidence for the role of *prior online learning experience* in the relationship between *learner control* and *online learning self-efficacy*. In addition, Huang, Lin, and Huang (2012) found that prior knowledge mediated the relationship between online participant and learning performance. Although the design of this study could not explain these relationships thoroughly, Hypothesis 4.5 was upheld.

In summary, learner control is found to be positively correlated to online learning self-efficacy. Both the quantitative and qualitative findings support this positive relationship. Distance students appear to have higher self-efficacy levels than internal students. Students who have been studying in the online programme longer have higher self-efficacy than novice learners. Age and gender have no influence on the relationship between learner control and online learning self-efficacy. CSSP, CSAP, and previous online learning experience mediate the investigated relationship. In addition to these findings, other related variables such as computer skills and the nature of online learning self-efficacy in learner-controlled online learning programme, are discussed in the next section.

7.3 Other interesting issues

The issues discussed in this section which emerged from the study are not related directly to the research question and hypotheses but appear to be worth to mentioning as adding to knowledge in this area.

7.3.1 Computer skills

In the previous section, CSAP and CSSP were found to have an effect either partly direct or spurious on the relationship between *learner control* and *online learning self-efficacy*. In this section, there are several issues worth mentioning in relation to learners' *computer skills*. Firstly, the findings showed a contradiction to other studies discussed in the literature review section 2.5.1 in that online learners nowadays were more familiar with daily used technology but still lack of academic skills (e.g., Kennedy et al., 2008; Mandernach et al., 2006; Wojciechowski & Palmer, 2005). According to existing research, those students should have more CSSP than CSAP but it appeared that the sample group showed an opposite trend with CSSP, $M = 24.5$ ($SD = 4.5$) and CSAP, $M = 34.4$ ($SD = 7.4$). One explanation for this trend might be related to the

inclusion of competency in computer use as a requirement in the pre-selection process and for students to enter the programme. The majority of participants (74.7%) had intermediate CSSP; only a few students had advanced *computer skills for social purpose* (1.3 %). This phenomenon indicated that advanced skills are not needed for daily use of the computer and the Internet, except for those who are doing specific tasks such as linking to a database, developing a website, or creating a video clip.

Secondly, the ANOVA found that CSSP level had no influence on *online learner self-efficacy* but a partial correlation indicated that CSSP had an influence on the relationship between *learner control* and *online learning self-efficacy*. On the other hand, ANOVA showed both CSAP level and CSAP significantly affected *online learning self-efficacy*. Participants with intermediate and advanced CSAP level also showed a significantly higher *self-efficacy* than the basic CSAP level group. The multiple regression also proved that CSAP (accounting for 12.8% of OLSE's variance) was a good predictor of learner *self-efficacy* next to *learner control* (which accounted for 27.7% of OLSE's variance). Together, these two variables can explain around 40% of OLSE's variance. In other words, other variables account for 60% of the variation in OLSE. Thus, more research is needed to complete this puzzle.

Thirdly, the pilot study found that participants overestimated their computer skills (See Appendix H.1). This finding is supported by existing research (e.g., Baim, 2004; Jurica & Holmes, 2008). Despite this, the actual and perceived computer and technology skills reported in the main data collection showed little difference. Indeed, most participants (91.5%) reported their computer skills accurately. As mentioned in Chapter Five, this difference in findings might result from the larger and more diverse sample group of the main study.

Fourthly, *perceived computer skills* is significantly related to *actual computer skill* (the sum of CSAP and CSSP, grouped into three skill levels) with $r = .260$, $p < .05$. The relationship between *learner control* and *online learning self-efficacy* of participants with *basic*, *intermediate*, and *advanced perceived computer skills* are shown in Table 7.1. The relationship between *learner control* and *online learning self-efficacy* of participants with basic and intermediate *perceived computer skills* are similar to the relationship between *learner control* and *online learning self-efficacy* of participants

with basic and intermediate *actual computer skill*. However, the relationship within the participants with advanced computer skill was strong while no relationship to *learner control* was found in the group of participant with advanced *perceived computer skills*. The relationship of the intermediate and advanced actual computer skill were found to be significantly different. This finding implies that computer skill has a positive effect on the relationship between *learner control* and *learner self-efficacy* via either CSSP or CSAP. ANOVA also confirmed that *online learning self-efficacy* increased proportionately with the level of *actual computer skill*. Learner confidence to succeed in online learning was significantly higher for students with intermediate and advanced computer skill than learners who had basic computer skill.

Table 7.1 *The Relationship between Learner Control and Online Learning Self-efficacy within the Subgroup of Perceived and Actual Computer Skills*

Skill level	Perceived computer skills	Actual computer skill
Basic	No significant relationship	No significant relationship
Intermediate	r = .590**	r = .418**
Advanced	No significant relationship	r = .819**

Note: *Note*: ** Correlation is significant at the .01 level (one-tailed).

Lastly, *perceived computer skills* also affects the relationship between *learner control* and *online learning self-efficacy* but the effect is not as strong as *actual computer skill*. When the effects of CSAP and CSSP were removed, the second-order partial correlation yielded similar results to the third-order partial correlation when CSAP, CSSP, and *perceived computer skills* were controlled. In addition, ANOVA did not find any difference in *online learning self-efficacy* in relation to *perceived computer skills*. Therefore, *perceived computer skills* must have an indirect effect on *online learning self-efficacy* via other related variables or might affect *learner control*. The clear explanation of these relationships was limited by this research design. Thus, further study is needed to look at these links.

7.3.2 The nature of online learning self-efficacy in learner-controlled online learning programme

In this present study, the mixed methodology design produced very rich data and information that can assist in the understanding of learner self-efficacy in the learner-controlled online learning programme. The quantitative findings present empirical

evidence of the relationship between learner control and online learning self-efficacy whilst the qualitative data findings allow a more detailed exploration of the complex nature of online learning self-efficacy that a correlational research design on its own may not provide.

From this study, the quantitative findings affirm that learner control embedded in the online programme has a positive effect on learner self-efficacy. The qualitative findings, however, confirm that the increasing of learner self-efficacy comes from four sources as stated by Bandura (1997b): mastery experience, vicarious experience, verbal persuasion, and physiological states. The improvement of learner self-efficacy came mainly from mastery experience (See Bandura, 2006a; Maddux, 2000). With embedded scaffolding, learner self-efficacy gradually improves through the incremental success of the assigned tasks (See Graham, 2011; Yantraprakorn et al., 2013). Through online interaction with their peers, learners receive efficacy information from their friends' achievement (Bandura, 2012; Hodges & Murphy, 2009). These interactions, if positive enough, could eliminate the transactional distance between learners themselves and their teachers (Moore, 2007), especially if they feel engaged with the learning tasks and a sense of belonging to the learning environment/ community. Boling et al. (2012) notes that online learners who had a difficult time interacting with their teachers and peers felt isolated and unhappy. For this reason, Boling et al. recommended that online learning courses should be designed to develop a community of learners and social presence.

Constructive and timely feedback was identified from this study as another source to improve learners' self-efficacy (Bates & Khasawheh, 2007; Xiao, 2012). Research has shown that quality feedback is more important than quantity of feedback (Swan, 2001). In term of interactivity, feedback is the interaction between learners and their instructor. Croxton (2014) confirms that learner interactivity in form of activities and feedback engages learners. In addition, online learners receiving quality feedback feel positive about their learning process and have a sense of belonging to the learning community. Croxton concludes that high interactivity in this form can benefit by increasing higher retention rates.

Lastly, mood of students was found to contribute to the changes in online learning self-efficacy (H. R. Chen & Tseng, 2012; Sawang et al., 2013; Tempelaar et al., 2012). In this present study, high efficacy participants reported that they were satisfied with the online learning programme. The positive feeling about the learning environment added to learners' self-efficacy via physiological and affective states. A positive link between online learning self-efficacy and satisfaction is confirmed by many studies (e.g., Eastin & LaRose, 2000; Joo et al., 2013; Kuo et al., 2013). Additionally, Joo et al. (2013) found that satisfaction mediates the relationship between self-efficacy and persistence.

In line with previous research (e.g., Hill & Hannofin, 1997; Multon et al., 1991; Pintrich & Groot, 1990; Zimmerman et al., 1992), efficacious learners were engaged and put great effort into learning online. When faced with challenges, they tried to use many strategies to resolve problems (Reeve, 2009). They also persevered after encountering failure (See Bandura, 1994). These online students were motivated (See Alivernini & Lucidi, 2011; Beier & Kanfer, 2010; Chowdhury & Shahabuddin, 2007; Kozlowski & Salas, 2010; Vancouver & Kendall, 2006), felt positive and satisfied with their learning process (See Joo et al., 2013; Kuo et al., 2013).

A significant finding from this present study about online learning self-efficacy was that learner self-efficacy is not consistent but can rise up and down throughout the course of study. This changing nature of online learning self-efficacy corresponds to Haddoune's (2009) finding. While learning, online learners are required to complete many tasks, some tasks were more difficult than others and learners might not feel satisfied with their performance and failed to complete that tasks. Consequently, their self-efficacy at that point lowers and they can start to have negative perceptions about their overall learning experience. If these learners are not supported or successful in accomplishing another task, their self-efficacy could decrease even more. However, online learners with high self-efficacy levels could motivate themselves and see their failure as room for improvement. They were resilient and could regain the same level of self-efficacy back in a short time (Schwarzer & Warner, 2013). Therefore, these students could maintain a positive approach to learning in order to successfully complete the online programme.

Other than learner control, computer skills for academic purpose (CSAP) was found to be a good predictor of online learning self-efficacy. From the multiple regression analysis, learner control and CSAP accounted for 40% of the variation in online learning self-efficacy. While learner control alone explained 27.7% of online learning self-efficacy variance, CSAP accounted for 12.5% of online learning self-efficacy's variation. This finding suggests that increasing in online learning self-efficacy can be done by improving learners' computer skills for academic purpose such as technology skills for searching information, presentation, collaboration, research, and online learning (Ratliff, 2009). Such skill building can be done through online technical support or orientation to novice learners. Shen et al. (2013) recommended in their recent work that orientation should be given to novice learners, especially information on how to navigate and utilise available tools in the online environment. In addition, Brown, Keppell, Hughes, Hard, and Smith's (2013) pointed out that frequently online students might not either be aware of the availability of the support systems or are afraid to reach out for support. For this reason, a support system should be introduced to the students as early as possible. With adequate and obvious supports, inefficacious online learners can be successful in the online learning environment as well as efficacious learners.

7.4 Refection on Data Collection Tools

Research in the area of online learning self-efficacy is increasing and a number of recent studies share the same notion that online learning self-efficacy is multi-dimensional. Instead of using a one dimensional self-efficacy scale like computer self-efficacy or academic self-efficacy scale, multi-dimensional scales were invented to suit the context of study. Shen et al. (2013), for instance, constructed a scale to measure the self-efficacy of American online learners. Their scale consisted of five subscales: self-efficacy to complete an online course; self-efficacy to interact socially with classmates; self-efficacy to handle tools in CMS; self-efficacy to interact with instructors in an online course; and self-efficacy to interact with classmates for academic purposes. In this study, OLSES was also invented based on this multi-dimensional measure construct of self-efficacy of learners in a learner-controlled online learning environment. Even though OLSES is composed of two subscales, (a) Learner Control and Interaction, and (b) Computer and Internet subscale, OLSES and Shen et al.'s scale are similar in that

both scales were designed to measure the learners' interaction and computer competency in relation to online learning. In addition, both scales followed Bandura's (2006a) guideline using unipolar 10-unit intervals from 0-10 (cannot do at all to highly certain can do).

However, OLSES and Shen et al.'s (2013) online learning self-efficacy scales are different when analysing the data. OLSES measures self-efficacy of learners in an online environment by combining scores from two subscales and reporting students' perceived capability to succeed in an online programme. On the other hand, Shen et al. measured self-efficacy to complete an online course in a separate subscale and did not sum any of the scores from five subscales. The scores of each subscale were reported separately.

Regarding the generalisability of OLSES, OLSES can be used to measure learner self-efficacy in a wide range of online learning environments due to the fact that online learning being offered around the world varies in degrees of learner control. The online course with lowest learner control generally allows learners to browse and search. However, caution should be taken when planning to apply OLSES to different online learning environment contexts such as synchronous online environments.

7.5 Synthesis of the Findings

As described so far, the relationship between learner control and online learning self-efficacy is complex and not fully explicated by this research design, since both learner control and online learning self-efficacy are multidimensional. However, the findings are useful enough to build an understanding of how to support online learners by using learner control embedded in the online course to elevate learner self-efficacy. Among students equal in ability but differing in self-efficacy, those with a higher sense of efficacy manage their time better, are more persistent, are less likely to reject good solutions prematurely, and are more successful in their problem solving (Schunk & Meece, 2006). Xiao's (2012) study, mentioned in section 2.4.2, also confirmed that successful learners (the top 15% of the class) had a strong sense of efficacy. With high online learning self-efficacy, these students, more often than not, were not afraid of making mistakes and learned from their faults since they viewed errors as informative

rather than failure. Furthermore, the result of Hsu's (2012) survey study with 125 university online students in Taiwan showed that students with high self-efficacy find it easier to adjust and cope better with learning anxiety than students with low self-efficacy. Hsu also stated that efficacious students, no matter of what learning styles, could get back and carry on their learning after facing an obstacle quicker than inefficacious students. Therefore, it is important to keep learner self-efficacy at high levels because "self-efficacy masters strategic thinking, productive enlistment of resources, and perservance in different undertakings" (Bandura, 2013, p. 151). From this study, the way to raise and stabilise learner self-efficacy in the learner-controlled online learning programme is shown in Figure 7.1. The diagram conveys the dynamic nature of online learning self-efficacy in a learner-controlled online programme.

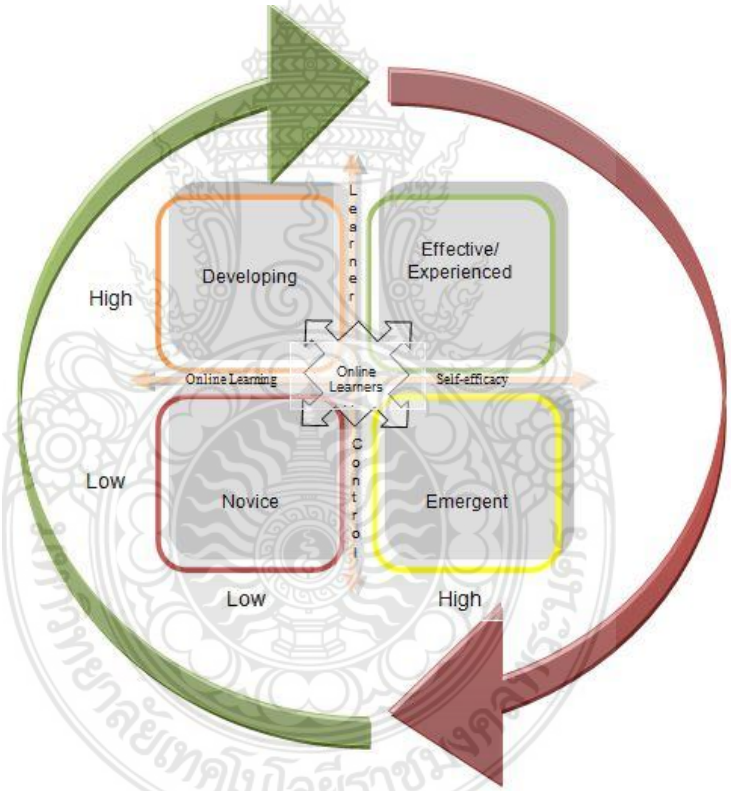

Figure 7.1 Online learners and stage of self-efficacy improvement

Learners might start online learning at any of the quadrants depending upon many factors. These factors could include previous online learning experience, academic success, and computer technology skills. Novice online learners are more likely to have low self-efficacy levels towards their new online learning environment and probably lack some essential learning skills. An online learning course should start with less control or lower task difficulty and provide considerable technical and psychological

support. These supports should make learners feel more competent and comfortable so that they become at least emergent learners that are ready for higher levels of learner control. Without adequate support, learners might not have required learning skills and feel confused, helpless and isolated, which pulls their self-efficacy to a level lower than the existing one. Eventually, these learners will be prone to failure and more likely to give up the online course.

As learners progress through the online courses, higher levels of learner control can be added. Emergent learners might feel less confident if the task is very different or requires higher collaborative or critical thinking skills. At this stage, support from peers and instructors is needed to help them cope and persist in the learning environment. Learners at this stage should develop enough competency and confidence toward their online course as well as a sense of belonging. Thus, they are called developing learners. As they accomplish more complex tasks, their self-efficacy will improve and rise even higher and they will become experienced learners who can master the online learning programme effectively, have more autonomy, and are more likely to achieve good academic outcomes. However, the term *experienced* here is not used to mean the learners have become an expert or are fully developed, or that they will not need more development. Online learning environments are continually changing as new technology emerges.

As stated earlier, this study notes two important issues that should be emphasised here. Firstly, online learning self-efficacy of online learners is sensitive to tasks or the learning environment. Learners' level of self-efficacy can fluctuate all the way throughout the programme. Though online learner self-efficacy can bounce back on its own, it is crucial to monitor the level of self-efficacy and support online learners when their self-efficacy drops. Secondly, the effect of learner control on learner self-efficacy cannot be maximised without scaffolding design. With these two issues in mind, this study concludes with a framework for successful online learning and therefore learners. This framework is composed of six essential elements that should be embedded in an online programme: identification, scaffolding, technical support, networking, positive feedback, and collaboration (See Figure 7.2).

Figure 7.2. The embedded framework for supporting successful online learners

Following Ward and Benson's (2010) recommendation, this framework is developed from the experience and perspective of online learners unlike Mishra and Koehler's (2006) framework, TPCK or TPACK, which was developed from instructor perspectives (AACTE Committe on Innovation and Technology, 2008). This framework is dynamic in nature from the start to the end of the online programme because the self-efficacy levels of online learners are not always stable. The learning skills of novice online learners and self-efficacy level related to a learning programme should be assessed as early as possible. This identification process should be set during the orientation or pre-course modules. In this way, at-risk learners are identified and supported to prevent them from failing or dropping out.

Support is necessary to the success of the online learning course and learner survival. Technical support should be designed as a part of student orientation and continued within the programme. This technical support should introduce learners to the online learning interface. Additionally, specific software skills should be given in separate online modules which are easy to access via the online programme website. If learners

have adequate online learning but are still inefficacious, support should put emphasis on the psychological level such as giving them an online buddy, access to a hotline support team, and encouraging statements from lecturers. Any activity that helps online learners connect with lecturers, a support team, and their online friends is helpful. It can build ties among online learners and the teaching team which can strengthen online learners' sense of belonging.

Scaffolding is another essential element for building an online course with learner control because learner control itself might not provide a full effect on learner self-efficacy. Online learners might be put off by a course constructed with a low level of learner control. On the contrary, an online course with high levels of learner control might be too difficult and lessen learner self-efficacy. The mix of low and high learner control is not effective at all either without the incremental success of scaffolding. The benefits of scaffolding match with the nature of self-efficacy because learners will aim for more challenging goals one after another. Furthermore, scaffolding should also apply not only for the instruction but also to the support system. As learners' confidence and competency increase, the support should be taken away gradually. In addition, Cannon-Bowers and Bowers (2010) emphasise that "the most crucial feature of scaffolds is fading" (p. 242). Therefore, scaffolding should be gradually removed allowing learners to take control, become more independent, and gain a sense of self-direction.

Networking and collaboration are also important, especially for distance learners. The design of online courses should promote networking among students, lecturers, and support staff through functions such as forum, synchronous chat, or meeting, and other social network tools. In addition, high levels of learner control naturally enables collaboration and interaction via learning tasks and activities. The more interaction learners have the more secure sense of belonging and stronger support network they get (L. Thomas, 2012).

Last but not least, positive feedback is vital to learner success in online learning. This study found that distance learners need constructive and timely feedback from their lecturers. The absence of feedback makes learners feel frustrated and left out which leads to a drop in their confidence toward their learning. Lengthy generic feedback is

not as effective as briefer personalised feedback. Positive feedback helps learners confirm their understanding as well as uplifting their emotions which strengthens their self-efficacy. Positive feedback in the form of encouraging messages also motivates learners to be more confident and willing to persevere when they face a difficult learning stage (Corbalan, Kester, & Merrienboer, 2009).

The recommended online course design frameworks help to guide the learning design process to effectively support online learners, especially the at-risk students who are more likely to fail online courses. These six elements are important to the framework for successful online learners. It is important to acknowledge that each learner is unique and needs a different level and type of support. In addition, learners should be monitored throughout an online programme to guarantee success, since countless factors can influence their online learning self-efficacy.

In addition to the embedded framework for support successful online learners, this study has prompted the development of a set of guideline called SUCCESS that provides a useful tool for online learning course developers. This set of guidelines emphasises the benefits and outcomes that online learners should get from the online courses, not only subject information but also metacognitive knowledge of themselves as learners.

The word SUCCESS is an acronym for Scaffolding, Understanding (Knowledge), Competence (Skills), Control (Learner control – autonomy), Enjoyment (Satisfaction), Self-efficacy, and Support. While the embedded framework for support successful online learners offers elements that the online course should have, SUCCESS is the product of that framework. Designing a course with this framework, could assist in providing learners with an optimal degree of control and incremental success. Thus, learners can be encouraged to be efficacious, autonomous, and satisfied with their learning process.

7.6 Chapter Summary

In summary, this chapter discussed the quantitative and qualitative findings. The relationship between *learner control* and *online learning self-efficacy* was confirmed with a link to other variables: *delivery mode*, *previous online learning experience*,

computer skills for academic purpose, and *computer skills for social purpose*. Despite the complexity of these relationships, ways to support learner self-efficacy by learner control are explained and summarised through the development and presentation of the *Embedded Framework for Support Successful Online Learners* and a set of related guidelines (SUCCESS). Both the Framework and the Guidelines may prove useful for online educational course developers as they plan for increased student engagement, success, and self-efficacy as well as student completion and retention rates.

CHAPTER 8

CONCLUSIONS AND IMPLICATIONS

Learn from the past, set vivid, detailed goals for the future, and live in the only moment of time over which you have any control: now.

(Denis Waitley)

8.1 Introduction

This chapter summarises the findings of this study and its limitations. It then reflects on the contribution the research has made to new knowledge in the area of online learning, specifically in relation to self-efficacy, before outlining the major implications for both educational practice and further research. The chapter concludes on a personal note with the researcher's final thoughts.

8.2 Research Summary

In the quest to find practical strategies for supporting online learners by improving their self-efficacy using a built-in element, learner control, this study tested four main hypotheses. For the purpose of this study, an Online Learning Self-efficacy Scale (OLSES) was constructed and validated as no relevant scale was available when planning for the study in 2010. The scale was found to be reliable with an internal consistency of .895 and its use in the pilot study showed it did measure the self-efficacy construct in online learning environments (Also see Appendices H.2 and H.3).

Learner control was found to have an effect on *online learning self-efficacy*. However, the answer to the research question, *what is the relationship between learner control and online learning self-efficacy*, is not straight forward. Though this study confirmed that learners' sense of control has a positive influence and is a good predictor of *online learning self-efficacy*, it provided only one-third of learner *self-efficacy* variance. That means other variables also played a significant role in this relationship. From this research design, *gender* and *age* had no significant effect on the relationship, while

perceived computer skills, CSAP, CSSP, *prior online experience*, and *delivery mode* did influence the investigated relationship. However, the findings could not clearly explain how these variables – *perceived computer skills*, CSAP, CSSP, *prior online learning experience*, and *delivery mode* – are related to the investigated relationship. Nevertheless, multiple regression analysis confirmed that *learner control* and CSAP are good predictors of *online learning self-efficacy* since these variables explained 40.5 % of the variation in *online learning self-efficacy*.

Overall, the study found that the relationship between learner control and online learning self-efficacy is complex and further research is needed to explicate the role of such variables in this relationship. The qualitative findings provide valuable insights of how learner control embedded in the online learning programme strengthens learner self-efficacy via mastery experience, peer modelling, constructive feedback, and physiological states. Importantly, understanding the effect of online learning on learners was enriched through the qualitative data. Other interesting themes revealed through these data included the role of interaction, satisfaction, and support. Finally, drawing on the findings and contemporary literature, an embedded framework to support successful online learners was constructed to guide educators and in particular future online course development.

8.3 Limitations of this Study

The research faced a number of limitations due to challenges of investigating the relationship of *learner control* and online *learning self-efficacy* in an authentic online learning environment. For example, this online learning programme was specially designed with learner control scaffolding, and built-in support. It was characterised as an instructor-directed online learning programme, but was also designed to allow both internal and distance students greater control over their online learning environment. Since learner control and online learning courses can be implemented with different purposes and strategies, therefore, caution should be taken when applying the findings of this study to online learning in different instructional settings.

Due to the time limitation of this study, a cross-sectional data collection research design was used. The sample group was small due to the actual class size of the chosen online

programme. The participation rate was around 30% due to voluntary participation. This sample group was also homogeneous, comprising mostly white-European New Zealanders. In addition, the participants were studying in a four-year initial teacher education programme. The findings might be different when applying this research design for online learners who have different culture, ethnicity, socioeconomic backgrounds, and learning orchestrations and are studying in other disciplines. All these factors have a bearing when interpreting the significance of the study.

8.4 Contribution to New Knowledge

Despite the above limitations, the study contributes new knowledge to the area of online learning self-efficacy, especially in relation to authentic online learning environments. In this regard, the results of this study help to address an important gap in the research literature, as identified in Chapter Three. Importantly, the relationship between *learner control* and *online learning self-efficacy* in an authentic online learning context was confirmed. New insight and understanding of learner control and self-efficacy in online environments was gained, especially in relation to scaffolding of learning experiences. Additionally, a reliable multi-dimensional Online Learning Self-efficacy Scale (OLSES) was developed and validated. In the future, this scale can be adapted and used by other researchers to assess learner self-efficacy in similar authentic online learning environments.

8.5 Implications for Educational Practices

This study sheds some new light on how to design online learning courses that can support online learner self-efficacy. Online educators, instructors, and designers can use this embedded framework for supporting successful online learners recommended in section 7.5 to build an online course that promotes online learner success. At the design level, scaffolding and learner control should be embedded in the online course as learning experiences. As stated in section 2.6.5, learning tasks or activities should be structured from less learner control to more difficult levels that need a high level of thinking. Additionally, technical support systems such as online learning tutorials, should operate in concert as parts of the learning environment. At the policy level, learners should be a focus of the online learning policy. Teaching developers should

ensure that teachers understand the importance of scaffolded support, and that they have enough expertise in building online courses with embedded learner-controlled and strategies that encourage interactivity to improve learner self-efficacy. Another recommendation is that online course should be designed differently for internal, blended, and distance students because students enroled in the different modes do not share the same background experiences or motivational drivers in studying that impact on self-efficacy. Therefore, on-campus and off-campus based and online based online courses should be uniquely constructed to optimise the opportunity of all learners. As a result, completion rate of online learning in higher education can be improved.

8.6 Implications for Future Research

While this research brings the complexity of online learning self-efficacy in an authentic online learning context to light, it actually poses more questions than it gives answers. In many respects, the study has only scratched the surface and more research about online learning self-efficacy is needed, particularly in authentic learning environments. In the future, a larger case study or longitudinal study in an authentic setting is recommended to probe the complexity of the relationship among variables and the dynamic nature of online learning self-efficacy. A bigger and more diverse sample in terms of ethnicity, culture, background, the implementation of learner control, and so on should also provide a fuller picture of online learning self-efficacy, its nature, and how to foster and stabilise it in an authentic online class setting.

8.7 Final Thoughts

The level of interest in online learning in higher education grew significantly over the last three years. There is little doubt that online courses will become even more common in the years ahead and the boundary between online and face-to-face teaching modes will be blurred even more, especially through further technological advancements. Nevertheless, this study suggests that online learning providers need to pay more attention to the specific needs of their learners as they are likely to differ from on campus students. Despite the fact that the study could not fully answer or explain the relationship between how online learners' beliefs in their own ability affects their success in their online learning courses, the research verifies the role of such beliefs in

online learner success. Moreover, this study also confirms that when embedded in online courses, learner control is an effective means to foster learner self-efficacy and encourage the interactivity which contributes to a greater sense of belonging and helps create a community of practice. Learner control also offers learners more autonomy and self-direction which helps shape them to be independent lifelong learners in the future. On a personal note, the study has contributed to my own understanding of the power of thought which will be invaluable in my own practices when I return to my online work with my students at RMUTP in Thailand.

We are what we think. All that we are arises with our thoughts. With our thoughts, we make the world.

(The Lord Buddha)

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APPENDICES

APPENDIX A

ETHICAL APPROVAL

MASSEY UNIVERSITY

31 January 2011

[redacted]

Dear Widchaporn

Re: HEC: Southern A Application – 10/80
The relationship between learner control and online learning self-efficacy: Online learners in asynchronous online courses

Thank you for your letter dated 31 January 2011.

On behalf of the Massey University Human Ethics Committee: Southern A I am pleased to advise you that the ethics of your application are now approved. Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Prof Julie Boddy, Chair
Massey University Human Ethics Committee: Southern A

cc Dr Benjamin Kehrwald
School of Curriculum & Pedagogy
PN900

Dr Sally Hansen
STEUS
PN900

Dr Alison Kearney, HoS
School of Curriculum & Pedagogy
PN900

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Graduate School of Education
PN900

APPENDIX B

REQUEST FOR PERMISSION LETTER

January 5, 2011

[redacted]

[redacted]

I am a PhD student at Massey University conducting a research supervised by Dr. Benjamin Kehrwald and Dr. Sally Hansen. Since my proposed research focuses on online undergraduate students in a fully online learning environment offered in the College of Education, therefore, this letter is written to seek your permission to carry out my research within the college.

The proposed study, titled *The Relationship between Learner Control and Online Learning Self-efficacy: Online Learners in Asynchronous Online Courses*, aims to find whether levels of learner control in a fully online learning environment influences learners' online learning self-efficacy. This correlational research design seeks to develop understanding of the relationship between two variables: learner control and learners' self-efficacy in an online learning environment. Then, that understanding can be applied to improve online course design that can enhance learners' perceived efficacy toward their online learning while they are learning.

For your consideration of this request, a few issues related to this research are highlighted as followed:

- Participation to this study is on a voluntary basis. Anonymity will be ensured and written consents will be obtained according to the Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants, Massey University. This research does not anticipate any negative consequences of the potential identification of the context for the study, but it will not be named in order to help protect the identities of participants.
- The name of the institute will not be mentioned in the findings, thesis, and publication, however, it may be able to identify due to a relatively small number of tertiary institutions in New Zealand and nature of the research context.
- A pilot study is scheduled during November-December 2010 and the online data collecting process is planned during February – June 2011. This study intends to collect data from online students, from 1-year to 4-year, in the selected programme. Since this research is cross-sectional, online invitations will be distributed to all

students in the programme at a certain point of their study. If they are interested to participate, they must provide written consents before getting a link to the online questionnaire. The anticipated time is about 10-15 minutes.

- This research will occur online with [redacted] During the development of the data collection instruments, experts in the field which are online programme coordinators, researchers, and lecturers working in the college will be invited to evaluate and critique the instrument. Therefore, your permission is sought as [redacted] to allow staff, faculties and students to participate in working time and for the College's premises to be used for this research.

If you have any questions, I will be pleased to provide further information regarding this proposed study. Alternately, if you are satisfied with the information provided, your soonest reply with permission to proceed with this research would be very much appreciated.

I look forward to hearing from you.

Yours sincerely,

Widchaporn Taipjutorus
PhD Student, School of Curriculum and Pedagogy

Approved.

[redacted]

6.1.11

APPENDIX C

INFORMATION SHEET

MASSEY UNIVERSITY
COLLEGE OF EDUCATION
TE KUPENGA O TE MĀTAURANGA

The Relationship between Learner Control and Online Learning Self-Efficacy: Online Learners in Asynchronous Online Courses

INFORMATION SHEET

Hello all,

The purpose of this information sheet is to clarify concerns about this research, the researcher and your rights in agreeing to be involved in this study.

My name is Widchaporn Taipjutorus and I am conducting research titled *The Relationship between Learner Control and Online Learning Self-Efficacy: Online Learners in Asynchronous Online Course* as part of my PhD study in the College of Education at Massey University supervised by Dr. Sally Hansen and Associate Professor Mark Brown. This research is inspired by my own experience as a lecturer in a university in Thailand where most learners have low confidence in their ability to deal with an online learning environment. With the intention of enhancing online learners' self-efficacy, my research will try to explore the relationship of learner control and online learners' perceived efficacy toward their learning environment. The findings should provide useful information for online educators in order to design online courses that can enhance online learning self-efficacy of learners while they are learning.

What is the purpose of this study?
This study aims to find the relationship between levels of learner control and online learning self-efficacy of online learners studying in a university context.

Who is involved?
This research focuses on online learners in tertiary institutions in New Zealand. If you are an online learner in an online programme this year (2011), I would like to invite you to take part in this study. Your participation is on a voluntary basis and will have no effect on your study outcome. Your identity will be concealed and your responses will be confidential. I would like to have as many learners as possible to take part.

Who will know about your participation?
The responses that you give will be put together with the responses of all the other people to form general results. These responses will be kept at the SurveyMonkey website until the end of data collecting period and will be downloaded to the researcher's password-protected personal computer. Your identity will be anonymous as your response will come from Massey University IP address. No one can identify you as a participant.

The general information will be used in a PhD dissertation, and academic articles. The information will be stored in personal computer and the backup of these data will be stored in storage devices kept in a secure cabinet in a secure office at Massey University, Palmerston North. After 5 years, all data from this study will be destroyed.

What do you do if you wish to take part in this study?
If you are interested and would like to take part in this study, you will be required to respond to the web-based questionnaire. This should take about 20-30 minutes to complete. The questions include a free word association, multiple choice questions, rating scales and open-ended questions. To access

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the questionnaire, click on the web link found at the end of this information sheet. Such a procedure ensures that all participants remain anonymous to the researcher. This means I will not be able to identify who had made the decision to respond to the questionnaire, unless you provide me with your contact details. In this case, your responses will not be linked to your identity, and your identity will remain confidential.

How do you give your consent to participate?
Since this research will gather the data via online responses, your consent is given by filling in the questionnaire and submitting the results. Completion of the questionnaire implies consent. Thus, you have no consent form to sign. There is a statement acknowledging your consent at the beginning of the questionnaire. If you do not want to participate then please ignore this request.

What will benefit you as a participant?
Your participation in this research will not benefit you directly. However, the information you provide will help online educators like lecturers, paper coordinators, designers and policy makers, improve online programmes. This will help future learners who have low confidence in their abilities to deal with online learning to improve their online learning self-efficacy and therefore increase their chance of completing their studies.

What are your rights if you decide to take part in the research?
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- ask any questions about the study at any time during participation;
- miss responses if you do not wish to respond to a particular question;
- receive a summary of the research findings. After data are analyzed, preliminary findings will be posted on [redacted]

Project Contacts
Please feel free to contact Widchaporn or Dr. Hansen on the details below, if you have any questions about the research or just wish to know more.

Widchaporn Taipjutorus
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Committee Approval Statement
This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern A, Application 10/80. If you have any concerns about the conduct of this research, please contact Prof. Julie Boddy, Chair, Massey University Human Ethics Committee: Southern A, telephone 04 801 5799 x 2541, email: humanethicsoutha@massey.ac.nz

Please note that you can respond to the questionnaire **until October 30, 2011** after this date the questionnaire will not be accessible anymore.

APPENDIX D

THE QUESTIONNAIRE

How confident are you as an online learner?

This questionnaire contains items about your confident you are as an online learner. This should take you less than 25 minutes to complete the entire questionnaire. If you do not wish to respond to a particular question, simply go to the next question. Completion and return of this questionnaire implies your consent.

1. Have you ever performed these following tasks?

	Never	Hardly ever	Some of the time	Frequently
Playing a computer game	◯	◯	◯	◯
Reading and composing an e-mail	◯	◯	◯	◯
Participating in chat rooms on popular topics	◯	◯	◯	◯
Using MSN to chat with your friends	◯	◯	◯	◯
Booking a ticket, purchasing or selling items online	◯	◯	◯	◯
Playing an online game	◯	◯	◯	◯
Sharing your favourite songs or video clips with your friends on facebook or twitter using hyperlinks	◯	◯	◯	◯
Developing a website using a web authoring software such as Adobe Firework or Macromedia	◯	◯	◯	◯
Linking a database to use on an e-commerce website	◯	◯	◯	◯
Creating or editing movies and animations	◯	◯	◯	◯
Converting image files or audio files to various formats	◯	◯	◯	◯

How confident are you as an online learner?

Your computer experience

2. Which term is the best to decribe your computer skill?

- ◯ Beginner
- ◯ Intermediate
- ◯ Advanced

3. How often have you performed these following tasks in your past study?

	Never	Hardly ever	Some of the time	Frequently
Searching for a book using a library catalogue	◯	◯	◯	◯
Adding text to describe an image	◯	◯	◯	◯
Creating a presentation using software such as Microsoft PowerPoint	◯	◯	◯	◯
Selecting shapes or graphics to present ideas	◯	◯	◯	◯
Importing a digital image into a document or presentation	◯	◯	◯	◯
Modifying background and layout of presentation slides	◯	◯	◯	◯
Making a digitized image from a hard copy	◯	◯	◯	◯
Making and selecting appropriate graphs and elements to display data	◯	◯	◯	◯
Performing statistical analysis using statistical software	◯	◯	◯	◯
Using track changes and comment tools	◯	◯	◯	◯
Using navigation buttons and non-linear design for your presentations	◯	◯	◯	◯
Refining web searches using Boolean operators	◯	◯	◯	◯
Creating and editing table layouts	◯	◯	◯	◯

Cheers, your information is essential.

How confident are you as an online learner?

Your previous online learning experience

4. How much experience have you had as an online learner?

- ◯ None
- ◯ a little
- ◯ Some
- ◯ A lot of

5. Please describe type of online learning experience you have before.

How confident are you as an online learner?

Your experience in using Stream

Which tasks have you performed in your papers in the Bachelor of Education (Teaching) Primary/ Diploma in Education Studies this semester. Please TICK the appropriate box.

6. How often have you performed these tasks in [redacted]?

	Never	Hardly ever	Some of the time	Frequently
Getting familiar with the programme of study by going to an orientation or viewing introductory video clips.	○	○	○	○
Going through Stream to get familiar with the learning environment.	○	○	○	○
Finding course materials posted by lecturers.	○	○	○	○
Asking help from administrators by posting a query on Stream.	○	○	○	○
Helping others to understand key concepts by contributing links.	○	○	○	○
Doing an assignment using knowledge independently gained from other sources.	○	○	○	○
contributing to a group project or report.	○	○	○	○
Posting your opinions or ideas on the discussion board or forum.	○	○	○	○
Completing a task (eg. teaching module) expressing your ideas and concepts from the course.	○	○	○	○
Presenting a result from an assignment in Stream by writing a report or posting to the discussion forum.	○	○	○	○
Learning at your own pace from wherever you want.	○	○	○	○
Doing an assigned task in your own time.	○	○	○	○
Enhanced understanding of a concept from reviewing online studied materials and Stream.	○	○	○	○

How confident are you as an online learner?

Your experience in using Stream

7. Please describe other online tasks you did in your study not mentioned in this questionnaire.

You are halfway through. Please keep going.

How confident are you as an online learner?

Your online learning confidence

This section is designed to help us get a better understanding of the kinds of things that are difficult for you as an online learner. Please rate how certain you are that you can do each of the things described below by ticking the appropriate number. Rate your degree of confidence by choosing a number from low to high using the scale given below.

8. Learner Control and Interaction

	0 - Cannot do at all	1	2	3	4	5 - Moderately can do	6	7	8	9	10 - Highly certain can do
Assesing your progress in a programme.	○	○	○	○	○	○	○	○	○	○	○
Doing well in this programme with little help online from my lecturer.	○	○	○	○	○	○	○	○	○	○	○
Managing your time to complete all assigned tasks in the programme.	○	○	○	○	○	○	○	○	○	○	○
Planning and managing your own learning needs.	○	○	○	○	○	○	○	○	○	○	○
Staying involved with the course without face-to-face interaction with the lecturer.	○	○	○	○	○	○	○	○	○	○	○
Working well with my group for a task required in any online courses.	○	○	○	○	○	○	○	○	○	○	○
Organising and leading a course project involving other participants.	○	○	○	○	○	○	○	○	○	○	○
Participating in a discussion group in which the topic is discussed over a period of time by leaving messages for other participants.	○	○	○	○	○	○	○	○	○	○	○
Participating in group decision making.	○	○	○	○	○	○	○	○	○	○	○
Doing an online role-play activity if one is assigned.	○	○	○	○	○	○	○	○	○	○	○
Communicating effectively when my responses will be read by many people.	○	○	○	○	○	○	○	○	○	○	○

How confident are you as an online learner?

Your online learning confidence

Rate your degree of confidence by choosing a number from low to high using the scale given below.

9. Computer and Internet technology skills

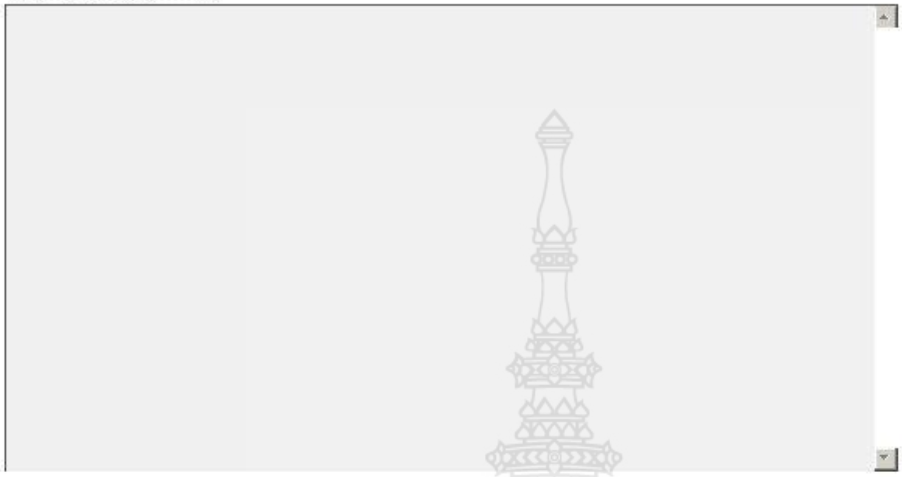
	0 - Cannot do at all	1	2	3	4	5 - Moderately can do	6	7	8	9	10 - Highly certain can do
Viewing an attachment from an incoming e-mail message.	○	○	○	○	○	○	○	○	○	○	○
Using online database such as one at the library or Google to find information needed.	○	○	○	○	○	○	○	○	○	○	○
Saving files from the Internet to my computer.	○	○	○	○	○	○	○	○	○	○	○
Using a word processing programme such as Microsoft Word to do my report.	○	○	○	○	○	○	○	○	○	○	○
Converting a Word file to a .pdf file.	○	○	○	○	○	○	○	○	○	○	○
Manipulating a picture and putting it in my report.	○	○	○	○	○	○	○	○	○	○	○
Using e-mail to communicate with my lecturer or classmates.	○	○	○	○	○	○	○	○	○	○	○
Putting an audio clip or video clip on a presentation programme.	○	○	○	○	○	○	○	○	○	○	○

Just a few more questions!!

How confident are you as an online learner?

Your online learning confidence

10. How confident are you that you can successfully complete the online requirements of this programme?



How confident are you as an online learner?

Who are you?

The following demographic information is essential for the successful completion of my study, please fill in.

11. You are

◯ Male ◯ Female

12. What is your age group?

◯ 16-24 ◯ 25-34 ◯ 35-45 ◯ 46-64 ◯ > 65

13. Which year are you in the Bachelor of Education (Teaching) Primary/ Diploma in Education Studies programme?

◯ Year 1 ◯ Year 2 ◯ Year 3 ◯ Year 4

14. How many papers have you been completed intowardt his programme?

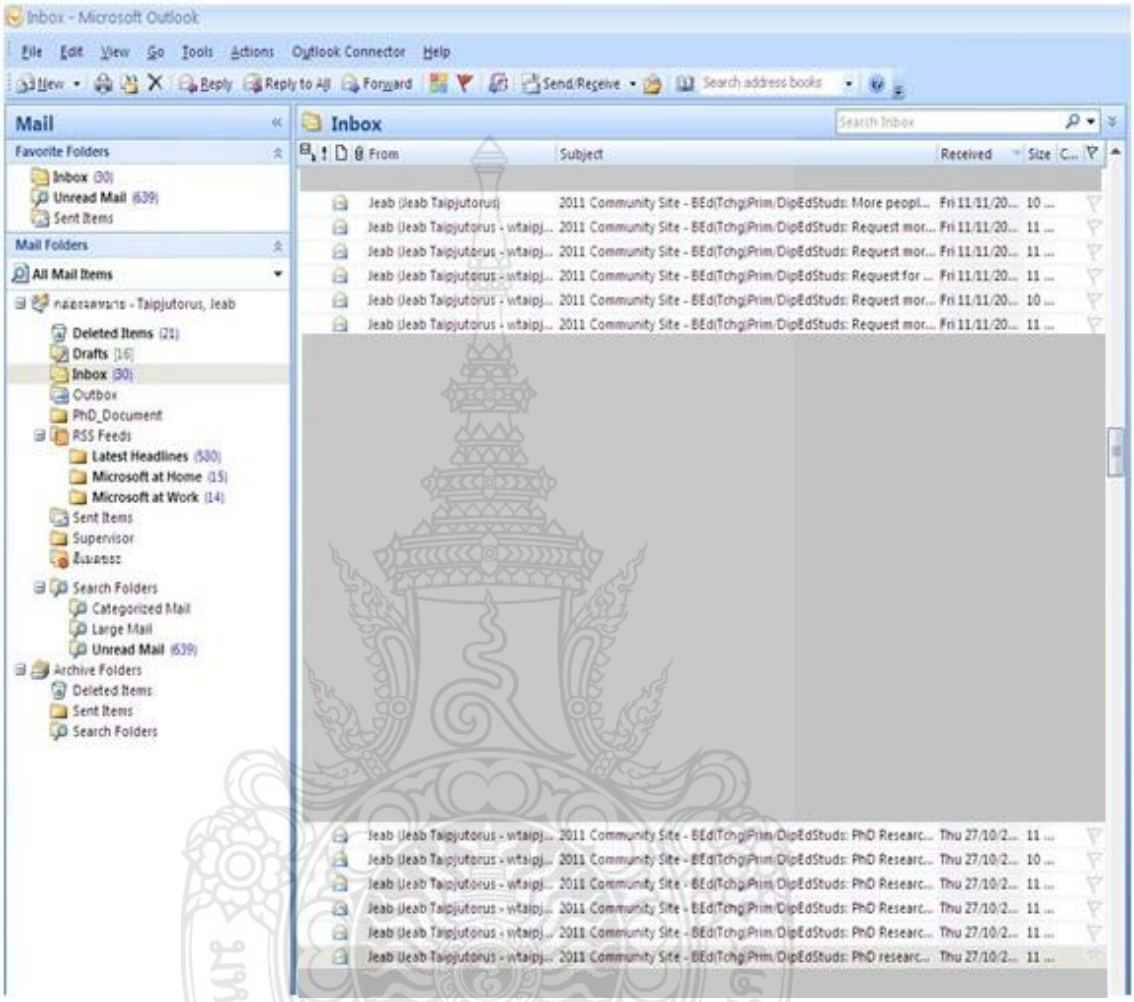
15. How many papers are you currently enrolled this semester?

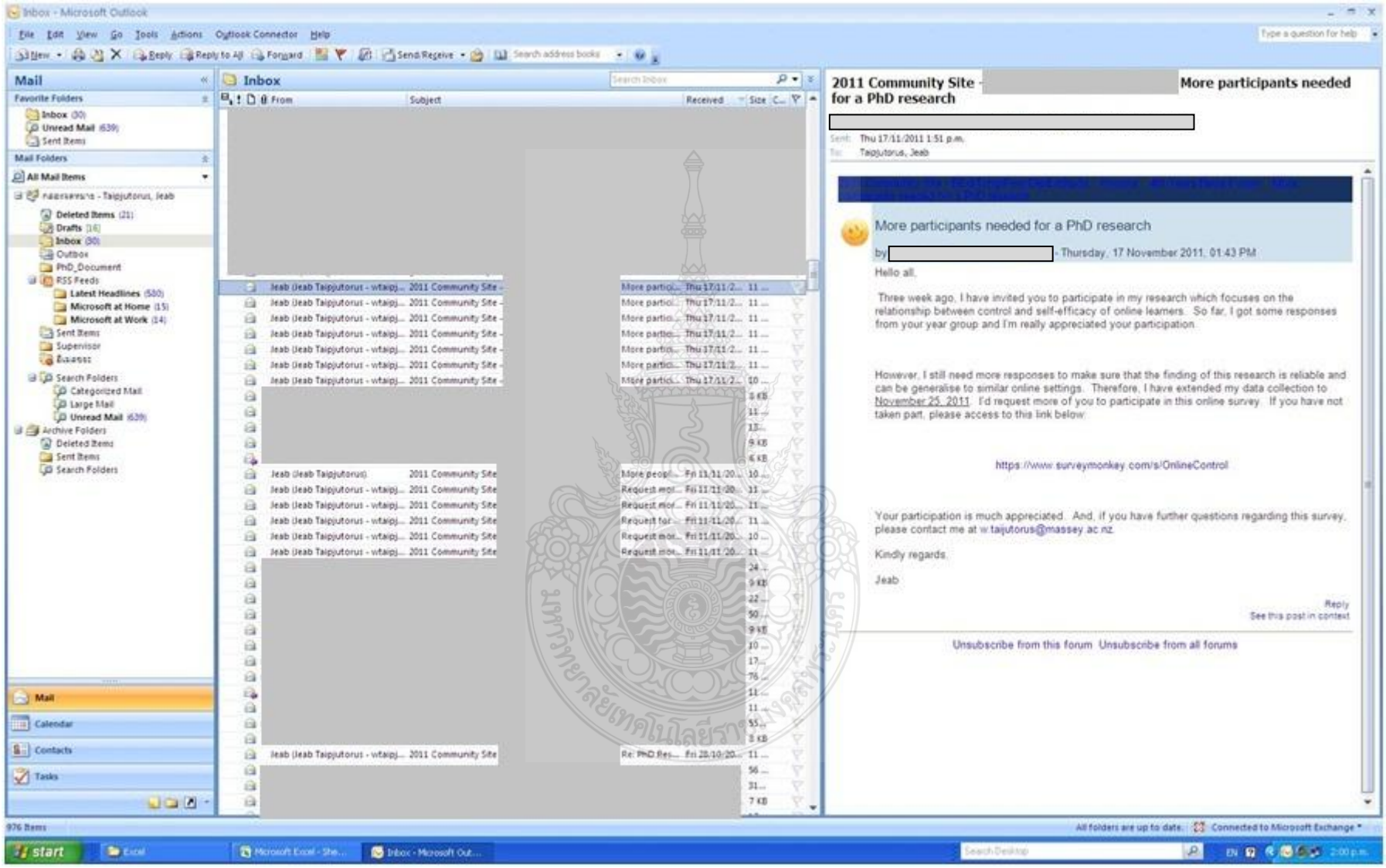
16. Do you have anything else to say about being an online learner?

Thank you for your participation.

APPENDIX E

THE INVITATION TO PARTICIPANTS




Inbox - Microsoft Outlook
Mail
Inbox
2011 Community Site - [redacted] More participants needed for a PhD research
More participants needed for a PhD research
Hello all,
Three week ago, I have invited you to participate in my research which focuses on the relationship between control and self-efficacy of online learners. So far, I got some responses from your year group and I'm really appreciated your participation.
However, I still need more responses to make sure that the finding of this research is reliable and can be generalise to similar online settings. Therefore, I have extended my data collection to November 25, 2011. I'd request more of you to participate in this online survey. If you have not taken part, please access to this link below:
https://www.surveymonkey.com/s/OnlineControl
Your participation is much appreciated. And, if you have further questions regarding this survey, please contact me at w.taijutorus@massey.ac.nz.
Kindly regards,
Jeab

APPENDIX F

QUANTITATIVE FINDINGS

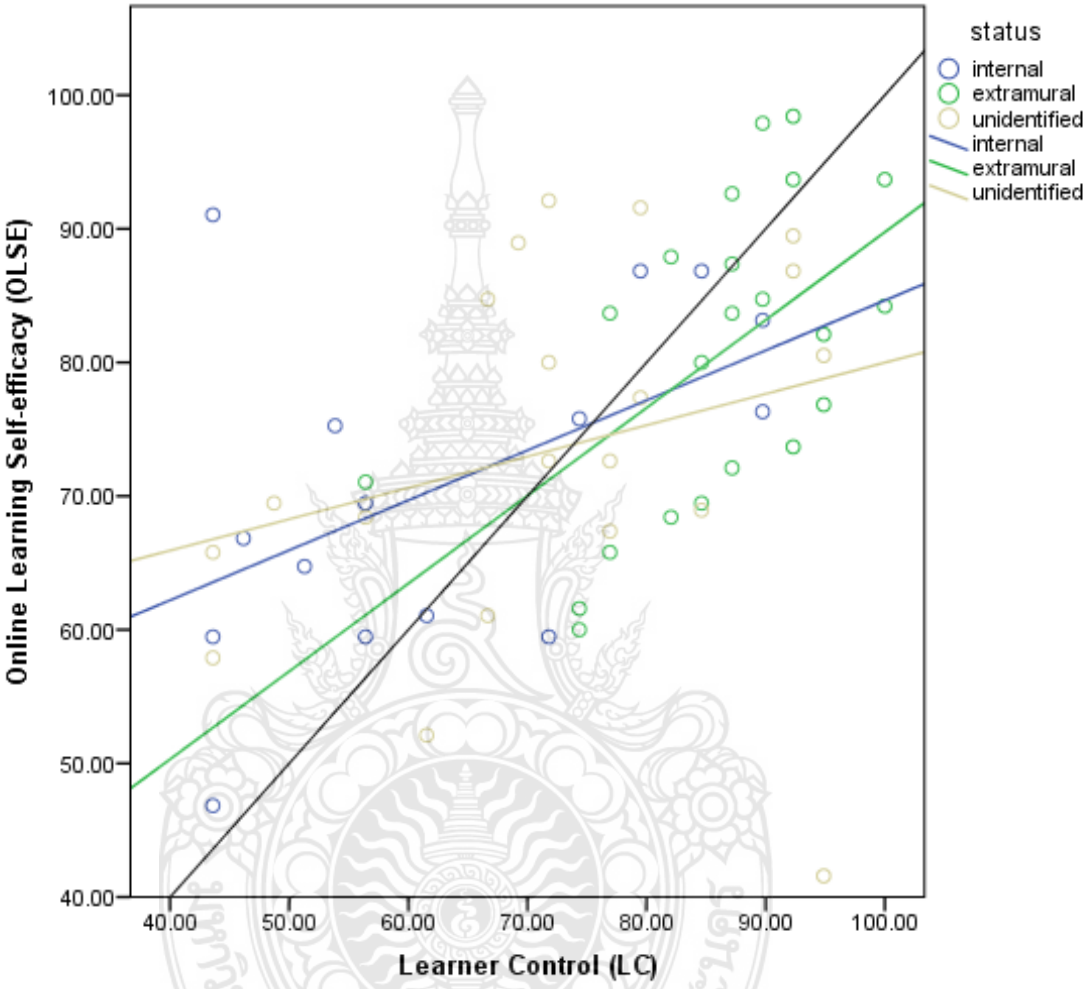


Figure F.1. A scatter plot between LC and OLSE by delivery mode

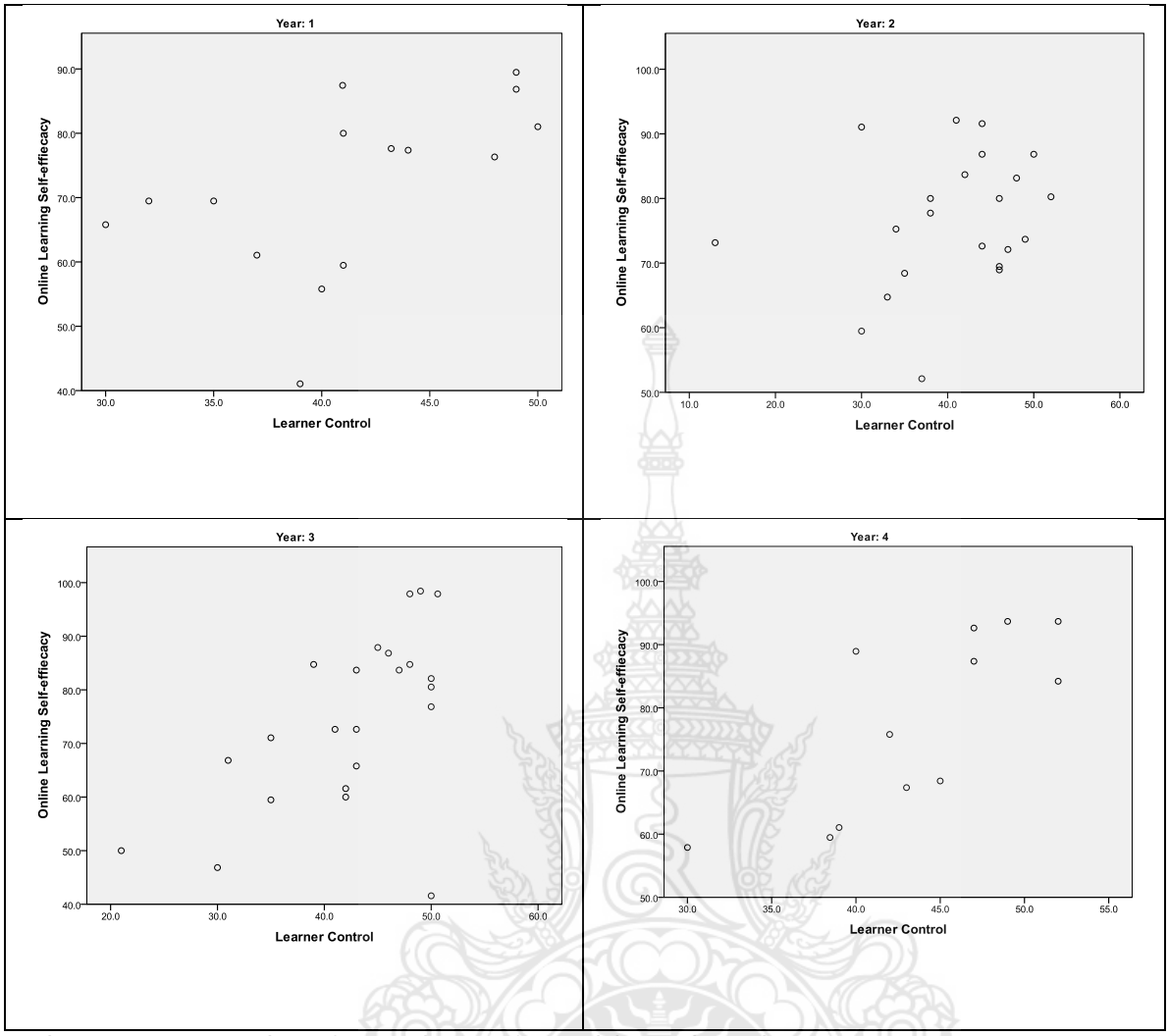


Figure F.2. Scatter plots of LC and OLSE for participants in each year group

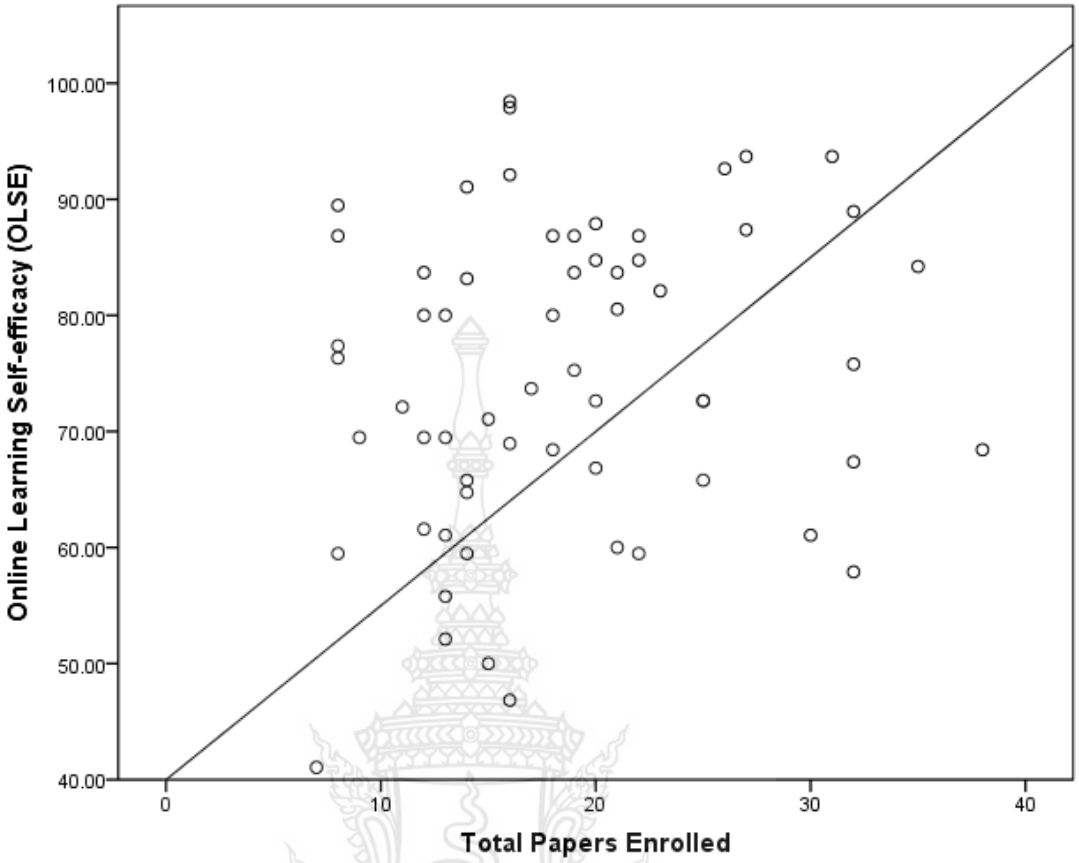


Figure F.3. The scatter plot between total papers participants had enroled and OLSE

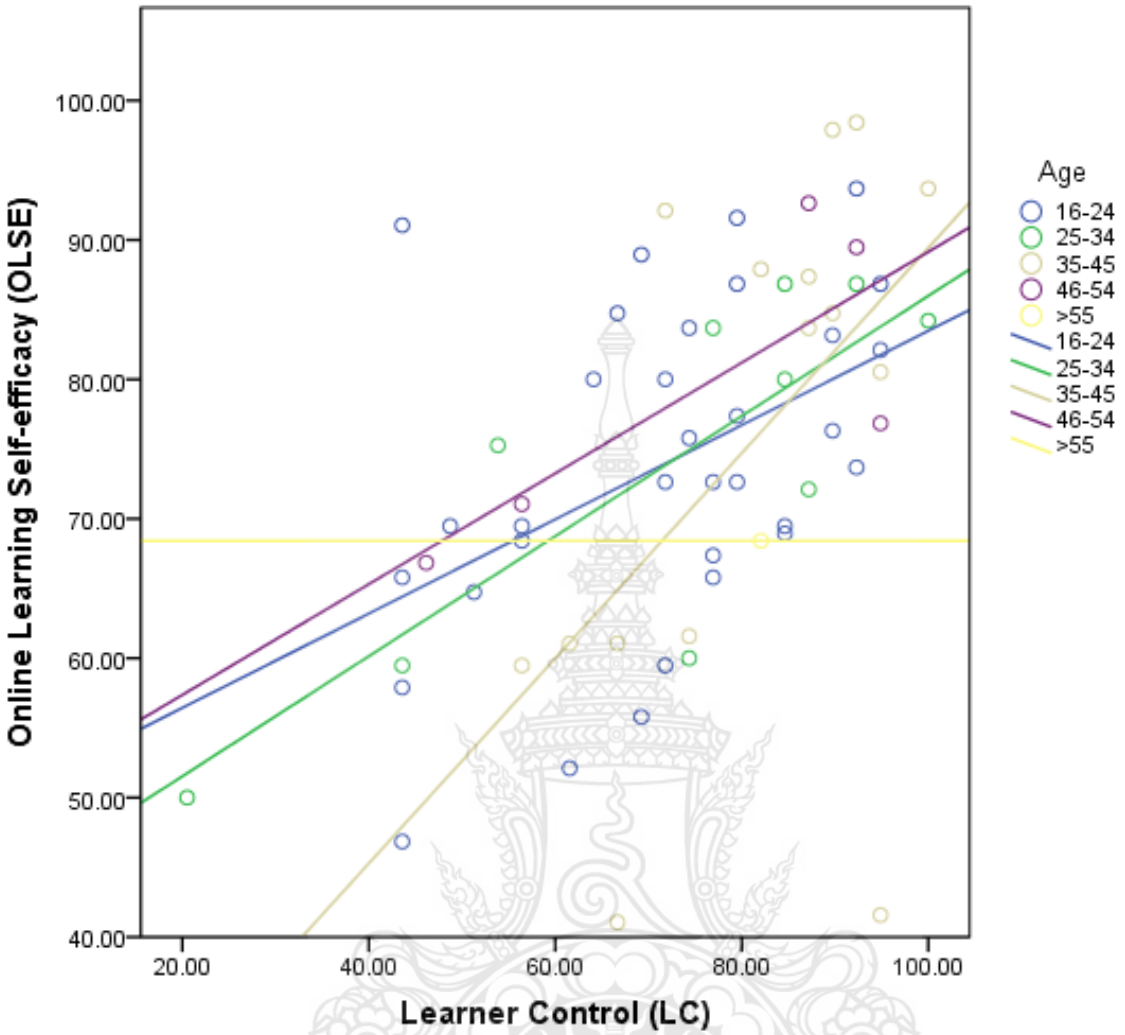


Figure F.4. The scatter plot between LC and OLSE by age group

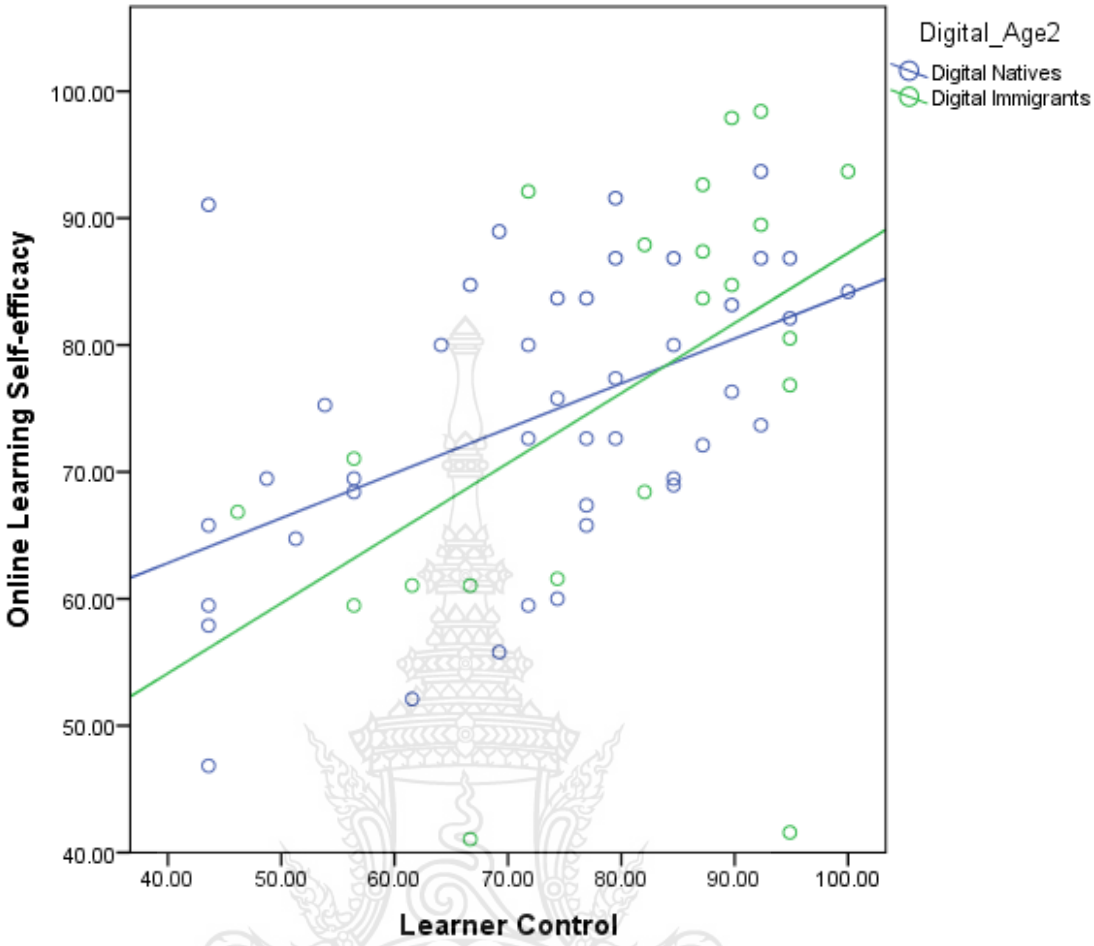


Figure F.5. The scatter plot between LC and OLSE by age group

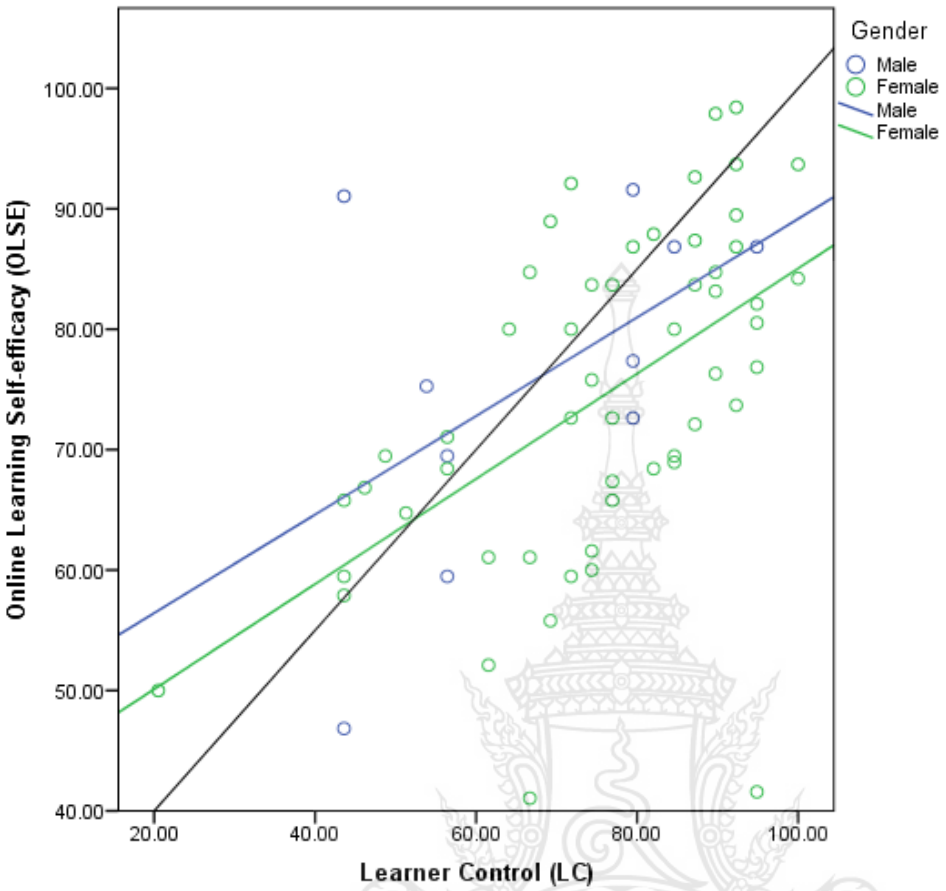


Figure F.6. The scatter plot between LC and OLSE by gender

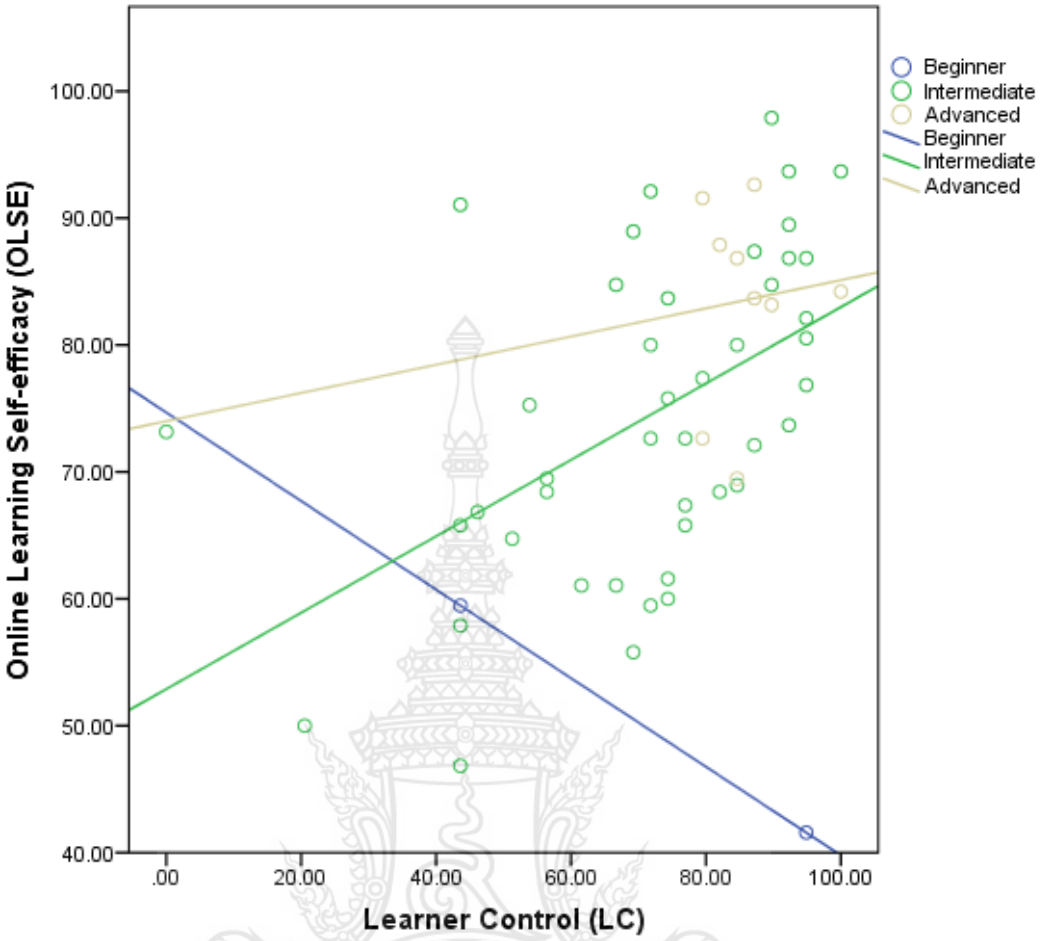


Figure F.7. The scatter plot between LC and OLSE by perceived computer skills

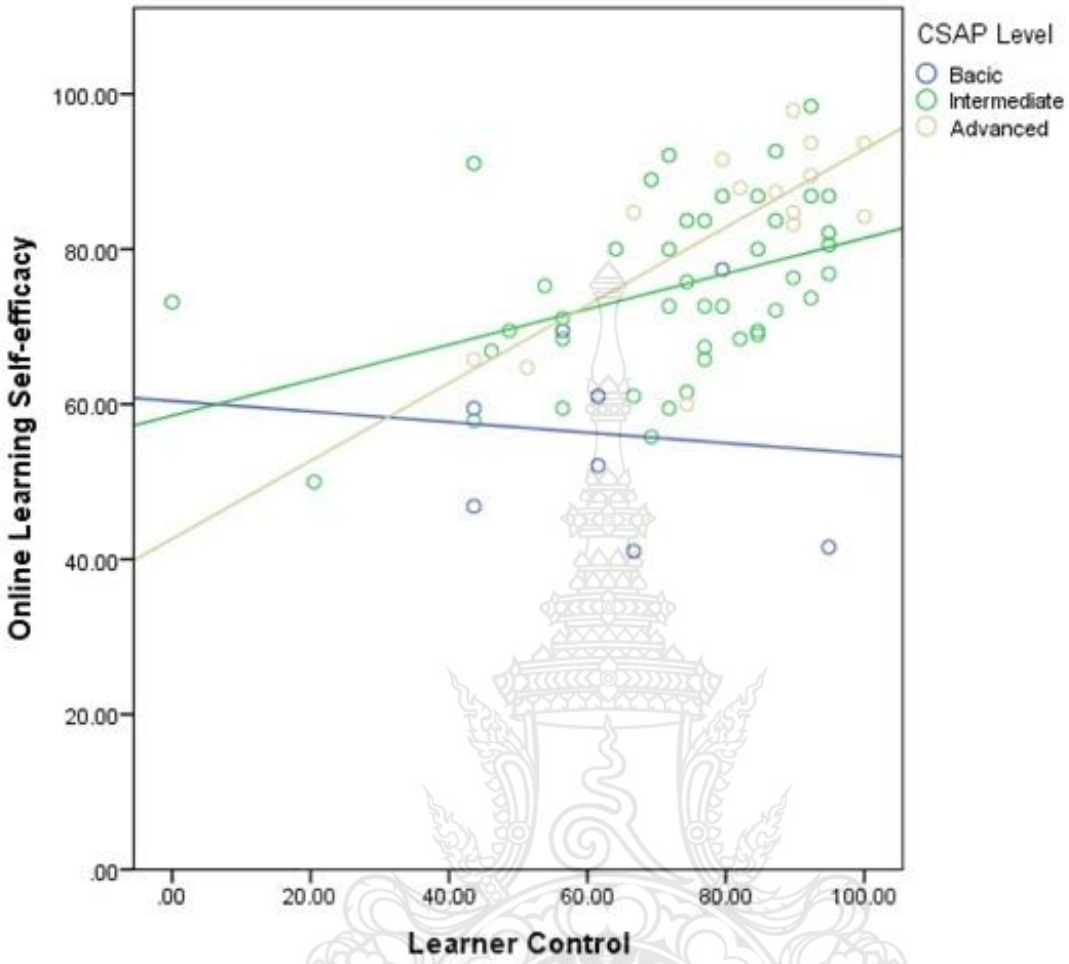


Figure F.8. The scatter plot between LC and OLSE by CSAP

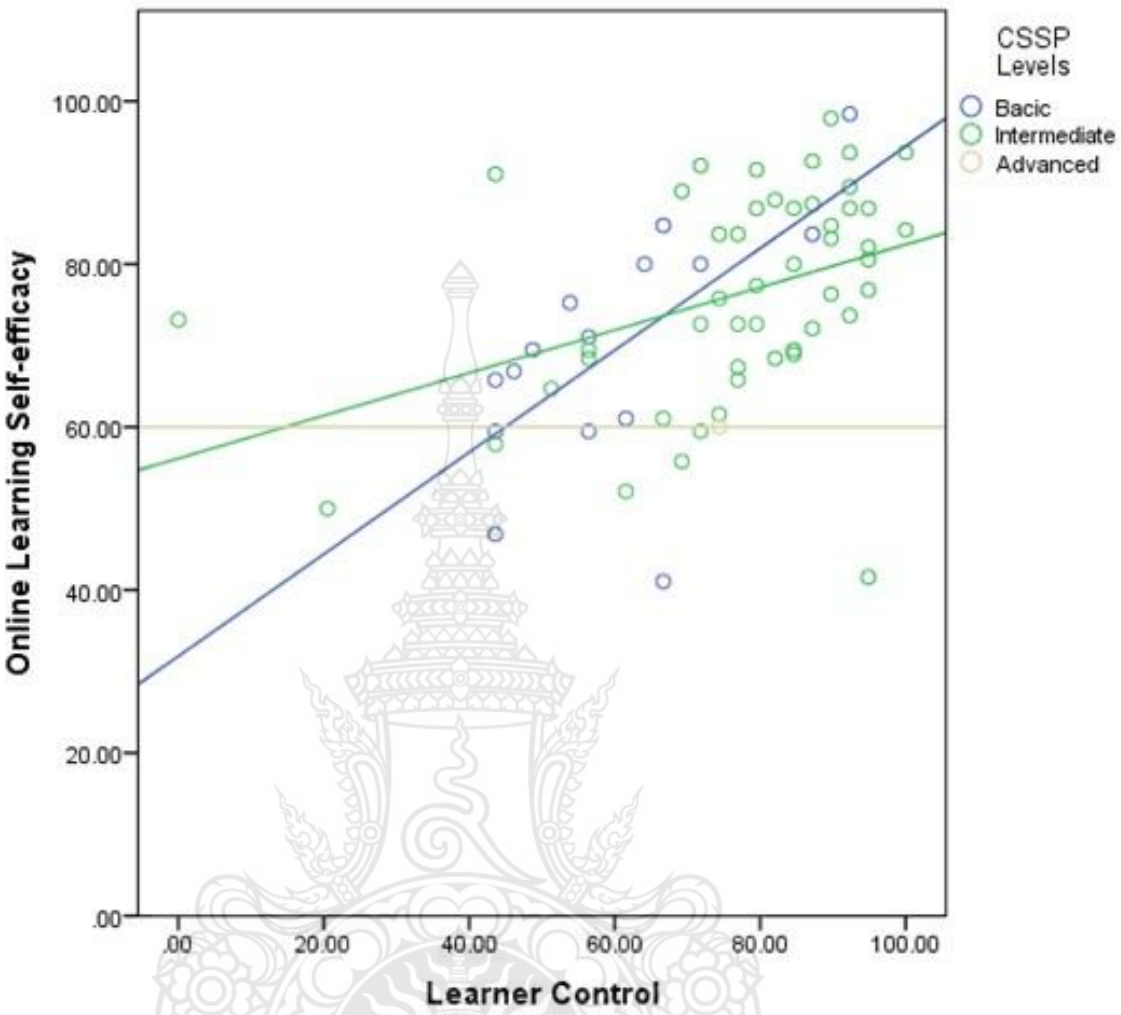


Figure F.9. The scatter plot between LC and OLSE by CSSP

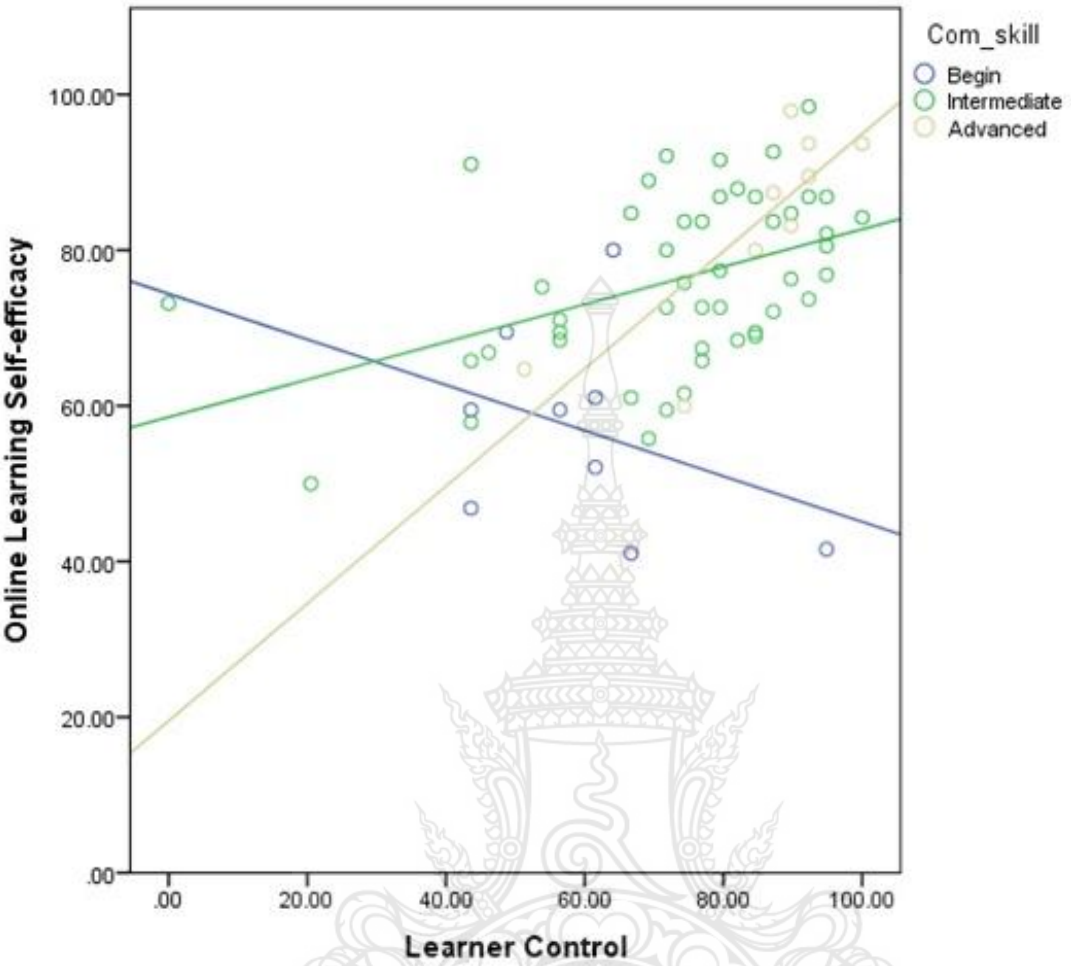


Figure F.10. The scatter plot between LC and OLSE by actual computer skills

Descriptives

OLSE_P

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Year-1	12	69.3421	13.81995	3.98948	60.5613	78.1229	41.05	89.47
Year-2	20	76.2632	10.92046	2.44189	71.1522	81.3741	52.11	92.11
Year-3	23	74.5080	16.07072	3.35098	67.5585	81.4575	41.58	98.42
Year-4	12	77.5439	14.12313	4.07700	68.5705	86.5173	57.89	93.68
Total	67	74.6504	13.89018	1.69696	71.2624	78.0385	41.05	98.42

Test of Homogeneity of Variances

OLSE_P

Levene Statistic	df1	df2	Sig.
1.332	3	63	.272

ANOVA

OLSE_P

			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		491.087	3	163.696	.842	.476
	Linear Term	Unweighted	327.665	1	327.665	1.686	.199
		Weighted	260.603	1	260.603	1.341	.251
		Deviation	230.484	2	115.242	.593	.556
Within Groups			12242.761	63	194.330		
Total			12733.849	66			

Figure F.11. SPSS output from ANOVA

APPENDIX G

QUALITATIVE FINDINGS

Table G.1 *The Coded Data to the Set Theme of Learner Control Levels*

Response	Browsing	Searching	Connecting	Collecting	Generating
1		/			/
2		/	/		
3			/		
4		/	/	/	/
5		/			
6			/	/	
7		/	/		
8		/			
9		/			
10			/	/	
11		/	/	/	/
12			/	/	
13			/	/	
14			/		/
15		/			
16		/	/	/	/
17			/		
18		/	/	/	/
19				/	/
20		/	/		
21			/		
22					/
23			/		/
24				/	/
25		/			
26		/	/		
27		/	/	/	
28			/	/	/
29		/	/		
30			/		
31		/			

Table G.2 *The Coding in Response to the Participants' Online Learning Self-efficacy*

Participants	High	Moderate	Low
1		/	
2			/
3	/		
4	/		
5	/		
6			/
7	/		
8	/		
9	/		
10	/		
11	/		
12	/		
13			/
14	/		
15			/
16		/	
17	/		
18	/		
19	/		
20		/	
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39	/		
40		/	
41	/		
42	/		
43	/		
44	/		
45	/		
46	/		
47		/	
48	/		
49		/	
50	/		
51	/		
52	/		
53	/		
54	/		
55	/		
56	/		
57	/		
58	/		
59	/		
60	/		
61	/		
62	/		
63	/		
64	/		

Table G.3 *The Emerging Themes*

No	Satisfaction		Support				Interaction		Feeling		
	Positive	Negative	Tutors/ lecturers	Friends	Technical	Psychological	Low	High	Isolation	Self-motivated	frustration
1		/					/		/		
2		/	/								
3		/	/								
4		/						/	/		
5		/	/	/	/	/	/		/		
6											
7		/									
8		/							/		/
9		/			/						
10		/									
11	/									/	
12	/	/	/		/			/			/
13		/									
14		/	/				/				
15	/	/							/		
16		/	/								
17	/										
18		/									
19		/	/			/					/
20		/									
21	/	/	/								
22		/	/						/		/
23	/										
24		/	/								
25		/	/								
26		/									
27		/	/								/
28	/	/									
29	/									/	
30		/	/		/				/		
31		/	/								
32		/		/							

มหาวิทยาลัยเทคโนโลยีราชมงคลพระนคร

APPENDIX H

PAPER PUBLICATION, CONFERENCE, AND PROCEEDING

H.1 Journal Article:

Taipjutorus, W., Hansen, S., & Brown, M. (2012). Investigating a relationship between learner control and self-efficacy in an online learning environment. *Journal of Open, Flexible and Distance Learning, 16*(1), 58-69. Retrieved from http://journals.akoaotearoa.ac.nz/index.php/JOFDL/article/viewFile/95/76

DEANZ
JOURNAL OF OPEN, FLEXIBLE AND DISTANCE LEARNING

Investigating a Relationship between Learner Control and Self-efficacy in an Online Learning Environment

Widchaporn Taipjutorus, Massey University
Sally Hansen, Massey University
Mark Brown, Massey University

Abstract

In both traditional face-to-face and online learning contexts, self-efficacy has been shown to be a key contributor to learner success. Once established, self-efficacy can be generalised to other learning situations, with the strongest effect occurring with learning activities that are closest to those in which self-efficacy has been improved. Self-efficacy is not only a good predictor of learners' academic outcomes, but efficacious learners also tend to persist, cope, and adapt well, even when they have no prior experience. Learners who have low confidence in their ability to study can become frustrated, overwhelmed, and demotivated—they are more likely to achieve low grade point averages, and in some cases drop out.

When people become online learners, especially for the first time, they may feel less confident, despite being familiar with day-to-day computer and technology usage. They may still lack essential learning and technology skills for tertiary education and online learning. To support these learners, online courses should be designed to foster learners' efficacy. Research findings have shown that embedded learner control in online modules can enhance learning, improve attitudes, and increase self-efficacy. However, little research has been done to examine self-efficacy of online learners with different levels of learner control in a real online class setting. Therefore, this paper describes current research that focuses on this gap in research, and uses a quantitative research design to investigate the relationship between learner control and learner self-efficacy. Online learning self-efficacy scales and a set of questionnaires were developed and validated. In a pilot study, 31 postgraduate online learners were asked to assess their own self-efficacy and experience with different levels of learner control. Preliminary results show a positive relationship between learner control and online learning self-efficacy.

Keywords: online learning; learner control; online learning self-efficacy

Introduction

The term *self-efficacy* was coined around 40 years ago by Albert Bandura (1977a). Since then, research in this area has been growing steadily. Bandura (1997) defines self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). It is a judgement of confidence about the performance of a specific task (Lorsbach & Jinks, 1999). Self-efficacy is not the same as ability or motivation, but they are strongly related (Kozlowski & Salas, 2010). Indeed, self-efficacy is the personal determination of one's own ability to deal with a certain task. Notably, this determination is not based entirely on

H.2 Conference Proceeding:

Taipjutorus, W., Hansen, S. & Brown, M. (2012). *Does Learner Control Help Online Learners Improve Their Self-efficacy? A Study in an Authentic Online Setting*. In T. Bastiaens & G. Marks (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2012* (pp. 420-425). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/41627.

Does Learner Control Help Online Learners Improve Their Self-efficacy? A Study in an Authentic Online Setting

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Abstract: This paper describes a research-in-progress on the relationship between *learner control* and *self-efficacy* of online learners in an asynchronous online programme. The main focus is to see whether learner control positively influences students' self-efficacy. Although learners are increasingly familiar with daily computer and Internet usage, some still find online learning a challenge. Previous literature has shown that online learners' interactions, sense of belonging, and self-efficacy increase when they have control over their online learning environment. However, few studies have looked at this relationship in an authentic online setting. Preliminary findings of this study show a positive relationship between *learner control* and online learning *self-efficacy*. A more in-depth study will explore this relationship with a larger and more diverse sample group. There are early indications that this research may be useful for educators and instructional designers in shedding light on how online learners may be able to overcome their challenges.

Introduction

Online learning seems to have been implemented successfully in many parts of the world, especially in the US according to Means, Toyama, Murphy, Bakia, and Jones (2009). However, literature still shows online learners have difficulties in dealing with their learning environment (Cook & Jenkins, 2010). Many students still find it hard to adapt and perform well in university online classes, in part because of the demands and stress of the transition from secondary schools to tertiary education. Some students struggle to cope with the complexity of an online environment and often have doubts about their learning performance (Saadé & Kira, 2009), despite the fact that they are commonly using computers and technology in their daily life. Moreover, there is evidence that some students still find the absence of face-to-face interaction challenging (Levy, 2007).

In order to successfully cope with the demands of online learning, students must have certain skills such as critical thinking, collaboration, and writing as well as computer and Internet use (Harrell, 2008). Not only must they have these skills but they must also be able to apply their skills when needed. Moreover, they must be efficacious to cope with a learning environment that is different from traditional classes they have studied in previously. Some studies show that students with higher confidence in themselves or higher self-efficacy are more likely to perform well and persist in online courses (e.g., Swan, 2004). However, not all students have the high self-efficacy needed to cope with an unfamiliar online environment, especially students in their first year of learning (Berge & Huang, 2004). These students often experience cognitive overload during the first week of their studies due to disorientation, new teaching/ learning methods, unfamiliar subjects, and the challenge of working with unfamiliar technology (S. L. Chang & Ley, 2006). This point explains why many feel uncertain, frustrated, and anxious as they try to adjust themselves to the learning environment. In some cases, students can become de-motivated and procrastinate because they feel overwhelmed, nervous, and worried about a teaching approach that requires more

Taipjutorus, W. (2012). Improving learners' self-efficacy in a learner-controlled online learning environment: a correlational study. In M. Brown, M. Hartnett & T. Stewart (Eds.), *Future challenges, sustainable futures. Proceedings ascilite2012* (pp. 907-911). Wellington, New Zealand. Retrieved from http://www.ascilite.org.au/conferences/wellington12/2012/images/custom/taipjutorus,_widchaporn_-_improving.pdf

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FUTURE CHALLENGES | SUSTAINABLE FUTURES
25 - 28 November 2012 | Wellington | New Zealand

Improving learners' self-efficacy in a learner-controlled online learning environment: a correlational study

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Online learning is gradually being adopted by higher institutes and becoming much more common in higher education worldwide, but some learners still find it challenging. Though they are familiar with computer and technology usage, they are still uncertain of their ability to perform well in online classes. A review of studies focused on how these learners gain more confidence and success shows a link between self-efficacy and learners' outcomes. Efficacious learners tend to adapt and cope well when faced with obstacles. Moreover, learners who were given control over their learning environment performed better, were more satisfied, and had higher self-efficacy than control groups. It is theorised that embedding learner control into online learning programmes might help inefficacious learners gain more self-efficacy but few studies have investigated this relationship in the real online class setting. Therefore, this study in progress is an attempt to fill in this research gap.

Keywords: Learner control, online learning, self-efficacy, online learner

Research background

Many tertiary institutes now perceive online learning as an educational trend for the future. Online learning is cost effective and can reach more learners. In some sense, it is seen as more creative ways in teaching as well as a sustainable way for learning. Though many studies report success stories of online learning in terms of retention and effectiveness (e.g., Means, Toyama, Murphy, Bakia, & Jones, 2009), findings still show online learners have difficulties in dealing with their learning environment (Cavanaugh, 2005; Cook & Jenkins, 2010; Levy, 2007). Despite using computers and technology in their daily life, they might feel less confident about enrolling in online classes, especially at the tertiary level. They might not have enough of the necessary learning and technology skills for the combination of university and online learning such as skills to compose essays, prepare presentations, analyse data, and do research work (Kennedy, Judd, Churchward, Gray, & Krause, 2008; Mandernach, Donnelli, & Dailey-Hebert, 2006; Ratliff, 2009). Many students still find it hard to adapt and perform well in university online classes because of the demands and stress of the transition from secondary schools to tertiary education. Some students struggle to cope with the complexity of an online environment and often have doubts about their learning performance (Saadé & Kira, 2009). Thus, more technical and psychological support is often needed for online students.

Self-efficacy in online learning environment

In online learning, self-efficacy is considered to be a key psychological contributing factor to students' success (Pajares, 1996) because it can alter students' perceptions of their learning environment (Multon, Brown, & Lent, 1991). Consequently, students might perceive their learning environments either positively or negatively. Self-efficacy is not only a good predictor of learners' academic outcomes but it helps learners well adjust and handle with the unfamiliar learning environment (Alivernini & Lucidi, 2011), even when they have little prior online experience (Swan, 2004).

According to Bandura's self-efficacy theory, *self-efficacy* is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). It is a judgment of confidence about the performance of a specific task (Lorsbach & Jinks, 1999). Self-efficacy is not the same as ability or motivation, but they are strongly related (Chowdhury & Shahabuddin, 2007; Vancouver & Kendall,

Taipjutorus, W., Hansen, S., & Brown, M. (2012). *Linking between learner control and self-efficacy of online learners in a New Zealand postgraduate online programme.* Proceedings of the Joint Australian Association for Research in Education and Asia-Pacific Educational Research Association Conference (AARE-APERA2012), Sydney, NSW, Australia. Retrieved from: http://files.eric.ed.gov/fulltext/ED542514.pdf

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LINKING BETWEEN LEARNER CONTROL AND SELF-EFFICACY OF ONLINE LEARNERS IN A NEW ZEALAND POSTGRADUATE ONLINE PROGRAMME

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Abstract

This paper describes a research-in-progress study on the link between *learner control* and *self-efficacy* of postgraduate students in an online programme at a New Zealand university. Even though students are familiar with computers and Internet usage, learning online may still pose a challenge, especially for inexperienced online learners. By enabling learners to control their own learning, their interactions increase along with their self-efficacy and a sense of belonging to the learning community, all of which contribute to better academic outcomes. However, few studies have looked at the link between *self-efficacy* of online learners and *learner control* in a real online setting. To do so, students in a postgraduate online programme embedded with *learner control* were selected as the sample group. The preliminary findings showed a positive relationship between these two variables, though not as strong as expected. Follow-up research is being undertaken with a larger sample group.

Introduction

Although online learning has become increasingly common in higher education over the last decade, not all students are confident and some students still find the absence of face-to-face interaction challenging. Despite using computers and technology in their daily life, learners feel less confident about studying online, especially the first time. Such feelings may be justified as Ratliff (2009) suggests they may not have enough necessary learning and technology skills for university and online learning. For example, the technology skills to compose essays, prepare presentations, analyse data, and do research work. However, this should not be the case because characteristics of online students have changed to include a higher proportion of high school graduates. They are younger and more familiar with computer technology than those in the past (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Nevertheless, many of these students still find it hard to adapt and perform well in university online classes because of the demands and stress of the transition from secondary schools to tertiary education (Chemers, Hu, & Garcia, 2001). Some students even struggle to cope with the complexity of an online environment and often have doubts about their learning performance (Saadé & Kira, 2009).

In order to deal with online learning, students must have certain skills such as critical thinking skills, collaboration skills, academic writing skills as well as computer and Internet skills (Harrell, 2008). It is important to not only possess these skills, but be also able to apply these skills when needed. Moreover, they must be efficacious in dealing with a learning environment that is different from the traditional classes in which they have previously studied. Some studies show that students with higher confidence in themselves or higher self-efficacy are more likely to perform well and persist in online courses (e.g., Hayashi, Chen, Ryan, & Wu, 2004; Multon, Brown, & Lent, 1991; Pajares, 1996; Swan, 2001). However, not all students have the high self-efficacy needed to deal with an unfamiliar online environment, particularly students in their first year of learning (Berge & Huang, 2004). These students often experience cognitive overload during the first week of their studies due to disorientation, new teaching/ learning methods, unfamiliar subjects, and the challenge of working with unfamiliar technology (S. L. Chang & Ley, 2006; Whipp & Chiarelli, 2004). For these reasons, many learners

H.3 Conference Papers

Taipjutorus, W., Hansen, S., & Brown, M. (2012). *Investigating a relationship between learner control and self-efficacy in an online learning environment*. Paper presented at the DEANZ2012, Wellington, New Zealand. Refereed paper retrieved from http://www.deanz.org.nz/home/index.php/deanz-conference-2012/conference-2012/2012-programme/session-4-11am-1230pm/71-session-4-11am-1230pm/235-investigating-a-relationship

Investigating a relationship between learner-control and self-efficacy in online learning (Refereed)

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Abstract

In both traditional face-to-face and online learning contexts, self-efficacy has been shown to be a key contributor to learner success. Once established, self-efficacy can be generalised to other learning situations, with the strongest effect occurring with learning activities that are closest to those in which self-efficacy has been improved. Self-efficacy is not only a good predictor of learners' academic outcomes, but efficacious learners also tend to persist, cope, and adapt well, even when they have no prior experience. Learners who have low confidence in their ability to study can become frustrated, overwhelmed, and demotivated—they are more likely to achieve low grade point averages, and in some cases drop out.

When people become online learners, especially for the first time, they may feel less confident, despite being familiar with day-to-day computer and technology usage. They may still lack essential learning and technology skills for tertiary education and online learning. To support these learners, online courses should be designed to foster learners' efficacy. Research findings have shown that embedded learner control in online modules can enhance learning, improve attitudes, and increase self-efficacy. However, little research has been done to examine self-efficacy of online learners with different levels of learner control in a real online class setting. Therefore, this paper describes current research that focuses on this gap in research, and uses a quantitative research design to investigate the relationship between learner control and learner self-efficacy. Online learning self-efficacy scales and a set of questionnaires were developed and validated. In a pilot study, 31 postgraduate online learners were asked to assess their own self-efficacy and experience with different levels of learner control. Preliminary results show a positive relationship between learner control and online learning self-efficacy.

Taipjutorus, W., Hansen, S., & Brown, M. (2012). *Investigating university students' self-efficacy in a learner-controlled online learning environment*. Paper presented at the HERDSA2012, Hobart, Tasmania, Australia. Showcase presentation retrieved from http://events.cdesign.com.au/ei/viewpdf.esp?id=314&file=//srv3/events/eventwin/docs/pdf/herdsa2012abstract00140.pdf

Investigating university students' self-efficacy in a learner-controlled online learning environment

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Although online learning has become increasingly common in higher education in the last decade, not all students are confident and successful. Some students still find the absence of face-to-face interaction challenging. By enabling them to control their own learning, their interactions increase along with their confidence and a sense of belonging, all of which contribute to better academic outcomes. Learner control has been discussed as a concept in a traditional face-to-face classroom setting for a long time before it was applied to computer-assisted instruction and online learning. Most studies in online learning have investigated student outcomes comparing control groups to experimental groups; few studies have looked at students in a real online setting. Therefore, this research-in-progress intends to see whether learner control embedded in the investigated online programme actually helps improve students' self-efficacy.

GLOSSARY

Actual computer skills. The summation of CSAP and CSSP scores which reflects the real computer and internet abilities.

Analysis of variance (ANOVA). A test of significance for testing the differences between more than two sample means.

Association. A relationship between two variables.

Asynchronous online learning. One category of online learning in which learners from anywhere get online at any time and set-up communication networks among themselves as well as with their teachers.

Coefficient of determination (r^2). The proportion of all variation in a dependent variable that is explained by an independent variable.

Computer skills. The ability to use the software and hardware of a computer.

Computer skills for academic purpose (CSAP). The computer skills that are used for studying at the university level.

Computer skills for academic purpose (CSAP) level. The level of CSAP skill grouped into three categories.

Computer skills for social purpose (CSSP). The computer skills that are used for day to day activities.

Computer skills for academic purpose (CSSP) level. The level of CSSP skill grouped into three categories.

Computer skill levels. The category that is used to divide computer users according to their ability to use the software and hardware of a computer.

Confounds. An extraneous variable that correlates to the independent and dependent variables.

Correlation matrix. A table showing the strength and direction of the relationships between all possible pairs of variables.

Correlational study. A type of nonexperimetal research in which the degree of relationship between two variables is assessed.

Dependent variable. A variable that is thought to be caused by another variable.

Descriptive statistics. Statistics designed to describe a single variable or the relationships between two or more variables.

Digital natives. The term used for the generation that was born after 1980.

Digital immigrants. The term, in opposition to digital natives, used for the generation that was born before 1980.

Direct relationship. A relationship between two variables in which the third variable has no effect.

Distance students. Students that study online and normally have no face-to-face interaction with their instructors.

Effect size. The proportion of variance in the dependent variable that is accounted for by the manipulation of the independent variable(s).

Hypermedia. Computer-based documents composed of hyperlinks and media in various symbol sets including text and graphic icons to give information and serve as an index that allows users to access further information in a non-linear fashion.

Independent variable. A variable that is thought to cause another variable.

Inferential statistics. A statistical technique that allows researchers to generalise from samples to populations.

Interaction. A kind of action that occurs as two or more persons/ objects have an effect upon one another in the online learning environment.

Interactivity. The degree to which a communication technology can create a mediated environment in which participants can communicate (one-to-one, one-to-many, and many-to-many), both synchronously and asynchronously, and participate in reciprocal message exchanges.

Internal students. Students that study on-site of the university campus and normally have traditional face-to-face interaction with their instructors and peers.

Learner control. The extent to which learners can choose what and how to learn.

Linear relationship. A relationship between two variables that can be approximated by a straight line on a scattergram.

Mean. The arithmetic average of the scores.

Measure of association. Statistics that quantify the strength and direction of the association between variables.

Multimedia. The result of combining two or more digitized media, usually with interactivity.

Multiple regression. A multivariate technique that separates the effects of the independent variables on the dependent variable. Also used to predict the dependent variable using all independent variables.

Negative association. A relationship in which the variables vary in opposite directions.

Nominal scale. A scale in which objects or individuals are broken into categories that have no numerical properties.

Nonparametric test. A test of significance that does not assume a normal sampling distribution.

Normal curve. A theoretical distribution of scores that is symmetrical, unimodal, and bell shaped.

One-tailed. A type of hypothesis test that can be used when 1) the direction of the difference can be predicted or 2) concern is focused on one tail of the sampling distribution.

One-way analysis of variance. An application of ANOVA in which the effect of a single independent variable on a dependent variable is observed.

Online learners. Students who are studying an online course in a formal setting. In this study, the setting is higher educational institutes such as universities, colleges, institute of technology, and polytechnics.

Online learning. Learning that takes place partially or entirely over the Internet.

Online learning self-efficacy. One's determination of his/her own ability to study and succeed in an online learning environment.

Ordinal scale. A scale in which objects or individuals are categorised and the categories from a rank order along a continuum.

Paper. A New Zealand term used for a learning course.

Partial correlation. A multivariate technique for examining a bivariate relationship while controlling for a third variable.

Pearson *r*. A measure of association for interval-ratio-level variables.

Perceived computer skills. The computer and internet ability that a user think he/she is capable of.

Positive association. A relationship in which the variables vary in the same direction.

Post hoc tests. The statistical tests used after ANOVA to determine which groups differ significantly from others.

Prior online learning experience. Any online learning experience taken before taking the study programme.

Psychological support. A way to help learners to study effectively by providing a positive environment such as providing good feedback, encouraging networking, and improving a sense of belonging.

Range. The highest score minus the lowest score.

Regression line. The single, best-fitting straight line that summarises the relationship between two variables.

Reliability. An indication of the consistency of a measuring instrument.

Sample. The group of people who participate in this study.

Sampling distribution. The distribution of a statistic of all possible sample outcomes of a certain size.

Scaffolding. An instructional process where students are supported to increase their skills and meet their learning goals.

Scattergram. A graph that shows the relationship between two variables.

Self-efficacy. Beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments.

Spearman's rho (ρ). A measure of association appropriates for ordinal-level variables.

Spurious relationship. A relationship in which the third variable causes both dependent and independent variables.

Support. Help for learners to study effectively.

Technical support. Help for learners to study effectively by giving them skills related to the study such as computer training and library usage.

Validity. A measure of the truthfulness of a measurement, indicating that the instrument measures what it claims to measure.

Zero-order correlation. Correlation coefficient for bivariate relationships.