Students' Learning Outcomes and Attitudes toward Online Learning in a University Blended Environment

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Abstract

Keywords: attitudes toward online learning, learning outcomes, online learning, blended learning

The present study sought to investigate the effects of undertaking a blended learning course on a group of second-year university students' learning outcomes and attitudes. The research aimed to investigate the factors which might influence the students' learning outcomes and attitudes toward online learning after taking a blended course. To approach these aims, the present project used quantitative and qualitative methods across two phrases. Phase One included a pre- and posttest survey, weekly reports, and online forum contributions. Phase Two consisted of interviews, which were conducted after the course was completed.

Of the 120 participants in the course, the pre- and posttest questionnaire data were available from 94 participants. These participants were administered the pre- and posttest at the outset and conclusion of the course. The pretest questionnaires fixed upon the participants' course expectations, prior experiences, as well as prior attitudes. In addition, students responded to items tapping their dispositional self-control (as a character trait) and their habitual motivational patterns which included items tapping self-regulatory strategies. The posttest measured the participants' actual attitudes toward several aspects in the course. Among the 94 participants who completed the pre- and posttest, 74 of them furnished the weekly reports on their experiences within the course and these 74 participants' online forum contributions were also used for data analysis. After the course was completed, eight participants were interviewed in depth concerning their course experiences and attitudes toward online learning.

It was found that both dispositional self-control and specific self-regulatory strategies significantly predicted the participants' learning outcomes, which were expressed in terms of the participants' grades. It was found that the impact of these predictive factors on the participants' learning outcomes was mediated through their course participation. For instance, self-control predicted self-regulation and course participation, which thereby facilitated learning outcomes.

Meanwhile, it was found that the participants' attitudes towards online learning evidenced an increase (d = .63), and the level of the participants' attitudes reported was generally positive. The participants' attitudes toward online learning by the end of the course were significantly predicted by their prior online learning attitudes and motivation (i.e., intrinsic and performance orientation) in learning.

The interview data indicated that the individuals, who evidenced positive changes in their attitudes towards online learning, showed greater interest in the course and reported higher levels of course participation and perceived learning outcomes. These individuals disclosed higher levels of interactions with their peers and instructors.

It has been concluded that for many individual students, the blended learning format offered an opportunity that was generally viewed as highly positive and facilitative of their learning.

Declaration

I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university. To the best of my knowledge, this thesis does not contain any materials previously published or written by another person except where due references are made in the text.

Yue ZHU 15/12/2013

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Chapter 1: Introduction

This chapter depicts the context of the present study about university students' learning outcomes and attitudes toward online learning in a blended course. Firstly, different modes of learning environments are described. Then research findings concerning students' learning outcomes and attitudes in an online or blended environment are briefly examined. Next, the aims and design of the study are provided, followed by a description of the terms specified in the study. The structure of the thesis is illustrated finally.

1.1 Introduction of the study

With the application of information and communication technologies (ICTs), especially the Web 2.0, learning in higher education has been transformed from traditional mode of learning to online or blended learning, which is supported by a variety of online learning tools (Kukulska-Hulme, 2012; Lee & McLoughlin, 2011; Njagi, Smith, & Isbell, 2003). Online or blended delivery of learning has created a flexible environment for students to complete education (Lee & McLoughlin, 2011; Tiene & Ingram, 2001). Especially, blended learning is increasingly being used by Australian universities, with the assumption that it provides students with better access to courses materials they take and control of their studies through the usage of an array of ICTs (Balsera, 2001; Harasim, 2000; Harding, Kaczynski, & Wood, 2005; McCarthy, 2010).

Online delivery of education increases students' access to course materials (Lee & McLoughlin, 2011; Stacey & Mackey, 2009; Upton, 2005). Breaking down geographical and physical barriers, online courses are believed to be extended to the students who are geographically isolated or deprived of the opportunity of studying full-time degrees on campus or cannot attend face-to-face instructional sessions, because of their family duties or employment commitment. Therefore, when studying a course in an online or blended environment, students can have a flexible access to course materials and learn at their own pace.

Meanwhile, an online or blended environment can improve students' learning skills (Roblyer & Doering, 2013). Students are encouraged to construct their knowledge in a social context supported by different online communication and social networking tools. Moreover, students can be motivated in self-regulated learning by using online learning components, such as locating information through online search engines, learning from online resources, and communicating with teachers and peers synchronously or asynchronously.

Students' attitudes toward online learning can be a critical factor for their learning (Davies, 2006). Strong attitudes can guide people's behaviours and students' effective employment of learning strategies is based on their positive attitudes towards learning (Maio & Haddock, 2009; Sharp, 1999). Students' attitudes toward online learning have been found to be positive, negative, or neutral in some studies (e.g., Aydin, 2012; Jung, Choi, Lim, & Leem, 2002; Kim, 2012; Shih & Gamon, 2001; Williams & Pury, 2002). As blended learning is widely used in universities, further research is needed to investigate which factors will influence students' attitudes toward online learning in a blended environment.

Learning outcomes can be another important factor in the research in a context of an online or blended learning environment. It appeared in the reviewed literature that learning outcomes can be categorised into two types — students' actual course results (Beffa-Negrini, Miller, & Cohen, 2002; Chen & Jang, 2010; Shih, Ingebritsen, Pleasants, Flickinger, & Brown, 1998; Wang, Kanfer, Hinn, & Arvan, 2001; Yukselturk & Bulut, 2007) and self-perceived learning outcomes (Beffa-Negrini, Miller, & Cohen, 2002; Chen & Jang, 2010; Eom, Wen, & Ashill, 2006; Ho & Kou, 2010). Hiltz (1986) suggested that students' cognitive and psychological characteristics, such as the level of academic ability, motivation, and the degree of effort, were positively correlated with their learning outcomes in online learning. In the present study, the learning outcomes mainly referred to students' actual course results, but their perceived learning outcomes were also measured.

The present study aimed to examine several factors' influence on a group of university students' learning outcomes and attitudes toward online learning in a blended course. Through the review of literature, the factors which might influence university students' learning outcomes in an online or blended environment were found to be to their course expectations, prior attitudes, prior experiences, self-control, self-regulation in learning, and course experiences through online interactions. In addition, the factors which might influence university students' attitudes toward online learning were identified as gender difference,

course expectations, prior attitudes, prior experiences, course experiences through online interactions, and self-regulation in learning.

1.2 The background to the present study

This section provides the background to the present study, which was conducted in a blended learning environment at an Australian university. In the present study, it was possible to monitor the progress of 94 participants who enrolled in a bachelor of education award at the university. The participants took a second-year course of "Using ICTs in Learning and Teaching". The course was offered in a blended mode, in which the participants attended face-to-face instructional sessions (i.e., weekly lectures and tutorials) and had an access to the online course content, online learning resources and tools, and online communication and social networking tools.

The following sections provide the review of existing research concerning several factors' impact on university students' learning outcomes and attitudes toward online learning in an online or blended environment. The research questions were developed based on the literature review, which laid the foundation of the present study.

1.2.1 Online and blended learning

Online learning developed from distance learning with the support of ICT tools and has gained popularity in universities after computer and the Internet technologies (especially Web 2.0) were incorporated in education (Bates, 2001; Haddad & Draxler, 2002; Hiltz & Turoff, 2005; Kukulska-Hulme, 2012; Lee & McLoughlin, 2011; Tinio, 2003). Distance learning originated from correspondence learning via postal mails. Then distance learning was supported by audio recordings, radio and television broadcast, and teleconferencing, and later gradually developed into the learning supported by various computer and the Internet technologies (Anderson & Elloumi, 2004; Belanger & Jordan, 2000; Brûlé & Chaptal, 2012; Tinio, 2003; Watson, 2008).

Combining the advantages of traditional and online learning, blended learning offers flexibility and convenience for students to arrange their study, as their learning is supported by face-to-face instructional sessions and online learning resources and tools (Lei, 2010; Rudestam & Schoenholtz, 2010; Watson, 2008). Additionally, the communications between students and teachers and among students can be extended by the use of various online communication and social networking tools (Dziuban, Hartman, & Moskal, 2004). The

detailed discussion on the three modes of learning (i.e., traditional, online, and blended learning) is presented in Chapter 2.

1.2.2 Students' learning outcomes in an online or blended environment

This section briefly reviews the relationships between university students' learning outcomes and several factors in an online or blended learning environment, such as prior attitudes, prior experiences, course expectations, course experiences through online interactions, self-control, and self-regulated learning. The detailed discussion on the above factors' influence on students' learning outcomes is presented in Chapter 3.

In the present study, the students' learning outcomes were measured mainly by two instruments — students' actual results from the course (i.e., the students' aggregate marks from the course) and their perceived learning outcomes (i.e., the students' perceived knowledge acquisition and skill improvement after the course).

a. Prior attitudes. Prior attitudes consisted of students' prior attitudes toward ICT usage, the subject area, and online learning. Generally, strong attitudes can guide and predict people's behaviours (Maio & Haddock, 2009). It was reported that students' prior attitudes toward ICT could predict their learning outcomes in online learning (Beffa-Negrini et al., 2002; Chen & Lin, 2002; Özgür & Tosun, 2010; Sharp, 1999; Sringam, 2000). In addition, Zwikael, Shtub, and Chih (2013) found that students' prior attitudes toward the subject area were related to the improvement in learning. Furthermore, Loomis (2000) reported a significant relationship between university students' prior online learning attitudes and learning outcomes. However, other researchers reported a non-significant relationship between students' learning outcomes and prior attitudes (e.g., Reynolds & Walberg, 1992).

b. Prior experiences. Regarding the impact of students' prior experiences, it has been reported that prior experiences of ICT usage, subject area, and online learning can affect university students' learning outcomes. For instance, LaPointe and Gunawardena (2004) found that students' prior experiences of using computers had an effect on their perceived learning outcomes. However, a non-significant relationship between students' prior ICT experiences and their learning outcomes was reported by Hong (2002), Fredericksen, Pickett, Pelz, Shea, and Swan (2000), and Swan, Fredericksen, Pickett, Pelz, and Maher (2000a).

In respect to the impact of students' prior subject experiences on their learning outcomes, it was reported by Beffa-Negrini et al. (2002) that students' prior experiences of the subject

area strongly influenced their learning outcomes. Zwikael et al. (2013) found that the improvement in learning was identified only among the students with higher levels of prior experiences of or attitudes toward the subject area. However, Gauss and Urbas (2003) did not find any significant relationship between students' prior subject area experiences and learning outcomes.

Concerning the impact of prior online learning experiences, Wang et al. (2001) found a significant positive relationship between students' prior online learning experiences and their learning outcomes. However, Paechter, Maier, and Macher (2010) and Lim and Morris (2009) reported a non-significant relationship between these two factors.

c. Course expectations. In the respect to students' course expectations, Paechter et al. (2010) found that students' learning outcome was related to their expectations from the course. Similarly, Bolin, Khramtsova, and Saarnio (2005) found a significant relationship between a group of university students' course expectations and perceived learning outcomes in a psychology course. However, the findings in other studies concerning the influence of students' course expectations remained unclear and further investigation is needed (Holsapple & Lee-Post, 2006; Keasar, Baruch, & Grobgeld-Dahan, 2005).

d. Online interactions. Online interaction is an important component during online learning and consists of student-content, student-interface, student-teacher and peer interactions (Hillman, Willis, & Gunawardena, 1994; Moore, 1993; Moore & Kearsley, 2011). Students' course experiences through the above four types of online interactions have been found to influence their learning outcomes.

Firstly, in regard to the impact of students' interactions with course content during online learning, Hong (2002) found a significant positive relationship between 26 students' course grades and their satisfaction with the online course content. However, a negative relationship between students' satisfaction with online course content and learning outcomes was found by Wang et al. (2001). Additionally, Eom et al. (2006) reported a non-significant relationship between students' use of online course content and their learning outcome.

In respect to the interactions between students and course interface, which contained a variety of online learning components, Wang et al. (2001) found that students' satisfaction with technical support in an online course was significantly correlated with their final scores. Wan, Wang, and Haggerty (2008) found a significant effect of students' ICT usage on their

perceived learning effectiveness in an online course. Yang and Chang (2012) reported that students' learning outcomes were positively related to their attitudes toward the usage of blogs. However, a non-significant relationship between students' self-efficacy of technology usage and learning outcomes was found by Hong (2002), Lee, Srinivasan, Trail, Lewis, and Lopez (2011), and Puzziferro (2008).

Several researchers found that students' learning outcomes were significantly influenced by some aspects of student-teacher interactions, such as teaching presence (Arbaugh, 2010; Lim, Morris, & Kupritz, 2007), effectiveness of teachers' instruction (Lim & Morris, 2009), teachers' encouragement (Arbaugh & Rau, 2007; Jung et al., 2002), and students' satisfaction with teachers' instruction and support (Beffa-Negrini et al., 2002; Eom et al., 2006). However, Grandzol and Grandzol (2010) and Lee et al. (2011) found a non-significant relationship between students' perceived support from their teachers and learning outcomes in an online environment.

Finally, concerning the effect of peer interactions on students' learning outcomes, it was found that higher levels of peer interactions were related to better learning outcomes (LaPointe & Gunawardena, 2004; Rovai, 2002; Shih, 2011; Swan, 2001). For example, LaPointe and Gunawardena (2004) found in their study that the students' self-reported number and effectiveness of online peer interactions significantly influenced their learning outcomes. Rovai (2002) reported that students' sense of community in an online course was related to their learning outcomes. Shih (2011) identified an improvement in a group of students' scores in writing tests after using peer assessment on Facebook in an English writing course. However, inconsistent findings about the relationship between peer interactions and students' learning outcomes were identified in other studies (e.g., Hong, 2002; Grandzol & Grandzol, 2010; Lee et al., 2011).

e. Course satisfaction. Several researchers reported that students' satisfaction with their online experiences was positively related to their learning outcomes in the course (e.g., Barnard, Paton, & Lan, 2008; Eom et al., 2006; Lee et al., 2011; Wang et al., 2001). However, inconsistent findings were also identified in the research by Chen and Jang (2010) and Hong (2002).

It seems that students' perceptions of their course experiences may not always influence their learning outcomes. Meanwhile, students' learning outcomes in the reviewed research were indicated either by their course results or perceived learning outcomes. Moreover, students'

satisfaction with online learning was found to be indicated by different aspects, such as satisfaction with online courses compared with face-to-face instruction, perception of online communication and collaboration, perceived course quality, intention for future online learning, and willingness to recommend the courses to other people. Hence, students' satisfaction with online learning can be possibly interpreted from different angles and measured by different instruments.

f. Course input. It was found that students' course input, such as effort and time they devoted in an online or blended course, significantly influenced their learning outcomes. For example, Puzziferro (2008) found that the more time and effort students exerted in a course, the better results they achieved by the end of the course. Grandzol and Grandzol (2010) found a significant positive relationship between 354 students' course input and completion rate in online courses. However, Beffa-Negrini et al. (2002) did not find any significant impact of students' effort and time spent on the course on their learning outcomes. Hong (2002) also found a non-significant relationship between students' learning outcomes and the time they spent on learning in an online course. It is important to note that, in some research, students' course input was measured by their self-report. Further research can measure students' course input by employing more diverse instruments, such as students' diaries and online discussion contributions.

g. Self-control. As one of the personality traits, self-control refers to an individual's capability of thinking through long-term goals, resisting temptations, delaying gratification, and controlling emotional impulses (Baumeister & Tierney, 2011; Vohs & Baumeister, 2004). In the present study, the participants' self-control was measured by the Self-control Scale, as used in a recent research by Baumerster and Tierney (2011), but was first published by Tangney, Baumeister, and Boone (2004).

Some researchers found a significant relationship between students' self-control and learning outcomes in both traditional and online learning environments. The predictive power of self-control on younger students' success in learning was reported by Mischel, Shoda, and Peake (1988) and Shoda, Mischel, and Peake (1990) in their "Marshmallow test". Furthermore, Moffitt et al. (2011) demonstrated strong predictive relationships between childhood self-control and a wide range of consequential life outcomes including educational qualifications. Wolfe and Johnson (1995) and Tangney et al. (2004) also addressed the relationship between a group of university students' self-control and learning outcomes. Yu, Chen, Yang, Wang,

and Yen (2007) found that a lower level of self-control capability was one of the reasons for students to reject online learning.

However, few studies addressed students' self-control as a personal trait and its impact on their learning outcomes in an online or blended environment. Meanwhile, most of the studies, which examined students' self-control in online learning, either regarded self-control as a component in the dimensions of metacognition, or treated self-control as some specific learning strategies (e.g., emotion or cognition control) applied by students in online learning (Topcu & Ubuz, 2008; Whipp & Chiarelli, 2004).

h. Self-regulation. Self-regulation in learning was found to be a factor to influence students' learning outcomes in an online environment. Self-regulation in learning refers to (a) students' motivation of self-generating thoughts, feelings, and actions, which are planned and cyclically adapted to achieve their learning goals; and (b) students' application of particular strategies to manage their thoughts and learning behaviour during learning (Pintrich, 1995; Zimmerman, 1998, 2000). The specific characteristics, such as being independent, experienced, confident, highly motivated, and literate, numerate and technologically competent, are critical for students to achieve success in an online course (Brennan, 2003).

In the resent study, self-regulation in learning was distinguished from self-control, as the former referred to the specific strategies or activities students would apply or do, in order to achieve their goals, while the later stood for the ability to control ones' impulses. In addition, a short version of the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich, Smith, Garcia, and McKeachie (1991, 1993) was used to examine the participants' self-regulated learning in the present study.

It was reported that there was a significant relationship between students' self-regulated learning and learning outcomes in several studies. For instance, Pokay and Blumenfeld (1990) found that the students' grades in a high school geometry course were predicted by the self-perception of their ability and metacognitive strategy used in the course. Another positive relationship between self-regulation and learning outcomes among a group of younger students was reported by Pintrich and De Groot (1990a). Additionally, Puzziferro (2008) found that students' regulation of time, study environment, and effort was significantly related to their final grades. Similarly, Yukselturk and Bulut (2007) found that metacognitive strategy and effort management could predict students' learning outcomes. Knowles and Kerkman (2007) reported that the students with higher external locus of control

score received higher scores in an online course. Topcu and Ubuz (2008) found a significant relationship between students' metacognitive knowledge and quality of their online participation. Ho and Kuo (2010) found that that the influence of students' computer attitudes on their learning outcomes was mediated through intrinsic motivation.

However, other researchers reported inconsistent findings about the influence of self-regulated motivation on students' learning outcomes. For example, the non-significant relationship between motivation and learning outcomes was reported by Yukselturk and Bulut (2007). They reported that either intrinsic or extrinsic motivation could not predict students' learning outcomes. Chen and Jang (2010) also reported a non-significant impact of motivation on students' learning outcomes.

Generally, it was found that the university students' learning outcomes in an online or blended environment were influenced by the factors, such as prior experiences, prior attitudes, course expectations, experiences of online interactions, self-control, and self-regulation. However, inconsistent results about the relationships between the above factors were also identified. The present study aimed to investigate whether the above factors would influence university students' learning outcomes in a blended environment. The detailed discussion on the relational of further study is provided in Chapter 3.

1.2.3 Students' attitudes toward online learning

This section briefly discusses the research results concerning the relationship between university students' attitudes toward online learning and several factors, such as gender differences, course expectations, prior experiences, prior attitudes, self-regulation, and course experiences through online interactions. The results from these studies highlighted the needs for further research on university students' attitudes toward online learning. The detailed review of the literature is presented in Chapter 4.

a. Gender differences. The differences between male and female students in terms of their attitudes toward online learning have been found to be inconclusive. Several researchers reported that males showed more positive attitudes toward ICTs or online learning than females (e.g., Banerjee, 2011; Bostock & Wu, 2001; Ferris, 1996; Kim, 2012; Mark, 1992; McSporran & Young, 2001). However, other researchers found that females were more positive than males toward online learning (e.g., Aydin, 2012; Chen & Tsai, 2007; Dabaj & Basak, 2008; Price, 2006). Additionally, other studies found no significant difference

between genders in online learning (e.g., Clark & Gorski, 2002; Gunn, McSporran, Macleod, & French; 2003; Hung, Chou, Chen, & Own, 2010; Lim, 2001; Ory, Bullock, & Burnaska, 1997).

b. Course expectations. Regarding the impact of students' course expectations, it has been reported that there was a significant relationship between students' course expectations and attitudes toward online learning (e.g., Appleton-Knapp & Krentler, 2006; Herbert, 2006; Wu, Tennyson, & Hsia, 2010). For instance, Appleton-Knapp and Krentler (2006) found that the students, whose actual course experiences exceeded their expectations from the course, showed higher levels of satisfaction. Similarly, Wu et al. (2010) found in their research that the students' expectations explained 68% of the variance in their satisfaction with online learning. However, Paechter et al. (2010) emphasized that little was known about students' expectations from online learning, regardless of the rapid development of online learning in higher education.

c. Prior experiences. Prior experiences in the present study consisted of students' prior ICT experiences, prior experiences of the subject area, and prior online learning experiences. Several researchers found that students' prior experiences of ICT usage were related to their attitudes toward online learning (Kurubacak & Baptiste, 2002; Spiceland & Hawkins, 2002; Stephens & Creaser, 2004). However, other researchers reported a non-significant impact of students' prior ICT experiences on their attitudes in an online learning environment (Buzzetto-More & Sweat-Guy, 2006). In respect to the influence of prior subject area experiences, Suanpang (2007) and Cybinski and Selvanathan (2005) reported a significant relationship between students' prior experiences of the subject area and attitudes in an online learning environment.

Regarding the relationship between students' prior online learning experiences and attitudes toward online learning, Contreras (2004), Smart and Cappel (2006), and So and Brush (2008) found a significant positive relationship between these two factors. However, Bolliger, Supanakorn, and Boggs (2010) and Lim, Morris, and Yoon (2006) reported a negative relationship. Furthermore, Paechter et al. (2010), Rodriguez, Ooms, and Montañez (2008), Stokes (2003), and Thurmond, Wambach, Connors, and Frey (2002) found that there was no significant impact from students' prior online learning experiences on their online learning attitudes.

d. Prior attitudes. Students' prior attitudes in the present study comprised prior attitudes toward ICT usage, the subject area, and online learning. The findings by Beffa-Negrini et al. (2002), Rodfiguez et al. (2008), and Wang et al. (2001) indicated that students' prior attitudes toward ICT usage significantly influenced their attitudes in online learning.

In regard to the impact of students' prior attitudes toward the subject area, some researchers reported a significant relationship between students' prior subject area attitudes and online learning attitudes (e.g., Cybinski & Selvanathan, 2005; Reynolds & Walberg, 1992; Suanpang, 2007). However, the subject areas in the majority of the located research were relevant to mathematics and further investigation is needed in more diverse subject areas.

Concerning students' prior attitudes toward online learning, limited studies were located and inconsistent findings were identified. For example, Lim et al. (2006) found that the students with positive prior attitudes toward online learning were more satisfied with the subsequent online course. However, Roberts and Dyer (2005) found that students' confidence in online learning prior to an online course could not predict their actual attitudes toward online learning in the course.

e. Self-regulation. Another factor which may influence students' attitudes toward online learning was self-regulation in learning. Self-regulated learning process involves students' application of metacognitive and cognitive learning strategies driven by their motivation in learning (McCombs, 1986; Pintrich & De Groot, 1990a, 1990b; Pintrich & Schrauben, 1992). Motivational components in self-regulation included beliefs, judgments, goal orientation, and values related to the leaning tasks and about themselves, and these motivational strategies can drive students' learning behaviour in some form of external self-regulation (Pintrich et al., 1991, 1993). Several researchers applied Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991, 1993) to address students' motivated learning and found that students' application of self-regulated learning strategies (i.e., motivation and metacognitive and cognitive learning strategies) were related to their attitudes in an online learning environment.

Puzziferro (2008) found that the strategies of rehearsal, elaboration, metacognitive self-regulation, and time and study environment were significantly correlated with students' satisfaction with online learning. Additionally, some researchers have reported a significant impact of motivation on students' online learning attitudes (Lee, Cheung, & Chen, 2005; Moon & Kim, 2001; Mullen & Tallent-Runnels, 2006; Paechter et al., 2010; Xie, Debacker,

& Ferguson, 2006). These researchers found that the students, who were motivated in learning, tended to be more positive toward learning in an online environment.

f. Online interactions. Students need to interact with course content, course interface, teachers, and other students in an online or blended course to make sense of what they have learned (Shank & Sitze, 2004). The relationships between students' attitudes during online learning and their experiences of online interactions are briefly discussed as below.

It was found that students' attitude toward online learning was influence by four type of online interactions, such as student-content interactions (Gunawardena, Linder-VanBerschot, LaPointe, & Rao, 2010; Lim et al., 2006; Paechter et al., 2010; Swan, 2001), student-interface interactions (Arbaugh & Benbunan-Fich, 2007; Drennan, Kennedy, & Pisarski, 2005; Huang, 2002a; Kettanurak, Ramamurthy, & Haseman, 2001), student-teacher interactions (Arbaugh, 2001; Lee et al., 2011; Paechter et al., 2010; Russo & Benson, 2005; Swan, 2001), and peer interactions (Jung, Choi, Lim, & Leem, 2002; Huang, 2002b; Lee et al., 2011; Russo & Benson, 2005; Swan, 2001).

However, inconsistent findings about the influence of online interactions on students' attitudes toward online learning were also identified. For example, Arbaugh and Rau (2007) found a non-significant impact of a group of students' interactions with course interface and the teachers on their satisfaction with the online delivery medium in seven blended courses. Moreover, Arbaugh and Rau (2007) and Gunawardena et al. (2010) found a significant negative relationship between peer interactions and students' satisfaction with an online course.

In sum, it was found that university students' attitudes toward online learning were related to several factors, such as gender differences, course expectations, prior experiences, prior attitudes, self-control, self-regulation, and online interactions. However, inconsistent finding were also identified. The present study aimed to examine whether university students' attitudes toward online learning would change after taking a blended course and whether the above factors would influence the students' attitude toward online learning by the end of the course.

1.2.4 The purpose the present study and problem statement

The present study was undertaken to further investigate the factors that might underpin students' learning experiences in the context of a blended course at a university level. These

factors included course expectations, prior attitudes, prior experiences, self-control, self-regulation in learning, and course experiences through interactions.

In particular, the study aimed to investigate (a) what factors might influence the students' learning outcomes in a blended course; (b) whether there would be any significant change in the students' attitudes toward online learning after taking the course; and (c) what factors might influence the students' attitudes toward online learning by the end of the course.

1.3 Significance and contribution of the study

The investigation of students' learning outcomes and attitudes toward online learning may help to clarify the impact of factors such as students' course expectations, prior attitudes, prior experiences, self-control, self-regulation in learning, and course experiences.

By exploring the relationship between the students' course experiences and their learning outcomes and online learning attitudes, the study may further elucidate whether the factors at the beginning of a course (e.g., students' course expectations, prior attitudes, prior experiences, self-control, self-regulation in learning) can exert their influence on the students' learning outcomes and online learning attitudes through the mediation of their course experiences. Finally, the study may contribute to explain how a student's experiences in a blended course may lead to his or her online learning attitude changes.

1.4 Terms and concepts within the thesis

As there was considerable variation in the literature review regarding the usage of several terms, it would be appropriate to provide a preferred usage for the following terms in this thesis.

1.4.1 Traditional learning

Traditional learning is a mode of learning which occurs in an environment, where a teacher talks to a group of students, all together in a synchronous learning environment (i.e., at the same time and in the same place) and the students acquire knowledge from the teacher or through books. In the present study, the term "traditional learning" and "traditional mode of learning" were used interchangeably.

1.4.2 Distance learning

Distance learning refers to a mode of learning supported by postal materials or television or radio broadcast, before computer and the Internet technologies were integrated in education.

The students and teachers in a distance learning environment were separated physically and geographically and took correspondence course using printed materials and communication via post and telephone.

1.4.3 Online learning

Online learning refers to a mode of learning which uses the Internet technologies to deliver course content, support communication between teachers and students and among students, and facilitate students' learning. In essence, online learning stands for the learning occurring totally online.

1.4.4 Blended learning

Blended learning refers to a mode of learning which combines face-to-face interactions and online learning. Students' learning is supported by face-to-face instructional sessions and usage of various online learning components.

1.4.5 Learning outcomes

Learning outcomes refer to students' achievements from a course, which can be indicated by their actual course results. The students' perceived knowledge acquisition or improvements in learning are specified as perceived learning outcomes.

1.4.6 Online interactions

Online interactions refer to the interactions occurring in an online environment and include four types of interactions: student-content, student-interface, student-teacher, and peer interactions.

1.4.7 Course participation

Course participation in the present study refers to the participants' actual input in the course based on the results of factor analysis, which includes: (a) online forum contribution frequency; (b) online forum contribution length; (c) weekly reports frequency; and (d) number of hours spent for the course online.

1.5 Structure of the thesis

The present thesis comprised eight chapters. Chapter 1 introduced the background of the present study. Chapter 2 reviewed different modes of learning from traditional, online, to

blended learning. In Chapter 3 and Chapter 4, the studies concerning several factors' influence on university students' learning outcomes and attitudes toward online learning were reviewed. These factors included gender differences, prior attitudes, prior experiences, course expectations, self-control, self-regulated learning, and course experiences through online interactions. Chapter 5 described the research methodology of the present study. Chapter 6 presented the results based on quantitative analysis of the dataset in Phase One (a pre- and posttest survey, weekly reports, and online forum contributions). Chapter 7 reported the findings from open-ended questions in the posttest, weekly reports, and interviews. Chapter 8 discussed the research findings and drew a conclusion for the present study.

Chapter 2: Traditional, Online and Blended Learning

This chapter provides a background for the present study by reviewing three modes of learning, including traditional, online, and blended learning. An overview is provided for each mode of learning at the beginning of each section, which is then followed by the discussion on the strengths, limitations, and potential issues of each learning environment.

2.1 Introduction

Learning is often concerned with (a) acquisition of new skills, knowledge, and attitudes; and (b) recognition of how the newly acquired knowledge, skills, and attitudes relate to those that people have already possessed (Hilgard & Bower, 1975; Talbot, 2003). Learning and teaching activities occurring in classrooms in a school environment remain a major method for students to acquire knowledge and skills.

Since the introduction of information and communication technologies (ICTs) in learning and teaching, it has been possible to receive education in different learning environments, e.g., classrooms, online, or blended learning environment. ICTs can help to break down physical, geographical and temporal barriers, provide better access to a much wider range of resources in multiple formats, cater for students with different needs, and increase in the interactions between teachers and students as well as among students.

Combining the advantages of traditional and online learning, blended learning maintains face-to-face interactions between teachers and students and among students. At the same time, students are provided with access to online course materials and flexible communication supported by ICTs. Blended mode of learning appears to be a trend of education across different levels. This chapter presents an overview of different types of learning modes from traditional, online to blended learning, in order to provide a general background to the present study. The discussion on three modes of learning (i.e., traditional, online, and blended learning) is provided as below.

2.2 Traditional learning

This section describes the characteristics of traditional learning, such as live instruction, scheduled instruction sessions, immediate interactions between teachers and students and among students, and learning activities occurring in classrooms. Then the strengths and limitations of traditional learning are discussed.

2.2.1 Characteristics of traditional learning

Traditional learning environment is characterized as that a teacher interacts with a group of students, all together in a synchronous environment at the same time and in the same place. Meanwhile, the students acquire knowledge from their teachers and resources in labs or books (Loxley & Julien, 2004). Interactions between teachers and students in classrooms can be supported by immediate feedback and visual cues, which have the advantage of ease of social interactions (Chickering & Gamson, 1987).

Traditional learning activities include teachers' instruction, feedbacks, drills, tests, assignments, group work, and experiments. Teaching and learning activities in classrooms are aided by various resources and tools, such as text books, note books, blackboard, pictures, posts, and other specific teaching aids for subject areas (Black, 2002; O'Malley & McCraw, 1999; Spodick, 1995).

2.2.2 Strengths of traditional learning

A classroom is a familiar and comfortable environment for most of students, owing to the face-to-face interactions in such a synchronous environment (Engelbrecht, 2003; Voci & Young, 2001). Scheduled instructional sessions can help students to keep up with the course process to some extent (Lance, Clavell, Fischer, Link, & O'Dell, 1988). Furthermore, in traditional learning environment, immediate interactions between students and teachers and among students can be a motivational factor for students' learning (Breisinger, Höllerer, Ford, & Folsom, 2006; Engelbrecht, 2003). The following sections elaborate the strengths of traditional learning in more details.

2.2.2.1 Scheduled instructional sessions

Traditional learning normally sets requirements for students' attendance to the scheduled instructional sessions, such as lectures, classes, lab activities, and tutorials. In this sense, these sessions require students to keep up with the course process by providing them with

strong directions and structures about attending classes, reading course materials, taking notes, and finishing learning tasks (Lance et al., 1988; Oh & Kim, 2007). Teachers' supervision, instruction, and support in classrooms also help to organize their students' learning and ensure that the students complete learning activities and tasks for each instructional session.

2.2.2.2 Immediate interactions

Immediate interactions in classrooms can be regarded as one of the significant advantages of traditional mode of learning. Students can receive live instruction and instant feedback from their teachers and other students without delay (Black, 2002; Breisinger et al., 2006; Engelbrecht, 2003; Jones-Shoeman, 2009; Zhang, Zhao, Zhou, & Numamaker, 2004).

It is assumed that face-to-face communications make it easy for students to clarify difficult topics or misunderstandings by obtaining direct help from teachers (Jones-Shoeman, 2009; Müller, 2004). Additionally, teachers can receive feedback from students by observing them, listening to their inquiries, or asking them questions. Hence, teachers can supervise their students through the students' classroom behaviour.

Finally, traditional mode of learning is assumed to be beneficial for students to interact with peers through cooperative and collaborative team work (Zhang et al., 2004). Students can learn from each other, solve problems, enhance their learning, and develop their social skills in peer learning activities through face-to-face discussion, presentation, and group work in classrooms (Breisinger et al., 2006).

2.2.2.3 Student motivation

With direct attention from teachers and group work with peers in classrooms, students may be more readily motivated to learn. They may be more engaged in learning with the involvement of and consultation with their teachers as well as team work with other students (Black, 2002; Chickering & Gamson, 1987; Lance et al., 1988; Zhang et al., 2004).

2.2.3 Limitations of traditional learning

2.2.3.1 Lack of flexibility

As traditional mode of learning is conducted in a synchronous environment, it is constrained by time and location (Zhang et al., 2004). In other words, students and teachers must be in the same place at the same time (Black, 2002). The subject area knowledge offered in classrooms

is only available to the students who are able to attend the classes (Mazoué, 1999). The students may be deprived of opportunities to receive education, if they are located in remote areas without access to schools or have various responsibilities from employment or families, which conflict with the schedule of face-to-face instructional sessions.

2.2.3.2 Interaction limitations

Not every student can have an equal opportunity to interact with teachers in classrooms, owing to their personal preference or the large class size (Alvarez, 2001; Jones-Shoeman, 2009). There might be lower levels of contributions from "shy, marginalized or analytical people" (Jones-Shoeman, 2009; Shank & Sitze, 2004, p.11). For instance, shy students may participate in the class discussion at a lower level. During the instructional session in a large class, it may be difficult for teachers to attend to all students' inquiries.

Furthermore, communication in classrooms often follows a one-dimensional and linear path, which emphasizes on teachers as the most important element of communication in class (Sidhu & Selvanathan, 2005). In certain instructional sessions, such as lectures in universities, students have limited time to interact with their lecturers for further inquiries or expression of their thoughts during the lectures (Alvarez, 2001). Therefore, in such a case, students have to find other time after the lectures to have their inquiries answered.

2.2.3.3 Limitation in catering students' different learning preferences and needs

Supervision and guidance from teachers in classrooms may assist students to complete scheduled learning tasks and ensure that the whole class can follow the teachers' instruction (Tseng, Lu, Yin, & Chen, 1995; Zhang et al., 2004). However, it may be difficult for teachers to cater their students' different learning preferences or address their learning needs (Herie, 2005). Teacher-centred instruction may cause the issue that teachers will tend to focus on leading their students as a whole group to complete learning tasks.

A lack of attention from teachers to students' different learning preferences or needs may cause the students' negative perception, such as boredom or dissatisfaction (Huang, 2002a; Thomerson, 2006). For instance, compared with the learning resources supported by ICTs, the main sources of course materials for traditional mode of learning were mainly teachers' instruction, textbooks, pictures, and other materials from libraries, bookshops, or museums. Hence, under the traditional form of instruction, the agenda is set under teachers' direction

and limited by the resources provided by the teachers, in terms of the content and sequencing of instructional experience, and students' preferences and elective choices may be minimized.

2.3 Online learning

With the introduction of ICTs in education, traditional learning has been facilitated by different ICT tools. In the context of distance learning, the emergence of the Internet technologies has made a significant impact on students' learning. The following sections will elaborate on the development of online learning and discuss its strengths and limitations.

2.3.1 Overview of online learning

Online learning is a mode of learning, by which students acquire knowledge and construct personal meaning through the use of the Internet technologies (e.g., Web 2.0 and personal or mobile technologies) to access learning materials, interact with teachers and other students, and obtain support during learning process (Ally, 2004; Lee & McLoughlin, 2011). It can be assumed that online learning provides an environment for students to construct knowledge by accessing online resources, using various online learning components, and interacting with teachers and peers through online communication and social networking tools.

Especially after the Web 2.0 and personal and mobile technologies were applied in education, online learning can be accessible via online course materials and synchronous and asynchronous communications. For instance, online learning can be supported by a variety of online components, such as knowledge management system (e.g., online libraries, student portal, online assignment submission, and course evaluation). In addition, synchronous and asynchronous online tools facilitate online communication between students and teachers and among students. For example, video conferencing, as a synchronous communication tool, support immediate feedback from teachers or other students. On the other hand, asynchronous tools such as chat rooms, blog, wikis, Facebook, or discussion forums enable students to communicate with their teachers and classmates at their convenience. The increasing availability and versatility of personal and mobile devices (e.g., iPad and smart phones) add further flexibility to online learning (Jolliffe, Ritter, & Stevens, 2001; Kukulska-Hulme, 2012; Lee & McLoughlin, 2011).

2.3.2 The history of integrating ICTs into distance learning

Information and communication technologies (ICTs) have been commonly accepted as the modern technological solutions used for processing, transmitting, creating, disseminating, storing, and managing information, through a set of technological tools, principally computer and the Internet application and telecommunications (Blurton, 1999; Brûlé & Chaptal, 2012).

ICTs include compact discs and CD-ROMs, videodiscs, broadcasting technologies, educational television, VCRs, cable TV, interactive radio, telephone, microcomputer-based laboratories, computers, virtual reality, instructional software, the Internet (e.g., Web 2.0), and recent technologies, such as online communication and social networking tools (e.g., email, Twitter, Myspace, and Facebook) and personal and mobile technologies (e.g., iPad, Tablet, and 3G or 4G mobile phones) (Haddad & Draxler, 2002; Maumbe & Okello, 2013; Tinio, 2003).

Online learning originated from distance learning, which can be traced back about 150 years ago. According to Anderson and Elloumi (2004), the integration of ICTs in learning evolved through five generations. None of these five generations has completely displaced the previous ones. Instead, the technologies for each generation were remained and used over all five generations in combination (Anderson & Elloumi, 2004; Hannay & Newvine, 2006; Spodick, 1995; Tinio, 2003). These five generations are illustrated in details as below.

During the first generation, distance learning took place through postal communication between students and teachers and students took correspondence course by using printed materials and communication via post and telephone (Southworth, Flanigan, & Knezek, 1981). The distance learning during this generation started in Europe and the United States in the middle of the 19th century (Belanger & Jordan, 2000; Sherry, 1995).

Distance learning in the second generation (between the early and the middle of the 20th century) was supported by audio recordings and radio and television broadcasts (Belanger & Jordan, 2000; Tinio, 2003). From the 1920s to 1950s, radio and television were widely used as educational tools through three general approaches — direct class teaching, school broadcasting, and general educational programming over community (Tinio, 2003).

In the third generation (at the middle of the 20th century), distance learning was based on synchronous tools of video and audio teleconferencing and began to provide rapid feedbacks (Anderson & Elloumi, 2004; Douglas, 1993). Early forms of the instruction via computers

took the form of computer-assisted instruction (CAI) or computer-based instruction (CBI), which were accepted as educational tools (Heydenrych & Prinsloo, 2010).

The fourth generation was from the later of the 20th century to the beginning of the 21st century. Distance learning in this period was supported by computer conferencing, which allowed for direct interaction between teachers and students and among students (Anderson & Elloumi, 2004). Then later in the 1990s, the Internet era emerged, starting from the first browser software (Mosaic) which transformed a text-based Internet into a combination of text and graphics. At the beginning of the 2000s, email, online multimedia, videoconferencing, and portable devices made it easy and popular for the Internet access, which led to a flourish in distance learning (Roblyer & Doering, 2013). In this generation, online communication and resource sharing emerged and the Internet technologies were increasingly used by educational sections (Heydenrych & Prinsloo, 2010).

The fifth generation (at present day) witnessed the rise of Web 2.0 technologies. There were more open educational resources and online communication and social networking technologies (e.g., YouTube) (Heydenrych & Prinsloo, 2010). Online learning is delivered by autonomous agents, intelligent, and database-assisted learning, which is referred to the educational Semantic Web (Web 3.0) (Anderson & Elloumi, 2004).

In fact, the history of applying ICTs in education presents the origin of distance learning and development of online learning, as the development of online learning is a process inseparable from the integration of ICTs into distance learning. The application of a variety of online components promises a large-scale participation and open access via the Web, which can be regarded as a trend of online learning — a massive open online course (MOOC) (Daniel, 2012). Moreover, the combination of classroom teaching and online learning has been increasingly used in higher education. Being regarded as either a sole delivery method or supplement of traditional learning, online learning benefits teaching and learning in various aspects, which are elaborated as below.

2.3.3 Strengths of online learning

2.3.3.1 Practical advantages

Flexibility can be one of the most important advantages of online learning. Online courses are accessible anytime from anywhere without physical and geographical limitations. In this sense, with the support of ICTs, more alternatives and opportunities are provided for the

students, who live in scattered, remote and rural areas, or are previously excluded from education as a result of cultural and social factors, such as ethnic minorities, gender, age, disabilities, financial problems, and time constraints. In addition, students can have more control on their learning pace, as they can choose the time and location to access to course materials (Balsera, 2001; Black, 2002; Harasim, 2000; Jones-Shoeman, 2009; O'Malley & McCraw, 1999; Stansfield, McLellan, & Connolly, 2004).

2.3.3.2 Enabling more interactions at teachers' and students' convenience

Online learning can extend the interactions beyond face-to-face instructional sessions (Balsera, 2001) and improve the quality of discussion (Black, 2002; O'Malley & McCraw, 1999; Song, Singleton, Hill, & Koh, 2004). Online asynchronous and synchronous communications allow different types of interactions between students and teachers and among students, which will not be limited by scheduled instructional sessions (Song et al., 2004).

It is commonly understood that online learning has the potential to enhance interactions between teachers and students and among students. Students can interact with their teachers, other students, and even more experts via email, forum, and blog at their convenience. Furthermore, it is believed that asynchronous communication can encourage students' reflective thinking. Students can have more time to process information and more opportunities to refine their ideas (Rovai & Jordan, 2004; Stansfield et al., 2004). Meanwhile, through synchronous communications, students and teachers can arrange video conference and some human factors (e.g., eye contact and facial and verbal expression) can be remained in the live communication.

Online interactions make it possible for students to collaborate with teachers or peers in or outside classrooms. For instance, students can communicate and work collaboratively with their teachers, peers, or even experts online (Ally, 2004). Students can make contribution to their team work by posting ideas via online communication and social networking tools (e.g., Email, blogs, online forum, and Wiki). Students can also collaborate with other people by sharing information and resources, making comments, raising questions, discussing various topics, contributing on team work, and completing projects online.

2.3.3.3 Enhancing students' learning

Students' learning can be enhanced by using different online learning components (Black, 2002; Newhouse, 2002; O'Malley & McCraw, 1999; Song et al., 2004). For example, students can access online course materials presented in different multimedia formats at their convenience. The interactions between teachers and students and among students can be extended for problem solving, information sharing, and collaboration by using online communication and social networking tools. Additionally, students can use online resources and learning tools to facilitate their learning, such as practising on drills, developing higher order thinking skills, and improving problem solving skills.

2.3.3.4 Facilitating teaching

Various online learning resources and tools can facilitate teachers' teaching, as these online learning components provide teachers with an access to a huge amount of information and materials for their teaching (Williams, Coles, Wilson, Richardson, & Tuson, 2000). Additionally, teachers can have an interactive approach to teaching online and make more students engaged in learning through using an array of ICTs, e.g., multimedia, courseware, and the Internet applications (HM Inspectorate of Education, 2007). With the support of course management system, teachers can publish course materials online and be aware of students' learning process by checking their online participation.

2.3.4 Limitations of online learning

2.3.4.1 Practical limitations

Online learning expands the population of potential students. However, it may be the case that some students may not have access to online learning because of their economic situations, or different social, cultural, geographical, and gender background (Tinio, 2003). Moreover, it may be a challenge for teachers to manage group tasks among the students located in different locations and even in different time zones (Harasim, 2000).

2.3.4.2 Technical issues

There may be technological issues during online learning (Shank & Sitze, 2004). The problems of useability and inadaptability of hardware and software, lack of technical assistance, insufficient information about technology application, and poor infrastructure may place obstacles for teachers and students to use technologies (Pelgrum, 2001; Tinio, 2003; Williams et al., 2000). When the Internet connection is not functioning, teachers' and

students' access to online courses will be inhibited. Prior to the learning process, online students may also encounter difficulties in enrolment procedures, when there is a lack of hands-on instruction from teachers or administrative staffs (Chizmar & Williams, 1997).

2.3.4.3 Interactional limitations

Online environment may lack strong social dimension and can be socially isolating (Johnson, Aragon, Shaik, & Palma-Rivas, 2000). Online interactions incline to be less spontaneous than the interactions in classrooms (Molinari, 2003; Stansfield et al, 2004). Especially, the asynchronous online communication has text-based nature (Rovai & Jordan, 2004). Hence, online discussion among students and teachers might be voluminous and overwhelming (Harasim, 2000). Furthermore, when there are insufficient communications between teachers and students or among students online, students may feel stressed, owing to the lack of a sense of community, feelings of isolation, and delay in others' responses (Hara & Kling, 1999; Song et al., 2004; Vonderwell, 2003).

2.3.4.4 Learning limitations

The difficulty in understanding instructional goals and course content may be an issue for students during online learning (Song et al., 2004). Compared with learning in classrooms, there may be fewer chances for students to have face-to-face interactions to solve their inquiries in an online environment. As a result, students may interpret course information or assessment requirements in different ways or even misunderstand the course content (Baker, 1986; Shank & Sitze, 2004).

2.3.4.5 Suitability limitations

2.3.4.5.1 Not suitable for every subject area

Not every subject area can be suitable for online learning (Tinio, 2003). Online instruction may not be suitable for the subjects that require high degrees of student-teacher interactions for demonstration or hands-on practice, such as performance-based training methods subjects (Johnson et al., 2000).

2.3.4.5.2 Not suitable for everyone

Online learning may bring new challenges to students both emotionally and academically, as there may be less teachers' supervision during online learning compared with learning in classrooms (Barnard-Brak, Paton, & Lan, 2010). Students need to be more motivated and skilled at self-regulated learning. For instance, students may need to put more effort to cope

with time management, learning independently, and effective usage of learning strategies, in order to achieve success in an online learning environment (Bernt & Bugbee, 1993).

In addition, online learning has requirements on students' computer literacy. Students need to be reasonably computer literate or have some prior experiences with the Internet use (Jones-Shoeman, 2009). Online courses may cause frustration, anxiety, and confusion among the students who are less experienced in computer or the Internet use (Zhang et al., 2004). Hence, although computer and the Internet usage may not be an issue for the students at the age of twenties because of their frequent access to computers, the lack of computer experiences for some individuals can hinder their online learning.

2.3.4.6 Higher requirements for educational providers

In order to provide online courses with good quality, it is not sufficient for teachers to merely publish course content online. Teachers need to design the courses based on the pedagogy suitable for the topics and target students in an online environment. In addition, teachers' lack of computer and the Internet experiences can be an obstacle for them to integrate ICTs in teaching (Pelgrum, 2001; Tinio, 2003; Williams et al., 2000).

Furthermore, administrators need to ensure that technology support systems can assist teachers and students to solve technical problems during online learning (Watson, 2008). Additionally, logistical problems (e.g., space for locating technical devices), lack of training for teachers, and insufficient administrative assistance may also stand out in the way of using ICTs to facilitate teaching or learning activities (Pelgrum, 2001; Tinio, 2003).

Despite of the above issues, the advantages of online learning have been commonly recognized. Online mode of course delivery has been widely applied in higher education sections and the number of students taking online courses may be in an uptrend. MOOCs are regarded as massive open online course programs and offer free or affordable courses by universities. Allen and Seaman (2011) together with Babson Survey Research Group and Quahog Research Group conducted a research project in 4523 institutions and surveyed a total of 2512 respondents, which represented 56% of the sample group. The results displayed a continued growth in the number of students learning online over the past nine years from 2002 until 2011 and the faculty acceptance of online learning also increased during the same period.

In addition to the mode of total online delivery, online learning components are also integrated in face-to-face instructional sessions to provide flexibility, a vast amount of course materials, and more opportunities for interactions. The strengths of traditional and online learning can be combined to achieve optimal educational quality. A blended mode of learning is considered to optimise the advantages of both traditional and online learning to offer students a flexible access to course content and remain face-to-face interactions in classrooms.

2.4 Blended learning

2.4.1 Overview

Blended learning refers to a mode of learning delivery which combines face-to-face and online learning and enables blends across four key dimensions as space, time, fidelity, and humanness (Bleed, 2001; Graham, 2006; Sharma, 2010). Blended learning introduces online learning components into a course, at the same time, recognizes the merit in retaining face-to-face interactions and other traditional approaches to support students (Macdonald, 2006; Rudestam & Schoenholtz, 2010; Watson, 2008).

Blended learning combines the instruction from two historically separate educational models — face-to-face learning and non-traditional learning systems, which have been interpreted in various ways, such as distributed learning, distance learning, e-learning, virtual instruction, and online learning (Akkoyunlu & Soylu, 2008; Bleed, 2001; Harding, Kaczynski, & Wook, 2005; Graham, 2006; Moonen & Colis, 2001).

The term “hybrid” has been used to refer to the courses that combine face-to-face interactions with online delivery systems (Young, 2002). Osguthorpe and Graham (2003, p. 229) preferred the term “blended”, as they argued that, according to Oxford English Dictionary, “hybrid” was defined as “derived from heterogeneous or incongruous sources: having a mixed character; composed of two diverse elements; mongrel.” The origin of the word “hybrid” is the interbreeding of two different species of animals or plants to create a new species. On the other hand, the term “blended” emphasizes on “the mingling together in ways that leads to a well-balanced combination”, as suggested in OED that blend means “to mix, mingle; esp. to unite intimately, so as to form a uniform or harmonious mixture.”

Stracke (2007, p. 58) supported that it seemed appropriate to adopt the term “blended learning”, because it accurately described the particular educational environment and placed

the study in a broader research context. In the present study, blended learning is described based on the research by Moonen and Colis (2001) as a combination of face-to-face learning and online learning so that learning occurs both in classrooms and an online environment.

Blended learning can be supported by various online learning components, such as real-time virtual or collaboration software, self-paced Web-based courses, electronic performance support systems (EPSS) embedded with job-task environment, and the knowledge management systems. The advent of new learning technologies, such as podcasting, e-portfolios, social networking tools (e.g., blogs and wikis), and personal and mobile technologies, create new blending potentials (Kukulska-Hulme, 2012; Lee & McLoughlin, 2011).

2.4.2 The emergence of blended learning

The blending of face-to-face instruction with various types of online learning components has been operated for more than four decades (Dziuban et al., 2004). Blended learning at high school level can be traced back to the 1920s. Later blended learning was promoted at the University of Nebraska by 1930 and introduced as a basic component of the teaching system of the United Kingdom's Open University in 1969 (Bonk & Graham, 2006). Within higher educational sections, online materials were introduced initially to assist off-campus students, but have developed into an integral part of course materials and complements traditional mode of learning (Oliver & Omari, 2001). Since computer and the Internet technologies have expanded educational options available for teachers and students, innovative applications of technologies have begun to blur the distinctions between traditional face-to-face and online learning environments (Osguthorpe & Graham, 2003).

Blended learning may be helpful to compensate the weaknesses of traditional and online learning to some extent. In traditional learning environment, students' learning activities, interactions with teachers and other students, and their access to course materials and information are constrained in classrooms. Meanwhile, online learning may have the issue of limited face-to-face interactions between teachers and students and among students. It is assumed that blended learning can maximize the strengths of face-to-face learning and online learning (Akkoyunlu & Soylu, 2008). However, there are also challenges for both teachers and students to provide instruction and learn in a blended environment. The following sections discuss both strengths and challenges of using a blended mode in teaching and learning.

2.4.3 Strengths of blended learning

2.4.3.1 Combining the best of both modes of learning

The advantage of blended learning is characterized as the convergence of the merits of traditional face-to-face learning and online learning (Macdonald, 2006; Orton-Johnson, 2009). First of all, blended learning provides greater flexibility and convenience, which is a major advantage offered by online learning. When this advantage is integrated into traditional mode of learning, the flexible approach to course materials offers students more opportunities to learn on their own schedule (Harding et al., 2005; Lei, 2010).

Next, students can access to more resources relevant to the subjects owing to various online resources and tools. With the support of ICTs, students do not have to be limited by the resources provided by teachers. For example, students can use online search engines to locate information relevant to the subjects they are taking, and, at the same time, the resources available online can be of multimedia formats, which facilitate students' information processing (Cooner, 2010; Graham, 2006; Huon, Spehar, Adam, & Rifkin, 2007).

Furthermore, human factors are still remained in blended learning, as students can attend face-to-face instructional sessions. Students can enjoy the convenience offered by online learning components, and, at the same time, do not have to sacrifice social interactions (i.e., receiving immediate feedback and corrective action from teachers in classrooms) (Dziuban et al., 2004; Harding et al., 2005; Graham, 2006).

2.4.3.2 Meeting students' diverse needs and multiple commitments

As incorporating various online learning components, blended learning appeals to different learning preferences among students. As being provided with flexible and convenient access to course materials, the students with family duties or employment commitments can have more opportunities to receive education (Graham, 2006). Especially in the course with large-enrolment, blended mode of learning may make it possible for the students with work or family obligations to complete their degrees (Ross & Gage, 2006).

2.4.3.3 Creating better learning community

Blended learning environment can create an effective learning community (Hanson & Clem, 2006). Interactions between students and teachers and among students can be extended after class by using online communication and social networking tools. Enhanced communications after face-to-face instructional sessions may help to form more long-lasting relationships

between teachers and students or among students. The use of online communication and social networking tools, such as Email, discussion forum, blogs, and video conference, can promote the exchange between teachers and students and collaboration among students in more depth and form better learning communities.

2.4.3.4 Greater insight into students' learning progress

Course management system in blended learning can help teachers to collect detailed data about students' course participation in the online environment (Macdonald, 2006; Ross & Gage, 2006). Teachers can track students' learning progress besides their observation in classrooms, in order to provide more help to the students who are left behind or need more assistance. In this sense, course management system may help teachers effectively prevent the students from failing or dropping out of the courses. Meanwhile, students can also check their learning progress and compare their course participation with other students.

2.4.3.5 Improving learning by providing various ICT tools and more online resources

The use of online materials in a blended course can expand the scope and content of the curriculum (Horgan, 1998). Students' learning can be enriched through the usage of various ICT tools and a larger amount of online resources (Lei, 2010). Additionally, course management system makes it possible for students to review their course more carefully and reflect on their learning more thoughtfully and deeply (De George-Walker, Hafeez-Baig, Gururajan, & Danaher, 2010).

Moreover, an array of learning strategies supporting active learning, such as peer-to-peer learning, learner-centred or self-paced learning, and face-to-face learning, can be more fully used in a blended environment (Collis, Bruijstens, & van der Veen, 2003; Hartman, Dziuban, & Moskal, 1999). Students can require technology-related skills during online learning process and their class time can be contributed to applications, case studies, and decision-making skills development (Cottrell & Robison, 2003).

2.4.4 Challenges of blended learning

2.4.4.1 Balance

The course designers and teachers need to keep a proper balance between online and traditional modes of course delivery (Macdonald, 2006). Every blended course has its unique nature and each one may have a different balance point (Osguthorpe & Graham, 2003). Face-

to-face and online instruction and interactions need to be blended effectively and designed properly to complement each other (Graham, 2006).

For example, face-to-face instruction can emphasize on knowledge transmission and construction. Students' review on course content through the course website can facilitate their reflection and reinforcement. The goal of class or online discussion can focus on the interactions between students and co-construction of an understanding of the discussion topics and subject area knowledge.

2.4.4.2 Higher requirements on students' self-regulation in learning

It can be noted that, in a blended course, the combination of tradition mode of learning with online learning components requires a high level of self-regulation among students (Collis et al., 2003). Dennis et al. (2006) suggested that online learning might be more appropriate for self-directed learners. As online learning is an integrated part of blended courses, the requirement of self-regulation may frustrate the students who lack the appropriate prerequisite skills, resources, and attitudes to be engaged in online learning (Boyle, Bradley, Chalk, Jones, & Pickard, 2003; Huang & Zhou, 2006).

2.4.4.3 Requirement on more support for teachers and students

In a blended learning environment, both teachers and students need considerable support, in terms of school policies, resources, scheduling, and technical assistance (Garrison & Kanuka, 2004; Hartman et al., 1999; Im & Lee, 2003; Levine & Wake, 2000; Morgan, 2002). Teaching blended courses requires teachers to design and publish the course materials on the course website, provide instruction in classrooms, maintain and update the online course content on a regular basis, and provide support for their students during and after the instructional sessions (Macdonald, 2006). In this case, teachers need support, training, and effective communication with different faculties to make sure that the courses can proceed smoothly (Hofmann, 2006). Furthermore, students also need support from teachers or administrative staffs when they encounter technical issues or ask for assistance on ICT usage.

2.4.4.4 Designing blended courses

Some issues during integrating ICTs in a blended course may emerge, such as informal designing process, underestimating the difficulty level of designing a blended course, simply stringing stand-alone components together into a learning path, and lack of experiences in designing and facilitating the course (Hofmann, 2006). It needs to be ensured that

technological and pedagogical advancements are integrated based on sound pedagogical theories (Jones, 2006).

2.4.4.5 Not suitable for all students

Similar with online learning, blended learning requires a high level of self-regulated learning. Not all students will necessarily appreciate the demand of independent online learning or be competent enough to gain success in a blended course (Macdonald, 2006). Harding et al. (2005) found that, although blended learning environment enriches students' interactions with their classmates and teachers, some students still commented on their learning experience as a lonely activity. Additionally, blended learning may not be suitable for the students, who lack adequate access to technologies (Stracke, 2007).

Based on the above discussion of three modes of learning (i.e., traditional, online, and blended learning), the following table summarises the characteristics, strengths, and limitations or challenges of these learning modes (Table 2.1).

Table 2.1
Summary of traditional, online, and blended learning

	Characteristics	Strengths	Limitations or challenges
Traditional learning	Face-to-face interactions during instructional process; resources which are physically accessible	Face-to-face interactions; immediate feedbacks; scheduled instructional sessions; easiness for group work during learning process	Lack of flexibility; limited opportunity for communication owing to students' individual differences and various types of instructional sessions; limitations in catering for student with different learning preferences and needs
Online learning	Learning and teaching activities supported by ICTs; a convenient and flexible access to course materials and resources through the Internet; synchronous and asynchronous online communications	A flexible and easy access to course materials and resources; enabling more interactions at teachers' and students' convenience; enhancing students' learning through using different online learning components; facilitating teaching with the aid of online resources and tools	Limitation of students' access to online learning because of economic situations and social, cultural, geographical, and gender background; potential technical issues; potential social isolation; difficulty in understanding instructional goals and course content; issues of suitability for subject areas and students; higher requirements for educational providers
Blended learning	Combining traditional and online learning, such as face-to-face and online instruction, face-to-face and online synchronous and asynchronous communications	Blending advantages of traditional and online learning; meeting students' diverse needs and multiple commitments; creating better learning community; greater insight into students' learning progress; improving learning by providing various ICT tools and more online resources	Issues of balance between online and traditional modes of course delivery; higher requirement on students' self-regulation in learning; requirement on more support for teachers and students; issues of course design; issues of suitability

2.4.5 The future of blended learning

According to Young (2002), blended learning constitutes a significant development in tertiary education in the early years of the 21st century. The strong pervasiveness of online learning technologies in universities well substantiates the significance of blended learning in higher education (Derntl & Motschnig-Pitrik, 2004). In 2006, Wagner stated future learning would move toward a mode of blended learning that features course content for personalizing and enhancing students' learning. Bonk, Kim, and Zeng (2006) documented that blended learning was proliferating across universities and this trend would increase.

López-Pérez, Pérez-López, and Rodríguez-Ariza (2011) have suggested that higher educational sections are currently making considerable efforts in popularizing blended courses. For instance, in Spain, Spanish Conference of University Rectors (CRUE, 2009) found that 72% of the teaching and research staffs in universities made use of the institutional virtual teaching platform and 93% of the students used this platform. It is also apparent that, in University of South Australia, every course offered to the students from 2011 onwards has to comply with university policy, which involves online instructional components (e.g., online course content, online learning resources, student portal, and online communication and social networking tools). It can be noted that blended courses are taking an important role in higher education, with various online learning components being developed to complement, rather than replacing traditional mode of learning (Donnelly, 2010; Mitchell & Forer, 2010).

Chapter 3: University students' learning outcomes in an online or blended environment

This chapter reviews the research concerning factors that may impact on university students' learning outcomes in an online or blended environment. These factors include prior attitudes, prior experiences, course expectations, course experiences, self-control, and self-regulation in learning. A brief introduction of university students' learning outcomes is provided at the beginning of the chapter, which is followed by the literature review of the relationships between students' learning outcomes and the above factors. Finally, the issues emerging from the reviewed literature are summarized.

3.1 Overview

Learning outcomes can be generally regarded as what students achieve from a learning process. These outcomes can be (a) the cognitive domain, e.g., competencies including knowledge acquisition, skills achievement, problem solving, and personal, social, or technology competences; (b) the emotional domain, e.g., satisfaction and attitudes; (c) psychomotor domain, which include awareness, readiness to act, guided response, mechanism, complex overt response, adaptation, and origination (Bloom, 1956; Chiu, Hsu, Sun, Lin, & Sun, 2005; Gagné, 1985; Gagné & Driscoll, 1988; Levy, 2007; Paechter et al., 2010; Simpson, 1972; Weinert, 2001). Students' learning outcomes has often been specified as the extent that students acquire knowledge, adapt knowledge into the underlying structure of understanding response to the new knowledge, and apply the knowledge toward practical situations (Allan, 1996; Byrnes, 2008; Gray & Meister, 2004). In the present study which was conducted in a context of higher education, the investigation of learning outcomes focused on the students' knowledge and skill acquisition and application.

As seen from the reviewed literature concerning university students' learning outcomes in an online or blended environment, students' learning outcomes can be measured in two ways: (a) the actual results from a course; and (b) the self-perceived learning outcomes. The actual results can be measured by the results that students have achieved through course

assessments (e.g., assignments or examinations) (Beffa-Negrini et al., 2002; Shih et al., 1998; Wang et al., 2001; Yukselturk & Bulut, 2007). Next, self-perceived learning outcomes can be demonstrated by students' self-reported knowledge or skills acquisition or improvement in the course (e.g., Beffa-Negrini et al., 2002; Eom et al., 2006).

It was found that university students' learning outcomes in an online or blended environment were likely to be influenced by several factors, such as prior attitudes, prior experiences, course expectations, course experiences, self-control, and self-regulation. This chapter reviews studies concerning the relationships between the above factors and students' learning outcomes, which were indicated either by their course results or self-perceived learning outcomes.

3.2 Prior attitudes

Attitudes are based on evaluative concepts regarding the characteristics of the referent object and give rise to motivated behaviour (Rajecki, 1990). It is commonly assumed that strong attitudes would guide and predict people's behaviour (Maio & Haddock, 2009). It was reported that students' learning outcomes during online learning could be related to their prior attitudes (e.g., Beffa-Negrini et al., 2002; Chen & Lin, 2002; Özgür & Tosun, 2010; Sharp, 1999). The review in this section addresses the research concerning the relationships between university students' learning outcomes and their prior attitudes toward ICT usage, the subject area, and online learning.

Beffa-Negrini et al. (2002) carried out a pre- and posttest survey to examine which factors could influence 41 students' learning outcomes in an online course. The students' prior ICT attitudes were indicated by their perceived importance, usefulness, and comfort with computer and the Internet usage. The students' learning outcomes were measured by their self-reported knowledge acquisition from "1 = none" to "5 = a great deal". It was found that the students' with more positive prior ICT attitudes showed higher levels of knowledge acquisition.

Similarly, Papasratorn and Wangpipatwong (2006) found a significant relationship between students' prior computer attitudes, prior computer self-efficacy, and expected learning outcomes. A total of 425 university students in a computer course completed a survey before the course started. It was shown that the students' prior computer attitude and computer self-efficacy significantly predicted their expected learning outcomes. However, a limitation in

this study was that the students' actual learning outcomes (i.e., course results) were not measured, as the student who had higher levels of expected outcomes might not necessarily achieve higher levels of course results (Astin, 1993; Dumont & Troelstrup, 1980; Gonyea, 2005).

The above finding was consistent with the study by Gattiker and Hlavka (1992). They found that the students' prior computer attitudes, which were measured before attending a course, affected their learning outcomes. Moreover, Kim and Davisa (2009) reported that students' negative attitudes toward computer could negatively influence their learning.

Regarding students' prior attitudes toward the subject areas, Zwikael, Shtub, and Chih (2013) investigated 69 students' improvement in learning during Simulation-Based Training (SBT). It was found that the significant improvement in learning by the end of the training was identified among the students with more positive prior attitudes toward SBT.

However, Reynolds and Walberg (1992) found a low correlation between students' prior subject area attitudes and learning outcomes. The participants were 3116 seventh-grade students taking mathematics from 54 public schools. The students' prior mathematics attitudes were measured at the beginning of Grade 7. Their learning outcomes were indicated by the results from a test in Grade 8. It was found that the students' prior attitudes (Grade 7) and achievement (Grade 8) had a relatively low correlation (r = .17). Detailed interpretation of the low relationship was not provided. Hence, the assumption that positive prior subject attitudes will predict learning outcomes remains a questionable hypothesis.

Loomis (2000) found a significant relationship between 28 university students' prior online learning attitudes and learning outcomes in a research method course delivered online. The students' prior attitudes toward online learning were measured at the beginning of the course. The students' learning outcomes were indicated by four components — withdrawal from the class, final report on the class group project, assignments, and two journal article reports. The students' prior online learning attitude was found to be able to predict one performance component — withdrawal from the course.

In sum, the studies reviewed in this section generally reported a positive relationship between students' learning outcomes and their prior attitudes (i.e., prior attitudes toward ICT usage, the subject area, and online learning). However, not all studies found a strong relationship between these factors. Further investigation is needed to clarify the significance of the

relationships. Moreover, it may be worthwhile to examine how students' different prior attitudes would influence their participation in an online or blended course, which in turn may bring different learning outcomes.

3.3 Prior experiences

Students' prior experiences include their prior experiences of ICT usage, the subject area, and online learning. As shown from the review, inconsistent results regarding the influence of prior experiences on students' learning outcomes were identified.

In respect to the relationship between students' prior ICT experiences and learning outcomes, LaPointe and Gunawardena (2004) conducted a study among 228 university students from 30 online courses, which incorporated computer-mediated conference (CMC) for online discussion. The students' learning outcomes were gauged by their self-reported knowledge and skill acquisition. Their satisfaction with online peer interactions was also measured. It was found that the students' prior CMC experiences significantly influenced their learning outcomes. Their prior CMC experiences had a small direct effect on the perceived learning outcomes (path coefficient = 0.16), and the indirect effect from the prior CMC experiences (0.21) on the learning outcomes was mediated through the students' satisfaction with peer interactions.

Similarly, Woodrow (1991) investigated the relationship between 98 students' prior computer experiences and their learning outcomes in a course relative to computer literacy. The students' learning outcomes were measured by their final grades in the course. It was found that the students' grades correlated significantly with their prior computer experiences.

Wan et al. (2008) found a significant impact of students' prior ICT experiences on their perceived learning outcomes. The participants were 383 university students from 13 blended courses in different subject areas. The students' prior ICT experiences were indicated by their experiences of three types of ICT usage: information seeking, computer mediated communication, and online socialization. Additionally, the students' confidence in ICT was measured by their virtual competence. The students' learning outcomes were indicated by their perceived learning effectiveness. It was found that the influence of the students' prior ICT experiences on their perceived learning effectiveness was medicated through their virtual competence.

However, Hong (2002) reported a non-significant relationship between 26 students' prior ICT experiences and learning outcomes in an online course. The students' prior computer experiences were measured and their final grades in the course were recorded as the learning outcomes. It was found that the students' prior computer experiences were not significantly related to their grades in the course.

Hong (2002) surmised the possible reasons might be that the students received help from their teachers and peers when they encountered problems with computer use. The students' learning experiences in the course enhanced their computer skills, regardless of their prior computer experiences. Hence, the help and support from teachers and peers and course experiences could help the students to adapt to the online learning environment. Further, the extent and types of ICTs usage in Hong's study would be significantly different from the ICT tools in the latter part of the last century, as computer use after 2000 was becoming a common part of people's daily life. Hong's finding was consistent with the research by Fredericksen et al. (2000) and Swan et al. (2000a).

Regarding the influence of students' prior subject area experiences on their learning outcomes, Beffa-Negrini et al. (2002) carried out a pre- and posttest survey among 52 students in an online introductory nutrition course. The students' prior subject experiences were measured by a test on their nutrition knowledge at the beginning of the course. The students' grades achieved in the course were used as their learning outcomes. The result revealed that the students' prior nutrition knowledge could significantly predict their grades in the course.

Zwikael et al. (2013) investigated 69 students' improvement in learning during Simulation-Based Training (SBT). The researchers found that the significant improvement in learning by the end of the training was identified among the students with a high level of prior knowledge of the subject area (SBT).

However, Gauss and Urbas (2003) found a non-significant relationship between 18 university students' prior subject area experiences and their learning outcomes in an engineering course. The students' learning outcomes were indicated by their test results in the course. The researchers did not find a significant relationship between the students' prior subject experiences and learning outcomes. Rather, the students' learning outcomes were positively affected by their prior computer experiences and motivation. Gauss and Urbas argued that intrinsic motivation had a positive effect on the students' learning, regardless of their prior

experiences of the subject area. The researchers also suggested that all students could get sufficient information about the course content. It appeared that providing detailed and well-structured course materials might overcome the lack of students' prior subject area experiences.

Concerning the impact of prior online learning experiences, Wang et al. (2001) conducted a pre- and posttest survey among 24 university students who enrolled in an online course. The students were grouped based on their prior online learning experiences which were indicated as "Had" and "Never had". The students' learning outcomes were measured by their final scores in the course. It was found that the students with prior online learning experiences received higher grades than those without prior experiences.

However, Paechter et al. (2010) reported a non-significant relationship between prior online learning experiences and learning outcomes among 2196 university students. The number of previous online courses that the students had taken was used to imply their prior online learning experiences. The students' learning outcomes were measured by their perceived knowledge acquisition and personal and media competence, which were achieved from their online learning experiences. The result showed no significant differences in the learning outcomes among the students with different prior online learning experiences.

Similarly, Lim and Morris (2009) found a non-significant relationship between 60 students' prior online learning experiences and learning outcomes in a blended course. The students were asked to choose from "Yes" and "No" to report their prior online learning experiences. The students' learning outcomes were measured by their examination results and perceived understanding of the subject and frequency of learning application. It was found that there was no significant difference between the students with different prior online learning experiences in terms of their learning outcomes.

The findings by Paechter et al. (2010) and Lim and Morris (2009) were consistent with the study by Wu and Hiltz (2004), who surveyed 116 university students studying in a blended environment. It was found that the students' prior experiences of online learning were not significantly related to their perceived learning outcomes.

In summary, it appeared that students' learning outcomes did not always strongly relate to their prior experiences (i.e., prior experiences of ICT usage, subject areas, and online learning). The studies reporting non-significant relationships between students' prior

experiences and learning outcomes implied that other factors (e.g., course input, teaching factors, and peer interactions) may contribute to their learning outcomes. For example, students' experiences in online learning sometimes may explain more on their learning outcomes (Gauss & Urbas, 2003). It may be worthwhile to further investigate whether the students' learning process factors can contribute to different learning outcomes, rather than merely examining their prior experiences.

3.4 Course expectations

This section reviews the relationship between university students' course expectations and learning outcomes. When taking an online course, students may have certain levels of expectations of their course experiences and learning outcomes, such as benefits brought by the course, teacher's instruction, and knowledge acquisition from the course. Some researchers reported a positive relationship between these two factors (e.g., Bolin et al., 2005; Paechter et al., 2010). However, the findings of other studies remained unclear (Holsapple & Lee-Post, 2006; Keasar et al., 2005).

Paechter et al. (2010) investigated the relationship between students' expectations and perceived learning outcomes among 2196 students who enrolled in various courses supported by the Internet technologies in 16 universities. The students' perceived learning outcomes were measured by their self-report of (a) the acquisition of subject knowledge and skills; (b) the personal competence (e.g., self-regulated learning); (c) the media competence (e.g., the Internet use); and (d) course satisfaction. It was found that the students' self-reported acquisition of knowledge and skills was mainly positively related to their expectations to acquire knowledge and the Internet skills. The course expectations were found to explain 24% to 15% of the variance of learning outcomes.

Similarly, Bolin et al. (2005) found a significant relationship between 172 university students' course expectations and perceived learning outcomes in a psychology course. The students' expectations were indicated by their motivation and perception of the possible benefits that the course would bring to them. The students' perceived learning outcomes were measured by their ratings on to which extent the course helped them to acquire knowledge and improve themselves. It was found that the students' course expectations were significantly related with their perceived learning outcomes (r = .53).

Holsapple and Lee-Post (2006) conducted a survey on course expectations among 330 students studying in classroom and 39 students learning online. They found that, when compared with the students from classrooms, the online students showed higher levels of expectations for course performance and achieved better learning outcomes. However, further analysis on the relationship between the students' performance expectations and learning outcomes in the two groups were not performed.

Keasar et al. (2005) conducted a study among 96 students in two blended courses. The students' pre-course expectations and course grades were measured. Ninety percent of the students expected that using online learning components could improve their learning outcomes in the course. The researchers tested (a) whether the students' expectation was fulfilled by recording the number of the students' visits to the course website; and (b) whether the students' website visits would be correlated with their course grades. The result indicated a non-significant correlation between the students' visits to the course website and course grades. Furthermore, it was not tested whether the students' actual course website usage fulfilled their expectations and whether their expectations influenced the course grades.

As seen from the review, although a positive relationship between students' course expectations and learning outcomes was found in several studies, this relationship remained unclear in other studies. For example, the questions of how the students with different course expectations would have different course participation and achieve different course outcomes were not further tested with statistical significance (e.g., Asunka, 2008; Holsapple & Lee-Post, 2006; Keasar et al., 2005). Paechter et al. (2010) suggested further investigations on the influence of university students' expectations on their online learning. Further studies can be conducted to examine the impact of students' course expectations on their online learning experiences and learning outcomes at a university level.

3.5 Course experiences

Course experiences, such as students' experiences from learning the online course content, using various online technologies, and communicating with their teachers and other students, have been found to influence students' learning outcomes in online learning (e.g., Arbaugh, 2010; Shih, 2011; Yang & Chang, 2012). In particular, existing research has identified a number of components of course experiences as influential. These components include students' experiences of online interactions (i.e., student-content, student-interface, student-teacher, and peer interactions), course satisfactions in general, and course input.

3.5.1 Experiences of online interactions

Interactions during learning can be regarded as one of the most important components of learning experiences in both traditional and online environments (Holmberg, 1983; Moore, 1993; Vygotsky, 1978). Four types of interactions have been identified as significant, which are student-content, student-interface, student-teacher, and peer interactions (Hillman, Willis, & Gunawardena, 1994; Moore, 1993; Moore & Kearsley, 2011).

Online interactions have been found to significantly influence students' learning outcomes (Arbaugh, 2010; Brady, 2004; Ivers, Lee, & Carter-Wells, 2005; Jung et al., 2002; Roblyer & Wiencke, 2004). The review in this section focuses on university students' experiences of different interactions during online learning. It appears that higher levels of interactions can help students to achieve better learning outcomes, but inconsistent results are also identified from several studies (e.g., Chen & Jang, 2010; Eom et al., 2006; Grandzol & Grandzol, 2010; Lee et al., 2011).

3.5.1.1 Student-content interactions

Learning takes place when a student interacts with the content of an online course. During online learning, students interact with course content such as lecture notes, interactive exercises, online library, video clips, graphics, and virtual tours. It was found that students' perception of learning from online course content could be related to their learning outcomes. For instance, Hong (2002) found a significant positive relationship between 26 students' course grades and their interactions with the online course content. The student-content interaction was indicated by the students' satisfaction with the course content and their learning outcomes were represented by the final grades in the course. It was found that the students with more positive views of the course content were likely to have better learning outcomes in the course.

However, Wang et al. (2001) reported a significant negative relationship between 24 students' satisfaction with the course content and learning outcomes in an online course. The students' interactions with the course content were gauged by their satisfaction with the course lectures, homework, quiz, and project. The students' final scores were used to indicate their learning outcomes. A negative correlation showed that the students with higher levels of satisfaction with the course content had lower grades than those who showed lower levels of satisfaction (r =.-41). The researchers surmised that the negative relationship might be due to

that the higher achieving students tended to be more critical about the design of the course content.

Further, other researchers reported a non-significant relationship between student-content interaction and learning outcomes. For example, Eom et al. (2006) investigated students' perceived learning outcomes among 397 university students taking at least one online course. The students reported their perception of the course content design, such as the usability of course website, the clarity of course objectives and procedures, and the quality of course materials. The students' learning outcomes were measured by their perceived knowledge acquisition and quality of online learning experiences, compared with learning in classrooms. It was found that the students' perception of course content could not significantly predict their perceived learning outcomes.

Generally, students' interactions with online course content were measured by their self-reported experiences. The students, who reported positive experiences of interacting with online course content, tended to achieve better learning outcomes. But it was found that student-content interactions did not always significantly correlate with students' learning outcomes (e.g., Eom et al., 2006; Wang et al., 2001). Further research needs to examine whether student-content interactions will influence students' learning outcomes in an online or blended environment.

3.5.1.2 Student-interface interactions

Student-interface interactions occur between students and different types of interfaces during online learning, e.g., navigating websites, accessing online materials, and using online communication and social networking tools. In respect to this type of interactions, researchers are concerned about functionality, usability, visual appearance, and graphic design of online course interface (Watzman, 2003). For example, a course website needs to be well-structured and easy for students to navigate (Shank & Sitze, 2004). Some issues need to be considered regarding the usability of a course interface, such as the number of actions that students need to perform, the amount of the information that students need to remember, the amount of mental work that students need to perform to use the interface, memory loading, and the usability of the online system. Additionally, visual design of the course website needs to help students to process information and facilitate their learning.

Wang et al. (2001) carried out a pre- and posttest survey among 24 university students who enrolled in an online course. The students' interactions with the course interface were

indicated by their self-reported experiences of using online learning components. The students' learning outcomes were measured by their final scores in the course. It was found that the students' satisfaction with technical support significantly correlated with their final scores (r = .43).

Yang and Chang (2012) examined 154 university students' learning outcomes in a blended course. The student-interface interactions were indicated by the students' attitudes toward the usage of educational blogs in the course. The students' learning outcomes were measured by their actual course results. It was found that the students with more positive attitudes toward blog usage achieved better learning outcomes.

Shih (2011) found an improvement of 23 university students' learning outcomes through using Facebook in an English writing course delivered in a blended mode. The students' learning outcomes were represented by the scores of two writing tests which were completed in the pre- and posttest respectively. It was found that the students' writing scores increased significantly from the pre- to posttest. Shih claimed that the integration of Facebook in the course could effectively improve the students' English writing, as the students could practise writing by frequently sending posts and commenting on others' writing on Facebook.

Arbaugh and Rau (2007) investigated student-interface interactions among 575 university students in a blended learning environment. The students' interactions with the course interface were measured by their self-reported experiences of online communications. It was found that the students' experiences of online communications positively predicted their perceived learning outcomes. But regarding the impact of increased online learning components, it was found that the increased variety of online learning components predicted the students' perceived learning outcomes in a negative direction. Arbaugh and Rau argued that the possible reasons might be that (a) the increased use of various technologies might bring higher requirements on the students' and teachers' ICT skills and cause some technical issues, which did not facilitate the students' learning; and (b) too much media added to the courses without pedagogical consideration might not enhance the students' learning and might cause information overloading.

A non-significant relationship between students' self-efficacy of using online learning components and their learning outcomes was found by Puzziferro (2008), who surveyed 815 college students in an online course. The students' online component self-efficacy was measured by the belief about their abilities to use online technologies. The students' final

grades in the course were measured as their learning outcomes. It was found that the students' technology self-efficacy in online learning was not correlated with their final grades. Puzziferro suggested that the possible reason for this finding might be that the majority of the students reported relatively a high level of confidence in using online learning components. Puzziferro also recommended that the instruments about technology usage needed be examined by revising and adding the items which could reflect the most current technologies.

Similarly, Hong (2002) also reported a non-significant impact of 26 students' perceptions of using online discussion on their learning outcomes. The students' perception of using online conference for discussion was measured by the end of the course and their final grades in the course were used to indicate their learning outcomes. It was found that the students' perceived usage of online conference did not significantly correlate with their grades in the course.

Lee et al. (2011) investigated the relationship between 110 undergraduate students' perceived technical support and their final scores in an online course. The students were asked to rate their experiences of asking help regarding any technical issues during learning. It was found that the students' perceived technical support was not significantly related to their final scores.

In sum, students' interactions with online course interface were usually measured by their perception of the experiences of using online learning components from several aspects, such as experiences of using particular online components, attitudes toward ICT usage, and perception of technical support. Although it was found that the students' interactions with course interface could be related to their learning outcomes, inconsistent findings were also identified and further interpretation of the non-significant relationship was not provided in some studies (e.g., Hong, 2002; Lee et al., 2011). Further studies are needed to investigate how student-interface interactions can contribute to desired learning outcomes.

3.5.1.3 Student-teacher interactions

The online interactions between students and teachers can take place via synchronous and asynchronous online communications, which allow students to raise inquiries, ask for help, exchange ideas, and converse more in-depth thinking based on teachers' feedback (Huckstadt & Hayes, 2005). Short, Williams, and Christie (1976) postulated "social presence" as a critical factor in online communications. They described "social presence" as "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal

relationship" (p. 65). Generally, social presence implies the degree of people's perception of another person as a "real person" during online interactions (Gunawardena & Zittle, 1997, p. 9).

Teaching presence in online learning begins before the course commences as instructional designer (i.e., planning and preparing the course), continues during the course as the instructor (i.e., facilitating the discourse and providing instruction), and extends after the course as a facilitator and supporter (Anderson, Rourke, Garrison, & Archer, 2001).

In respect to the relationship between student-teacher interactions and students' learning outcomes, the reviewed research focused on different aspects of teachers' instruction and support, such as teaching presence, the effectiveness of teachers' instruction, teachers' encouragement, and students' satisfaction with their teachers' instruction or support.

LaPointe and Gunawardena (2004) examined learning outcomes among 228 university students from 30 online courses which incorporated computer-mediated conference for online discussion. The students' learning outcomes were measured by their self-reported knowledge and skill acquisition and satisfaction with online peer interactions. The students' interactions with their teachers were measured through the model by Anderson et al. (2001), which addressed teaching presence (i.e., course design, facilitation of discourse, and direction of learning). The result showed that the students' perceived teaching presence significantly influenced their perceived learning outcomes. The students' perceived teaching presence had a direct effect on their perceived learning outcomes (path coefficient = 0.24) and the indirect effect (0.15) was mediated through the students' satisfaction with online peer interactions.

Arbaugh (2010) also investigated the influence of teaching presence and teacher immediacy behaviour on students' perceived learning among 643 students, who took 46 online MBA courses. In Arbaugh's research, teaching presence was measured through three components – – course design and organization, facilitating discourse (building understanding), and direct instruction (Anderson et al., 2001). Teachers' immediacy behaviour was measured by 11 items of Verbal Immediacy Scale by Gorham (1988). The students' perceived learning outcomes were indicated by their self-reported knowledge acquisition. It was found that the students' perceived learning outcomes were significantly predicted by teaching presence and teacher immediacy behaviour.

Lim et al. (2007) investigated the relationship between several instructional factors and 125 students' perceived learning in a program evaluation course. Among the students, 59 and 69 took the course in online and blended modes respectively. Open-ended questions asked the students about the reasons for high or low level of perceived learning and learning application. Instructional effectiveness was identified as the most influential factor for high level of perceived learning for both groups of students, which included "clear and concise learning content" and "review and repetition of learning" (p. 32). On the other hand, instructional ineffectiveness was stated by the students as the most important factor negatively influencing their learning.

Lim and Morris (2009) investigated the relationship between 60 students' learning outcomes and their perceived teaching quality and learning support. The students' learning outcomes were indicated by (a) the examination results; (b) perceived degree of understanding of the course (from "1 = Do not understand" to "5 = Completely understand"); and (c) perceived learning application (from "1 = None" to "5 = Frequently use"). It was found that the students' perception of teaching quality was significantly correlated with their perceived understanding (r = .48) and learning application (r = .53). Additionally, it was found that learning support was significantly related to the students' perceived learning (r = .32) and learning application (r = .34). However, the examination results were not found to be significantly related to teaching quality and learning support.

Arbaugh and Rau (2007) investigated student-teacher interactions among 575 university students taking blended courses. The students were asked to report their experiences of interacting with their teachers, such as whether the teachers frequently asked questions, offered opinions, and encouraged and motivated peer interactions. It was found that the student-teacher interactions had the strongest positive prediction on the students' perceived learning, when compared with peer interactions and student-interface interactions.

Jung et al. (2002) found that teachers' support was important to produce better learning outcomes during online learning. The participants were 124 undergraduate students from three online courses. Their learning outcomes were measured by the course results. The students' course participation level was indicated by the messages posted on the discussion board. The students were divided into three groups based on the characters of online interactions — academic interaction group, collaborative interaction group, and social interaction group. In the academic interaction group, the students interacted with their teacher

only for content-related matters, without motivational or interpersonal communication. The students in the collaborative interaction group were involved in collaborative peer interactions and online discussion. The teacher posted discussion topic and asked the students to participate in discussion and share ideas. In social interaction group, the students were provided with interpersonal and social feedbacks from the teacher. The social presence of the teacher was emphasized for this group.

It was found that the students in the social interaction group showed the highest levels of course participation and best learning outcomes. Jung et al. (2002) suggested that the social interactions between the students and teacher contributed to more increase in the students' learning outcomes, compared with the other two groups.

Beffa-Negrini et al. (2002) found that students' satisfaction with the teacher-student interactions was relevant to their learning outcomes in an online environment. The researchers conducted a pre- and posttest survey among 54 university students in an online course. The pretest measured the students' demographic information, prior nutrition knowledge, prior subject attitudes, and prior technology attitudes. The students' satisfaction with the interactions with their teacher was measured by their self-report on the teacher's instruction during the course. The students' course results were used to indicate their learning outcomes. The result revealed that 50% of the variance in the students' course results was predicted by their satisfaction with the teachers' instruction together with another two factors (i.e., age and prior knowledge).

Eom et al. (2006) conducted a survey among 397 university students who took at least one online course. The students were asked to report the perception of their teachers' feedback through online communications (i.e., perceived helpfulness and timeliness of the teachers' feedback). The students' learning outcomes were measured by the perceived quality of their online learning experiences. It was found that the students' perception of teacher's feedback significantly affected their perceived quality of online learning experience.

However, other researchers found a negative relationship between student-teacher interactions and learning outcomes in an online or blended environment. For example, Chen and Jang (2010) conducted a questionnaire survey among 267 students learning online. The students' interactions with their teacher were measured by the Learning Climate Questionnaire developed by Williams and Deci (1996), which addressed teacher support during learning. The students' final grades and perceived knowledge and skill acquisition

were gauged as their learning outcomes. Additionally, the students reported whether their needs had been satisfied in the course. It was found that the direct effect of teacher support on the students' learning outcomes was negative, while the indirect effect on the learning outcomes mediated through the satisfaction of the students' needs was positive. Chen and Jang suggested that haphazard and aimless support without addressing the students' needs might probably bring adverse effect, which would be even worse than "no effects" (p. 750). This finding highlighted that it might be important that the support from teachers could address their students' needs during learning.

Lee et al. (2011) found a non-significant relationship between 110 undergraduate students' perceived support from teachers and learning outcomes in an online course. The students' perception of their teachers' support were indicated by their self-reported experiences of asking questions and receiving help from the teachers. The students' final scores were used as an indicator of their learning outcomes. It was found that the students' perceived teachers' support did not significantly relate to their course results. But the teachers' support was found to be significantly related to the students' course satisfaction, which was related to the students' final scores. However, further analysis on whether the influence of teacher support on the students' final scores could be mediated through their course satisfaction was not performed.

Grandzol and Grandzol (2010) also found a non-significant relationship between student-teacher interactions and students' learning outcomes among 354 university students in online business courses. The student-teacher interactions were indicated by the teacher's participation in teaching (i.e., time spent by the teacher on the course website). The students' course completion rate was used to demonstrate their learning outcomes. It was found that the students' learning outcomes were not related to the teacher's participation. However, the detailed interpretation was not provided.

It was commonly accepted that higher levels of student-teacher interactions could help students to achieve better learning outcomes. The higher levels of student-teacher interactions can be specified by teachers' presence during learning, students' perceived help and support from teachers, frequent communication, and timely feedback from teachers. However, inconsistent results were also identified. It seems that teachers' involvement and support in students' learning may not always be facilitative and beneficial, if the support does not

address students' needs (Chen & Jang, 2010). It may be worthwhile to investigate how teachers' instruction and support can meet students' needs and facilitate their learning.

3.5.1.4 Peer interactions

Peer interactions happen between one student and other students or among students, with or without the presence of teachers (Moore, 1989). By interacting with other students, students feel more at ease to share and exchange information and ideas in a peer-facilitation and reflect deeper on other students' ideas (Hew & Cheung, 2012). By interacting with other students, students can share and exchange information and ideas. In an online or blended learning environment, students can interact with their peers through online communication and social networking tools, such as email, online forum, video conference, Wiki, blog, Twitter, and Facebook.

It was found from the literature that some aspects of peer interactions played an important role in students' learning in an online or blended environment. These aspects consisted of frequency of peer interactions (e.g., communication and discussion), perceived relationship with other students, and perceptions of peer interactions. It was found that higher levels of online peer interactions were related to better learning outcomes (LaPointe & Gunawardena, 2004; Rovai, 2002; Shih, 2011; Swan, 2001). However, inconsistent findings were identified as that there was no significant relationship between peer interactions and students' learning outcomes (e.g., Hong, 2002; Grandzol & Grandzol, 2010; Lee et al., 2011). The following sections review the studies concerning these two factors in details.

LaPointe and Gunawardena (2004) conducted a study among 228 university students enrolled in 30 online courses which incorporated asynchronous online discussion. The students' learning outcomes were measured by their self-reported knowledge and skill acquisition and satisfaction with peer interactions through online discussion. The students' experiences of peer interactions were represented by their self-reported number of peer interactions and effectiveness of peer interactions to facilitate their learning. It was shown that the students' experiences of peer interactions significantly influenced their learning outcomes.

Arbaugh and Rau (2007) conducted a research project among 575 university students learning in a blended environment. The students' perception of peer interactions was indicated by their self-reported experiences of raising questions to each other, exchanging information, and answering others' questions. It was found that peer interactions had a significant positive relationship with the students' perceived learning outcomes.

The finding from the studies by LaPointe and Gunawardena (2004) and Arbaugh and Rau (2007) were consistent with other research. For example, Picciano (1998) reported that students' perceived learning outcomes in online courses were related to the amount of discussion taking place among the students. Swan (2001) found a positive relationship between peer interactions and learning outcomes among 1406 university students in an online environment. The students' perceived interaction with peers was significantly related to their course grades (r = .46) and perceived learning outcomes (r = .44).

Furthermore, Rovai (2002) examined another aspect of peer interactions (i.e., sense of community) and learning outcomes among 314 university students from 26 online courses. The students' perceived learning outcomes were gauged by a self-report about how much they learned from the course. The questions tapping the students' sense of community contained two subscales — connectedness with other students and perceived learning subscale (the students' perceived knowledge construction and satisfaction of learning goals and expectations). It was found that the students' sense of community strongly related to their perceived learning outcomes (r = .63). The students' sense of community predicted 43% of the variance of their perceived learning outcomes.

Shih (2011) found a positive impact of peer interactions on Facebook on 23 first year university students' learning outcomes in an English writing course. The students' learning outcomes were indicated by their scores of two writing tests which were completed in a pre- and posttest respectively. It was found that the students' writing scores increased significantly from the pre- to posttest. Six students participated in the interviews and provided more detailed information about their usage of Facebook. Shih reported that the majority of the interviewees suggested that they had more opportunities to observe their peers during learning and their writing skills were improved by providing comments and receiving feedback from peers on Facebook.

However, inconsistent findings about the relationships between peer interactions and students' learning outcomes were identified. For instance, Hong (2002) found a non-significant impact of 26 students' satisfaction with peer interactions on their learning outcomes in an online course. The students' satisfaction with peer interactions was measured by the end of the course. Additionally, the students' final grades in the course were used to indicate their learning outcomes. It was found that the students' satisfaction with peer interactions did not significantly influence their grades in the course.

Similarly, Lee et al. (2011) investigated the relationship between 110 undergraduate students' perceived peer support and final scores in an online course. The students' perceived peer support was gauged by their self-reported experiences about asking for help and receiving support from other students and the amount of peer interactions. The result revealed that the support from other students was not significantly related to the students' final scores in the course.

Furthermore, Grandzol and Grandzol (2010) found a significant negative relationship between the levels of peer interactions and course completion rate among 354 university students in online business courses. The researchers found that the more the students participated in peer interactions, the lower completion rates they had by the end of the course. The researchers interpreted that, the students, who invested a lot of time in the course website for peer interactions, might feel frustrated with the online learning components. Or perhaps when the courses were difficult, students had to spend more time in peer interactions. Therefore, the students in the course with high difficulty level might report lower completion rates. It appeared that overloaded peer interactions might not be beneficial for the students' learning.

It was found from the reviewed literature that higher levels of online peer interactions could contribute to better learning outcomes among students. However, non-significant relationship between these two factors was also reported. Further study is needed to investigate how peer interactions, such as online discussion in an online or blended learning environment, can bring true value to students' learning, rather than merely recording the time or frequency of peer interactions.

3.5.1.5 Summary of the review of students' experiences of online interactions

The above sections reviewed the research concerning the relationships between students' learning outcomes and their experiences of online interactions. The majority of the studies reported that higher levels of interactions during online learning could help students to achieve better learning outcomes. However, non-significant and negative relationships were also identified, which left the hypothesis of the impact of interactions on students' learning outcomes questionable. Additionally, most of the surveys were based upon students' self-reported learning experiences, rather than their actual learning activities in the course.

Although the relationships between online interactions and students' learning outcomes have been examined in many studies, there is a need for further investigation (Sher, 2009). For

example, various instruments (i.e., students' diaries, online discussion participations, or course attendances), rather than merely students' self-report, can be used to measure their experiences of online interactions. Both actual course results and perceive knowledge and skill acquisition can be used to specify students' learning outcomes, instead of merely gauging their perceived learning outcomes. Moreover, it is important that the interactions need to address students' needs and enhance their learning experiences, which in turn may contribute to better learning outcomes (Chen & Jang, 2010). Further investigation needs to examine how different types of online interactions can facilitate students' learning and investigate which potential issues may emerge from online interactions and hinder students' learning in an online or blended environment.

3.5.2 Course satisfaction in general

It has been reported that students' satisfaction with online learning was related to their learning outcomes. A number of variables were found to be used to measure students' course satisfaction, such as satisfaction with online courses compared with face-to-face instruction, perceived course quality and learning activities, perception of online communication and collaboration, intention for future online learning, and willingness to recommend the courses to other people. Several studies reported positive relationships between students' course satisfaction and learning outcomes in an online or blended environment (e.g., Barnard et al., 2008; Eom et al., 2006; Lee et al., 2011; Wang et al., 2001). However, inconsistent findings were also identified in other research (e.g., Chen & Jang, 2010; Hong, 2002).

Eom et al. (2006) carried out a study among 397 university students who took at least one online course. The students' satisfaction was measured by their perception of the course quality, intention for future online learning, and the willingness to recommend the course to other students. The students' learning outcomes were implied by their perceived knowledge acquisition and quality of learning experiences compared with learning in classrooms. It was found the students' overall satisfaction significantly predicted their perceived learning outcomes.

Lee et al. (2011) investigated the relationship between 110 undergraduate students' course satisfaction and their final scores in an online course. The students' course satisfaction in general was indicated by their perceived achievement, likeness, and willingness to recommend the course to others. It was found that the students' course satisfaction significantly related to their final scores in the course (r = .28).

Some researchers examined the relationship between students' satisfaction with online communication and their learning outcomes. For example, Wang et al. (2001) found a strong relationship between 24 students' satisfaction with online communication and final scores in an online course (r = .47).

Similarly, Barnard et al. (2008) reported a significant positive relationship between 204 students' learning outcomes and perception of online communication and collaboration. The students' perception of online communication and collaboration was represented by their willingness to be engaged in online communication and collaboration. The students' learning outcomes were measured by their current cumulative grade point averages (GPAs). It was found that, the students, who felt more positive about the online communication and collaboration, tended to achieve better learning outcomes.

However, a non-significant relationship between students' course satisfaction and their learning outcomes was also identified. For example, Chen and Jang (2010) investigated 267 students' learning outcomes in an online environment. The students reported whether their needs in online learning were satisfied. The students' final grades and their perceived knowledge and skill acquisition were measured as their learning outcomes. It was found that there was a non-significant relationship between the satisfaction of the students' needs and their final grades. But the students' perceived knowledge and skill acquisition were significantly related to the satisfaction of their needs. Nevertheless, it remained questionable that whether students' perceived learning outcomes could reflect their actual course achievement. Chen and Jang argued that the non-significant relationship between the students' grades and satisfaction might be due to the fact that the students' grades were generally high and homogeneous.

Hong (2002) also found a non-significant relationship between 26 students' satisfaction with the course activities and learning outcomes on an online course. The students' satisfaction with the course activities was gauged by the end of the course and their final grades in the course were used as a measure of their learning outcomes. It was found that the students' satisfaction with the course activities did not significantly relate to their final grades. Hong indicated that the students with better learning outcomes might regard online learning environment as merely another tool to support their learning. Hong also suggested that the students could achieve the same success in the online course as in other learning

environments, but their success in online learning might not necessarily increase their satisfaction with the online course.

It was found that the students' with higher levels of satisfaction with online learning experiences might achieve better learning outcomes. However, non-significant relationships between these two factors were also found. It seems that students' perception of online learning may not always influence their learning outcomes. Meanwhile, students' learning outcomes in the reviewed research were indicated either by their course results or perceived learning outcomes, which may contribute to the different results between these studies.

Moreover, students' satisfaction with online learning was found to be indicated by different aspects. For example, Eom et al. (2006) focused on the students' satisfaction with the online course quality and willingness to recommend the course to other people. Wang et al. (2001) placed emphasis on the students' satisfaction with online communication. Hence, students' satisfaction with online learning can be possibly interpreted from different angles and measured by different instruments. Further research can examine students' attitudes toward different types of interactions, which may extensively represent their perception of various aspects of course experiences. In addition, it may be worthwhile to investigate whether students' attitudes toward the online interactions can influence their learning outcomes in an online or blended environment.

3.5.3 Course input

It was found that students' course input, such as effort and time they devoted in an online or blended course, significantly influenced their learning outcomes. However, non-significant relationships between these factors were also identified. This section reviews the research concerning the relationship between students' effort and time spent on learning and learning outcomes in an online or blended environment.

Puzziferro (2008) surveyed 815 college students in an online course and found a significant impact of the students' effort, time, and study environment management on their final grades in the course. The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991, 1993) was used to measure the students' management of their study time, environment, and effort. This finding indicated that the more time spent and effort exerted in the course, the better results were found among the students.

Grandzol and Grandzol (2010) found a significant positive relationship between students' course input and course completion rate among 354 university students in an online environment. The students' course input was indicated by the time they spent on the course website (i.e., homepage, gradebook, and email). It was found that the time spent on the course significantly predicted the students' course completion rates.

However, Beffa-Negrini et al. (2002) did not find any significant impact of students' effort and time on their learning outcomes. The participants were 54 university students in an online introductory nutrition course. The students' self-reported effort and time included (a) their desire to get a higher grade; (b) the amount of time spent on the course; (c) the amount of effort put into the course; (d) the amount of work they felt the course required; and (e) the frequency of reading the messages posted in online discussion. The students' learning outcomes were gauged by their examination results. The researchers did not find the predictive effect of the students' course input on their learning outcomes. Beffa-Negrini et al. suggested that more research was needed to further investigate the effect of time management and study skills on students' learning outcomes in an online environment.

Hong (2002) also found a non-significant relationship between 26 students' learning outcomes and the time they spent on an online course. The amount of time that the students spent was measured by the end of the course and their final grades were used to indicate their learning outcomes. It was reported that the time spent on learning did not significantly influence the students' grades in the course. Hong discussed that the quality rather than the quantity of time spent on learning might be of more importance.

Similarly, Lim and Morris (2009) found a non-significant relationship between study time and learning outcomes among 60 students in a blended environment. The students were divided into three groups based on the average time they spent in learning (i.e., "more than 1 hours", "from 1 to 2 hours", and "less than 2 hours"). Their learning outcomes were specified by the course results and perceived learning outcomes. It was found that there was no significant difference in the students' learning outcomes between the three groups.

In sum, it was reported that the more course input by students could contribute to better learning outcomes in an online or blended course. However, other research has identified inconsistency with regard to the relationship between students' course input and learning outcomes. In addition, students' course input was measured by their self-report in several studies (e.g., Beffa-Negrini et al., 2002; Lim & Morris, 2009; Puzziferro, 2008). Further

investigation needs to gauge students' course input from more diverse instruments, such as weekly reports about their course experiences and online discussion participations, which can represent the students' course participation from different aspects rather than merely using their self-reported time or frequency of participation in the course.

3.6 Self-control

In the literature of personality psychology, the term self-control is used to refer to people's ability to make plans and implement them in the face of difficulties and challenges (Vohs & Baumeister, 2004). Thus, self-control encompasses several aspects, such as thinking through long-term goals, resisting temptations, delaying gratification, and controlling emotional impulses.

A variety of scales were used to measure people's self-control (e.g., Grasmick, Tittle, Bursik, & Arneklev, 1993; Mezo & Heiby, 2005; Tangney et al, 2004). Among these scales, the Self-control Scale developed by Tangney et al. (2004) was based on an extensive literature. The scale documented substantial individual differences in the ability to exercise self-control, specifically the ability to override temptations and refrain from acting on impulses, in order to achieve a worthy long-term goal (Baumeister & Tierney, 2011).

It is assumed that the trait self-control ought to be related with people's success in their learning. Individuals with higher levels of self-control may receive better learning outcomes in school, as they can be able to keep up with assigned tasks, manage their study time, prevent distractions from disrupting activities, and control negative emotions (Shoda et al., 1990; Moffitt et al., 2011).

A series of classical experiments of self-control was the "Marshmallow test" conducted by Mischel et al. (1988) and Shoda et al. (1990) since 1970s. The researchers found that the young children, who showed higher levels of self-control, achieved better learning outcomes in young adulthood, including higher scores on the SAT, general adjustment, and educational achievement. Taking SAT score as an example, the children, who were better at self-control, received higher SAT score, which was, on average, 210 points higher than that of the children with lower levels of self-control.

Later research by Moffitt et al. (2011) demonstrated strong predictive relationships between childhood self-control and a wide range of consequential life outcomes including educational qualification. Their research was across a period of over 30 years from the birth to adult age

among 1000 participants. Assessments had been carried out at ages of 3, 5, 7, 9, 11, 13, 15, 18, 21, 26, and 32 years. By the age of 10 years old, the participants were measured on their self-control and divided into five groups from low to high levels of capability in self-control. Then the researchers followed the participants over 30 years and traced the consequences of childhood self-control for their education, health, wealth, and criminal offending. The participants with lower levels of self-control showed poorer adult outcomes. Taking their educational qualification as an example, there were more participants (about 42%) from the lower self-control group leaving school with no educational qualification than those (about 5%) in the group with the highest scores in self-control.

Wolfe and Johnson (1995) addressed students' personalities (including self-control) among 201 university students. The participants' personalities were measured by the Jackson Personality Inventory (JPI) (Jackson, 1976) and a 155-item booklet of items with a five-point Likert scale. It was reported that self-control was the most powerful predictor among 32 personality variables and significantly contributed to the grade point average (GPA) among the students.

Tangney et al. (2004) developed a scale to measure self-control in a project of two studies and investigated the relationship between self-control and university students' learning outcomes. In their first study (Study One), the participants were 351 undergraduate students who enrolled in a psychology course. The participants in Study Two were another 255 psychology undergraduate students. A questionnaire with 36 items about self-control was administered among two groups of students. Based on the review of item-total correlations from Study One to Study Two, the Brief Self-Control Scale with 13 items was constructed. It was found that the students' grade point averages were correlated with self-control scores at .32 and .18 in two groups respectively.

Tsai (2009) investigated a series of self-control strategies used by students to concentrate on learning in an online environment. In order to develop effective online learning strategies, Tsai employed an interview, pilot study, and main study to develop an instrument — the Online Learning Strategies Scale (OLSS) with 36 items. A total of 261 students participated in the main study. Factor analysis was used to examine the validity of the constructs and five factors were extracted as motivation, self-monitoring, the Internet literacy, the Internet anxiety, and concentration. The factor of concentration was generated as the student self-control strategies to concentrate on their learning. The self-control strategies of avoiding

distraction from interruption, focusing on learning, and using time effectively were found to be important for the students' learning in an online environment.

Yu et al. (2007) found that a low level of self-control was one of the reasons for students to reject online learning. A questionnaire survey was administered to 233 public health nurses from different health centres in Taiwan. Twenty-six participants expressed an attitude of rejecting online learning and 12% among them indicated that a low level of self-control and laziness were the barriers for them to adopt online learning. The researchers indicated that, for some students, capability of self-control might be one of the considerations for adopting or rejecting online learning.

The literature has identified two perspectives from which self-control was approached. Firstly, self-control can be viewed as a background personality trait which emerges in the course of childhood. This has been established in the research by Mischel et al. (1988), Moffitt et al. (2011), and Shoda et al. (1990). The second approach regards self-control as synonymous with self-regulation, which is the ability to mobilise effective strategies (e.g., Pintrich, Wolters, & Baxter, 2000; Topcu & Ubuz, 2008; Whipp & Chiarelli, 2004; Zimmerman, 1998, 2000). The second approach represents the process that specifies what people need to do in order to achieve self-control. Both approaches are valid and well supported, but they are likely to be associated with different measurement procedures. Further research is needed to investigate whether students with different levels of self-control as a personality background will achieve different learning outcomes in an online or blended environment at a university level.

3.7 Self-regulation in learning

3.7.1 Overview

Self-regulation in learning can be described as students' capability of self-generating their thoughts, feelings, and actions, which are planned and cyclically adapted to achieve their learning goals. So it also refers to students' control of their thoughts, motivations, and learning behaviours in order to accomplish their learning goals (Pintrich, 1995; Zimmerman, 1998, 2000).

Self-regulated learners are metacognitively, motivationally, and behaviourally active participants in their learning (Zimmerman, 1986). They plan, organize, self-instruct, self-monitor, and self-evaluate at various stages during learning process (Zimmerman, 1986). In

the construct of self-regulated learning, self-views (e.g., self-concept and self-image) and self-judgments or beliefs (e.g., self-esteem, self-worth, and self-efficacy) are regarded to be related to people's perceptions of the tasks, goals (e.g., self-protection and self-enhancement), motivations (e.g., intrinsic and extrinsic), the application of self-regulated learning strategies, and attributions of the causes of learning outcomes (McCombs, 1986).

Self-regulation in learning requires students' capabilities of using coping strategies, problem-solving and decision-making skills, goal setting, planning, self-evaluation, self-monitoring, and self-reinforcement, as well as self-assurance to use these capabilities effectively (Bandura, 1982; McComb, 1984). Additionally, self-regulated learners are aware of the strategic relations between regulatory processes or responses and learning outcomes and they use these strategies to achieve academic goals (Zimmerman, 1990a, 1990b).

The Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991, 1993) has been widely used to investigate students' self-regulated learning strategies and it was validated through factor analysis, reliability analysis, and correlations with the measures of students' learning outcomes (Winne & Perry, 2000). MSLQ addresses students' self-conception, self-judgement, motivational strategies, and different self-regulated learning strategies, which indicate students' use of metacognitive and cognitive strategies and management or control of their effort on academic tasks to achieve learning goals (Pintrich & De Groot, 1990a; Zimmerman, 1989).

3.7.2 Self-control and self-regulation

The work by Tangney et al. (2004) has indicated that self-control is an underlying trait, whose expression may emerge through the strategies that people use to achieve self-regulation. Self-regulation is a term generally used to refer to the actual behaviour that people can take in order to achieve their goals. For example, self-regulation can stand for people's exercise of control over themselves, especially through activating the most effective strategies, in order to bring the self into line with preferred standards.

Although the terms of self-control and self-regulation appear to overlap, there is an important distinction. Self-control refers to the human capacity or personality trait, which is needed to achieve long-term goals through being able to control one's impulses and resist threat to those goals (Baumeister & Tierney, 2011). Self-regulation, on the other hand, refers to what people actually do, that is the specific activities people use in order to keep oneself on-track

(Zimmerman, 1989). In the present study, self-control was treated as the background personality trait; while self-regulation was regarded as the specific strategies that students applied to achieve their learning goals.

3.7.3 Self-regulated learning and learning outcomes

Studies concerning the influence of students' self-regulated learning on their learning outcomes have been conducted in both face-to-face and online learning environments. These studies focused on different aspects of students' self-regulation, such as goal orientation, self-efficacy, attribution, or self-evaluation, as well as the application of metacognitive and cognitive learning strategies.

Pokay and Blumenfeld (1990) administered a questionnaire survey among 283 high school students in geometry classes to examine the relationship between the students' motivation, usage of learning strategies, and learning outcomes. The students' motivation was measured by the items used in the study by Eccles (1983), who assessed the students' self-concept (self-perception of their ability), expectation for success, and perceived value of the subject matter. The students' usage of self-regulated learning strategies was measured by their usage of metacognitive and cognitive strategies and effort management (Pintrich, 1986). The questions of motivation and strategy use were administered early and later in the semester respectively. The participants' grades from the first and third geometry tests were used to indicate their learning outcomes early and late in the semester.

In respect to the motivation and self-regulated learning strategies measured early in the semester, the students results of the two geometry tests were significantly related to the (a) motivational components: self-perceived ability (r =.38 and r =.44) and expectation for success in geometry (r = .44 and r = .46); and (b) self-regulated learning strategy of effort management (r = .31 and r = .30).

Regarding the motivation and self-regulated learning strategies measured later in the semester, it was revealed that the students' results of the two geometry tests were strongly related to self-perceived ability (r = .71 and r = .62). In addition, perceived value in the subject measured later in the semester was significantly related to the first geometry test result (r =28). Effort management later in the semester was significantly related to the second geometry test result (r = .26).

Another research concerning the relationship between self-regulated learning and learning outcomes among younger students was conducted by Pintrich and De Groot (1990a). The participants were 173 students on the seventh grade from science and English classes. The MSLQ (Pintrich et al., 1991, 193) was administered to measure the students' self-regulated learning. After factor analysis, three motivational factors (i.e., self-efficacy, intrinsic value, and test anxiety) and two cognitive scales (i.e., the cognitive strategy use and self-regulation) were constructed. It was found that the students' grades by the end of the semester were significantly related to intrinsic value (r = .30), self-efficacy (r = .36), test anxiety (r = -.23), strategy use (r = .20), and self-regulation (metacognitive and effort management items) (r = .36).

Yukselturk and Bulut (2007) conducted a study among 80 students in an online computer course. The students' self-regulated learning was examined by the MSLQ (Pintrich et al., 1991, 1993). The items of the MSLQ were categorized into seven components: (a) intrinsic and extrinsic motivation; (b) self-regulation strategies (metacognitive strategy and effort management); (c) cognitive strategy; (d) task value; (e) locus of control; (f) self-efficacy; and (g) test anxiety. The students' learning outcomes were indicated by the scores achieved in the course. It was found that the students' learning outcomes were significantly correlated with their intrinsic motivation (r = .36), locus of control (r = -.24), task value (r = .28), self-efficacy (r = .39), self-regulation (r = .39), and cognitive strategy use (r =.24). However, the linear stepwise regression analysis revealed that only self-regulation strategies could significantly predict the students' learning outcomes.

Puzziferro (2008) also used the MSLQ to measure students' self-regulated learning. It was found that the students' regulation of time, study environment, and effort was significantly related to their final grades.

Topcu and Ubuz (2008) examined the impact of students' metacognitive knowledge on their participation in an asynchronous online forum. Thirty-two third-year pre-service teachers participated in the study. A grading rubric was developed by the researchers to score the participants' messages posted to the online forum in order to determine the quality of their participation in the forum. The result indicated that the participants' metacognitive knowledge was an important determinant of the quality of online participation.

Moreover, Barnard et al. (2008) found a significant positive relationship between 204 university students' self-regulation and learning outcomes during online learning. The

students' self-regulation in online learning was measure by the Online Self-regulated Learning Questionnaire (OSLQ), which was developed from the work of Zimmerman in 1998 (Lan, Bremer, Stevens, & Mullen, 2004). The students' learning outcomes were gauged by their current cumulative grade point averages (GPAs). The relationship between the students' self-regulated learning and learning outcomes was weak and positive with a standardized path coefficient value of .18, but significant at the .05 level. The significant relationship between students' self-regulation and learning outcomes was also supported by Al-Khatib (2010), Shih and Gamon (2001), Thompson, Meriac, and Cope (2002), Whipp and Chiarelli (2004).

However, Lynch and Dembo (2004) did not find a significant relationship between the students' self-regulation and learning outcomes in an online environment. They suggested that the students in their research generally showed a high level of self-regulation. Lynch and Dembo indicated that further research needed to be conducted to re-examine the relationship between students' self-regulation and learning outcomes in an online environment.

Generally, it was reported that students' self-regulated learning was significantly related to their learning outcomes in both classrooms and an online learning environment. The more self-regulated learning strategies the students can apply during their learning process, the better learning outcomes they will achieve.

3.7.3.1 Motivation

Some studies have specifically addressed the influence of students' motivation on their learning outcomes in an online environment. For example, Knowles and Kerkman (2007) administered two questionnaire surveys among 29 students in an online art course. The students' motivations were assessed by the Locus of Control questionnaire based on the study by Rotter (1996) on internal versus external control of reinforcement. The students' learning outcomes were measured by their examination scores. The result showed a significant correlation between the locus of control and the students' examination scores (r = .53).

Ho and Kuo (2010) examined the relationship between computer attitudes, flow experience, and learning outcomes among 239 employees from 50 technological companies, who had experiences of online learning for professional development. The participants' computer attitudes were indicated by computer affinity, confidence, usefulness, and anxiety (Loyd & Gressard, 1984). Flow was considered as intrinsic motivation and the employees' flow experience was measured through four factors (i.e., feeling in control, focusing attention on

activity, feeling curiosity, and having intrinsic interest) (Trevino & Webster, 1992). The employees' learning outcomes were gauged by their self-reported knowledge and skill acquisition through online learning experiences. It was found that the employees' computer attitudes and flow experience had a positive direct influence on their learning outcomes.

However, other research reported inconsistent findings concerning the relationship between students' motivation and learning outcomes. Yukselturk and Bulut (2007) conducted a study among 80 students who attended an online computer course. The students' motivation was represented by intrinsic and extrinsic motivation, based on the use of the MSLQ (Pintrich et al., 1991, 1993). Their learning outcomes were indicated by their course results. Although the students' learning outcomes were significantly correlated with their intrinsic motivation, the linear stepwise regression analysis revealed that neither intrinsic nor extrinsic motivation could predict the students' learning outcomes. Rather, self-regulation strategy (i.e., metacognitive self-regulation and effort regulation) was found to be the only predictive factor for the students' learning outcomes. The teachers, who were invited to the interviews following the questionnaire survey, suggested that the motivational components might affect students' learning outcomes. However, no further interpretation was provided.

Similarly, Chen and Jang (2010) reported a non-significant impact of motivation on 267 students' learning outcomes in an online environment. The students' motivation (i.e., intrinsic and extrinsic) was measured by Academic Motivation Scale (AMS) based on self-determination theory (Vallerand et al., 1992). The students' final grades and perceived knowledge and skill acquisition were used as their learning outcomes. It was found that motivation was not a significant predictor on the students' learning outcomes. Chen and Jang argued that the insignificant impact of motivation on learning outcomes might be due to (a) the survey and objective data were not as valid as expected; and (b) other factors, such as contextual support and satisfaction of the students' needs during learning, had more salient influences on the students' learning outcomes.

Generally speaking, students' motivation during online learning process can contribute to their desired learning outcomes. The students with higher levels of motivation may tend to obtain better learning outcomes in an online or blended environment. However, non-significant relationships between these factors have also been identified. It appears that, in some case, other factors (e.g., other self-regulated learning strategies, students' satisfaction, or learning support) may play a more important role in students' learning (e.g., Chen & Jang,

2010; Yukselturk & Bulut, 2007). There is a need to conduct further research to investigate whether students' motivation can influence their learning outcomes in an online or blended environment and whether the influence of motivation on the students' learning outcomes can be mediated through their learning process.

3.7.3.2 Learning strategies

A number of researchers particularly investigated the impact of students' application of learning strategies on their learning outcomes in an online or blended environment. For instance, Shih et al. (1998) examined the relationship between 99 students' usage of learning strategies and learning outcomes in two online courses. A learning strategy scale was developed and the students' grades were gauged as their learning outcomes. A strong correlation was found between the students' learning outcomes and their application of self-regulated learning strategies (r = .50).

Puzziferro (2008) found a significant impact of using rehearsal and organization strategies on 815 students' online learning outcomes. The MSLQ (Pintrich et al., 1991, 1993) was used to measure the students' usage of specific learning strategies. The students' final grades were measured as their learning outcomes. It was reported that the students' self-reported applications of rehearsal and organization strategies were significantly related to their final grades in the course.

Loomis (2000) found a significant relationship between 28 students' use of self-regulated learning strategies and their learning outcomes in an online course. The students' application of self-regulated learning strategies was measured by the Learning and Study Strategies Inventory (LASSI) (Weinstein, 1987) at the beginning of the course. LASSI addressed ten scales of learning strategy usage (i.e., attitude, motivation, time management, anxiety, concentration, information processing, selecting main ideas, using study aids, self-testing, and test strategies). The students' learning outcomes were indicated by (a) withdrawal from the course; (b) non-examination points received from the assignments; and (c) the examination results. Non-examination points and examination results were aggregated to generate a variable of "total class points".

Loomis found that the students' ability of selecting main ideas significantly predicted their withdrawal from the course in a negative direction. The non-examination points were significantly predicted by concentration and using study aids. Additionally, the students'

examination results were found to be predicted by using study aid. Finally, it was shown that time management and using study aid significantly predicted the students' total class points.

The above findings were consistent with other researchers' work. For example, Azevedo, Guthrie, and Seibert (2004) found the importance of students' self-regulated learning skills in an online environment. Feldman, Martinez-Pons, and Shaham (1995) also reported that the students with higher levels of self-regulation received higher grades in their course.

To sum up the review in Section 3.7, the majority of the reviewed studies reported a significant relationship between self-regulation and students' learning outcomes; however inconsistent findings were also identified regarding the impact of students' motivation on their learning outcomes (e.g., Chen & Jang, 2010; Yukselturk & Bulut, 2007).

Moreover, the students' self-regulation in the reviewed studies was mainly indicated by their self-report. There is a need to examine whether the students' self-reported capability of self-regulated learning can represent their actual learning behaviour in an online or blended course. Furthermore, although a significant impact of self-regulation on students' learning outcomes has been identified in the reviewed studies, it has not been investigated that how students' self-regulated learning may influence their learning outcomes, e.g., how students with different levels of self-regulation will participate in an online or blended course at different levels.

Further studies are necessary to investigate whether the students' with different levels of self-regulation will achieve different learning outcomes in an online or blended environment. It is also needed to examine how students' self-regulation can influence their learning outcomes, such as whether the influence of self-regulation on students' learning outcomes can be mediated through their learning process, such as course input or participation.

3.8 Summary of the review of students' learning outcomes in an online or blended environment

This chapter reviewed the influence of some factors on students' learning outcomes in an online or blended environment. These factors comprised prior attitudes, prior experiences, course expectations, course experiences, self-control, and self-regulation. It was found that the significant relationships between the above factors were reported. However, inconsistent findings were also identified. The following table (Table 3.1) summarises the findings from the reviewed studies.

Table 3.1
Summary of the Review of Students' Learning Outcomes in an Online or Blended Environment

Factors		Conclusion on the findings in the reviewed studies
Prior attitudes		Generally, positive relationships were found, but the effects of prior attitudes were often weak and not all studies reported a significant relationship. There is a need to further investigate whether students' prior attitudes (toward ICT usage, the subject area, and online learning) will influence their learning outcomes in an online or blended environment.
Prior experiences		Inconsistent results regarding the influence of prior experiences on students' learning outcomes were found. Further research is needed to investigate whether university students' prior experiences with ICT usage, the subject area, and online learning will have an impact on their learning outcomes, especially in the case that the majority of the students are familiar with computer and the Internet usage.
Course expectations		Both significant and non-significant relationships were identified. Further study can be done on what students expect from learning in an online or blended environment and whether different levels of expectations will contribute to different course participation and learning outcomes among the students.
Course experiences	Teacher-student interactions	Most of the surveyed studies reported significant relationships, but non-significant relationships were found by some researchers.
	Peer interactions	Inconsistent findings about the relationship were found and the hypothesis between the two factors remains questionable.
	Student-content interactions	Inconsistent findings were found, such as significant positive and negative, and non-significant relationships.
	Student-interface interactions	Both significant and non-significant relationships have been identified.
	Course satisfaction in general	The research findings about the relationship were not consistent with both significant and non-significant relationships.
	Course input	Both significant and non-significant relationships were identified. Diverse instruments (i.e., students' diaries, online discussion, and frequency of logging on the course website), which can present various aspects of students' experiences of online interactions, can be used for further investigation on the influence of students' participation in the course on their learning outcomes.
Self-control		The surveyed studies generally reported significant relationships. Researchers have approached self-control from two perspectives — a background personality trait and the ability to mobilise effective strategies as self-regulation. In the present study, self-control was treated as a personality trait. It was found from the review that self-control could significantly influence students' learning outcomes. Further research is needed to examine how self-control can interact with self-regulation to influence students' learning outcomes.

Self-regulation	The majority of the reviewed studies reported significant relationships; however, inconsistent findings were identified regarding the impact of self-regulation on students' learning outcomes. Further research is needed to examine whether students' self-regulated learning will influence their learning outcomes in a blended course and whether the effect of self-regulation will be mediated through the students' participation in the course.

Although a number of studies have investigated the relationships between the students' prior attitudes or experiences and learning outcomes, inconsistent or unclear findings were identified. In addition, it is difficult to advance a conclusion concerning the role of students' course expectations and whether their expectations would predict the learning outcomes.

The students' learning outcomes in some studies were measured merely by their perceived learning outcomes, which might not represent their actual knowledge and skill acquisition. It may be worthwhile to address both students' actual course results and perceived learning outcomes in further studies, in order to gain a comprehensive measurement of their learning outcomes.

Additionally, the students' course experiences were also found be to gauged through their self-reports in the majority of the review (e.g., Arbaugh, 2010; Beffa-Negrini et al., 2002; Lee et al., 2011; Puzziferro, 2008). More diverse instruments need to be used to measure students' course experiences from various aspects. The instruments such as students' weekly diaries and online discussion contributions may well represent their participation in the course, rather than the single instrument of self-reported frequency or time spent in the course (e.g., Hong, 2002; Lim & Morris, 2009).

It has been noticed that there are inconsistent findings on the influence of self-regulation on students' learning. Although the questions of MSLQ have been widely used, different constructs have been developed from the existing studies (e.g., Pintrich & De Groot, 1990a; Yukselturk & Bulut, 2007). Moreover, there appears to be little consistency in the findings across different studies concerning the relationship between students' motivation and learning outcomes. At time, the constructs such as intrinsic and extrinsic motivation was found to be related to students' learning outcomes, but this is not always documented in the available studies.

Further studies need be done to address students' application of self-regulated learning strategies in online learning (Chen & Jang, 2010; Eastmond, 1995; Loomis, 2000; Zariski &Styles, 2000). Boekarts (1997) stated that most classrooms were still populated with the students, who were not self-regulated in learning, and most teachers were not yet equipped to facilitate their students to improve the capability of self-regulation. More importantly, the role of self-regulatory skills in an online learning environment has not received the same attention as it does in the face-to-face learning environment (Barnard, Lan, To, Paton, & Lai, 2009).

In the present study, self-control was regarded as students' personality trait, while self-regulated learning referred to students' capability of using different self-regulated learning strategies. Although both characteristics were found to significantly influence students' learning outcomes, it remains unclear about how self-control will interact with self-regulated learning to predict students' learning outcomes. There is a need to investigate whether students' characteristics such as self-control and self-regulation will impact on their learning outcomes and whether the impact will be mediated through the learning process factors (e.g., course participation).

Chapter 4: University students' attitudes toward online learning

This chapter reviews the literature of relationships between university students' attitudes toward online learning and several antecedent factors, such as gender differences, course expectations, prior experiences, prior attitudes, self-regulation, and interactions during online learning. The chapter begins with an overview of attitude. This is followed by a review of the existing research concerning students' online learning attitudes and the above factors. Inconsistent findings are identified and a summary of the review is provided at the end.

4.1 Overview

Attitudes are psychological entities about an individual's views of an event or others' behaviour, which reside in the individual's private experiences and prompt his or her behaviour (Allport, 1967). Generally, attitudes are based on evaluative concepts regarding the characteristics of the referent object and give rise to motivated behaviour (Rajecki, 1990).

Attitudes are assumed to have three components — affective, behavioural, and cognitive components (Rajecki, 1990; Triandis, 1971). Affective component essentially is the evaluative element in an attitude. Attitude holders judge the object to be good or bad based on the evaluative and emotional element. Behavioural component is regarded as a predisposition to action and represents an intentional element in attitudes. Cognitive component means any information, fact, or knowledge relevant to the attitudinal object. It is used to indicate the functions, implications, or consequences of the object. In the present study, the students' attitudes were indicated by the items which presented the above three components of attitudes toward online learning.

Attitudes are important for students' learning and positive attitudes can contribute to their success in learning (Sharp, 1999). Maio and Haddock (2009) concluded that attitudes varied in the degree to which they were persistent over time and were influential in guiding information processing and predicting behaviour. Students' attitudes are important to their

academic achievement. For example, students' attitudes can reflect their learning from several aspects, such as how they perceive about their learning, whether they are willing to be engaged in learning, or whether they intended to learn (Chen & Lin, 2002; Sringam, 2000).

With the advent of the Internet technologies to deliver course materials, understanding students as learners in an online learning environment becomes more important (Davies, 2006). For example, students' positive attitudes toward online learning can promote retention and learning achievement (Ivers et al., 2005). Rodriguez et al. (2008) suggested that students' attitudes toward their online learning experiences could to be a determining factor for their success in online learning. Having positive attitudes, students may tend to be motivated toward their online learning. In contrast, the students with negative attitudes may not be actively engaged in learning or achieve desired learning outcomes.

It was found that some factors were important in affecting university students' attitudes toward online learning in an online or blended learning environment. These factors include gender differences, course expectations, prior experiences, prior attitudes, self-regulation, and experiences of online interactions. This chapter reviews the research concerning the relationships between the above factors and students' attitudes toward online learning. The literature review identified some inconsistency among the studies and highlighted the necessity for further research.

4.2 Gender differences

Studies on the influence of gender differences on students' attitudes toward online learning focused on how male and female students might respond differently to learning in an online or blended environment. The variables included students' attitudes toward computer use, learning from online materials, and perceptions in online learning (e.g., confidence, likeness, readiness, willingness, preference, and satisfaction).

Inconsistent findings were evident in this area of research. For example, a group of researchers identified that males were more positive than females during online learning (Banerjee, 2011; Bostock & Wu, 2001; Kim, 2012). However, some studies reported that females were more positive when learning online (Aydin, 2012; Chen & Tsai, 2007; Dabaj & Basak, 2008; Price, 2006). Furthermore, other studies found no significant difference between genders in online learning (Clark & Gorski, 2002; Clay-Warner & Marsh, 2000;

Gunn et al., 2003; Hung et al., 2010; Lim, 2001; Ory et al., 1997). The detailed review of these studies is elaborated as below.

Ibrahim, Silong, and Samah (2002) examined students' attitudes toward online learning among 139 undergraduate students (73 males and 66 females). They found that the male students were more positive toward online learning than the female students.

More recently, Banerjee (2011) conducted a study among 240 students in a blended course. It was found that the male students had a greater preference for learning with technology than the females. Banerjee's research finding was also supported by Kim (2012) that the males in general showed more interest than the females in learning with online components.

The research findings about males' more positive attitudes during online learning were consistent with some studies about males' advantages in computer use. It was reported that males were more positive toward computer use or learning with computers (Bostock & Wu, 2001; Chen, 1986; Jones, Johnson-Yale, Millermaier, & Pérez, 2009; Liu, Reed, & Phillips, 1992; Mark, 1992; Muira, 1987; Njagi et al., 2003; Wilder, Mackie, & Cooper, 1985).

However, other researchers have found that females were more positive than males in online learning. Price (2006) investigated 209 students' confidence and likeness to learn in an online environment. A multivariate analysis showed a significant gender difference on online learning attitudes. The female students were more confident and willing to learn online than the males.

Chen and Tsai (2007) carried out a research project among 1866 students (940 males and 926 females) from 84 universities in Taiwan. It was found that the female students held a stronger belief than the males that gender was not essential to determine students' success in ICT literacy. Moreover, the females displayed more positive attitude toward learning from online course content. Following the questionnaire survey, 12 female students participated in the interviews and provided more information for their attitudes toward online learning. Some of the interviewees indicated that they did not agree that gender difference still existed in online learning. The researchers concluded that gender might not be an important factor influencing students' attitudes toward online learning.

Dabaj and Basak (2008) also reported that female students showed more positive attitude toward online learning than males. The study was based on a questionnaire survey among 118 university students taking three online courses. Regarding the students' preference to

traditional learning, more males than females preferred to take face-to-face instruction rather than study online.

Aydin (2012) carried out a survey among 626 university English studies students to examine their attitudes toward online communication. It was found that the females showed more positive attitudes toward the facilitative role of online communication in their social lives than the males. Compared with the males, the female reported that that online communications were more indispensable for them.

Some researchers found no significant gender differences in terms of students' attitudes toward online learning (Clay-Warner & Marsh, 2000; Hung et al., 2010; Lim, 2001; Ory et al., 1997). For example, Hung et al. (2010) conducted a study and found that there was no significant gender difference in the students' readiness for online learning. The research was conducted among 1051 college students enrolled in five online courses. The students' online learning readiness was measured by their motivation and confidence in online learning. All students' average scores of online learning readiness indicated that they exhibited above-medium levels of readiness to learn online. There was no significant difference between the male and female students.

Clark and Gorski (2002) and Ono and Zavodny (2003) used the data from the surveys during the period from 1997 to 2001, in order to discover the trend of the Internet use between males and females. They found that, while there was a gender gap in the Internet usage during the 1990s, females subsequently had a greater access to the Internet and the gap between genders had disappeared. They concluded that, although females and males might still differ in the frequency and intensity of the Internet use, differences between genders appeared to have diminished over time.

Similarly, Gunn et al. (2003) reported a ten year survey about different levels of computer literacy among the entry level undergraduate students in a large university (16 thousand students) from 1990 to 1999. The response rate was 30% in 1990, with the variation around 60% to 80% over the years until 1991. In the early years of the survey, the female students were found to be less experienced in ICT use and were less positive toward ICT use in their study and career. In the survey of 1999, the gender gap in E-mail and the Internet use was found to be closing. The proportional increase in the confidence was much greater among the females than the males. Gunn et al. (2003) concluded that the differences between genders had gradually and completely disappeared in the period from 1990 to 1999.

It seems that gender differences in online learning may be attributed to students' different experiences of computer and the Internet usage, rather than gender itself. Hyde (2005) reviewed several thousand projects to investigate gender effects by using meta-analysis. After reviewing the data gathered from behavioural and social science research since 1985, Hyde has concluded that the males and females are far more similar than they are different. Gender similarity hypothesis appears to be also applicable to the area of educational computing — gender may not be the predictor of students' differences in learning with technology.

Females and males' differences in computer experiences, which possibly contribute to their differences in online learning attitudes, may result from social influence. Bimber (2000) suggested that gender difference in computer and the Internet use may possibly be explained by a fundamentally socioeconomic status issue which limited women's frequent use of the Internet. In other words, the difference between genders may be a result of people's concept of masculinity definition on technology and males' dominance and control of computer application in the early 1980 (Fallon, 1998; Morahan-Martin, 1998).

Until the early 1990's, men still held key positions in computer service department in universities and the Internet population were predominately males (McSporran & Young, 2001; Sanders, 1995). This situation could possibly further contribute to males' more positive attitudes toward computer than females (Njagi et al., 2003; Usun, 2004; Wang et al., 2001). Smith and Necessary (1996) found that males' more positive attitudes than females in an online learning environment could still be the result of females' lack of computer experiences.

Durndell and Haag (2002) reported that the differences between male and female students in terms of attitudes toward the Internet were predicted by their experiences of the Internet usage. This finding implied that gender difference in the students' computer attitudes may be influenced by different computer experiences, rather than gender itself.

With the popularity of personal computers and mobile technologies equipped with more user-friendly software since 2000, gender differences in computer and Internet usage appeared to diminish (Davidson-Shriveres, Morris, & Sriwongkol, 2003; Hartsell, 2004). Especially after the advent of the Web 2.0, computer and the Internet use become more applicable for the public daily life (i.e., locating, publishing, and sharing information, social networking, or entertainment), rather than merely computing and programming (Asselin & Moayeri, 2011; Fallon, 1998).

The popularity of personal computers and mobile technologies may provide opportunities for people to access to computer usage regardless of gender differences. Females were found to have more frequent access to computer and the Internet usage. For example, Bulik (2007) found girls spent longer period of time communicating with their friends on Facebook or MySpace than did boys. With frequent usage of Web 2.0, the gender gap in terms of computer and the Internet use may gradually disappear (So & Swatman, 2010). Several researchers have also suggested that the difference in online learning attitudes between females and males is diminishing (Davidson-Shriveres et al., 2003; Hartsell, 2004; Hung et al., 2010).

Finally, either females or males may perceive learning with ICTs in different ways, because of different needs (e.g., workload and family duties) (Bimber, 2000; Powell, Conway & Ross, 1990; Sullivan, 2001). Furthermore, students' particular experiences in the certain online courses may contribute to their different responses to learning in an online environment (Nilan, 2000; Pagnucci & Mauriello, 1999; Rickly, 1999; Savicki, Lingenfelter, & Kelley, 1996; Sullivan, 2001).

Therefore, the investigation on students' attitudes toward online learning may not merely treat gender as a single predictor. Rather it may possibly be more meaningful to take several factors into consideration, such as students' prior experiences, different needs they have in an online course, and course experiences, which may influence their attitudes during online learning.

4.3 Course expectations

It appears from the relevant literature that university students' expectations were related to their attitudes in an online or blended learning environment (Appleton-Knapp & Krentler, 2006; Herbert, 2006; LaPointe & Reisetter, 2008; Mupinga, Nora, & Yaw, 2006; Wu et al., 2010). The following paragraphs elaborate on the research findings concerning the relationship between students' course expectations and attitudes toward online learning.

Appleton-Knapp and Krentler (2006) examined the relationship between students' expectations and their course satisfaction among 55 university students during online learning. Two sets of questions were generated to ask about the students' course expectations before the course and the satisfaction of their expectations near the end of the course respectively. One-way ANOVA analysis revealed that the differences in the students'

expectations fulfilment led to significant differences in their course satisfaction. The students, whose course experiences exceeded their expectations, showed significantly higher levels of overall satisfaction.

Herbert (2006) found that there was a significant difference in the satisfied expectations between the completers and non-completers among a group of students in an online course. The students were asked whether their online course experiences had met their expectations. It was found that the students, who did not complete the course, reported significantly lower levels of satisfied expectations. Herbert indicated that the lower levels of the students' satisfied course expectations might cause a corresponding decrease in their engagement and motivation to complete an online course.

Mupinga et al. (2006) investigated course expectations among 66 undergraduate students in three online courses. Open-ended questions were used to measure the students' course expectations. The most frequently reported expectations by the students were (a) communication with the teacher; (b) the teachers' feedback through email or course website; and (c) online course quality compared with face-to-face instruction. However, their research only reported the students' expectations from the courses, without addressing the relationship between the students' course expectations and attitudes toward online learning.

LaPointe and Reisetter (2008) examined 412 graduate students' expectations of peer interactions and their satisfaction in online graduate courses. The students were asked to evaluate their experiences of online interactions in the course, compared with those in classroom settings. As 74 of them sent replies, the emphasis was placed on these students' perceptions and the issues identified in the data, rather than attempting to generalize inappropriately. One group of students highly valued peer interactions in face-to-face settings. The researchers claimed that this expectation negatively affected the students' experiences of the online learning community. This group of students were less satisfied with online learning and they reported that online learning could not replicate the dynamic of peer interactions in classrooms. However, there was no detailed information about the number of the students who highly valued face-to-face peer interactions. The relationship between the students' expectations of face-to-face interactions and course satisfaction lacked statistical significance.

Wu et al. (2010) conducted a research on the factors which might predict 212 students' satisfaction in a blended learning environment. In their research, the students' performance

expectations were defined by the degree to which they expected that blended learning would help them to learn. It was found that the students' performance expectations explained 67.8% of the variance in their course satisfaction.

From the review above, it appears that the higher levels of students' satisfied expectations are related to their positive attitudes toward learning in an online environment. However, even though there has been a rapid development in online learning in higher education, little was known about students' expectations (Paechter et al., 2010). Teachers need to be sensitive to students' expectations, in order to maximize their online learning experiences (Mupinga et al., 2006; Vonderwell, 2003). On the other hand, students may have unrealistic expectations from their teachers, e.g., the teachers will provide instant feedback on the students' inquires (Anderson, 2004). Further investigation is needed on what students expect from an online course and whether their expectations will be related to their attitudes toward online learning.

4.4 Prior experiences

People's experiences can determine their attitudes and they will hold more positive attitudes toward the things with which they are familiar (Bornstein & D'Agostino, 1992; Greenwald & Banaji, 1995; Janiszewski, 1993; Murphy, Monahan, & Zajonc, 1995; Triandis, 1971; Zajonc, 1965, 2001). The relationship between students' prior experiences and their attitudes toward online learning has been investigated by a significant amount of research. Students' prior experiences were categorized into prior experiences of ICT usage, subject areas, and online learning.

It was found that students' prior experiences of ICT usage could influence their online learning attitudes (Gunnarsson 2001; Kurubacak & Baptiste, 2002; Spiceland & Hawkins, 2002; Stephens & Creaser, 2004). However, other researchers reported that there was no significant impact of students' prior ICT experiences on their attitudes in online learning (e.g., Buzzetto-More & Sweat-Guy, 2006). In addition, students' familiarity with the subject areas can help them reduce their anxiety and perceived difficulty level when they learn the subjects online (Gunnarsson, 2001; Hong, Ridzuan, & Kuek, 2003).

With regard to the relationship between students' prior online learning experiences and online learning attitudes, a positive relationship between the two factors was found by Contreras (2004), Smart and Cappel (2006), and So and Brush (2008). However, Bolliger et al. (2010) and Rodriguez et al. (2008) found a negative relationship between students' prior online

learning experiences and attitudes toward online learning. Furthermore, Agarwal and Prasad (1999) and Stoel and Lee (2003) found there was no significant impact from students' prior online learning experiences on their online learning attitudes. Detailed review of the impact of students' prior experiences of ICT usage, subject areas, and online learning on their online learning attitudes is provided as below.

4.4.1 Prior experiences of ICTs usage

Some studies have found that students' prior ICT experiences could continue to influence their attitudes in online learning (An & Frick, 2006; Aydin, 2012; Contreras, 2004; Gunnarsson, 2001; Hong et al., 2003; Roberts & Dyer, 2005; Stoel & Lee, 2003; Vernadakis, Giannousi, Antoniou, Zetou, & Kioumourtzoglou, 2010). However, consistent findings have not been forthcoming, as several other researchers did not find a significant relationship (Bolliger et al., 2010; Buzzetto-More & Sweat-Guy, 2006; DeBourgh, 1999; Nugroho, Djumhadi, & Sumardi, 2010; Sher, 2009; Thurmond et al., 2002).

For example, Gunnarsson (2001) examined the relationship between students' computer experiences and their perceived threat in an online environment. The participants were 42 first-year graduate students enrolled in a managerial statistics course. The students' prior computer experiences and attitudes toward learning statistics online were measured. It was found that the students with less computer experiences were more likely to find the online environment threatening.

Stoel and Lee (2003) addressed the relationship between 618 students' prior ICT experiences and attitudes in an online course supported by Web-based course tools (WebCT). The students' prior experiences of using WebCT were measured by the number of previous online courses which they had taken. Their online learning attitudes were indicated by the perceived usefulness and easiness of WebCT usage. It was found that the students' prior experiences of WebCT usage significantly influenced their perceived ease of technology use.

Hong et al. (2003) conducted a project among 88 undergraduate students learning online. The students' prior experiences of ICT usage were indicated by their basic knowledge and skills of the Internet usage. The researchers found a strong relationship between the students' prior Internet knowledge and attitudes toward using the Internet for learning (r = .58). The similar positive relationship between students' prior experiences of the Internet usage and satisfaction with online learning was reported by Stoke (2003).

Roberts and Dyer (2005) administered a pre- and posttest survey among 322 university students who took an online food science course. The students' prior ICT experiences were measured by their self-reported computer skills in the pretest. Their attitudes toward online instruction were measured in the posttest. The result revealed that the students' prior computer skills could positively predict their attitudes toward the online instruction.

An and Frick (2006) conducted a survey among 105 undergraduate students who took a blended course. The students' prior ICT experiences were indicated by their experiences of using computer-mediated communication. It was found that the students' prior ICT experiences were strongly related to their perceived comfort with online communication in the course (r = .48).

Vernadakis et al. (2010) conducted a study among 211 students to investigate the relationship between their prior computer experiences and attitudes toward the online course management system. The students' prior experiences with computer applications were ranged from "1 = Poor" to "5 = Excellent". The students' attitudes were indicated by their responses to the questions about several aspects of the course (i.e., participation, educational material, usefulness, user control, and interaction). It was found that the students' prior ICT experiences were significantly correlated with their attitudes toward the online course.

Aydin (2012) administered a survey among 626 university English studies students and found a significant relationship between the students' prior computer experiences and their attitudes toward online communication. The students' prior experiences of the Internet usage were described as "beginner, bad, average, good, or very good". It was found that the students with more computer experiences showed more positive attitudes toward the communication in an online environment.

However, other researchers reported a non-significant relationship between students' prior computer experiences and attitudes during online learning. DeBourgh (1999) found that being at ease with the Internet usage was not related to students' satisfaction with online learning. Agarwal and Prasad (1999) surveyed 230 users of an information technology innovation in a corporation. They found that there was no significant influence from the users' prior technology experiences on their perceived usefulness of technology. Thurmond et al. (2002) found a non-significant relationship between students' ICT experiences and their satisfaction with online learning. In the research by Thurmond et al. (2002) among 120 students from

seven online nursing courses, it was found that the students' computer skills and knowledge of using online communications tools did not predict their satisfaction with online learning.

Buzzetto-More and Sweat-Guy (2006) administered a survey among 178 students who took business courses in a blended mode. It was found that the students with different levels of computer skills were equally satisfied with their online learning experiences. But no detailed interpretation of the result was provided.

Similar results were found by Sher (2009), who surveyed 208 university students enrolled in three online courses. Sher found that the students' prior experiences of the Internet usage had no significant relationship with their satisfaction with online learning. The student-teacher and peer interactions were found to significantly contribute to the students' satisfaction with their online learning experiences. It was surmised that since all the participants possessed at least one year of the Internet experiences, it might be sufficient for the students to feel comfortable with the online course.

Bolliger et al. (2010) investigated the influence of prior technology experiences on 190 students' confidence in an online course. The students were asked to report whether they had any prior experiences of using podcast. No significant difference in the students' confidence in online learning was found. The similar non-significant relationship between students' prior ICT experiences and attitudes toward online learning was also reported by Nugroho, Djumhadi, and Sumardi (2010).

The research concerning the relationship between students' prior ICT experiences and attitudes in an online or blended environment yielded inconsistent results. The non-significant relationship between students' prior ICT experiences and online learning attitude may be the result of high level of familiarity with computer and the Internet usage, which has occurred with the advent of the Internet. The students from 15 to 30 at the present day, as characterized as Generation Y, have frequent access to computer and the Internet as a part of their daily life (Gardner & Eng, 2005; McCrindle, 2002). It is supposed that, given the popularity of computer and the Internet technolgies in university students' life, the majority of the students' may be experienced with ICT usage at a reasonable level. Further study can investigate whether there is a significant relationship between prior ICT experiences and online learning attitudes in the situation where computer and mobile technologies are widespread among university students.

Additionally, the measurement on students' prior experiences of ICT usage may be limited by the specific courseware or technology in a certain subject in some research (Stoel & Lee, 2003). Since 2000, especially after the advent of the Web 2.0, the ICT usage in an online learning environment mainly involves the basic computer application and the Internet usage (e.g., browsing, searching, and social networking), rather than the specific computer programming tools (Bolliger, Supanakorn, & Boggs, 2010; Stoel & Lee, 2003; Vernadakis et al., 2010). The instruments measuring students' ICT experiences need to be updated and more present tools need to be included into the survey to fairly represent the current ICT application in online courses (Stephens & Creaser, 2002). Hence, the measurement of students' experiences of ICT usage needs to cover updated computer and the Internet applications to provide a more current concept of ICT experiences.

4.4.2 Prior experiences of subject areas

Being familiar with the subject area may influence students' attitudes toward learning that subject online. This was evident in the study by Suanpang (2007), who examined online learning attitudes among 269 university students learning mathematics online and in face-to-face class respectively. The results of the students' interviews revealed that the students with stronger background knowledge in mathematics reported lower levels of course difficulty than those without a strong background.

Cybinski and Selvanathan (2005) investigated online learning attitudes among two groups of university students (73 and 26 from face-to-face and blended classes respectively) in an introductory statistics course. Although 76% of the face-to-face group while only 23% in the blended learning group had prior experiences in mathematics, no significant difference was found between the two groups with respect to the students' prior experiences of the subject area. Therefore, the data of both groups' survey responses were analysed together. It was found that the students' course enjoyment was positively related to their prior mathematics experiences (r = .21).

While these studies point to the importance of the relationship between prior experiences of the subject area, one needs be cautious about the findings as the studies seem to focus on the subject of mathematics. Further investigation on the influence of students' prior subject experiences on their attitudes toward online learning needs to be conducted in a variety of subject areas. Moreover, correlation analysis may not be powerful to establish the prediction of students' prior subject experiences on their online learning attitudes. Further analysis

needs to be performed to determine the predictive influence of student prior experiences of the subject area on their attitudes toward learning the subject in an online or blended environment.

4.4.3 Prior online learning experiences

It was found that students' prior experiences of online learning had an impact on their attitudes toward online learning. However, inconsistent findings were identified. For example, Contreras (2004) conducted a study among 209 undergraduate students learning in an online environment. It was shown that the number of online courses the student had taken previously predicted their confidence in using computer during online learning. Contreras suggested that prior online learning experiences could better prepare the students for taking other online courses.

Smart and Cappel (2006) identified a similar relationship in a survey among 53 university students taking an online course. It was found that the students with more prior online learning experiences had significantly higher levels of satisfaction with the course than those with less experience with online learning.

So and Brush (2008) also identified a positive relationship between 48 university students' satisfaction in a blended course and the number of prior online courses they had taken. It was found that the number of online courses the students took prior to the course was positively related to their course satisfaction (r = .30).

Rodriguez et al. (2008) examined students' perception about the quality of online courses compared with those delivered in a face-to-face mode. A total of 698 university students participated in the research and were grouped based on different prior experiences of online learning: (a) 168 students with prior online learning experiences; (b) 358 students with prior blended learning experiences; and (c) 172 students with no prior online or blended learning experiences. It was reported that more students from the group with prior online learning experiences (58%) believed online courses could meet the same quality standard as face-to-face courses than those in the groups with prior blended learning experience (21%) and no online learning experiences (22%). However, the statistical significance for the differences between the students was not provided.

In seeming contradiction, Bolliger et al. (2010) found a negative relationship between students' prior online learning experiences and attitudes toward online learning. In their

study, 190 students' prior experiences with online courses and their confidence in online learning were examined. The students were asked to provide the number of online courses they had taken. It was found that the students with more online course experiences (11 or more online courses) were less confident than those with less online learning experiences (6-10 online courses). However, detailed interpretation of the negative relationship was not provided and the researchers suggested further investigation.

Lim et al. (2006) carried out an investigation among 125 university students who took an online course. They found that the students with prior online learning experiences had significantly lower levels of learning motivation and were less satisfied with the learning support in the course than those without prior online experiences.

A non-significant relationship between students' prior online learning experiences and their online learning attitudes was reported by Stokes (2003). The researcher assessed a group of undergraduate students' satisfaction with learning in a course which incorporated Web-based modules. It was found that the students' satisfaction with online learning was not influenced by their prior online learning experiences.

Similarly, Thurmond et al. (2002) carried out a study among 120 students from seven online nursing courses. They found that there was no significant prediction from the number of the online courses the students had previously taken on their satisfaction with learning in the courses.

Rodriguez et al. (2008) conducted a survey among 698 university students. It was found that the students' comfort with online learning tools was not related to the number of online courses they had taken before. The students with different prior online learning experiences reported the same level of comfort with technology usage. Moreover, there was a negative relationship between the students' prior online learning experiences and satisfaction with online learning. The factors, which were related to the students' satisfaction with online learning experience, were found to be technology comfort and motivation to learn technology. It was suggested that the students' attitudes toward technology and motivation in learning might be more important for their online learning, rather than their prior experiences.

Sher (2009) investigated the influence of prior online learning experiences on students' satisfaction with online learning among 208 university students in three online courses. The students' prior online learning experiences were indicated by the number of previous online

courses they had taken. Sher found that the students' prior experiences of online learning had no significant relationship with their satisfaction with online learning in the current courses. Sher argued that the students with no prior online learning experiences might have prior experiences of the subject area, which possibly had an effect on their attitudes toward online learning in the courses. However, the students' prior subject experiences were not investigated in Sher's study.

Paechter et al. (2010) reported a non-significant relationship between 2196 university students' prior online learning experiences and their satisfaction with online learning. The students' prior online learning experiences were indicated by the number of online courses they had taken preciously. It was shown that there were no significant relationship between the students' satisfaction with online learning and their prior online learning experiences.

The research concerning students' prior experiences and attitudes toward online learning revealed inconsistent results. The findings, *inter alia*, suggest that prior experience of learning is not always a powerful factor in determining students' attitudes toward subsequent online courses. At times, prior experiences appeared to be facilitative, but at other times they appeared to be essentially irrelevant, and in several studies, negative effects have not been further interpreted (e.g., Bolliger et al., 2010; Lim et al., 2006). Further studies can be conducted in the subject areas except for mathematics to examine whether students' prior experiences of the subject will have an impact on their online learning attitudes when they take this subject in an online or blended environment. Moreover, it may be worthwhile to explore what other factors may influence students' attitudes toward online learning, under the circumstances that the students are fairly experienced with ICT usage, the subject area, or online learning before taking an online or blended course.

4.5 Prior attitudes

Students' attitudes toward learning can be carried around with them in ways that affect future learning for a long time (Biggs, 2003). It can be assumed that students' prior attitudes which were developed during learning can have continuous influence on their future learning. In the present study, prior attitudes comprised three sub-categories: (a) prior attitudes toward ICT usage; (b) prior attitudes toward the subject area; and (c) prior attitudes toward online learning.

4.5.1 Prior attitudes toward ICT usage

Wang et al. (2001) administered a pre- and posttest survey among 24 university students who took an online course. The students' attitudes toward technology and satisfaction in learning were measured respectively in the pre- and posttest. The researchers found that the students' prior attitudes toward technology were significantly related to their satisfaction with technical aspects of the online course (r = .42).

Beffa-Negrini et al. (2002) investigated the relationship between 54 university students' prior attitudes toward technology and course satisfaction in an online nutrition course. The students' prior attitude toward technology was found to significantly predict their satisfaction with peer interactions and the teacher's instruction during online learning.

An and Frick (2006) conducted a survey among 105 undergraduate students learning in a blended environment, where face-to-face classes were supported by online communication. It was found that the students' perceived comfort with computer before the courses was significantly related to their perceived comfort with online communication.

Stokes (2003) found that the students' perceived comfort with the Internet usage at the beginning of an online course influenced their satisfaction with the online learning experiences. The students who initially felt more comfortable with the Internet usage were more likely to be satisfied with their online learning experiences than those with lower levels of comfort.

The results from the reviewed studies revealed a commonly accepted assumption that the students with more positive attitudes toward ICT usage may show more positive attitudes in online learning. However, as personal computer and mobile technologies are widespread after 2000, the access to computer and the Internet may not be an issue for university students (Gardner & Eng, 2005). The significance of the relationship between university students' prior ICT attitudes and online learning attitudes needs to be further examined. For instance, it is needed to examine the influence of students' prior attitudes toward ICT usage on their online learning attitudes, under the circumstances that the students have certain amount of prior ICT experiences.

4.5.2 Prior attitudes toward the subject area

Reynolds and Walberg (1992) carried out a research on students' prior mathematics attitudes and attitudes toward learning mathematics in a subsequent course. The participants were

3116 seventh-grade public school students, who were a part of the Longitudinal Study of American Youth (LSAY) (Miller, Suchner, Hoffer, Brown, & Pifer, 1991). The students' prior attitudes and actual attitudes toward mathematics were measured at Grade 7 and Grade 8 respectively. The students' attitudes toward mathematics were indicated by the perceived usefulness of mathematics. It was reported that the students' prior mathematics attitudes at Grade 7 and mathematics attitudes at Grade 8 were significantly correlated with each other.

Lee and Witta (2001) administered a survey among 16 undergraduate students enrolled in an online course of "Introduction to Educational Technology". The students' self-efficacy for the course content was measured four times across the semester. It was found that the initial course content self-efficacy significantly predicted their course satisfaction and accounted for 32% of the variance of their satisfaction with the online course.

Gunnarsson (2001) conducted a research project among 42 university students who enrolled in an online statistics course. A multiple regression analysis was used to investigate the relationship between the students' prior subject attitudes and online learning attitudes. It was reported that the students, who felt more anxious or less favourable about the subject matter, showed negative attitudes toward learning online.

As seen from the review, the subject areas in the most of the reviewed research were relevant to mathematics (e.g., Cybinski & Selvanathan, 2005; Reynolds & Walberg, 1992; Suanpang, 2007). However, it is unknown about the relationships between the students' prior experiences of other subject areas (e.g., arts or social science) and their attitudes when they take these subjects online. In order to rectify the limitation of the investigation on single subject area, further studies need to include a student population representing other subject areas in a wide variety of disciplines (Buzzetto-More, 2008). Hence, it may be worthwhile to investigate students' online learning experience in other subject areas rather than merely mathematics.

4.5.3 Prior attitudes toward online learning

The inconsistent findings concerning the relationship between students' prior online learning attitudes and their actual attitudes when studying an online or blended course were identified in the reviewed studies. Lim et al. (2006) carried out an investigation among 125 university students who took an online course. The students' prior online learning attitudes were indicated by their preference to learn online, which was treated as one of the learner

characteristics. The students' actual online learning attitudes were measured by their course satisfaction as an outcome. It was found that the students, who preferred online learning method, showed significantly higher levels of course satisfaction.

However, Roberts and Dyer (2005) carried out a pre- and posttest survey among 322 university students, who took a food science course online. The students' prior online learning attitudes were indicated by their motivation (i.e., the degree to which a student instigated and sustained goal-directed behavior) and self-efficacy (i.e., confidence to achieve success) in the pretest. The students' actual online learning attitudes were indicated by their attitudes toward online instruction in the posttest. It was found that students' motivation and self-efficacy in online learning in the pretest could not significantly predict their attitudes toward online instruction in the course measured in the posttest.

It is assumed that attitudes are stable to some extent and can predict people's behaviour (Maio & Haddock, 2009). However, limited studies were located and inconsistent findings were identified. It may be important to investigate the relationship between students' prior online learning attitudes and their attitudes in a newly taken course in an online or blended learning environment.

4.6 Self-regulation

As discussed in Section 3.7.1, self-regulated learning refers to the motivational orientations and learning strategies that students employ to attain desired goals (Zimmerman 1989). Self-regulated learning process involves students' application of metacognitive and cognitive learning strategies driven by their motivation in learning (McCombs, 1986; Pintrich & De Groot, 1990a, 1990b; Pintrich & Schrauben, 1992). Regarding the role of self-regulation in students' attitudes in an online learning environment, several researchers found that students' application of self-regulated learning strategies (i.e., motivation and metacognitive and cognitive learning strategies) were related to their attitudes toward learning in an online or blended environment.

For example, Puzziferro (2008) found that rehearsal, elaboration, metacognitive self-regulation, and time and study environment management were significantly correlated with students' satisfaction with online learning. The research was conducted among 815 college students in 163 online courses. The students' self-efficacy in online learning was measured by Online Technologies Self-Efficacy Scale (OTSES), which addressed the students'

confidence in online learning (Miltiadou & Yu 2000). The students' application of learning strategies was measured by Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991, 1993). It was found that there were no significant relationship between the students' course satisfaction and self-efficacy. Regarding the impact of self-regulated learning strategies, it was found that the students, who showed higher scores in the scales of strategies of rehearsal, metacognitive self-regulation, and time and study environment management, were likely to be more satisfied at the end of the online course than those students who scored lower. However, the motivational components of MSLQ were not applied in the Puzziferro's study.

Besides the application of specific cognitive learning strategies, it was found from the reviewed studies that motivation was related to students' attitudes in online or blended learning. The motivational frame work in the concept of self-regulation overlapped with the motivational construct based on attribution theory (e.g., Weiner, 1986), achievement motivation (e.g., Heckhausen, 1980), intrinsic motivation (e.g., Deci & Ryan, 1985), goal orientation (e.g., Nicholls, 1984), and self-efficacy theory (e.g., Bandura, 1993).

The motivational components in the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991, 1993) included (a) beliefs, judgments, goal orientation, and values related to the leaning tasks and about students themselves; and (b) the motivational strategies which can drive students' learning behaviour in some form of external self-regulation. For instance, goal orientation beliefs (mastery and performance goal orientation) in motivational theories were related to the concept of self-determination theory, which distinguished intrinsic and extrinsic motivation (Ames, 1992; Boekaerts, 1996; Deci & Ryan, 1985; Dweck & Leggett, 1988; Harter, 1981; Nicholls, 1984). Intrinsic motivation refers to the move to act for its own sake (i.e., the fun or challenge). Intrinsically motivated students show more interest, excitement, and confidence in learning and the learning activity itself is engaging and in some way satisfying (Deci & Ryan, 1985; Ryan & Deci, 2000). On the other hand, the students, who are extrinsically motivated, are engaged in the behaviour in response to the aspects, such as external stimuli, pressures, rewards, or recognition from other people (Ryan & Deci, 2000). Most self-regulated learning models incorporated intrinsic and extrinsic motivational components to investigate the process of self-regulated learning in a specific context (e.g., Cho & Jonassen, 2009; Muis, 2007; Tsai, Tung, & Laffey, 2013).

Students' motivations were reported to be related to their attitudes in an online or blended learning environment. For instance, Xie, Debacker, and Ferguson (2006) conducted two studies among 91 and 32 students respectively. In the first study, the 91 students were from six sections of an undergraduate course, which was supported by an online discussion board. The same questionnaire was administered to them three times — at the beginning, the mid-point, and the end of the course. The students' intrinsic motivation (i.e., perceived value and interest in online discussion) was measured and their self-determination scores were also obtained. It was found from the first study that the students' attitudes toward the course by the end were significantly correlated with their perceived value (r = .41), interest (r = .27), and self-determination scores (r = .27).

The second study by Xie at al. (2006) was conducted in order to confirm the findings from the first study. The 32 students came from two sections of an online course. The researchers claimed that, among the students in the first section, their course attitudes were associated strongly with the perceived value (r = .69), interest (r = .54), and self-determination scores (r = .796). However, there was no significant correlation between the students' motivation and course attitudes in the other section.

The impact of students' motivation on their attitudes toward using online learning tools was investigated by Lee et al. (2005). In their research, an Internet-based learning medium (ILM) was used to provide live instruction and online communication for 544 on-campus students. The students' intrinsic and extrinsic motivations were respectively indexed by (a) perceived enjoyment; and (b) perceived usefulness and easiness of use. The students' attitudes during online learning were indicated by their perceptions of using ILM. The students' behavioural intentions were presented by their intention to use ILM. The results indicated that extrinsic motivation had a significant direct effect on the students' attitudes and behavioural intention. Intrinsic motivation exhibited a substantially moderate effect on attitudes and behavioural intention.

The predictive impact of motivation on students' attitudes toward learning with technology was reported by Moon and Kim (2001), who surveyed 152 graduate students. A regression analysis indicated that the students' attitudes toward using the Internet was significantly predicted by their perceived easiness of use, perceived usefulness, and playfulness (R^2 = .38). Similarly, Rodriguez et al. (2008) found a small relationship between 698 university students' motivations to learning and their comfort with technology use ($r \approx .25$ to .28).

Paechter et al. (2010) found a negative relationship between the difficulties in maintaining students' learning motivation and course satisfaction among 2196 students. The result showed that the students' course satisfaction in online learning was negatively related to their perceived difficulties in maintaining the learning motivation.

Several researchers used the Motivated Strategies of Learning Questionnaire (MSLQ) (Pintrich et al., 1991, 1993) to investigate the relationship between motivational components and students' attitudes toward learning in an online or blended environment. For instance, Mullen and Tallent-Runnels (2006) conducted a survey among 187 graduate students (91 and 96 learning online and in classrooms respectively). The students' motivational components were indicated by self-efficacy, intrinsic goal orientation, and task value scales of the MSLQ. Among the online students, their course satisfactions were strongly correlated with intrinsic goal orientation (r = .53), task value (r = .63), and self-efficacy (r = .47). For the classroom group, similar significant correlations were found between the course satisfaction and intrinsic goal orientation (r = .50), task value (r = .64), and self-efficacy (r = .49).

Artino (2008) investigated the relationship between 646 students' motivation and satisfaction with an online course they took. The students' motivation was measured by the MSLQ (Pintrich et al., 1991, 1993), which indicated the students' task value (perceived interest, usefulness, and importance of the online course) and self-efficacy (confidence in learning). It was found that the students' course satisfaction was significantly correlated with task value (r = .56) and self-efficacy (r = .47).

As shown from the above review, it can be assumed that the students with higher levels of self-regulatory learning strategy application are likely to show more positive attitudes toward learning in an online or blended environment. MSLQ can be a set of scale to measure students' motivation in learning. Although the significant relationships between motivation and attitudes in online learning were confirmed in several studies, there is a need to examine whether the students' motivational learning strategies measured at the beginning of an online or blended course will influence their attitudes toward online learning by the end of the course.

4.7 Interactions during online learning

Students construct their knowledge in an online course through various interactions (i.e., student-content, student-interface, student-teacher, and peer interactions) (See Section 3.5).

The following sections review the studies concerning the relationships between students' experiences of the above four types of online interactions in an online or blended course and their attitudes toward online learning. A summary of the review is provided by the end of this section (See Section 4.7.5).

4.7.1 Student-content interactions during online learning

It was found in the reviewed studies that students' interactions with online course content were mainly indicated by their self-reported experiences of learning from the course content. Some important factors were addressed in the existing studies, such as (a) the frequency of learning from course content (Anderson, 2003; Leasure, Davis, & Thievon, 2000; Marks, Sibley, & Arbaugh, 2005; Thurmond & Wambach, 2004); (b) satisfaction with the course content design (e.g., syllabi, lectures, handouts, and reading materials) (Abramov & Martkovich, 2002; Hara & Kling, 2000; Hughes & Daykin, 2002; Swan, Shea, Fredericksen, Pickett, & Pelz, 2000b; Paechter et al., 2010); and (c) course requirements (e.g., assignments, discussion questions, and learning objectives) (Abramov & Martkovich, 2002; Choy, McNickle, & Clayton, 2003; McAlister, Rivera, & Hallam, 2001).

It is assumed that increased and continuous interactions with online course content may contribute to the enhancement in students' learning and increase in their course satisfaction (Thurmond & Wambach, 2004). Several studies reported significant relationships between students' interactions with online course content and their attitudes in an online or blended learning environment. For instance, Swan (2001) examined the relationship between 1046 university students' perception about online learning and their interactions with the online course content. The interactions with the course content were indicated by the level of learning activity (from less to much higher) from the course content. It was found that the students, who reported higher levels of interactions with the course content, showed higher levels of satisfaction (r = .33). However, self-reported indices of content interactions may lack essential validity.

Huang (2002a) administered a survey among 31 university students enrolled in an online course. The students rated on the course organization (i.e., syllabus, assignments, and grading criteria) and reported their preference for online collaborative learning. It was found that the students' ratings on the course organization were strongly related to their preference for online collaborative learning (r = .50).

Lim et al. (2006) examined the relationship between 125 undergraduate students' satisfaction with the online course they took and their self-reported learning activity and involvement in the course content. The researchers claimed that they found strong correlations between the students' course satisfaction and learning activity (r = .61) and learning involvement (r = .92). The results of this study appeared entirely based on self-reports and the interpretation of such findings remained unclear.

Paechter et al. (2010) investigated the relationship between students' perception of online course content design and course satisfaction. The participants were 2196 university students enrolled in various subjects in an online or blended environment. The result showed that the students' perceived course content clarity and structure and learning material were positively related to their course satisfaction. Similarly, Gunawardena et al. (2010) found a significant positive relationship between 19 students' perceptions of the online course design and course satisfaction. The result indicated that the students, who were positive toward the course design, tended to be more satisfied with the online course.

4.7.2 Student-interface interactions during online learning

The research concerning students' interactions with course interface addressed the students' self-reported experiences of using online learning components, e.g., perceived flexibility (Arbaugh & Benbunan-Fich, 2007), design of the course website (Cashion & Palmieri, 2003a, 2003b), easiness of usage (Shank & Sitze, 2004), and level of interactivity (Kettanurak et al., 2001). The following paragraphs elaborate on some examples of the existing studies about students' interactions with online course interface. It is commonly assumed that positive experiences of technology use during learning may contribute to students' positive attitudes in online learning.

Arbaugh and Benbunan-Fich (2007) conducted a study about different types of interactions in online learning. Five hundred and seventy-nine university students from different online courses participated in the survey. After factor analysis, the items which assessed the students' interactions with the online learning components, were developed into one factor — course flexibility. It was found that course flexibility was strongly related to the students' satisfaction with technology use (r = .45) and attitudes toward the courseware (r = .39).

In order to examine the relationship between students' usage of online learning components and course satisfaction, Drennan et al. (2005) conducted a survey among 248 university

students in a first-year course. The results showed that the students' perceived easiness to use online learning components significantly influenced their course satisfaction and the influence was mediated through their perceived usefulness of the online learning components.

Lee et al. (2011) investigated the relationship between 110 undergraduate students' perceived technical support and attitudes in an online course. The students were asked to report on their experiences of asking help regarding any technical issues during learning. Their attitudes were indicated by the course satisfaction (i.e., the perceived achievement, likeness, and willingness to recommend the course to other people). It was found that the students' perceived technical support was significantly related to their course satisfactions (r = .54).

Kettanurak et al. (2001) conducted an investigation on 154 undergraduate students' attitudes in an online course supported by interactive multimedia instruction. The students' interactions with the instructional multimedia were measured by the level of the control available for the students while using the multimedia (from no interactivity to high degree of interactivity). The students were divided into three groups — one control group (with no interactivity) and two treatment groups (the one with low degree of interactivity and the other one with high degree of interactivity with the instructional multimedia).

The results of the study by Kettanurak et al. revealed that, in general, the degree of interactivity influenced the students' attitudes and motivation in learning. The students' in the group with high-degree interactivity displayed the highest levels of attitudes followed by those in low-degree interactivity group and non-interactivity group.

However, a non-significant predictive relationship between students' experiences of using online learning components and satisfaction in learning was reported by Arbaugh and Rau (2007). The researchers found a non-significant impact of student-interface interactions on 575 university students' satisfaction in seven blended courses. The questions about student-interface interactions included two items ("Class discussions were more difficult to participate in that in other MBA courses I have taken at university." and "Student-student interaction was more difficult than in other MBA courses I have taken at university.") (p. 94).

Although the correlation result showed that student-interface interactions were significantly related to the students' satisfaction with delivery medium (r = .15), in the hierarchical regression model, it was found that the prediction of student-interface interactions on the students' satisfaction was not significant. The researchers argued that, although online

courses could be enhance by various delivery medium (e.g., audio, video, and multimedia), it required more technology skills for both students and teachers to work properly. Additionally, the teachers with rich ICT experiences might post too much media, which, however, did not add value to the students' learning experiences, but might create a sense of information overload.

4.7.3 Student-teacher interactions during online learning

The research which examined student-teacher interactions was mainly based on students' self-reported experiences from several aspects, e.g., teaching presence (Anderson et al., 2001; Paechter et al., 2010; Shank & Sitze, 2004), frequency of communication with teachers (Swan et al., 2000b; Tu & Corry, 2003), immediacy of teachers' responses (Ali & Elfessi, 2004; Kurtz, Sagee, & Getz-Lengerman, 2003; Russo & Benson, 2005), teachers' encouragement and facilitation in online discussion (Choy et al., 2003), and teachers' support (Cashion & Palmieri, 2002). It appears that high levels of student-teacher interactions may possibly contribute to students' positive attitudes in online learning. The examples of the reviewed literature are provided in the following paragraphs.

Russo and Benson (2005) examined the relationship between teaching presence and 22 students' satisfaction and attitudes in an asynchronous online course. The students rated on their perceived teaching presence, which presented their experiences of interacting with the teacher. The researchers claimed that there were strong relationships between teaching presence and the students' attitudes toward their learning experiences (r = .70) and course satisfaction (r = .52).

Swan (2001) carried out a study among 1046 university students who took asynchronous online courses. It was found that the students, who reported more frequent online interactions with their teachers, showed higher levels of satisfaction than those who had fewer interactions with the teachers. Swan claimed that the correlation between the frequency of student-teacher interactions and the students' satisfaction was significant (r = .76). The figure is possibly inflated owing to the data stemming entirely from the students' self-reports.

Several studies addressed the impact of teacher immediacy during online interaction on students' learning. Immediacy refers to the communication behaviours (i.e., verbal and nonverbal) that reduce social and psychological distance between people (Mehrabian, 1971; Myers, Zhong, & Guan, 1998).

For instance, Arbaugh (2001) carried out a survey among 390 university students from 25 online class sections. The teachers' verbal immediacy behaviour was indexed by their demeanour (i.e., use of personal examples, humour, and openness toward and encouragement of students' discussion) and name recognition (the extent to which the teachers were addressed by name by the students and vice versa). The students' satisfaction with the online course experiences was also measured. Regression analyses indicated that the students' satisfaction with their course experiences was predicted by instructor demeanour (regression coefficient = .52) and name recognition (regression coefficient = .29).

Hackman and Walker (1990) also investigated the relationship between teacher's online immediacy and 102 university students' satisfaction in an online learning environment. The factors of teacher immediacy behaviours included using personal examples, encouraging students to participate, using humour, addressing students by name, providing individual feedback, inviting student contact, praising students, smiling, avoiding tense body positions, and using vocal variety. It was found that teacher immediacy behaviours were significantly correlated with the students' satisfaction with online learning. The similar significant relationships between teachers' immediacy and student attitudes in online learning were also reported by Freitas, Myers, and Avtgis (1998), Gorham (1988), and Sanders and Wiseman (1990).

Additionally, other researchers addressed teachers' role as a facilitator and investigated the impact of teachers' facilitation on students' attitudes in an online or blended learning environment. For example, Wu and Hiltz (2004) conducted a survey among 116 students in three blended courses, for which asynchronous online discussion was integrated into face-to-face instruction. The survey examined the relationship between the students' attitudes toward online discussion and their perception of the teacher's facilitation in online discussion activities. A significant correlation was found between the teacher's facilitation and the students' attitudes toward online discussion (r = .37).

To examine the impact of teaching competency and support in online learning on student satisfaction with online learning, Lim et al. (2006) surveyed 125 undergraduate students in an online course. The students were asked to rate on their teachers' competency and learning support. Lim et al. claimed that the students' satisfaction was significantly related to their perceived teachers' competency (r = .61) and support from the teachers (r = .37).

Similarly, Paechter et al. (2010) investigated the relationship between 2196 university students' course satisfaction and their perceived teachers' expertise in teaching online courses. It was shown that the students' course satisfaction was positively related to their perceived teachers' expertise and support from the teachers. More recently, Lee et al. (2011) investigated the relationship between 110 undergraduate students' perceived teacher support and their satisfaction with an online course. It was found that the students' perceived teacher's support was significantly related to their course satisfaction (r = .66).

Choy et al. (2003) carried out a survey among 201 students, who studied online from both public and private institutions. During the interviews, the students commented that it was most essential to have regular contact with their teachers during online learning. Some interviewees expressed their disappointment with delayed responses from their teachers. The researchers suggested that delayed feedback from the teachers might result in the students' negative perception that the teachers were not fully involved in teaching.

However, Arbaugh and Rau (2007) found a non-significant predictive effect of student-teacher interactions on 575 university students' satisfaction in seven blended courses. The student-teacher interactions were indicated by the students' self-report about whether the teachers frequently asked questions, offered opinions, and encouraged and motivated the students to be engaged in the courses. The correlation analysis showed that student-teacher interactions were significantly related to the students' satisfaction with the course delivery medium (r = .32). However, when tested in hierarchical regression model, it was found that the prediction of student-teacher interactions on the students' satisfaction was not significant. Further interpretation of this result was not provided.

4.7.4 Peer interactions during online learning

The research concerning peer interactions mainly focused on students' self-reported experiences, e.g., frequency of peer interactions (Brooks, 2003; Swan et al., 2000b; Woods & Baker, 2004), relationship with other students (Russo & Benson, 2005), feeling of isolation (Herrington, Oliver, & Reeves, 2003), and group work (McAlister et al., 2001). It appears that the students with higher levels of peer interactions may likely to show more positive attitudes in online learning.

Jung et al. (2002) administered a pre- and posttest survey among 124 undergraduate students from three online courses. The students were divided into three groups based on the

characters of online interactions: (a) academic interaction group; (b) collaborative interaction group; and (c) social interaction group. In academic interaction group, the students interacted with their teacher only for course content-related matters, without motivational or interpersonal communications. The students in collaborative interaction group were involved in online discussion. The teacher in this group posted discussion topics and asked the students to participate in discussion and share ideas. In social interaction group, the students were provided with various kinds of interpersonal and social feedbacks from their teacher. The social presence of the teacher was emphasized for this group.

The result revealed a significant difference between academic interaction group and collaborative interaction group, in terms of the students' satisfaction with online learning experiences. The students in collaborative interaction group expressed highest level of satisfaction with their learning experiences. Jung et al. suggested that the students' satisfaction with online learning experiences was more strongly related to the amount of peer interactions than the interactions with the teacher.

Swan (2001) examined the relationship between peer interactions and 1046 university students' online learning attitudes. The students' self-reported levels of interactions with other classmates were rated from 'none', 'insufficient', 'sufficient', and 'a great deal'. It was found that the students, who reported higher levels of interactions with their classmates, were more satisfied with online learning than those with lower levels of peer interactions.

Arbaugh (2001) investigated the relationship between students' perceived relationship with their class members, isolation, and course satisfaction among 390 university students from 25 online class sections. The feeling of isolation from the classmates was found to be negatively correlated with the students' satisfaction with technology use (r = -.31) and course satisfaction (r = -.32). The students' perceived relationship with other class members was positively related to their satisfaction with technology use (r = .34) and course satisfaction (r = .38).

Huang (2002a) administered a survey among 31 university students, who enrolled in an online course. Peer interactions were measured by the students' likeness to share information and ideas, the appropriateness of the class size for general discussion, and perceived help from peers. The result showed a strong correlation between the students' perception of peer interactions and preference for online collaborative learning (r = .56).

Russo and Benson (2005) carried out a study among 22 students who were enrolled in an online course. The students' experiences of peer interactions were measured by their self-reported peer presence. The researchers claimed that there was a strong relationship between peers presence and the students' satisfaction with learning in the online course (r = .69).

Lee et al. (2011) investigated the relationship between 110 undergraduate students' perceived peer support and course satisfaction in an online environment. Peer interactions were indicated by the students' self-reported experiences of asking for help, receiving support from other students, and the amount of peer interactions. The students' course satisfactions were measured by their perceived achievement, likeness, and willingness to recommend the course to other people. It was found that the students' course satisfactions were significantly related to their perceived support from other students (r = .56).

However, Gunawardena et al. (2010) found a significant negative relationship between peer interactions and students' course satisfaction based on regression analysis on the responses from 19 students who learned online. The result indicated that less peer interactions enhanced the students' overall satisfaction. The researchers discussed that this might be due to the limited guidance on how to interact with other students and insufficient information about the value placed on peer interactions. Gunawardena et al. also suggested the negative relationship might also be the results of the fact that online learners tended to be more self-directed and therefore might prefer a high level of independence during learning.

The similar negative relationship between peer interactions and students' satisfaction was also reported by Arbaugh and Rau (2007). Arbaugh and Rau found that, in their study among 575 university students studying online, peer interactions had a negative relationship with the students' satisfaction with the delivery medium in the course. The more peer interactions that the students had, the less satisfied they were with the online learning environment. The researchers argued whether online faculty at the graduate level needed to emphasize a high level of peer interactions, as requirement of peer interactions in an online course needed to be suitable for the course level. Arbaugh and Rau also pointed out that it was not clear that which form of the interactions was the most important for online learning or whether all of them were equally important. It appears that there is a need to further investigate how different types of interactions during online learning can benefit students' learning.

4.7.5 Summary of Section 4.7

Based on the survey of the research concerning different types of online interactions, the salient issues are highlighted in Table 4.1, which, to some extent, may be the potential factors to impact students' attitudes in online learning. Whilst these factors appear coherent and sensible, it is worth noting that, as shown in the reviewed studies, these statements are almost entirely based upon students' self-reports. This facet places a limitation upon the findings.

Table 4.1
Issues that Students may be Concerned about during Online Interactions

Types of interactions	Issues which may draw students' concerns or appear to influence their attitudes in an online or blended environment
Student-content interactions	Engagement with course content, design of course content and activities (e.g., clarity or clearance, structure, relevance to learning objectives, workload, and pedagogical foundation), and the assessment (e.g., fairness, clarity, and reasonability)
Student-interface interactions	The choice of technology used in online courses, easiness to access to the course and download the materials, reasonable requirements for students' ICT skills, proper training provided on ICT usage, technical problems, timely technical support from schools or teachers, and the design of course web sites
Student-teacher interactions	Teachers' teaching competency, frequency of teacher and student communication, timely response and support from teachers on students' inquiries, and teachers' ability to facilitate, motivate, mentor, and guide their students' learning and encourage online interactions among students
Peer interactions	Frequent communication with other students, timely response or support from other students, good team work with other students for learning tasks, high level of interactions in online discussion, and good relationship with other students (e.g., perceived connectedness or isolation)

Generally, it was commonly reported that the levels of students' online interactions (with course content, interface, teachers, and other students) positively affected their attitudes during online learning. The higher levels of interactions students experienced, the more positive attitudes and higher levels of satisfaction they tended to display in an online or blended course.

However, inconsistent results were identified in some studies concerning students' interactions with course interface, teachers, and other students. For example, higher levels of interactions with course interface, teachers, and peers may not always develop students' attitudes in a positive direction (e.g., Arbaugh & Rau, 2007; Gunawardena et al., 2010). It is

important to note that teachers need to take students' skills of using certain technologies into consideration. Moreover, teachers' application of online learning components needs to be based on pedagogical consideration and facilitate students' learning, instead of causing students' frustration and information overloading. Online interactions with teachers and other students need to be focused on meeting students' needs and the requirements about peer interactions needs to be suitable for the course level (Arbaugh & Rau, 2007).

It may not be sufficient to merely measure the frequency of online interactions, as the quality of interactions may possibly be more critical than the quantity (Lei, 2010; Lei & Zhao, 2007). Further research needs to examine students' experiences of different types of online interactions and how such experiences can contribute to their online learning attitudes by the end of the course. For example, it may be worthwhile to explore students' usage of different online learning components and examine how these components can benefit their learning. Further research can investigate how different types of online interactions may influence students' online learning attitudes through using open-ended questions to collect more detailed information about their learning experiences.

Finally, regarding the measurements of students' interactions with course content, interface, teachers, and peers, most of the reviewed studies used students' self-report or evaluation to indicate their experiences or perception of these interactions (e.g., Lee et al., 2011; Lim et al., 2006; Paechter et al., 2010; Russo & Benson, 2005). Further research can used diverse instruments to gauge students' interactions, such as students' weekly diaries, record of logging on the course website, or online discussion contributions.

4.8 The 3P model

In light of the literature review in Chapter 3 and 4, it has been indicated that several factors may influence students' learning outcomes and attitudes in an online or blended environment. The 3P learning system model (Biggs & Moore, 1993; Dunkin & Biddle, 1974) summarized the influence of the factors of presage and process on the product factors (Figure 4.1).

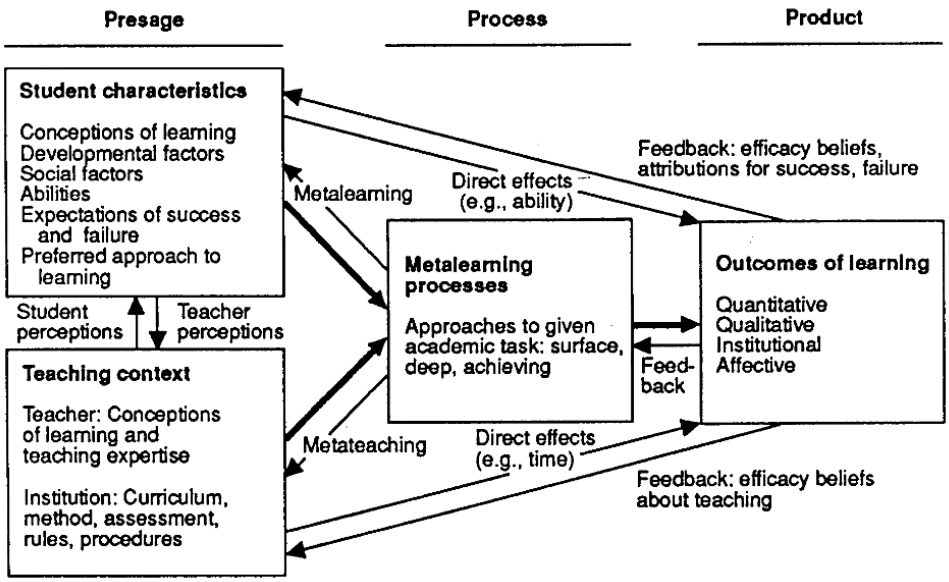

Figure 4.1 3P model (Biggs & Moore, 1993, p. 451)

The presage factors included students' characteristics and teaching context factors in a learning environment prior to the learning engagement. Students' characteristics consisted of prior knowledge, abilities, expectations, motivation, preferred approach to learning, intelligence, personality, and social background. Teaching context factors comprised teachers' expectations of teaching and learning, expertise, curriculum content, teaching methods, assessment, and the superstructure of rules and procedures. The process factors focused on learning activities. The product factors were identified as students' learning outcomes, which were described quantitatively (how much was learned), qualitatively (how well it was learn), or both quantitatively and qualitatively.

Biggs 3P model (1999, 1993) shifted its emphasis toward the teaching and learning system with complex learning variables in online or blended learning environment (Graham, 2006; Hamilton & Tee, 2010; Hofmann, 2008; Oh & Park, 2009). In light of the 3P model, the present study aimed to investigate (a) whether the students' online attitudes would significantly change after taking a blended course; (b) whether students' characteristics, such as their course expectations, prior experiences, prior attitudes, self-control, and self-regulation, would influence their learning outcomes and attitudes toward online learning by the end of the course; and (c) whether the influence of the factors of students' characteristics on their learning outcomes and attitudes can be mediated through learning process factors (e.g., course participation).

4.9 Summary of the review of students' online learning attitudes

As it revealed from the research concerning the relationships between students' online learning attitudes and several factors (i.e., gender differences, course expectations, prior experiences and attitudes, self-regulation, and interactions during online learning), the issues of inconsistency and limitations in the findings were identified, which needs further investigation (Table 4.2).

Table 4.2
Tabular Summary of Existing Research Concerning Students' Online Learning Attitudes

Variables	Conclusion on the relationships with online learning attitudes
Gender differences	Inconsistent findings were identified. Genders seem to be similar rather than different in terms of students' attitudes toward online learning.
Course expectations	Positive relationships were identified, but further studies are needed, such as what students expect from a course when they study in a blended learning environment.
Prior ICT experiences	Both significant and non-significant relationships were identified. A high level of students' familiarity with computer and the Internet use may explain the non-significant relationship. Further research is needed to investigate whether students' prior ICT experiences will influence their online learning attitudes, under the circumstances that the students are experienced with ICT usage.
Prior subject area experiences	Significant relationships were found, but limited studies were located. Further study is needed to be conducted in a diversity of subject areas.
Prior online learning experiences	Significant positive and negative relationships and non-significant relationships were identified. The research which reported non-significant relationships lacked detailed interpretation. Further study can be conducted to explore students' prior online learning experiences before taking a blended course and whether their prior experiences of online learning will continue to influence their online learning attitudes in a blended environment.
Prior attitudes toward ICT usage	Significant positive relationships were identified. Further investigation can incorporate more recent mobile and personal technologies and examine the relationship in the context that the majority of students are familiar with ICT usage.
Prior attitudes toward the subject area	Significant positive relationships were identified, but limited studies were located. Further research can be conducted in more diverse subject areas.
Prior attitudes toward online learning	Inconsistent results were identified, but limited studies were located. Further investigation on such relationship is needed, such as what are students' prior attitudes toward online learning before taking an online or blended course and whether their prior online learning attitudes will have an impact on their attitudes toward online learning.
Interactions during online learning	Positive relationships between online interactions and online learning attitudes were identified, but most of the studies were based on the students' self-reports. Additionally, diverse instruments are needed to measure students' course experiences to represent their course participation through various aspects.
Self-regulation	There were commonly agreed positive relationships between self-regulation and learning attitudes. It is worthwhile to investigate whether the influence of self-regulation on students' attitudes can be mediated through their learning process factors (e.g., course participation).

Although a large number of research projects have been conducted to address the issues of student attitudes toward online learning, there is a need to further examine this problem in more depth. First, besides presenting students' overall positive attitudes in online courses, it is necessary to explore whether there are significant relationships between students' attitudes toward online learning and several critical factors, such as course expectations, prior attitudes, prior experiences, students' differences self-regulated learning, and their experiences of different types of online interactions.

Next, there are limitations in the research methods applied in several studies. Sample size may influence the significance of the results (Sanders & Morrison-Shetlar, 2001). For example, although Knowles and Kerkman (2007) found significantly positive changes in the students' attitudes toward online learning, the researchers pointed out that the sample size was comparatively small (22 and 17 participants for the pre- and posttest respectively). The same issue was mentioned by Gunawardena and Zittle (1997) that caution must be taken in generalizing the data owing to the sample selection and size.

Furthermore, the validity of the constructs of the factors relevant to students' attitudes toward online learning needs further analysis. In several studies, it was apparent that attitudes were being measured by single item on questionnaires, which could not thoroughly address students' attitudes, in terms of the three attitude components — affective, cognitive, and behavioural components (See Section 4.1). Additionally, the items specifying students' attitudes need to be tested on their validity and internal consistency (e.g., Kabilan, Ahmad, & Abidin, 2010).

All four types of interactions during online learning need be considered in the investigation of students' online learning experiences. Thurmond et al. (2002) found in their study that the students' characteristics (i.e., age, computer skills, knowledge of electronic communication technology, number of web courses taken, and distance from main campus) did not influence their satisfaction with online leaning. Rather, their satisfaction was determined by what took place during online learning process. It has been pointed out by other researchers that students' course experiences in an online or blended environment may be influential in their attitudes toward online learning (Gunawardena et al., 2010; Lee et al., 2011; Paechter et al., 2010). This indicates that it may be important to further examine how students' different experiences of online interactions can lead to their different attitudes by the end of an online or blended course.

Regarding the impact of self-regulation on students' online learning attitudes, it was found that the students with higher levels of self-regulation tend to show more positive attitudes toward learning. Additionally, students' course engagement through various online interactions was found to be related to their online learning attitudes. For example, Swan (2002) found that the students, who had higher levels of course engagement through interacting with the course content, their teachers, and other students, reported higher levels of satisfaction with learning in an online course. Bertea (2009) also reported a significant relationship between the students' course participation and attitudes toward online learning. Further research is needed to investigate whether the influence students' motivational self-regulated learning strategies on their online learning attitudes can be mediated through learning process factors, such as course participation.

Finally, there is a need to investigate whether online or blended learning experiences can bring changes to students' attitudes toward online learning. Agarwal and Day (1998) found the mixed results about the students' attitude changes toward the subject after using the Internet. The participants included two groups of graduate students (40 students per group) and another two groups of undergraduate students (65 per group). One from each section (graduate and undergraduate groups) was chosen as the control group (learning in face-to-face format), compared with the other group — the Internet group. It was found that, among the graduate students, the positive change in attitude was consistently higher for the Internet group than the control group. However, for the undergraduate students, no significant differences in attitudes were identified between the two groups. This indicated, in Agarwal and Day's study, attitude changes were inconsistent in different groups among the participants.

Although positive changes in students' attitudes toward online learning have been reported, the explanations for the factors, which may cause such changes, remain unclear in some studies. For example, Jung et al. (2002) found that taking an online course led the students to view online learning in a more positive way, regardless of what types of interactions that the students experienced. However, the reasons for the students' attitude changes were not explained. Similarly, positive changes in students' online learning attitude have also been reported by Knowles and Kerkman (2007) and Sander and Morrison-Shetlar (2001), but there is a need to further investigate the reasons for the students' attitude changes.

Zheng, Young, Brewer, and Wagner (2009) found that the students, who used an online learning tool (a 3D game-like virtual tour) for English study, displayed more positive changes in their attitudes toward using online communication in English, compared with those who did not use this virtual tour. The researchers suggested that the students' experience of using the virtual tour contributed to the increases in their attitudes, but such effect lacked statistical significance.

The similar issue (i.e., the lack of statistical analysis on the reasons for students' online learning attitude changes) was identified in the study by Kabilan, Ahmad, and Abidin (2010). The researchers found that the students' experiences of using Facebook enhanced their motivation in learning. However, the influence of the students' usage of Facebook on their motivation lacked statistical analysis. Further study can investigate students' attitude changes with the evidence of statistical significance.

In sum, it is worthwhile to examine which factors may influence students' attitudes toward online learning, such as course expectations, prior experiences and attitudes, interactions during online learning, and self-regulation. Particularly, it is needed to investigate whether there will be any changes in students' attitudes toward online learning after taking a blended course and which factors may contribute to their attitude changes.

Chapter 5: Research methodology

This chapter describes the research methodology and the design of the present study. It begins with an overview of the research design. This is followed by detailed descriptions of two phases of the research design, the participants, the instruments, and the data collection procedures. The methods and tools used to analyse the data are presented finally.

5.1 Introduction

The present study aimed to explore university students' learning experiences and investigate the factors that might influence the students' learning outcomes and attitudes toward online learning in a blended course. In this context, the present study attempted to answer the following main research questions and subsidiary questions:

Question 1: Which factors may influence the students' learning outcomes in a blended course?

Question 1.1: Will the students' course expectations at the beginning of the course influence their learning outcomes?

Question 1.2: Will the students' prior experiences influence their learning outcomes?

Question 1.3: Will the students' prior attitudes influence their learning outcomes?

Question 1.4: Will the students' self-control influence their learning outcomes?

Question 1.5: Will the students' self-regulation in learning influence their learning outcomes?

Question 1.6: Will the students' course participation influence their learning outcomes?

Question 2: Will there be any significant change in the students' attitudes toward online learning after taking the course?

Question 3: Which factors may influence the students' attitudes toward online learning by the end of the course?

Question 3.1: Will the students' course expectations at the beginning of the course influence their attitudes toward online learning by the end of the course?

Question 3.2: Will the students' prior experiences influence their attitudes toward online learning by the end of the course?

Question 3.3: Will the students' course participation influence their attitudes toward online learning by the end of the course?

Question 3.4: Will the students' prior attitudes influence their attitudes toward online learning by the end of the course?

Question 3.5: Will the students' self-regulation in learning influence their attitudes toward online learning by the end of the course?

5.2 Overview of the research design

The present research was designed to investigate the factors which might influence university students' learning outcomes and attitudes toward online learning in a blended environment. The research consisted of two phases: Phase One ── questionnaire surveys of pre- and posttest, weekly reports, and online forum contributions; and Phase Two ── interviews.

The above two phases of the research were undertaken among 120 pre-service undergraduate teacher education students as the convenient sample in the first half of 2011, who took a blended course in University of South Australia. The design of each phase together with the rationale is provided as below.

5.2.1 Phase One

Phase One of the present study comprised a pre- and posttest questionnaire survey at the beginning (Time One — T1) and the end of the blended course (Time Two — T2), the participants' weekly reports on their learning experiences, and their online forum contributions in the course.

The design of Phase One aimed to examine (a) whether there would be any significant differences in the participants' attitudes toward online learning after taking the blended course; (b) which factors in the pretest (T1) would influence the participants' learning outcomes and attitudes toward online learning in the posttest (T2); and (c) whether the influence from the factors at T1 on the factors at T2 would be mediated through the learning process factors, which were measured through the participants' weekly reports and online forum contributions.

5.2.2 Phase Two

The interviews in Phase Two followed Phase One in order to obtain more detailed and in-depth information about the interviewees' learning experiences to clarify the potential causes for the changes in their attitudes toward online learning.

Henriques, Holloway, Urwin, Venn, and Walkerdine (1984) suggested that thesis analysis could be performed on interview data obtained from open-ended questions with students. The interviews in the present study obtained detailed information about the participants' learning experiences, self-perception of their learning outcomes and attitudinal statements about the course. The participants were asked to discuss their learning experiences and elaborate on the issues during their learning process. The information provided by the participants during the interviews might provide some clues for the changes in their online learning attitude.

5.2.3 Test on the instruments

The pre- and posttest, weekly reports, and interviews had been tested by asking ten students to have trials on the questions. Two of them were doctoral students and they both had teaching experiences before their doctoral candidature started. Another three were Master students and the rest (five) were undergraduate students. These students all studied in University of South Australia, where most of the courses were delivered in a blended mode, so they were familiar with the blended learning environment in this university. After their trials on the questions, there were no confusing terms or misleading concept in the questionnaires.

5.3 Research phases

5.3.1 Phase One

Phase One included a pre- and posttest survey, weekly reports, and online forum contributions. The following paragraphs provide detailed information about the participants, instruments, and procedures of the surveys in Phase One.

5.3.1.1 Pretest (T1)

5.3.1.1.1 Participants

The participants in Phase One were 120 second-year pre-service teacher education students, who took a blended course "Information and Communication Technologies (ICTs) in Learning and Teaching" in the first half of 2011. This course had a 12-week duration and

aimed to provide students with theories, research, and practices on using ICTs in learning and teaching.

The course blended traditional mode of teaching (a one-hour lecture and two-hour tutorial every week on campus) and online learning (e.g., an access to the online course content, participation in the online forums, and using email, blogs, and wikis to facilitate the completion of the course tasks and assignments).

Each student was provided with a username and password, by which the participants could enter the course website. The teachers published the course content online each week, such as reading materials, resources, and course requirements. The students could have an easy access to the course at their convenience.

Regarding the use of email, the students were provided with email accounts for them to communicate with their teachers and other students. The students could access their email boxes by using their usernames and passwords.

In addition, the students were also required to use blogs and wikis to upload their work. The teachers published exercises and topics on the course website every week and the students can upload their exercises and answers to the topics on their blogs and wikis. Instructions and help were provided to the students to design their own blogs and wikis in the tutorials.

Regarding online forum participation, there were seven tutorial groups in the course and each tutorial group had its own forum for the students to have online discussion. Over the period of 12 weeks in the course, the teachers posted questions on each tutorial group's online forum every week and the students were required to post their answers onto the online forums. Additionally, students were also encouraged to raise questions or comment on their group members' posts.

The 120 participants, who took part in the pretest, were from seven tutorial groups. They attended the lectures as a whole; while they participated in tutorial activities in a computer laboratory with their own tutorial group members. The lectures provided theories and topics of integrating ICTs in learning and teaching. The tutorials were compulsory for the participants to attend in order to discuss the lecture topics and develop their hands-on skills of applying ICTs in learning and teaching.

5.3.1.1.2 Instruments

The pretest questionnaire contained three sections (i.e., Section A, B, and C): (a) background information; (b) self-regulated learning and self-control; and (c) attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general (See Appendix 4).

The first section (Section A) consisted of 11 questions, which gauged the participants' demographic information, course expectations, ICT experiences, subject area familiarity, and prior online course experiences. The participants were firstly asked to provide the demographic information including name, email address, gender, age range, educational level, and language background. By keeping the records of the participants' names, their answers in the pretest could be matched with those from the posttest, weekly reports, and online forum contributions. The participants' answers to the questions about ICT experiences, the subject area familiarity, and online learning experiences were used as their prior experiences in data analysis.

Then eight questions were used to measure the participants' expectations from the course. A five-point scale (from "Unlikely to happen" to "Very likely to happen") was used to indicate their course expectations, such as achieving good learning outcomes, enhancing their learning, and self-improvement.

Next, the participants' prior experiences of ICT usage were measured by the frequencies of computer and the Internet applications. A six-point scale was used from "1 = Never" to "6 = Everyday". The items of ICT experiences addressed the participants' usage of computer application software, publishing tools, email, social networking and communication tools, and web search engines for general and academic purposes.

Regarding the questions measuring the participants' prior experiences of the subject area, a question was used with a four-point scale from "1 = Not familiar at all", "2 = Somewhat familiar", "3 = Quite familiar", to "4 = Very familiar". Finally, the participants were asked to provide the number of online courses they had taken previously.

In Section B, the participants' self-regulated learning and self-control were measured. The items measuring self-regulated learning were based on the questions which were used in the previous research (e.g., Barnard et al., 2008; Lan et al., 2004; Pintrich & De Groot, 1990; Pintrich et al., 1991, 1993). For instance, Pintrich and De Groot (1990a) and Pintrich et al.

(1991, 1993) developed instruments to measure students' learning motivation and application of different self-regulated learning strategies. Barnar et al. (2008) and Lan et al. (2004) developed the items measuring self-regulated learning in an online or blended learning environment.

In the present study, a pool of 49 items was adopted from the above research (especially Pintrich et al., 1991, 1993) and all these items concerned the ways in which the participants related to their university studies. Both motivational and cognitive strategies were cited. The participants were asked if each of these items reflected their personal study patterns on the scale from "1 = Not like me at all" to "5 = Very much like me".

Following the questions about self-regulated learning, the participants were asked to report their personality trait of self-control. The items of self-control were adopted from the Self-control Scale by Tangney et al. (2004). Thirteen items were retrieved from the original scale with 36 items, because (a) these 13 items were suitable for the context of the present study and focused on how students control their impulses, resist to temptations, and manage their temper and effort in order to achieve long-term goals; and (b) a shorter version of the self-control scale needed to be retrieved to keep the questionnaire in a reasonable length.

For each item of the Self-control Scale, the participants were asked to respond to a self-referring statement between "1 = Not like me at all" and "5 = Very much like me". All the items were related to the generic aspects of self-control such as resisting temptation, controlling one's impulses, and planning for long term goals. These items consisted of both positive and negative statements from the original questionnaire by Tangney et al. (2004), so the mixture of positive and negative items was remained in the present study.

The last section (Section C) included the items measuring the participants' attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general. For all questions in this section, a four-point scale was used from "1= Strongly disagree" to "4 = Strongly agree". The participants' answers to these questions were used as their prior attitudes in data analysis.

Firstly, the questions about attitudes toward ICT usage in the present study measured the participants' interest, likeness, comfort, confidence, and perceived difficulty level of ICT use. The items used in the present study stemmed from the scales of several existing research about students' computer attitudes, especially by Chamber and Clark (1987), Dambrot,

Watkins-Matek, Silling, Marshall, and Garver (1985), Davis, Bagozzi, and Warshaw (1989), Loyd and Gressard (1984), and Smalley, Graff, and Saunders (2001).

For example, Chamber and Clarke (1987) applied the questions to measure students' interest in using computer and intention to enrol a computer subject. Moreover, in the research by Davis, Bagozzi, and Warshaw (1989), the Technology Acceptance Model (TAM) measured students' perceived usefulness and easiness of using technologies. Jones and Clarke (1994) applied the Computer Attitude Scale for Secondary Students (CASS) in their research, which provided a base for the assessment of students' attitudes toward computers. The CASS addressed different aspects of students' computer attitudes, such as likeness, comfort, confidence, perceived difficulty level, nervousness, evaluation of computer use, and intention. Smalley, Graff, and Saunders (2001) developed the Computer Attitudes Scale, which identified psychological factors and investigated students' favourable perceptions, anxiety, confidence, and perceived usefulness of computer use.

As the subject area of the blended course in the present study was relevant to computer and the Internet use, the items about the participants' attitudes toward the subject area adopted the same patterns as the ICT attitude items.

The items about the participants' attitudes toward traditional and online learning components examined their perceptions about the learning activities in both face-to-face and online learning environments. The items, which measured the participants' attitudes toward traditional learning components, assessed the participants' perceptions of learning activities in a classroom environment, such as face-to-face contact in classrooms, reading from paper rather than a screen, and hands-on practice. The items about the participants' attitudes toward online learning components addressed their preference to learn from online course materials and use different online learning components.

The questions about the participants' attitudes toward online learning in general in the present study were adopted from several existing scales (Knowles & Kerkman, 2007; Robinson & Doverspike, 2006; Yudko, Hirokawa, & Chi, 2008). For instance, Knowles and Kerkman (2007) compiled the questions to measure students' attitudes toward online learning, in terms of their stress and perceived benefits from online learning. Robinson and Doverspike (2006) used belief-based attitude items to predict students' choice of online or traditional mode of learning. In their research, they measured the students' general attitudes toward online learning in terms of perceived benefit, judgement, and joyfulness of learning online. Yudko,

Hirokawa, and Chi (2008) addressed students' perceived benefits brought by online courses, compared with traditional delivery of course materials.

Based on the above research, the instruments about attitudes toward online learning in the present study addressed the participants' affective perception (likeness, interest, comfort, usefulness, confidence, anxiety, and perceived difficulty level), judgments, beliefs, and intention for future online learning.

5.3.1.1.3 Procedures

The approval for the present study was firstly obtained from the course coordinator. The application for ethics approval was submitted together with the letter of the course coordinator's approval. The ethics approval was subsequently given by the Human Resources Ethics Committee of University of South Australia in February 2011.

Invitations to the present study were given to the students during the tutorials in the first week of the course in the first semester of 2011. They were informed of the aim of the study, the length of the survey, and how the data would be collected, stored, and accessed. Additionally, the students were assured of the confidentiality that no personal information would be identified in the report. Out of 134 students who had enrolled in the course, 120 volunteered to participate in the study.

The pretest was carried out in the tutorial during the second week of the semester (at T1). The questionnaire was published online. The participants, who consented to participate in the research, were given the access (URL) to the pretest questionnaire.

The electronic data from the pretest were entered into the file of the Statistical Package for Social Science (SPSS) in the researcher's computer, which required password access and were analysed by SPSS.

5.3.1.2 Posttest (T2)

5.3.1.2.1 Participants

In the posttest, 94 out of the 120 participants completed the posttest questionnaires. The other 26 participants did not participate in the posttest survey. The attrition was due to two factors: (a) course withdrawal; and (b) non-attendance in the tutorials in the final weeks of the course.

5.3.1.2.2 Instruments

The posttest was implemented in order to (a) examine the differences in the participants' attitudes toward online learning after taking the course; and (b) investigate which factors might influence the participants' learning outcomes and attitudes toward online learning by the end of the course.

There were three sections (i.e., Section A, B, and C) in the posttest, which included several questions similar to those in the pretest, such as the participants' background information, experiences of ICT usage, and attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general (See Appendix 4).

Besides the above repeated questions, several additional questions were added in the posttest. These additional questions were categorised into: (a) satisfied expectations from the course; (b) intentions for future online learning; (c) perceived suitability of online learning; and (d) suggestions for future online course development. The questions used in the posttest survey are elaborated as below.

In Section A, the participants firstly provided their names and study mode (full-time or part-time), in order to keep a track on their answers from T1 to T2. Then the participants were asked about their satisfied expectations from the course. The themes of these questions matched those in the pretest, but with the alternative form of expression. For example, regarding the expectations about improving computer and the Internet skills in the pretest, the same theme was indicated in the posttest, but with a different way to express the question, such as "I improved my computer and the Internet skills". Meanwhile, a five-point scale (from "1 = Did not happen" to "5 = Yes, it happened") was used to measure the extent to which the participants' expectations had been satisfied by the end of the course. At the end of Section A, the participants' experiences of ICT usage were also measured by the same questions as in the pretest.

The items in Section B addressed the participants' attitudes toward several aspects in the course, e.g., ICT usage, the subject area, and online and traditional learning components, and online learning in general. These questions were similar to the items used in the pretest with a four-point scale from "1 = Strongly disagree" to "4 = Strongly agree".

The last section (Section C) included three questions. These questions asked about the participants' intentions for future online learning, their perceptions about the suitability of online learning, and suggestions to improve future online course development.

The first question in Section C asked about the participants' intention for future online learning. The choices were ranged from "1 = No, I will not study any courses online", "2 = Not sure", "3 = I will study online only in the subject areas which I am familiar with", to "4 = Yes, I will study online in any subject areas". Additionally, the participants were asked to provide reasons for their choices in a text box.

Another two questions in Section C asked the participants to nominate the subject areas they considered suitable and less suitable to be taught online. Finally, the participants were asked to provide suggestions to improve future online course development from their aspects.

5.3.1.2.3 Procedures

The posttest took place during the tutorial in the second last week of the semester. The URL to the questionnaire was provided to the participants who completed the pretest.

5.3.1.3 Weekly reports

The weekly report was a short questionnaire which was sent out to the 120 participants, who participated in the pretest at T1. The weekly reports were sent to the participants for six weeks and requested the participants to report their learning experiences. The data collected from the weekly reports, together with the participants' online discussion contributions, were regarded as learning process factors. The implementation of the weekly reports attempted to investigate whether the factors at T1, such as course expectations, prior experiences, prior attitudes, self-control, and self-regulation, would influence the participants' learning outcomes and attitudes at T2 through the learning process factors. The questionnaire of the weekly report is attached in Appendix 4.

5.3.1.3.1 Participants

In the present study, all participants, who participated the pretest, were asked to report their learning experiences in the weekly reports. Any participant who completed at least one weekly report was counted. Among the 94 participants who completed both pre- and posttest, 74 participants' responses to the weekly reports were used.

5.3.1.3.2 Instruments

The weekly report consisted of multiple-choice and open-ended questions. There were three sections (Section A, B, and C) in the questionnaire, which asked about the participants' weekly course experiences, e.g., (a) total and online studying hours; (b) perceived course pressure (difficulty level, workload, and stress); (c) positive and negative perceptions of the course experiences; and (d) learning strategies that the participants applied to make them learn better (See Appendix 4).

In Section A, the participants were asked to provide their names, so that their answers in the weekly reports can be tracked and analysed with those in the pre- and posttest. Then, the question in Section B asked about the number of hours that the participants spent in total and online for the course.

Section C consisted of six questions. The first two were multiple-choice questions, which addressed the participants' perceived course difficulty level and workload. The rest four were open-ended questions, which asked about how stressful the participants felt about the course, which parts of the course they liked and valued, which parts of the course they did not enjoy or value, and which learning strategies they applied to help them learn better.

5.3.1.3.3 Procedure

The questionnaires of the weekly report were sent to the participants through email for six weeks across the semester (first four weeks and last two weeks in the course). The weekly reports, which were completed by the participants, were sent back to the researcher through email.

5.3.1.4 Online forum contributions

In the present study, the participants' online forum contributions, together with the weekly reports, were regarded as learning process factors. There were seven tutorial groups in the course and each tutorial group had its own forum for students to have online discussion. Over the period of 12 weeks in the course, the teachers posted questions on each tutorial group's online forum every week and students were required to post their answers onto the online forums. Additionally, students were also encouraged to raise questions or comment on their group members' posts.

The transcripts of the participants' online forum contributions across 12 weeks were used to represent one aspect of their course input, in order to examine whether the influence of the

factors at T1 (e.g., course expectations, prior experiences, prior attitudes, self-control, and self-regulation) on the factors at T2 (e.g., learning outcomes and online learning attitudes) would be mediated through the learning process factors (the weekly reports and online forum contributions).

5.3.1.4.1 Participants

The participants who participated in the pretest were from seven tutorial groups respectively. As 74 participants' answers in the weekly reports were used, the same 74 participants' posts to the online forums were retrieved and analysed together with the data of their weekly reports.

5.3.1.4.2 Variables of the online forum contributions

Protocols from the forum groups were assessed in terms of six specific criteria. These criteria were analysed as the variables of the participants' online forum contributions:

(a) Online contribution frequency (the total number of the posts sent by the participants to the online forums during 12 weeks);

(b) Online contribution length (the aggregated words of the participants' posts during 12 weeks);

(c) Latency (how many weeks out of 12 weeks that the participants responded to the forum questions within 2 days);

(d) Chances for interactions (how many times the participants interacted with their tutorial group members);

(e) Number of facial pictures (the number of pictures for facial expressions posted by the participants);

(f) Number of illustrative pictures (the number of pictures for illustrative purposes posted by the participants).

5.3.1.4.3 Procedure

The researcher downloaded the transcripts of the 74 participants' posts to the online forums by the end of the semester and the data of the transcripts were recoded as the variables for further analysis.

5.3.2 Phase Two — Interviews

The interviews, which were conducted in Phase Two, aimed to obtain more in-depth information about the participants' course experiences. The questions in the interviews prompted the participants to elaborate on their learning experiences in the course and make

more detailed attitudinal statements, which might provide some possible clues for the changes in their online learning attitudes.

5.3.2.1 Participants

There were eight participants taking part in the interviews. Approximately one month after the course completed, 11 participants were approached for the interviews, as their online learning attitudes revealed marked changes based on the comparison of the participants' attitudes toward online learning from T1 to T2. All participants in the present study had been informed at the beginning of the course that interviews were to take place after the questionnaire surveys. This information had been incorporated in the participant information sheet for ethics approval.

Out of 11 participants, five of them had been identified through the pre- and posttest as appearing to display a marked shift in their attitudes toward online learning in a positive direction. The other six participants did not appear to display such a shift. Invitation letters were sent to the participants and eight of them agreed to participate in the interviews.

Among the eight participants, four showed high level of increases and another four did not present such increases in their attitudes toward online learning. Therefore, they were divided into two groups —— the Positive Change Group (PCG) and the Contrast Group (CG).

5.3.2.2 Procedure

Invitation letters for the interviews were sent to the participants through email. The participants were informed about the aim of the interview and the interview would take half an hour and be recorded.

Among the eight participants, six participated in face-to-face interviews and another two took part in telephone interviews, as they could not attend face-to-face interviews owing to logistical or practical reasons. The face-to-face interviews were carried out in an quiet office. The telephone interviews took place in the same office through the use of external speaker.

At the beginning of the interviews, the researcher gave a brief explanation about the process of the interviews. After the participants were ready, the researcher started the interviews by asking open-ended questions, which were followed by the cues to probe into their course experiences and attitudes toward online learning. The participants were asked to respond to

the probes, clarify the comments they had made, add any further information, and elaborate their answers if necessary.

An MP3 recorder was used to record the conversation of both face-to-face and telephone interviews for further check on the data. Additionally, the researcher took notes during the interviews. The recorder and notes were stored in a secured location. The recordings were transcribed after the interviews and the data were saved in the researcher's computer.

5.3.2.3 Instruments

The interview consisted of three sections (i.e., Section A, B, and C). These sections included the questions about the participants' learning experiences, perceived learning outcomes, and attitudinal statements about the course experiences in general (See Appendix 4).

The questions in Section A attempted to address the participants' course experiences through four types of interactions in the course: (a) student-content interactions; (b) student-interface interactions (i.e., the participants' experiences of using various online learning components); (c) student-teacher interactions; and (d) peer interactions.

With regard to the questions about the interactions with the course content and interface, the participants were asked whether there was anything they "liked, enjoyed, or valued" and "did not like, enjoy, or value" about the online course content and online learning components. Then the participants were asked if they encountered any problems and how they solved the problems.

Concerning the interactions with the teachers and other students, the participants were asked to talk about their experiences of having communication, discussion, teamwork through face-to-face and online interactions. Multiple-choice questions were used to ask about the main purposes and methods of the participants' communication with their teachers and other students. For example, the purposes for communication included "writing assignments", "group presentation", "online forum tasks", "problems with the course content", "technical problems", "course attendance", or "others". The methods for communication were listed as "face-to-face talk", "Email", "phone call", "online forum", or "others".

Furthermore, the participants were asked to report their experiences of communicating with their teachers and tutorial group members through face-to-face and online interactions. For instance, two questions were used to ask whether there was anything that the participants "liked, enjoyed, or valued" and "did not like, enjoy, or value" about the interactions. Then the

participants were asked to report whether they encountered any problems during the interactions and how they solved the problems.

Section B tapped the participants' perceived learning outcomes. There were five questions which asked the participants to report the improvement in several aspects after taking the course, such as "critical thinking", "using different learning strategies", "managing study time", "usage of self-control strategies", and "problem solving".

In Section C, the participants were asked to make attitudinal statements about their course experiences in general. For example, the researcher asked the question "How do you think about your course experiences in general?". The researcher then hypothesized three modes of learning (totally traditional, totally online, and blended mode of learning) and asked the participants to choose their favourite mode of learning and provide reasons for their choices. When interviews were completed, the participants were thanked for their cooperation.

5.3.3 Summary of the research phases

In summary, the design of the present study included questionnaire surveys of a pre- and posttest and weekly reports, the data from online forum transcripts, and interviews. The outline of the research design is shown in Table 5.1.

Table 5.1
The Two Phases of the Present Study

Phase		Participants	Data collection method
Phase One	Questionnaire: Pretest (T1)	120	Questionnaire survey
	Posttest (T2)	94	Questionnaire survey
	Weekly reports	74	Questionnaire survey
	Online forum contributions	74	Online forum transcripts
Phase Two	Interviews	8	Face-to-face and telephone interviews

Besides the data collected from Phase One and Two, the major dependant variable "learning outcomes" in the present study concerned the participants' course results, as defined by the overall grade aggregate that the participants achieved in the course. These data were provided by the course coordinator by the end of the course.

5.4 Data analysis

There were both quantitative and qualitative analyses in the present study. The quantitative analyses on the data from the pre- and posttest questionnaires, weekly reports, and online forum contributions was performed by using the SPSS and Smart PLS. The Alpha level was set at 0.05 for the purpose of the significance level in the present study. The data from the open-ended questions of the posttest questionnaires, weekly reports, and interviews were analysed through coding and themes.

5.4.1 Quantitative analysis

This section provides an overview of quantitative analysis in the present study. First, factor analyses were conducted for all variables in the pretest to develop several factors. The descriptive results of these factors were displayed by frequency tables or histograms.

Next, the descriptive results of the learning process variables (the weekly reports and online forum contributions) were presented. Factor analyses were run on all variables of the learning process variables and a new factor was developed and labelled as "course participation".

Finally, correlations and predictive relationships were examined between the factors of the pretest, course participation, and the posttest in order to examine which factors would influence the participants' learning outcomes and online learning attitudes. The results of the quantitative analysis were provided in Chapter 6. Detailed explanations of the procedure of quantitative analysis are presented as below.

5.4.1.1 Construct development

Factor analyses were conducted to test the internal consistency of the variables of several constructs, such as (a) course expectations; (b) self-control; (c) self-regulated learning; and (d) attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general.

Next, correlations and factor analyses were run on all variables of attitudes (i.e., the attitudes toward ICT, the subject area, online and traditional learning components, and online learning in general), as the concept of these questions overlapped with each other. It was shown that these attitude items could be generalized into one factor —– generalized attitude.

5.4.1.2 Descriptive results

The descriptive results were used to illustrate the distribution of the frequency of each factor in the pre- and posttest. The following paragraphs briefly present the analyses on the descriptive results, which were based on the data from the 120 participants (in the pretest), 94 participants (in both pre- and posttest), and 74 participants (in the weekly reports and online forum contributions).

5.4.1.2.1 Descriptive results from the 120 participants (the pretest at T1)

The descriptive results of the pretest showed the participants' background information, including (a) demographic background; (b) expectations from the course; (c) prior experiences of ICT usage; (d) prior experiences of the subject area; (e) prior experiences of online learning; (f) self-regulated learning; (g) self-control; and (h) prior attitudes toward several aspects of learning in the course (i.e., ICT usage, the subject area, online and traditional learning components, and online learning in general).

5.4.1.2.2 Descriptive results from the 94 participants (the posttest at T2)

In the posttest survey, 94 out of the 120 participants completed the questionnaires and the other 26 did not complete the survey. Before the analyses on the data of the posttest, the pretest answers from the 94 and 26 participants were compared to test if there was any significant difference between these two groups. The groups were compared on course expectations, prior experiences and attitudes, self-control, and self-regulated learning. No significant differences were found between the two groups.

With regard to the descriptive results in the posttest, the frequencies of several factors were provided, e.g., the participants' learning outcomes (i.e., course results), satisfied course expectations, present ICT experiences, present attitudes toward several aspects in learning (ICT usage, the subject area, online and traditional learning components, and online learning in general), and intention for future online learning.

5.4.1.2.3 Descriptive results from the 74 participants (the weekly reports and online forum contributions)

The data from the 74 participants' weekly reports and online forum contributions were converted to descriptive results, which were demonstrated by frequency tables and graphs. The variables in the weekly reports included (a) total number of the weekly reports submitted; (b) average report length; (c) hours spent in total and online; and (d) perceived difficulty level, workload, and stress level. For the purpose of analysis, the participants'

answers about the stress level were coded from "1 = Not at all" to "5 = Very stressful". The participants' responses to the open-ended questions about their course experiences were coded as positive and negative ratings, and the instances of their ratings were accumulated as descriptive results as well.

The descriptive results were also generated from the participants' online forum contributions, such as (a) online contribution frequency; (b) length; (c) latency; (d) chances of interaction; (e) number of facial pictures; and (f) number of illustrative pictures.

5.4.1.3 Comparison between the participants' attitudes in the pre- and posttest

The 94 participants' attitude factors at T1 and T2 were compared by paired sample *t*-test, in order to examine whether there would be any significant differences between the two occasions of pre- and posttest.

5.4.1.4 The factors which influenced the participants' learning outcomes

Correlations were run to investigate the relationships between the factors at T1 (i.e., course expectations, prior experiences and attitudes, self-control, and self-regulation), course participation, and the participants' learning outcomes. Then Partial Least Square approach (PLS) was used to construct path modelling. The software used for Partial Least Square was SmartPLS (Ringle, Wende, & Will, 2005).

5.4.1.5 The factors which influenced the participants' attitudes toward online learning at T2

Correlations were run to investigate the relationships between the factors at T1, course participation, and the participants' attitudes toward online learning at T2. Then regression and PLS model were used to examine the predictions from the factors at T1 and course participation on the participants' attitudes toward online learning at T2.

5.4.2 Qualitative analysis

In the present study, open-ended questions were used in the posttest, weekly reports, and interviews. Coding and themes were applied in the analyses on the participants' answers to these open-ended questions.

In respect to the open-ended questions in the posttest, the instances of the participants' nominated the subject areas suitable and less suitable for online learning were presented by frequency tables. The instances of the reasons for the participants' intentions for future online

learning were aggregated. The participants' suggestions for improving future online course development were also presented by frequencies.

The participants' self-reported course experiences in the weekly reports were coded as positive and negative attitudinal statements. Then the instances of the participants' detailed statements were presented by frequency tables.

Regarding the participants' answers to the interview questions, the themes of the data were generated and described by coding the text data, developing a description, defining the main themes from the data, and connecting and comparing the themes between the PCG and CG. The themes generated from the answers by the PCG and CG participants were listed and compared by frequency tables. Finally, a narrative discussion was provided to report, present, and interpret the findings. The results of the qualitative analysis were provided in Chapter 7.

5.5 Summary

The present study consisted of a pre- and posttest survey, weekly reports, online forum contributions, and interviews. The questionnaires of the pre- and posttest were completed by the participants online at the beginning (T1) and end of the course (T2). The design of the present study aimed to investigate (a) whether the participants' online learning attitudes would significantly change from T1 to T2; (b) which factors at T1 (i.e., course expectations, prior experiences, prior attitudes, self-control, and self-regulation) would influence the participants' learning outcomes and attitudes toward online learning at T2; and (c) whether the influence from the factors at T1 on the participants' learning outcomes and online learning attitudes at T2 would be mediated through learning process factors (e.g., course participation).

One-hundred and twenty students participated in the pretest and 94 out of them completed the posttest. Regarding the factors of learning process, 74 participants completed the weekly reports at different frequency. The same 74 participants' transcripts of the online forum contributions were retrieved. The data of the weekly reports and online forum contributions were treated as learning process factors, in order to investigate whether the influence of the factors at T1 on the participants' learning outcomes and online learning attitudes at T2 could be mediated through learning process factors.

Eight participants were involved in the interviews and they were divided into two groups (the PCG and the CG). The interviews were conducted through face-to-face interaction and

telephone. The process of the interviews were recorded and then transcribed. Coding and themes were applied to obtain detailed explanation for these participants' learning experiences and the changes in their online learning attitudes.

Through quantitative analysis, the factors influencing the participants' learning outcomes and online learning attitudes by the end of the course were presented in Chapter 6. The findings from the open-ended questions in the posttest, weekly reports, and interviews were elaborated in Chapter 7.

Chapter 6: Results (I)

This chapter presents the findings from quantitative analysis on the data collected from the pre- and posttest, weekly reports, and online forum contributions. Firstly, the constructs of the variables measured in the pre- and posttest were developed. Then the descriptive results of the data collected in the pre- and posttest, weekly reports, and online forum contributions were provided. Finally, the findings about the participants' online learning attitude changes and the factors influencing the participants' learning outcomes and online learning attitudes by the end of the course were presented.

6.1 Overview

This chapter presents the findings about the participants' online learning attitude changes after taking the blended course and the factors which influenced their learning outcomes and online learning attitudes by the end of the course. Before further data analysis, the constructs for the factors in the pretest (T1) were developed by factor analysis.

Next, the descriptive results for all factors in the pre- and posttest, weekly reports, and online forum contributions were presented by frequencies, histograms, and figures. The analyses on the data were respectively based on the responses from the 120, 94, and 74 participants.

Finally, the changes in the participants' online learning attitudes from T1 to T2 were presented. The results about the factors which influenced the participants' learning outcomes and online learning attitudes at T2 were provided. Additionally, the factors which influenced other factors at T2 (i.e., the participants' ICT usage, satisfied course expectations, attitudes toward ICT usage, the subject area, and traditional and online learning components, generalized attitudes in the course, and intention for future online learning) were also examined.

In respect to the main research questions, it was found that the participants' attitudes toward online learning significantly increased by the end of course. The factors which significantly influenced the participants' learning outcomes were self-control, self-regulation, and course

participation. The impact of self-control on the participants' learning outcomes was mediated through self-regulation and course participation. The participants' online learning attitudes at T2 were significantly predicted by their online learning attitudes measured at T1 and motivation (intrinsic and extrinsic orientation).

6.2 Construct development: factor analysis

The quantitative analyses were run on the variables in the questionnaires of the pretest (T1) and posttest (T2), weekly reports, and online forum transcripts. In order to ensure the consistency of the constructs in the pre- and posttest, factor analyses were used to test the internal consistency of the variables of constructs at T1, such as (a) course expectations; (b) self-control; (c) self-regulated learning; (d) attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general; and (e) generalized attitudes.

6.2.1 Course expectations

The participants' course expectations were initially measured at T1 through seven items. A principal component analysis indicated the operation of a single factor. The loadings are shown in Table 6.1. Reliability analysis indicated a Cronbach Alpha of 0.78 with all items contributing. The overall mean was 27.12, with *SD* = 3.34.

Table 6.1

Principal Component Loadings for the Seven Items Tapping Initial Course Expectations

Item	Loading
I will get a good grade.	.49
I will improve my computer and the Internet skills.	.64
I will enjoy this course.	.80
I will learn more about the subject area.	.67
I will learn more effectively by using online learning tools.	.68
I will have more communication with others by using online learning tools.	.65
I will have more self-control on my study.	.62

Note. (a) *n* = 120, (b) Extraction method: principal component analysis.

6.2.2 Self-control

The participants' self-control was initially gauged through 13 items from the Self-control Scale by Tangney et al. (2004), which measured the participants' self-control as a personality trait in the present study. A principal component analysis indicated the operation of a single

factor. The loadings are shown in Table 6.2. Reliability analysis indicated a Cronbach Alpha of 0.84 with all items contributing. The overall mean was 40.21, with *SD* = 8.29.

Table 6.2

Principal Component Loadings for the 13 Items Tapping Initial Self-control

Item	Loading
I am good at resisting temptation.	.55
I have a hard time breaking bad habits. (Reversed)	.50
I am lazy. (Reversed)	.66
I say inappropriate things. (Reversed)	.51
I do certain things that are bad for me, if they are fun. (Reversed)	.66
I refuse things that are bad for me.	.54
I wish I had more self-discipline. (Reversed)	.57
People would say that I have iron self-discipline.	.50
Pleasure and fun sometimes keep me from getting work done. (Reversed)	.64
I have trouble concentrating. (Reversed)	.66
I am able to work effectively toward long-term goals.	.39
Sometimes I cannot stop myself from doing something, even if I know it is wrong. (Reversed)	.68
I often act without thinking through all the alternatives. (Reversed)	.64

Notes. (a) *n* = 120, (b) Extraction method: principal component analysis

6.2.3 Self-regulation

As described in Chapter 5, self-regulation was assessed through using 49 items derived from the Motivational Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991, 1993). All of these items referred to motivational learning strategies. A principal component analysis indicated the operation of a four-factor solution based on 22 items. The loadings are shown in Table 6.3. The remaining 27 items were not included in the data analysis, as they failed to achieve loadings greater than 0.5 on any one factor.

Table 6.3

Factor Analysis: Loadings for the 22 Items Tapping Self-regulation

Factor 1: Metacognitive awareness (Eigen = 2.52, Cronbach Alpha = .75, Mean = 15.78, *SD* = 3.47)	Loading
When I study a course, I set goals for myself in order to direct my activities in each study period.	.74
I always treat the course material as a starting point and try to develop my own ideas about it.	.74
I always make simple charts, diagrams, or tables to help me organize the course material.	.70
When I study a course, I read my class notes and the course readings over and over again.	.69
I am persistent in getting help from my teachers or tutors.	.67
Factor 2: Self-management (Eigen = 2.98, Cronbach Alpha = .79, Mean = 19.53, SD = 4.35)	
When the course work is difficult, I either give up or only study the easy parts. (Reversed)	.80
I find it hard to stick to a study schedule. (Reversed)	.78
Even when the course materials are dull and uninteresting, I manage to keep working until I finish.	.73
During class time, I often miss important points because I'm thinking of other things. (Reversed)	.69
I make sure that I keep up with the weekly readings and assignments for a course.	.63
I often find that I have been reading for a course but don't know what it is all about. (Reversed)	.58
Factor 3: Intrinsic orientation (Eigen = 3.13, Cronbach Alpha = .80, Mean = 22.57, SD = 3.48)	
I feel it is important to learn the course material in this course.	.81
Understanding the subject matter of a course is very important to me.	.80
I think I am able to use what I have learnt in this course in other courses.	.79
The most satisfying thing for me in a course is trying to understand the content as thoroughly as possible.	.73
I prefer the course materials that really challenge me, so I can learn new things.	.65
When I have the opportunity in a course, I choose the course assignments that I can learn from even if they don't guarantee a good grade.	.52
Factor 4: Performance orientation (Eigen = 2.93, Cronbach Alpha = .81, Mean = 18.70, SD = 3.44)	
I want to do well in a class because it is important to show my ability to my family, friends, employer, or others.	.81
I set a high standard for my assignments in a course.	.81
I keep a high standard for my learning.	.78
If I can, I want to get better grades in a class than most of other students.	.77
When studying a course, getting a good grade in a class is the most satisfying thing for me.	.65

Notes. (a) $n = 94$, (b) Extraction method: principal component analysis, Oblimin rotation.

6.2.4 Attitudes toward ICT usage

Initial attitudes toward ICT usage were measured through seven items. A principal component analysis indicated the operation of a single factor. The loadings are shown in

Table 6.4. Reliability analysis indicated a Cronbach Alpha of 0.85 with all seven items contributing. The overall mean of ICT attitudes at T1 was 23.13, with *SD* = 3.23.

Table 6.4

Principal Component Loadings for the Seven Items Tapping Attitudes toward ICT Usage

Item	Loading
I am interested in computer and the Internet use.	.70
Computer and the Internet are useful for me.	.61
I feel confident about computer and the Internet use.	.87
I am comfortable with computer and the Internet use.	.89
I like using computer and the Internet.	.87
Computer and the Internet use are difficult for me. (Reversed)	.59
I feel anxious about computer and the Internet use. (Reversed)	.55

Notes. (a) *n* = 120, (b) Extraction method: principal component analysis.

6.2.5 Attitudes toward the subject area

Initial subject area attitudes were measured through seven items. A principal component analysis indicated a single factor solution. The loadings are shown in Table 6.5. Reliability analysis indicated a Cronbach Alpha of 0.83 with all seven items contributing. The overall mean of subject area attitudes at T1 was 20.14, with *SD* = 2.73.

Table 6.5

Principal Component Loadings for the Seven Items Tapping Attitudes toward the Subject Area

Item	Loading
I am interested in this subject area.	.70
This subject area is useful for me.	.39
I feel confident about this subject area.	.83
I feel comfortable with this subject area.	.84
I like this subject area.	.71
This subject area is difficult for me. (Reversed)	.78
I feel anxious about learning this subject area. (Reversed)	.69

Notes. (a) *n* = 120, (b) Extraction method: principal component analysis.

6.2.6 Attitudes toward online learning components

The online learning components in the present study stood for the online course content and various online learning components which facilitated the participants' learning in the course. The participants' online learning components attitudes were initially measured through 14

items. A principal component analysis indicated the operation of a single factor. The loadings are shown in Table 6.6. Reliability analysis indicated a Cronbach Alpha of 0.86 with 11 items contributing. The other three items were not accounted in data analysis. The overall mean of online components attitudes in the pretest was 33.38, with *SD* = 4.49.

Table 6.6
Principal Component Loadings for the 11 Items Tapping Attitudes toward Online Learning Components

Item	Loading
I am happy using email.	.77
I am comfortable about participating in online discussion forum.	.76
I enjoy searching material online.	.72
I find online course material valuable.	.75
I am comfortable about using the online communication tools, such as email, and online discussion.	.79
I like to use online resources, e.g., online course material, for this course.	.80
I like to use other online tools, such as Wiki, for this course.	.54
The IT help system, e.g., IT help, online support and student services, is not supportive to my study. (Reversed)	.39
I do not like to participate in online discussion. (Reversed)	.31
The online material is difficult for me. (Reversed)	.69
I am anxious to learn this course online. (Reversed)	.66

Notes. (a) *n* = 120, (b) Extraction method: principal component analysis.

6.2.7 Attitudes toward traditional learning components

The traditional learning components in the present study referred to the traditional mode of learning resources, tools, activities, and methods of communication. The participants' traditional learning components attitudes were initially measured through nine items. A principal component analysis indicated the operation of a single factor. The loadings are shown in Table 6.7. Reliability analysis indicated a Cronbach Alpha of 0.86 with seven items contributing. The other two items did not proceed in the data analysis. The overall mean of traditional components attitudes in pretest was 21.59, with *SD* = 3.36.

Table 6.7
Principal Component Loadings for the Seven Items Tapping Attitudes toward Traditional Learning Components

Item	Loading
I like learning things in a traditional environment, e.g., face-to-face lectures or tutorials.	.72
I would like to read information from paper rather than a screen.	.49
When I need help, I would really prefer face-to-face talk with teachers or other students.	.81
I like hands-on training.	.71
I prefer the instruction from a teacher rather than a computer.	.81
I like sharing or exchanging my opinions with others through face-to-face talk rather than online communication.	.78
I like cooperating or collaborating with others in a traditional group with face-to-face contact rather than the communication through the Internet.	.84

Notes. (a) $n = 120$, (b) Extraction method: principal component analysis.

6.2.8 Attitudes toward online learning

Initial online learning attitudes were measured through 17 items. A principal component analysis indicated the operation of a single factor. The loadings are shown in Table 6.8. Reliability analysis indicated a Cronbach Alpha of 0.90 with 12 items contributing. The other five items were not used in the data analysis. The overall mean of online learning attitudes at T1 was 33.03, with $SD = 4.92$.

Table 6.8
Principal Components Loadings for the 12 Items Tapping Attitudes toward Online Learning

Item	Loading
People can learn successfully through online instruction.	.47
Online learning provides a good learning environment.	.65
Overall, online learning is enjoyable.	.81
Online learning enhances students' interests in learning.	.60
I have a favourable attitude toward online learning.	.66
I would be happy if I had to enrol in an online course in the near future.	.72
I like online learning.	.87
I am interested in online learning.	.75
I feel confident about online learning.	.75
I feel comfortable with online learning.	.75
Online learning is difficult for me. (Reversed)	.64
I feel anxious about learning online. (Reversed)	.63

Notes. (a) $n = 120$, (b) Extraction method: principal component analysis.

6.2.9 Generalized attitudes

It was found that the participants' attitudes toward ICT usage, the subject area, online learning components, and online learning, which were measured at T1, were significantly

correlated with each other (Table 6.9). Factor analysis was conducted to investigate the relationships between these constructs and test the reliability and consistence of all items. This analysis revealed that a single factor solution was possible, which showed that there was a general attitude toward learning in this course among the participants.

Table 6.9

Pearson Correlations between Attitudes toward Several Aspects in the Course at T1

	1	2	3	4
1.Prior ICT usage attitudes	–	.54**	.56**	.37**
2.Prior Subject area attitudes		–	.55**	.55**
3.Prior online learning component attitudes			–	.58**
4.Prior online learning attitudes				–

Note. (a) $n = 120$, (b) ** $p < .01$.

Based on the above analysis, a new construct — generalized attitudes was developed. The factor of generalized attitudes represented an aggregate score based upon the four components (i.e., attitudes toward ICT usage, the subject area, online learning components, and online learning), which stemmed from 54 items. A principal components analysis indicated the operation of a single factor of 30 items. The other 24 items were not used for data analysis. The loadings are shown in Table 6.10. Reliability analysis indicated a Cronbach Alpha of 0.94. The overall mean of generalized attitudes in pretest was 89.02, with $SD = 10.98$.

Table 6.10

Principal Component Loadings for the 30 Items of Generalized Attitudes

Item	Loading
I am interested in computer and the Internet use.	.53
I feel confident about computer and the Internet use.	.55
I am comfortable with computer and the Internet use.	.56
I like using computer and the Internet.	.62
Computer and the Internet use are difficult for me. (Reversed)	.57
I feel anxious about computer and the Internet use. (Reversed)	.55
I am interested in this subject area.	.50
I feel confident about this subject area.	.70
I feel comfortable with this subject area.	.69
I like this subject area.	.53
This subject area is difficult for me. (Reversed)	.67
I feel anxious about learning this subject area. (Reversed)	.56
I am happy using email.	.68
I am comfortable about participating in online discussion forum.	.65
I enjoy searching material online.	.55
I find online course material valuable.	.53
I am comfortable about using the online communication tools, such as email, and online discussion.	.68
I like to use online resources, e.g., online course material, for this course.	.64
The online material is difficult for me. (Reversed)	.67
I am anxious to learn this course online. (Reversed)	.63
Online learning provides a good learning environment.	.55
Overall, online learning is enjoyable.	.65
Online learning enhances students' interests in learning.	.47
I would be happy if I had to enrol in an online course in the near future.	.53
I like online learning.	.67
I am interested in online learning.	.54
I feel confident about online learning.	.65
I feel comfortable with online learning.	.64
Online learning is difficult for me. (Reversed)	.64
I feel anxious about learning online. (Reversed)	.62

Notes. (a) n = 120, (b) Extraction method: principal component analysis.

6.2.10 Summary of Section 6.2

Through factor analysis on all variables, the constructs for the factors at the pretest were developed for further analysis. In the following sections in the chapter, the descriptive results were presented and the factors, which predicted the participants' learning outcomes and online learning attitudes at T2, were examined. The relationships between the factors at T1 and other factors at T2 (i.e., the participants' ICT usage, satisfied course expectations, attitudes toward ICT usage, the subject area, and traditional and online learning components, generalized attitudes in the course, and intention for future online learning) were also investigated.

6.3 Descriptive results

In the present study, 120 students participated in the pretest (T1) and 94 of them completed the posttest (T2). Seventy-four from the 94 participants submitted the weekly reports and these 74 participants' contributions to the online forums were used for the analysis as well. This section presents the descriptive results based on the responses from the 120 participants' at T1 (Section 6.3.1), 94 participants at T2 (Section 6.3.2), and 74 participants in the weekly reports and online forums (Section 6.3.3).

6.3.1 Descriptive results from the 120 participants' responses at T1

6.3.1.1 Demographic background

Among the 120 participants, 105 were females and 15 were males. The majority (63%) were among the age group of 15 to 20 years old, 18% were between 21 and 25 years old, 8% were from 26 to 30 years old, 3% were from 31 to 35 years old, and 8% were 36 or above.

Regarding the educational level, 94% of the participants were studying toward Bachelor degree, and 6% had already obtained Bachelor degree. Ninety-six percent in the sample group were native English speakers and the other 4% were from non-English speaking background.

There were 68% of the participants who were "somewhat familiar" with the subject area, 24% and 2% were "quite familiar" and 'very familiar" respectively, and 6% were not familiar with the subject area. Six percent of the participants took online course(s) (without face-to-face interactions) before.

6.3.1.2 Course expectations at T1

The items of course expectations presented what the participants anticipated to experience in the course and a five-point scale was rated from "1 = Unlikely to happen" to "5 = Very likely to happen". Course expectations were constructed by seven items, which addressed the participants' expectations of receiving a good result, effective usage of online learning tools, enjoyment in the course, knowledge acquisition, more online communication, and improvement in self-control. The natural mid-point (21) was the sum of middle point across the items (i.e. seven items with the mid-point of three for each item). One hundred and sixteen participants (97%) were above the natural mid-point of course expectations. Knowledge acquisition, effective use of online learning tools, and more online communication were given the highest expectations from the participants.

Table 6.11

Descriptive Information: Course Expectations at T1

	Mean	*SD*	Skewness	Kurtosis	Minimum	Maximum
Course expectations	27.12	3.34	-.58	.44	14	35

Notes. (a) n = 120, (b) natural mid-point = 21 across all seven items

6.3.1.3 ICT experiences at T1

The participants' prior ICT experiences measured at T1 were gauged through their self-report on the frequency of using different ICT tools by seven questions and the answers were based on a six-point scale ("1 = Never", "2 = Rarely", "3 = Once a month", "4 = Once a week", "5 = A few times a week", and "6 = Everyday"). Among the different ICT tools, email was the most frequently used tool by the participants (79 % with the experience on a daily basis and 20 % with the frequency of "a few times a week").

Regarding the computer application software such as word processing, 35% among the group used it every day, 48% used it a few times a week, and 13% used it once a week. The rest (4%) used it once a month.

Publishing tools are the ICT applications to which few participants had an access. Three percent in the group used them every day, 14% used them a few times a week, and 8% and 28% used them on a weekly and monthly basis respectively. Another 39% among the group rarely used them and 8% never used them.

In relation to the social networking tools, the participants used them more for individual purpose rather than group communication. Ninety-one percent of the participants used Facebook, MySpace, and Twitter at least once a week for individual purposes, while 63% used the social networking tools (e.g., Wiki, BBS, Weblogs, and online forum) for group communication on the same frequency.

Online search engines were used more for general purposes rather than academic purposes. On the daily basis, 54% of the participants conducted general search online and only 6% used online search engines for an academic purpose every day.

Table 6.12

Descriptive Information: ICT Experiences at T1

	Mean	*SD*	Skewness	Kurtosis	Minimum	Maximum
Computer application software	5.14	.79	-.78	.38	3	6
Publishing tools	2.88	1.27	.71	-.33	1	6
Email	5.78	.43	-1.7	1.77	4	6
Individual-based social network	5.33	1.25	-2.18	4.19	1	6
Group-based social network	3.87	1.37	-.37	-.77	1	6
Web search engines (general)	5.48	.62	-.76	-.40	4	6
Web search engines (academic)	4.19	.95	-.15	-.67	2	6

Note. (a) $n = 120$, (b) Natural mid-point = 3.5 per item, (c) Computer application software = word processing, database system, Speadsheets, presentation graphics; publishing tools = desktop publishing, web publishing; individual-based social network = MySpace, Facebook, Twitter, Video conferencing, Skype; Group-based social network = Wiki, bulletin board system, Weblogs, online forum, YouTube, chat rooms; Web search engines (general) = Google, Yahoo!, Ask.com, Being; Web search engines (academic) = online academic journals, Google Scholar, Eric, online library, Academic Search

6.3.1.4 Self-control

The present study used the Self-control Scale (Tangney et al., 2004) to measure the participants' self-control as a trait dimension and address their capability of deferring gratification, resisting temptation, and managing efforts in order to achieve long-term goals. A five-point scale was used to indicate the participants' self-control from "1 = Not like me at all", "2 = Probably not like me", "3 = Unsure", "4 = Somewhat like me", to "5 = Very much like me". Among the participants, 52% were above the mid-point (39) of the items of self-control.

Table 6.13

Descriptive Information: Self-control

	Mean	*SD*	Skewness	Kurtosis	Natural mid-point	Minimum	Maximum
Self-control	40.21	8.29	.20	-.41	39	21	61

Note. (a) $n = 120$

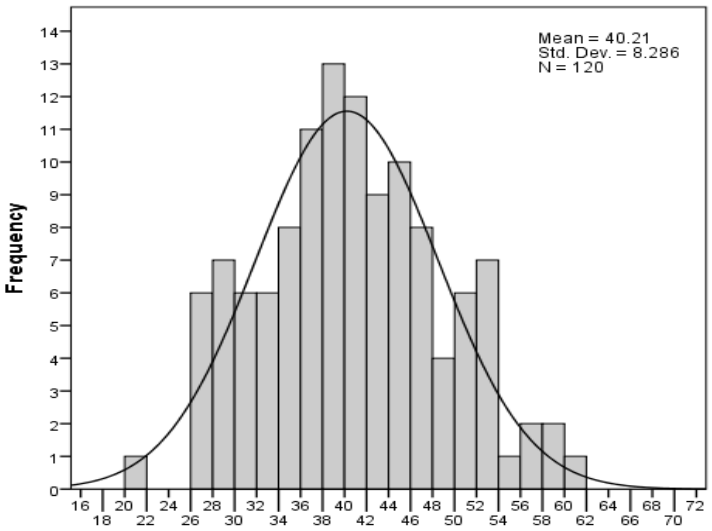

Figure 6.1 Histogram of self-control, *n* = 120

6.3.1.5 Self-regulation

Self-regulation in the present study addressed the participants' capabilities of keeping motivated in the course, applying different learning strategies, managing their time and environment for learning to achieve their learning goals. The items were measured based on a five-point scale from "1 = Not like me at all", "2 = Probably not like me", "3 = Unsure", "4 = Somewhat like me", to "5 = Very much like me". There were initially 49 items about self-regulated learning in the questionnaire of the pretest and four factors were generated from 22 items after factor analysis. The four factors were labelled as metacognitive awareness, self-management, intrinsic orientation, and performance orientation.

The first factor —– metacognitive awareness was constructed by five items and stood for various cognitive and metacognitive learning strategies to help the participants learn better. Fifty-two percent of the participants were above the mid-point (15).

Self-management comprised six items and measured the participants' capability of managing their time, environment, attention, and effort for learning. Sixty percent of the participants were above the mid-point (18).

Intrinsic orientation consisted of six items and specified that the participants acquired knowledge because of their interest in learning itself, self-improvement, and applying the knowledge, rather than learning for external factors, such as other people's appraisal and external pressure. Eighty-six per cent of the participants were above the mid-point (18).

Performance orientation included five items, which indicated that the participants were driven by getting a good grade and the approval from the external context, such as families, friends, employers, and others. Meanwhile, performance orientation also implied that the participants would set a high standard for their assignments and learning activities. Eighty-seven percent of the participants were above the mid-point (15).

Table 6.14

Descriptive Information: Self-regulation

	Mean	*SD*	Skewness	Kurtosis	Natural mid-point	Minimum	Maximum
Metacognitive awareness	15.78	3.47	-.18	-.36	15	7	23
Self-management	19.53	4.35	.02	-.24	18	9	30
Intrinsic orientation	22.57	3.48	.02	1.73	18	13	36
Performance orientation	18.70	3.44	-.14	1.24	15	9	30

Note. (a) $n = 120$

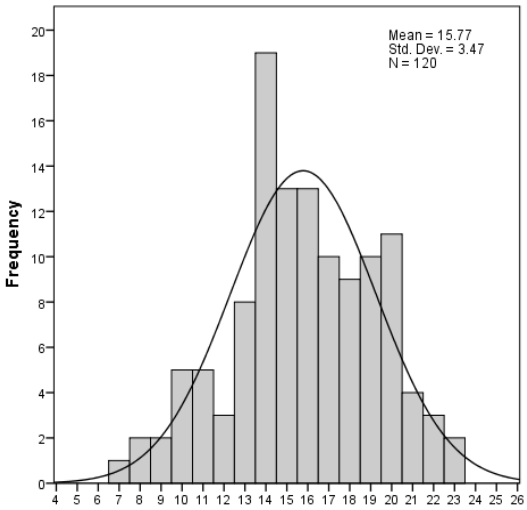

Figure 6.2 Histogram of metacognitive awareness

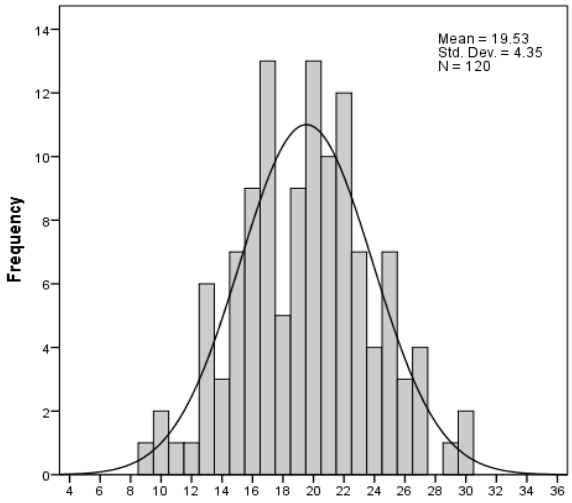

Figure 6.3 Histogram of self-management

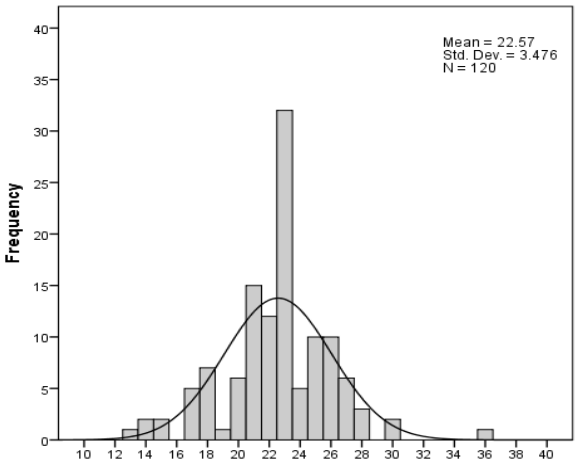

Figure 6.4 Histogram of intrinsic orientation

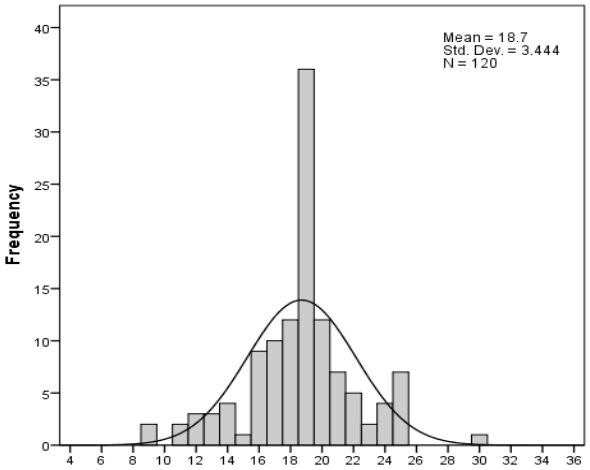

Figure 6.5 Histogram of performance orientation

6.3.1.6 The participants' attitudes at T1

With respect to the items measuring the 120 participants' attitudes at T1, a four-point scale was used from "1 = Strongly disagree", "2 = Disagree", "3 = Agree", to "4 = Strongly agree". Ninety-seven percent and 80% of the participants scored higher than the mid-points of the attitudes toward ICT usage (seven items) and the subject area (seven items) respectively. Ninety-five percent of the participants were above the mid-point of online learning components attitudes (11 items). A total of 93% were above the mid-point of traditional learning components attitudes (seven items). Concerning the participants' attitudes toward online learning (12 items), 74% among the group were above the mid-point. Finally, in relation to the generalized attitudes in the course (30 items), 92% showed higher scores than the mid-point.

Table 6.15

Descriptive Information: the Participants' Attitudes at T1

Attitudes at T1	Mean	*SD*	Skewness	Kurtosis	Natural mid-point	Minimum	Maximum
ICT attitudes	23.13	3.23	-.57	1.60	17.5	10	28
Subject area attitudes	20.14	2.73	-.44	1.64	17.5	9	28
Online learning components attitudes	33.38	4.49	-.18	2.19	27.5	15	44
Traditional learning components attitudes	21.59	3.36	.02	.93	17.5	10	28
Online learning attitudes	33.03	4.92	-.68	1.83	30	15	48
Generalized attitudes	89.02	10.98	-1.09	4.99	75	33	114

Note. (a) n = 120, (b) Generalized attitudes at T1 represented 30 items from the 54 items in the other scales on all of the questionnaire-derived construct at the pretest level.

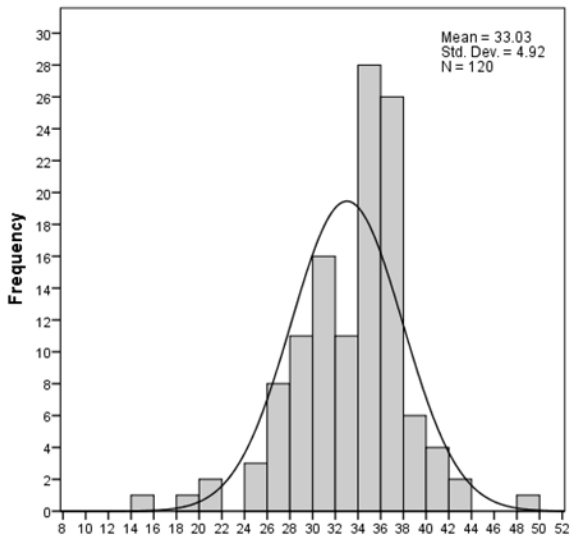

Figure 6.6 Histogram of online learning attitudes at T1

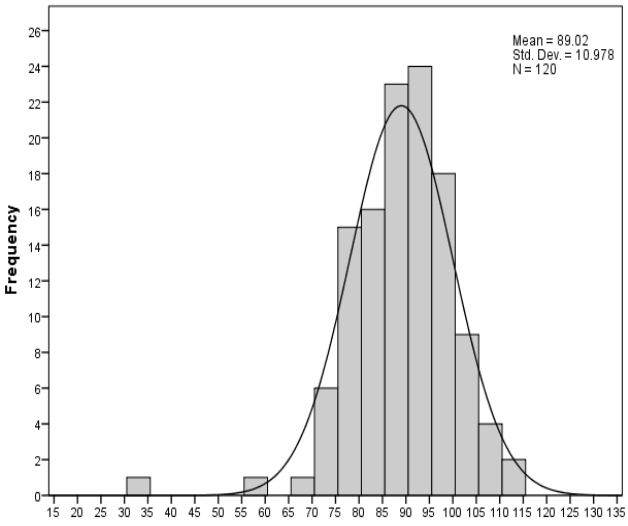

Figure 6.7 Histogram of generalized attitudes at T1

6.3.1.7 Summary of Section 6.3.1

Section 6.3.1 presented descriptive results of the 120 participants' responses to the pretest survey, such as their demographic background, course expectations, prior ICT experiences, self-control, self-regulated learning, and prior attitudes toward various aspects in the course. The following section (Section 6.3.2) provides descriptive results based on the 94 participants' responses in the posttest.

6.3.2 Descriptive results from the 94 participants' responses at T2

6.3.2.1 Comparison between the 94 and 26 participants' responses to the pretest at T1

At T1, 120 participants completed questionnaires of the pretest. At T2, 94 of them participated in the posttest and another 26 participants did not complete the posttest because of their withdrawal from the courses or absence from the tutorials. Among these 94 participants, 82 were females and 12 were males.

Independent *t*-tests were performed to compare the pretest responses from the two groups (the 94 and 26 participants). The results showed that there were no significant differences between these two groups, in terms of (a) course expectations; (b) prior experiences of ICT usage, the subject area, and online learning; and (c) prior attitudes toward ICT usage, the subject area, online and traditional learning components, and online learning in general.

6.3.2.2 Learning outcomes

The 94 participants' learning outcomes were reported in terms of their course results, which were gauged by the aggregate marks from the assessments (assignments, presentations, and online forum contributions) in the course. The full score was 100. By the end of course, 93 participants had passed the course, among whom 23% achieved Distinction and High Distinction (75-100), and 46% and 20% received Credit (65-74) and Pass (50-64) respectively.

Table 6.16

Descriptive Information: Learning Outcomes

	Mean	*SD*	Skewness	Kurtosis	Minimum	Maximum
Learning outcomes	69.29	8.23	-1.29	5.45	29	90

Note. (a) $n = 94$

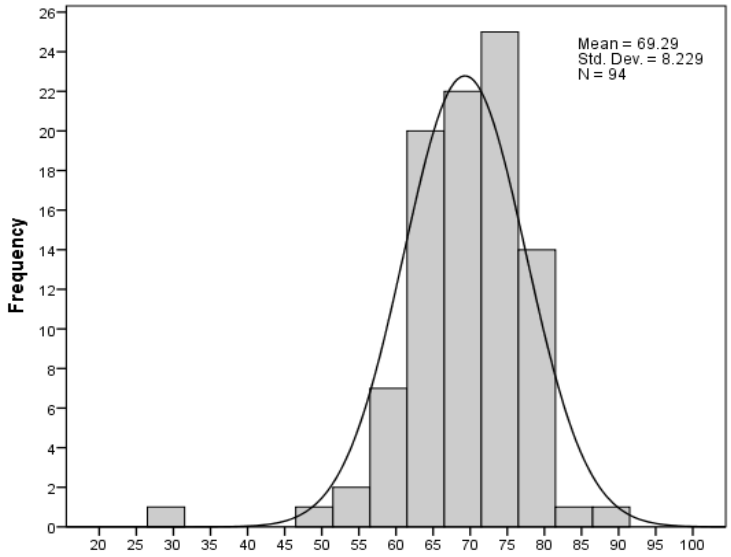

Figure 6.8 Histogram of learning outcomes among the 94 participants

6.3.2.3 Satisfied course expectations

At T2, the participants were asked whether their course expectations at the beginning of the course had been satisfied. The questions about the satisfied course expectations were designed based on the items in the pretest, such as expected course results, effective usage of online learning tools, enjoyment in the course, knowledge acquisition, and improvement in

self-control. A five-point scale was rated from "1 = Did not happen" to "5 = Yes, it happened". The individual course expectation items at T1 and T2 were correlated significantly with each other, except the item of "learning more effectively by using online learning tools" (Table 6.17).

Table 6.17

Pearson Correlations between Course Expectations at T1 and the Corresponding Items at T2

Course expectation (T1)	Satisfied course expectation (T2)	*p*
I will get a good grade.	I probably will get a good grade.	.42**
I will improve my computer and the Internet skills.	I improved my computer and the Internet skills.	.40**
I will enjoy this course.	I enjoyed this course.	.41**
I will learn more about the subject area.	I learned more about the subject area.	.38**
I will learn more effectively by using online learning tools.	I learned more effectively by using online learning tools.	.18
I will have more communication with others by using online learning tools.	I had more communication with others by using online learning tools.	.20*
I will have more self-control on my study.	I had more self-control on my study.	.21*
Sum of course expectations (T1)	Sum of satisfied course expectation (T2)	.44**

Note. (a) $n = 94$, *(b)* * $p < .05$,** $p < .01$, (c) The questions asked at T1 were "What are you expecting from this course?", (d) The questions asked at T2 were "Have your expectations from the course been satisfied?".

There appeared a slight decrease in the means of the participants' satisfied course expectations at T2 (Table 6.18). The Sign Test was then used to detect the shift on an item-by-item basis. Reductions were found for five items of course expectations. Although the overall mean reduced from 27.3 to 25, it is noted that the participants' satisfied expectations at T2 still remained positive since the natural middle point on the scale is 21 (Table 6.18). It is apparent from subsequent analyses (Table 6.53, Table 6.54, Figure 6.35, and Figure 6.36 in Appendix 5), that these reductions were more significant among the participants with lower levels of intrinsic orientation.

Table 6.18

Course Expectations Item Analysis: Comparison between T1 and T2

Course expectations at T1	Mean (*SD*)	Satisfied course expectations at T2	Mean (*SD*)	*Z*	Asymp. *Sig.* (2-tailed)
I will get a good grade.	3.83 (.62)	I probably will get a good grade.	3.64 (.76)	-1.87	.061
I will improve my computer and the Internet skills.	3.97 (.78)	I improved my computer and the Internet skills.	3.63 (1.02)	-2.68	.007
I will enjoy this course.	3.59 (.73)	I enjoyed this course.	3.33 (1.16)	-1.20	.229
I will learn more about the subject area.	4.24 (.65)	I learned more about the subject area.	3.91 (1.00)	-2.24	.025
I will learn more effectively by using online learning tools.	4.07 (.64)	I learned more effectively by using online learning tools.	3.69 (1.03)	-2.38	.018
I will have more communication with others by using online learning tools.	3.91 (.84)	I had more communications with others by using online learning tools.	3.39 (1.15)	-4.03	.001
I will have more self-control on my study.	3.70 (.73)	I had more self-control on my study.	3.35 (1.16)	-1.68	.093
Sum of course expectations (T1)	27.32 (3.13)	Sum of satisfied course expectation (T2)	24.95 (5.34)	*t* (93) = 4.73	.001

Note. (a) *n* = 94, (b) The items were analysed using Sign Test, whereas the sum of the course expectations at T1 and T2 were tested by *t*-test, (c) The mean were all expressed along the 5-point scale.

6.3.2.4 ICT experiences at T2

The questions about the participants' ICT experiences were repeated at T2. The frequencies of ICT usage measured at T1 were shown in Table 6.12. The answers from the 94 participants at T2 were compared with their answers at T1 by mean testing. No significant difference across the two occasions was evident.

6.3.2.5 The participants' attitudes at T2

The items measuring the participants' attitudes at T1 were used repeatedly at T2 to track their attitudes by the end of the course. The same items of each construct of the participants' attitudes at T2 were remained for further analysis.

All of the 94 participants were above the mid-point of attitudes toward ICT usage at T2. Regarding the participants' attitudes toward the subject area, 90% were above the mid-point.

Ninety-six percent and 94% were above the mid-point of online and traditional learning components attitudes respectively. In regard to online learning attitudes, 87% scored higher than the mid-point. Finally, 96% of the participants were above the mid-point for the generalized attitudes in the course.

Table 6.19

Descriptive Information: the Participants' Attitudes at T2

Attitudes at T2	Mean	*SD*	Skewness	Kurtosis	Natural mid-point	Minimum	Maximum
ICT usage attitudes	23.91	2.97	.04	-1.43	17.5	19	28
Subject area attitudes	20.88	2.91	.28	1.00	17.5	13	28
Online learning components attitudes	33.74	4.15	.63	-.08	27.5	26	44
Traditional learning component attitudes	22.16	3.33	.32	-.73	17.5	16	28
Online learning attitudes	34.83	4.75	.09	1.43	30	20	48
Generalized attitudes	92.67	9.50	.49	.71	75	69	118

Note. (a) $n = 94$

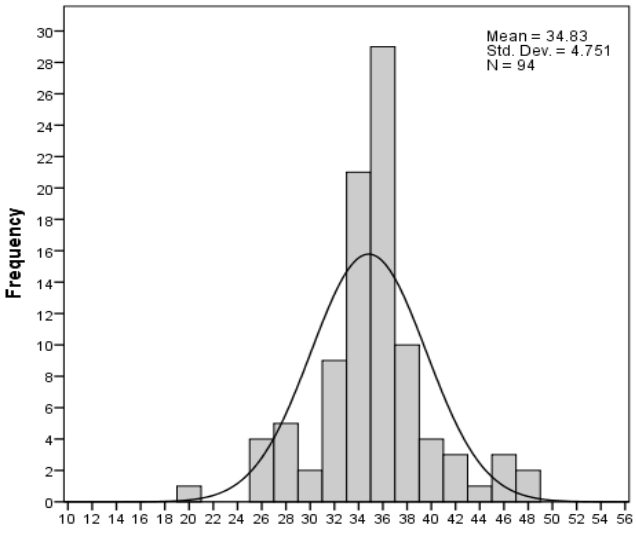

Figure 6.9 Histogram of online learning attitudes (T2)

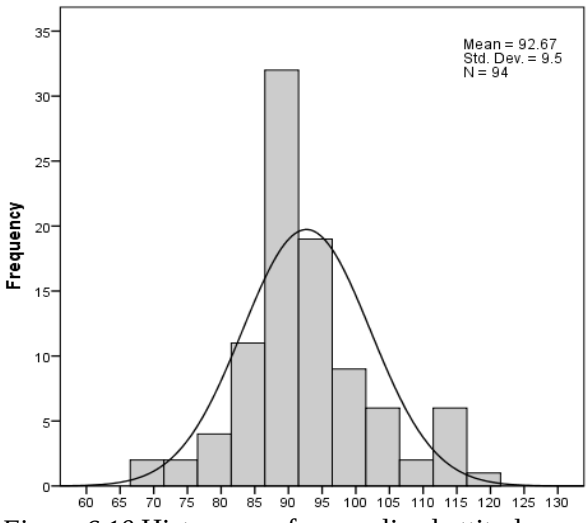

Figure 6.10 Histogram of generalized attitudes (T2)

6.3.2.6 The participants' intention for future online learning

Among the 94 participants, 15% claimed that they would not study any online course, and 36% indicated that they were "not sure". Thirty percent would only study the subjects, with which they were familiar. The remaining (19%) would study any subjects online.

6.3.2.7 Summary of Section 6.3.2

Section 6.3.2 provided descriptive results of the 94 participants' responses to the posttest, such as satisfied course expectations, ICT experiences, attitudes toward various aspects of the course, and intention for future online learning. In addition, the participants' learning outcomes are also presented in this section. The descriptive results of the learning process factors (the 74 participants' responses to the weekly reports and their online forum contributions) are presented in the following section (Section 6.3.3).

6.3.3 Descriptive results from the 74 participants' responses in the weekly reports and their online forum contributions

A total of 74 out of the 94 participants submitted the weekly reports. These 74 participants' responses to the weekly reports, together with their online forum contributions, were analysed as learning process factors. The following paragraphs in this section present the descriptive results from the participants' weekly reports and online forum contributions.

6.3.3.1 Descriptive results from the weekly reports

The weekly report was a short questionnaire, which was sent to the participants for six times across six weeks during the semester. The questions in the weekly report measured the participants' learning experiences, in terms of the number of hours they spent in total and online, perceived course load (i.e., stress, difficulty level, and work load), perceptions of their course experiences, and learning strategies they used on the relevant coursework. The available figures were averaged by the number of the weekly reports submitted by the participants across six weeks to obtain a weekly average figure for each participant.

Table 6.20 presents the descriptive results of various factors of participants' weekly learning experiences. Report frequency referred to the number of weekly reports the participants submitted in total. Report length stood for the averaged word length of the participants' answers to the open-ended questions in the reports every week. Number of hours indicated the time that the participants spent for the course in total and online per week. Difficulty

level, workload, and stress level presented the participants' perceived course load, which were the averaged results by the number of the weekly reports submitted by each individual.

Table 6.20

Descriptive Information: the Participants' Responses in the Weekly Reports

	Mean	Median	*SD*	Skewness	Kurtosis	Minimum	Maximum
Report frequency	3.09	3.00	1.74	.21	-1.42	1	6
Report length	68.60	64.35	45.30	3.43	18.17	7	342
Number of hours spent in total	5.31	5.00	2.29	1.55	4.25	1	15
Number of hours spent online	3.88	4.00	1.98	1.24	2.34	0	11
Difficulty level	2.39	2.40	.46	-.50	.43	1	3
Work load	2.14	2	.42	.42	1.83	1	4
Stress level	2.54	2.50	.85	.43	.55	1	5

Note. (a) $n = 74$

6.3.3.2 The participants' positive and negative comments about their course experiences in the weekly reports

In the weekly reports, the participants' answers to the open-ended questions about their course experiences were categorized into various aspects, such as (a) lectures; (b) tutorials; (c) online forums; (d) assignments (information about assignment requirements); (e) presentations (the group presentations in tutorials as one of the assessments); (f) learning activities and practice in the tutorials and lectures; (g) the usage of online learning tools; and (h) course workload. The participants' answers were also coded as positive or negative comments and the instances of both types of comments on different aspects of the course were noted. For the purpose of analysis, the positive and negative comments were summed up and separate tallies were conducted (Table 6.21 and Table 6.22). The frequency results in Table 6.21 were the aggregate of any positive and negative comments provided by the participants in the weekly reports.

The results in Table 6.21 were discrepant with those in Section 7.2.2 and Section 7.2.3 in Chapter 7, because the latter were analysed based on the reasons offered by the participants for their positive or negative comments on the course, and these reasons were coded as "positive and negative attitudinal statements" in Section 7.2.2 and Section 7.2.3.

Table 6.21

Descriptive Information: the Participants' Comments on their Course Experiences in the Weekly Reports

	Number of instances for comments	
	Positive comments	Negative comments
Comments on the lectures	34	37
Comments on the tutorials	47	30
Comments on the discussion forums	15	28
Comments on the assignments	7	26
Comments on the presentations	70	10
Comments on the learning activities and practice	95	0
Comments on the online learning tools	6	0
Comments on the course workload	0	19
Total comments	274	150

Note: (a) $n = 74$

Table 6.22

Descriptive Information: Total Positive and Negative Comments

	Mean	Median	*SD*	Skewness	Kurtosis	Minimum	Maximum	correlation
Positive comments	3.70	4.00	2.24	.32	-.93	0	9	.59**
Negative comments	2.03	1.50	1.74	.91	.18	0	7	

Note. (a) $n = 74$

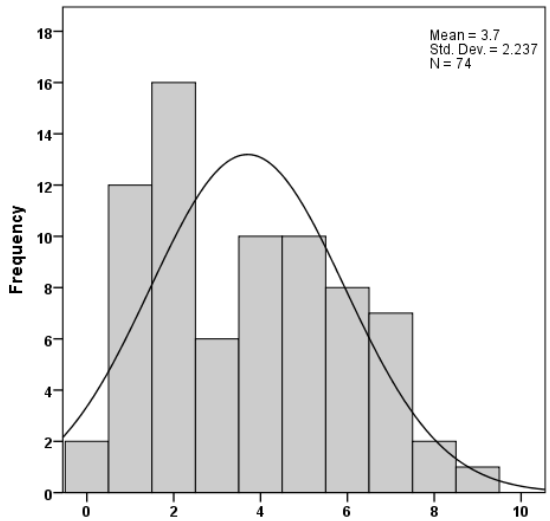

Figure 6.11 Histogram of total positive comments, n =74

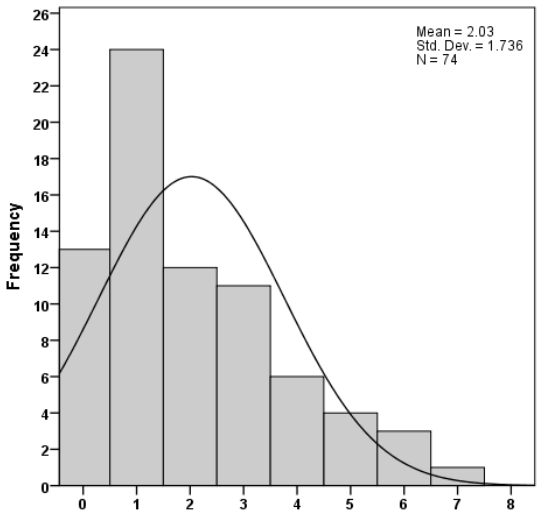

Figure 6.12 Histogram of total negative comments, n =74

6.3.3.3 Descriptive results of the 74 participants' online forum contributions

6.3.3.3.1 Tutorial groups

The 74 participants were from seven tutorial groups, which were run by three teachers (Table 6.23). The participants of each tutorial group registered in the online forum of their own tutorial group. Questions were posted by the teachers each week to the online forums of all tutorial groups. The participants' contributions to the forums could only be visible to their own group members and the teachers. The participants were not only required to answer the forum questions, but were also encouraged to interact with their group peers by asking questions or commenting on others' posts.

Table 6.23

Frequency of the Tutorial Groups

Tutorial Groups	Number of participants
Group 1	13
Group 2	5
Group 3	12
Group 4	10
Group 5	13
Group 6	11
Group 7	10

Note. (a) *n* =74

6.3.3.3.2 The participants' contributions to the online forums

The participants in the course were required to contribute to the online forums for 12 weeks across the semester. The factors indicating their participations in the online forums were elaborated as the followings:

(a) Online contribution frequency — the total number of the posts sent by the participants to the online forums through 12 weeks;

(b) Online contribution length — the aggregated words of the participants' posts during 12 weeks;

(c) Latency — how many weeks out of the 12 weeks that the participants responded to the forum questions within 2 days;

(d) Chances for interaction — how many times the participants interacted with their group peers;

(e) Number of facial and illustrative pictures — the number of pictures for facial expressions and illustrative purposes, as posted by each participant.

The participants' online forum contributions were coded into descriptive results and the descriptive information of the above factors are presented in Table 6.24. During the semester, 8% among the participants sent over 20 posts to the online forums, 38% posted 15-19 contributions, and 39% sent 10 to 14 posts to the forums.

With respect to the length of online forum contributions in total, 12% of the participants wrote about 1200 words or less and 67% posted to the discussion between 1200 to 3000 words. Another 18% of the participants posted to the online forums with from 3000 to 5000 words. The remaining 3% contributed between 6000 to 7000 words to the forums in total during the semester.

Regarding the latency, 11% of the participants replied to the forum questions within two days for eight to ten weeks and 25 % responded within two days for four to seven weeks. The remaining (64%) replied within two days for three or less than three weeks.

Regarding the number of interactions with group peers on the online forums, 27% had no online interaction with their group members. Fifty-eight percent had one to four times of interactions with their peers and another15% interacted with their group members five to nine times during the semester.

Most of the participants did not use facial or illustrative pictures in their online forum contributions (Table 6.25). Sixteen and ten participants respectively used facial and illustrative pictures for one to three times.

Table 6.24

Descriptive Information: the Participants' Online Forum Contributions

	Mean	Median	*SD*	Skewness	Kurtosis	Minimum	Maximum
Online contribution frequency	14.81	14	4.75	.52	1.26	4	29
Online contribution length	2375.91	2189	1143.34	1.19	1.92	599	6090
Latency	3.03	2	2.75	1.11	.48	0	10
Chances for interaction	2.31	2	2.11	.75	.12	0	9

Note. $n = 74$

Table 6.25

Frequency of the Number of Pictures Used in the Online Forums

Number of pictures / Type of pictures	0	1-3	4-6	8-10	11 and above
The number of the participants who used facial pictures	55	16	1	1	1
The number of the participants who used illustrative pictures	61	10	2	0	1

Note. (a) n = 74, (b) number of pictures = the number of each type of pictures used in the students' online forum contributions

6.3.3.3.3 Online forum contributions by the 74 participants from seven tutorial groups

The following paragraphs present the averaged contributions by the seven tutorial groups in which the 74 participants registered. The factors illustrated in the figures included the mean of each tutorial group's online contribution frequency, latency, and length across 12 weeks.

Online contribution frequency

During the semester, the participants in seven groups sent around one or two posts to the online forums each week. In week 9, the participants in Group 7 contributed four to five times to the forums averagely, which was much higher than all the other groups (Figure 6.13).

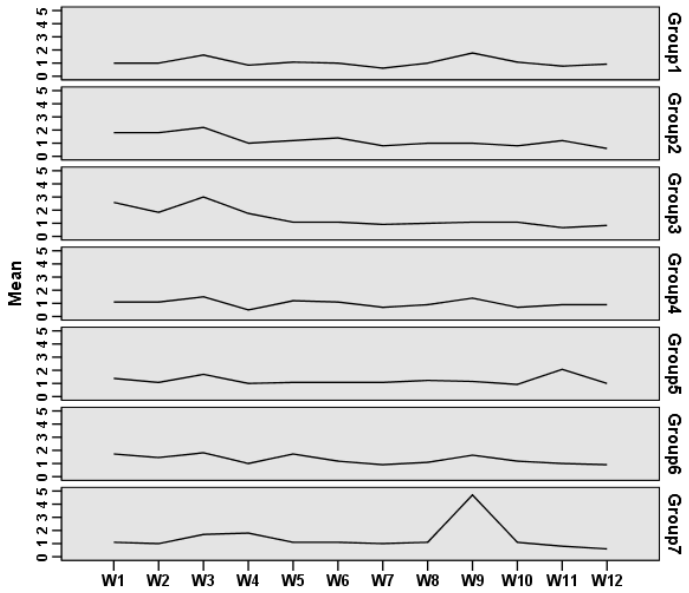

Figure 6.13 Frequency of the online forum contributions among the seven groups, n = 74, *W* = week, *Mean* = the average number of the posts sent by each group

Latency

At the beginning of the semester, the participants in Group 2 and Group 3 replied to the online forums more quickly than other groups. In week 4, the participants in Group 7 were the earliest to contribute to the online forum. During the following two weeks (week 5 and week 6), the participants in all groups generally took longer to reply to the forum questions. Toward the end of the semester, the latency for the participants' responses to the forum in each group tended to be similar to each other (Figure 6.14).

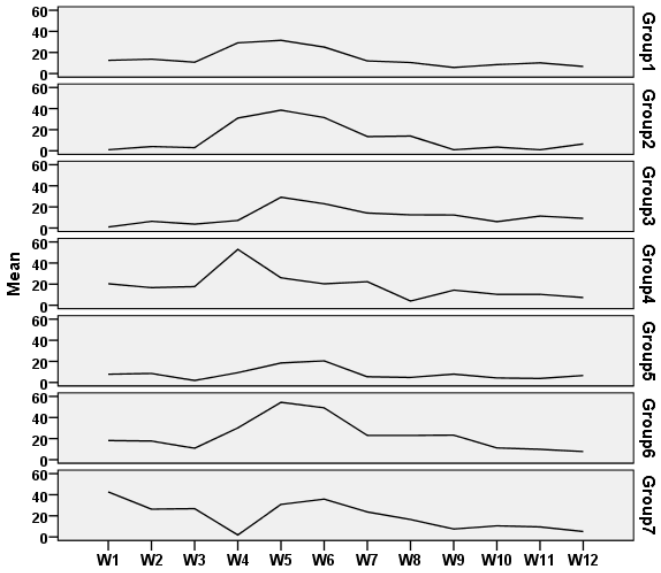

Figure 6.14 Latency of the online forum contributions among the seven groups, n = 74, W = week, *Mean* = the averaged days that the students of each group took to respond to the online forums

Length

The contribution length for all seven groups was about or more than 200 words for most of the weeks. In week 3, week 4, and week 9, the participants posted longer contributions to the forums. By the end of the semester, the average length of the participants' posts in each group decreased (Figure 6.15).

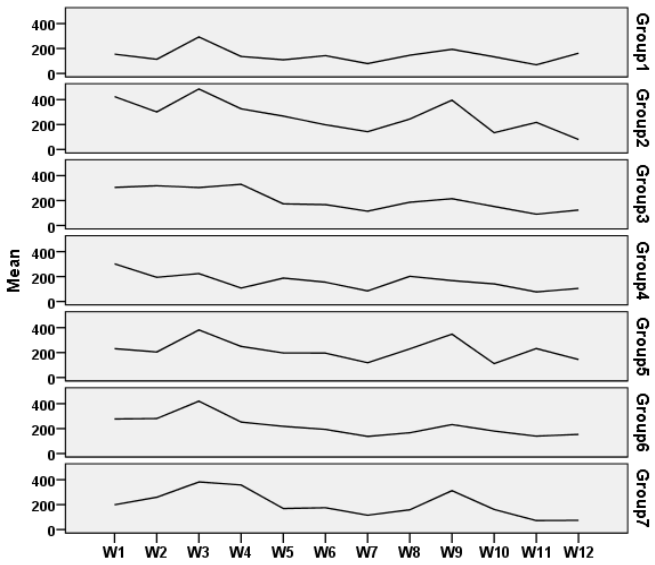

Figure 6.15 Length of the online forum contributions among the seven groups, *n* = 74, *W* = week, *Mean* = the averaged word length of the posts sent by each group

6.3.3.4 Summary of Section 6.3.3

Section 6.3.3 presented the descriptive results of the participants' weekly reports and their online forum contributions. The next sections examine the changes in the participants' attitudes toward online learning and investigate which factors would influence their learning outcomes and attitudes measured at T2.

6.4 Comparison of the 94 participants' ICT experiences and attitudes between T1 and T2

The 94 participants' ICT experiences and attitudes measured at T2 were compared with those at T1 by running paired sample *t*-test. There was no significant change in their ICT experiences from T1 to T2. The participants became more positive by the end of the course in terms of their attitudes toward ICT usage, the subject area, and online learning in general. The generalized attitude in the course also changed in a positive direction at a significant level (Table 6.26).

Table 6.26

Paired Samples T-test: Comparison of the Attitudes between T1 and T2

	Possible maximum	Mean (*SD*) T1	Mean (*SD*) T2	*t*	*Sig.*(2-tailed)	Effect size
ICT attitudes	28	23.22 (2.9)	23.91 (3.0)	2.19	.031*	0.33
Subject area attitudes	28	20.24 (2.6)	20.88 (2.9)	2.47	.015*	0.37
Online learning components attitudes	44	33.72 (4.3)	33.74 (4.2)	.05	.963	0.01
Traditional learning components attitudes	28	21.61 (3.3)	22.16 (3.3)	1.89	.062	0.30
Online learning attitudes	24	33.03 (4.4)	34.83 (4.8)	4.10	.000**	0.63
Generalized attitudes	120	89.49 (9.6)	92.67 (9.5)	3.55	.001**	0.54

Notes. (a) $n = 94$, (b) The figures in this table represent the means with deviation in parentheses, (c) Effect sizes were calculated on the basis of Cohen's (1977) procedure for means testing on correlated samples (repeated measures).

6.5 Factors which influenced the participants' learning outcomes

This section presents the results concerning the factors which influenced the participants' learning outcomes. The factors in the 74 participants' responses to the pre- and posttest and the variables of the weekly reports and online forum contributions were analysed, in order to (a) investigate which factors at T1 could predict the participants' learning outcomes; and (b) whether the effect would be mediated through the variables of the weekly reports and online forum contributions.

Firstly, correlations were run between the participants' learning outcomes, the factors at T1 (i.e., course expectations, prior experiences, prior attitudes, self-control, and self-regulation), and the variables of the weekly reports and online forum contributions (See Section 6.5.1 and 6.5.2). It was found that the participants' course expectations, prior experiences, and prior attitudes (at T1) did not significantly correlate with their learning outcomes.

The participants' learning outcomes were significantly correlated with self-control, self-regulation, and some variables of the weekly reports and online forum contributions (Table 6.27). Factor analysis was run on the variables of the weekly reports and online forum contributions. A new construct was developed and labelled as "course participation". It was found that the participants' learning outcomes were significantly influenced by self-control and self-regulated learning, whose impact was mediated through course participation.

Self-regulation was analysed with self-control, course participation, and learning outcomes in two ways. Firstly, the participants' responses to the questions of self-regulation were coded

as the frequency of their application of self-regulated learning strategies. The effects of self-control and the frequency of self-regulatory strategy application on the participants' learning outcomes were presented in Section 6.5.3. Secondly, it was apparent that self-regulated learning was defined in terms of four measured factors (metacognitive awareness, self-management, intrinsic orientation, and performance orientation) (See Section 6.2.3). The impact of the four factors of self-regulation on the participants' learning outcomes was illustrated in Section 6.5.4. In Section 6.5.5, the combined model of the influence of self-control and the four factors of self-regulation on the participants' learning outcomes was developed. The detailed results regarding the relationships between self-control, self-regulation, course participation, and learning outcomes are presented as below.

6.5.1 Correlations between self-control and the participants' learning outcomes

The correlation analysis showed that the participants' learning outcomes were significantly correlated with their dispositional self-control and certain variables of the weekly reports and online forum contributions, including (a) online forum contribution frequency (the total number of the posts sent to the forums by the participants); (b) online forum contribution length (the aggregated words of the participants' posts to the forums); (c) weekly report frequency (the number of weekly reports submitted by the participants); (d) online hours (number of hours spent online for the course per week); (d) positive comments (number of positive comments on the course reported in the weekly reports); and (e) difficulty level (perceived course difficulty level reported in the weekly reports) (Table 6.27).

Table 6.27

Pearson Correlations between Learning Outcomes, Self-control, and the Variables of the Weekly Reports and Online Forum Contributions

	2	3	4	5	6	7	8	9
1. Learning outcomes	.25*	.51**	.52**	.25*	.26*	.27*	.14	.22*
2. Self-control	–	.23*	.19	.05	.17	.14	-.19	-.01
3. Forum contribution frequency		–	.61**	.25*	25*	.34**	.25*	.07
4. Forum contribution length			–	.32**	.23*	.35**	.29*	.06
5. Weekly report frequency				–	.16	.90**	.66**	.09
6. Online hours					–	.21	.14	.28*
7. Positive ratings						–	.59**	.14
8. Negative ratings							–	.18
9. Difficult level								–

Notes. (a) $n = 74$, *(b)* * $p<.05$, ** $p<.01$.

6.5.2 The construct development of course participation

Course participation was defined through using the PLS algorithm. This model has the advantage of basing calculations on standard scores prior to computation. It was found that a coherent construct was able to be identified, based on the following indices: online forum contribution frequency, online forum contribution length, weekly report frequency, and online hours. Running the model disclosed acceptable coefficient for both average variance extraction indices and Cronbach Alpha (AVE = .48, Cronbach Alpha = .63).

Therefore, course participation was indexed by four independent factors: (a) online forum contribution frequency; (b) online forum contribution length; (c) weekly report frequency; and (d) online hours. At the outset, it was unclear if these factors could each be interpreted as the components of single construct of course participation. SmartPLS was then used in order to investigate the construct in two ways: (a) traditional reflective method; and (b) formative assessment principle. The notion behind the formative assessment is that the component items do not necessarily need to correlate. This aspect is important since course participation may be conceived of an aggregate of different components during learning process.

However, in the current dataset, the PLS analysis indicated that a satisfactory resolution was achieved through traditional reflective method. Importantly, the PLS modelling indicated that the reflective methods allowed an internal Alpha coefficient of .63. Moreover, when the factor of course participation was included in structural equation modelling (SEM) involving other factors (e.g., self-control and learning outcomes), average variance extraction (AVE) statistic of .48 emerged. The AVE figure represented an important index for PLS calculation, since the construct of course participation was well described by its indicators.

The PLS calculation indicated the loadings for the four components of course participation: online forum contribution frequency (0.83), online forum contribution length (0.85), weekly report frequency (0.52), and online hours (0.50). Table 6.28 presents the latent variable score of the factor "course participation" as obtained from PLS results. Figure 6.16 illustrates the distribution of the participants' course participation.

Table 6.28

Descriptive Information: Course Participation (PLS Scale Score)

	Mean	Median	*SD*	Skewness	Kurtosis	Minimum	Maximum
Course participation	8.82	8.63	2.73	.78	1.08	4	18

Note. (a) $n = 74$, (b) These values are generated by the PLS program following on from its internal factor analysis. As such, they have no absolute meaning other than the values used for computational purposes.

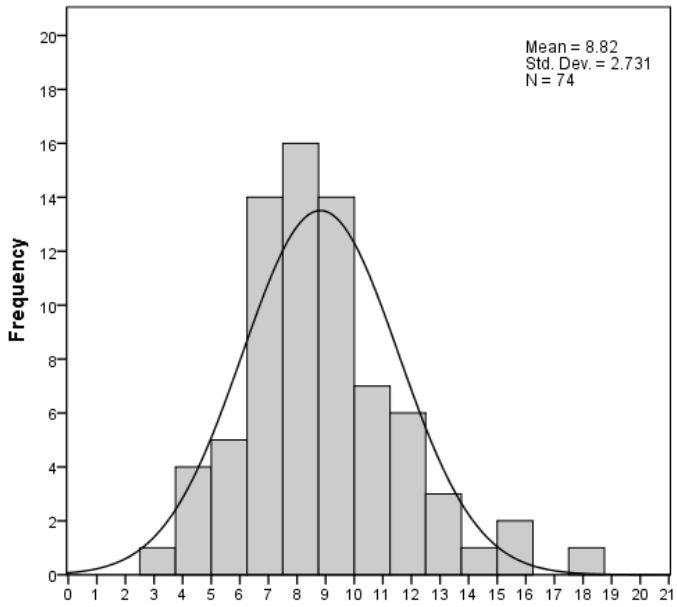

Figure 6.16 Histogram of course participation defined by PLS scale score

6.5.3 The influence of self-control on the participants' learning outcomes

After the new construct — course participation was developed, the prediction of self-control on the participants' learning outcomes, which was mediated through course participation, was examined by correlation and PLS model. In addition, self-regulation was entered in PLS model to investigate whether the influence of self-control would also be mediated through self-regulation. The following sections present the results about the relationship between self-control, self-regulation, course participation, and learning outcomes.

6.5.3.1 Correlations between self-control, course participation, and learning outcomes

It was found that the participants' learning outcomes were correlated with self-control measured at T1 and course participation at a significant level (Table 6.29)

Table 6.29

Pearson Correlations between Self-control, Course Participation, and Learning Outcomes

	1	2	3
1.Learning outcomes (T2)	–	.25*	.58**
2.Self-control (T1)		–	.23*
3.Course participation			–

Note. (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

6.5.3.2 Path modelling of self-control on the participants' learning outcomes

The relationship between self-control and learning outcomes was investigated using the partial least squares approach (PLS) (Ringle, Wende, & Will, 2005) for path modelling. This procedure enabled the researcher to trace variance through a series of regression analyses which balanced an outer model (the items which defined the constructs) with an inner model (relationships articulated between the constructs). The outer model employed traditional factor analysis procedures and variance extraction methods to ensure integrity of the constructs, and computed factor scores, which were then used to calculate the inner model expressed in terms of regression effects.

The initial model is shown in Figure 6.17. This figure depicts the expected relationships between self-control, course participation, and learning outcomes, as based upon the initial expectations. This form of descriptive modelling operates on an exploratory basis, as distinct from other forms of structural equation modelling which were based on confirmatory principles rather than regression. Thus, instead of testing a prior theory, one advantage of the PLS approach is that it allows sequences to be depicted in terms of descriptive relationships, which represent variance analyses in terms of both direct and indirect effects. The procedures were reviewed in depth in the handbook by Esposito Vinzi, Chin, Henseler, and Wang (2010).

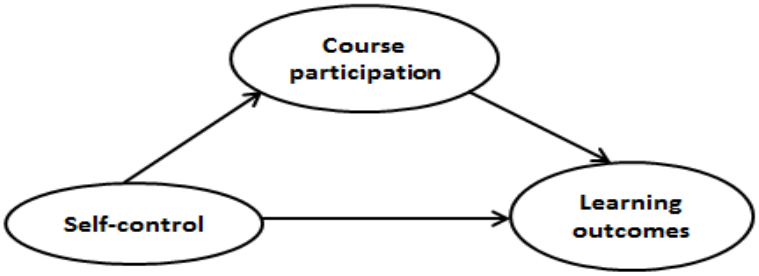

Figure 6.17 The initial model of the impact of self-control on the participants' learning outcomes

Figure 6.18 presents the final depiction of the significant pathways of the relationships between self-control, course participation, and learning outcomes. All variables were entered into analysis, consistent with Figure 6.17. Non-significant pathways were trimmed to produce a parsimonious and descriptive model. Thirty-four percent of the variance in learning outcomes was predicted by the variables of self-control and course participation (R^2 = .34). In the final path modelling, self-control had a direct influence on course participation. However, the direct influence of self-control on learning outcomes was not significant, as the effect was mediated through course participation. The direct and indirect effects of self-control on the participants' learning outcomes accounted respectively 46% and 54% of the relationship (Table 6.30).

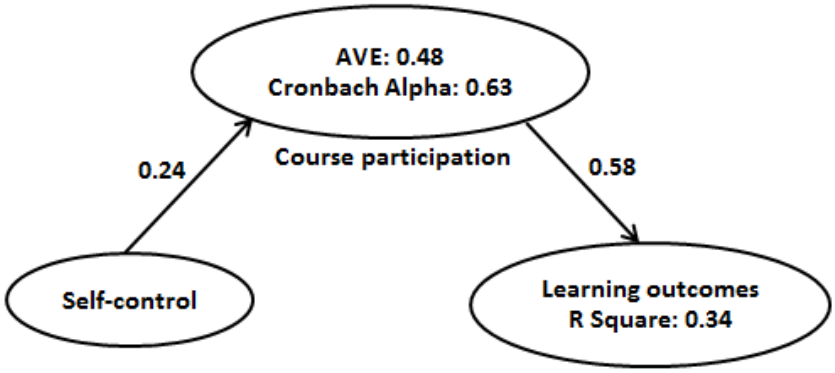

Figure 6.18 The final model of the relationships between self-control, course participation and the participants' learning outcomes

Table 6.30

Mediation Analysis: Impact of Self-control on the Participants' Learning Outcomes

Bivariate correlation	.246
Total effect accounted for in the PLS model	.246
Direct effect (self-control to learning outcomes)	.114 (46%)
Indirect effect mediated through course participation	.132 (54%)

Note: The percentage figures refer to percentage of the variance accounted for with regard to direct and indirect effects. The indirect effects account for 54% of the relationship.

6.5.3.3 The influence of self-control on the participants' learning outcomes mediated through self-regulated learning and course participation

In addition to the investigation on the impact of self-control on the participants' learning outcomes in the above section, the impact of self-regulation on learning outcomes was tested together with self-control. In the present section, all 49 items of self-regulation were computed into one variable as "strategy frequency", which indicated how many self-regulated learning strategies the participants reported to use for their learning.

As the 49 items of self-regulation were based on the scale from "1 = Not like me at all" to "5 = Very much like me" with "3 = Unsure" as the middle point, these items were recoded by interpreting the responses as either acceptance (response of "4" or "5") or non-acceptance (response of "1", "2", or "3"). Therefore, the participants' answers to the 49 questions could be recoded as acceptance or non-acceptance of the application of self-regulated learning strategies. The instances of acceptances were calculated as the number of self-regulated learning strategies that the participants applied. This created an index of how many strategies each participant endorsed as the characteristic of his or her study pattern and the new variable was labelled as "strategy frequency". The computing of the distribution of "strategy frequency" was performed among the 94 participants and they endorsed strategies ranging from "minimum = 6" to "maximum = 39" with the mean of 24.36, median of 24.5, and SD of 7.87.

Regarded as a background personality trait and particular learning strategies respectively, self-control and self-regulated learning (indicated as "strategy frequency") were tested together in PLS model to help specify the relationships between self-control, strategy frequency, course participation, and learning outcomes. The results are elaborated in the following sections.

6.5.3.3.1 The correlations between self-control, strategy frequency, course participation, and learning outcomes

It was found that self-control, strategy frequency, course participation, and learning outcomes were significantly correlated with each other (Table 6.31).

Table 6.31
Pearson Correlations between Self-control, Strategy Frequency, Course Participation, and Learning Outcomes

	1	2	3	4
1. Learning outcomes	–	.25*	.32**	.58**
2. Self-control		–	.43**	.23*
3. Strategy frequency			–	.33**
4. Course participation				–

Note. (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

6.5.3.3.2 Path modelling of determinants (self-control and self-regulated learning) on the participants' learning outcomes

The relationships between self-control, self-regulated learning indexed by strategy frequency, course participation, and learning outcomes were investigated using the partial least squares approach (PLS) for path modelling. As based upon the initial expectations, the initial model depicted the expected relationships between self-control, strategy frequency, course participation, and learning outcomes (Figure 6.19).

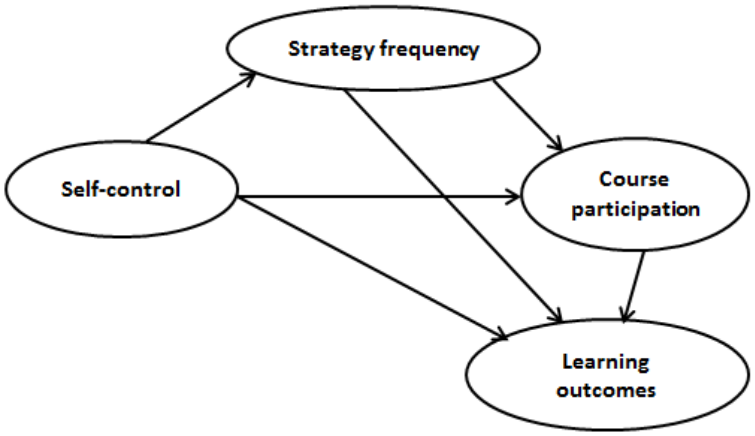

Figure 6.19 The initial model of the impact of self-control and strategy frequency on the participants' learning outcomes

Figure 6.20 presents the significant and non-significant pathways of the relationships between self-control, strategy frequency, course participation, and learning outcomes. All variables were entered into analysis, consistent with Figure 6.19.

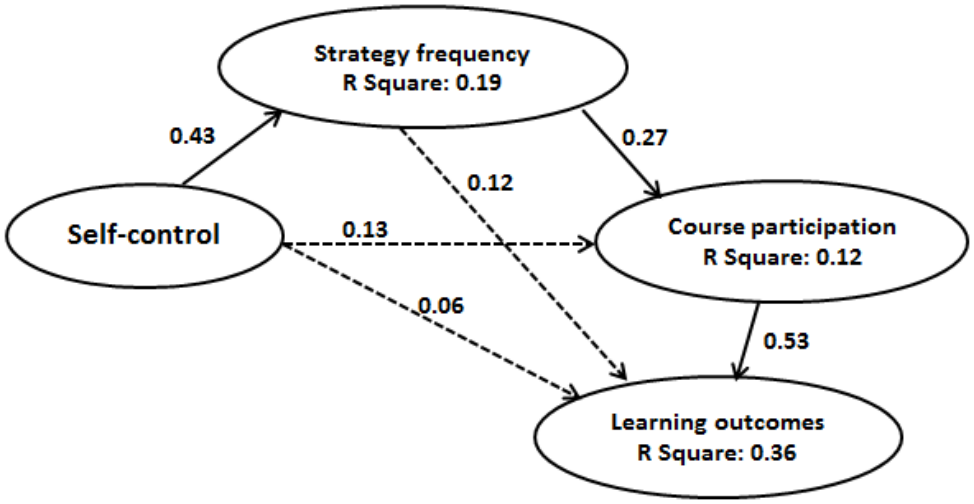

Figure 6.20 The complete model of the impact of self-control and strategy frequency on the participants' learning outcomes (Dash arrow = non-significant path)

In the final path modelling (Figure 6.21), non-significant pathways were trimmed to produce a parsimonious and descriptive model. Self-control had a direct influence on strategy frequency. However, the direct path from self-control to learning outcomes was not significant, as the effect was mediated through strategy frequency and course participation. Thirty-three percent of the variance in learning outcomes was predicted by the variables of self-control, strategy frequency, and course participation (R^2 = .33). The direct and indirect effects of self-control on the participants' learning outcomes accounted respectively 30% and 70% of the relationship (Table 6.32).

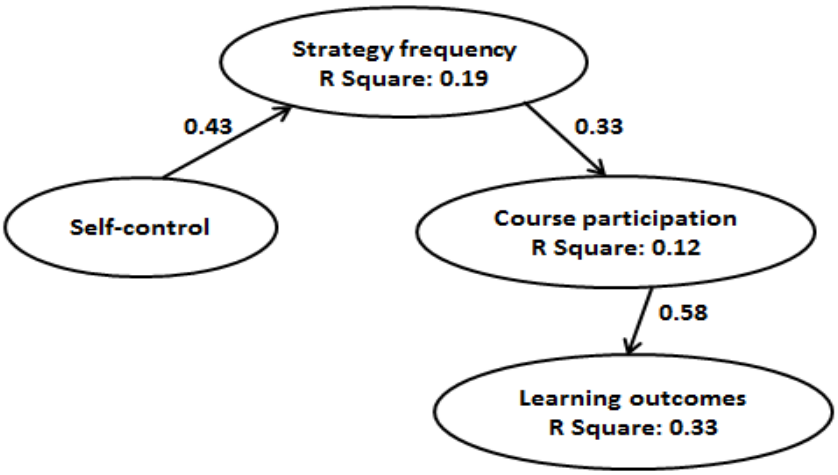

Figure 6.21 The final model of the relationships between self-control, strategy frequency, course participation, and learning outcomes

Table 6.32

Mediation Analysis: Impact of Self-control and Strategy Frequency on Learning Outcomes

Bivariate correlation	.245
Total effect accounted for in the PLS model	.245
Direct effect (self-control to learning outcomes)	.073 (30%)
Indirect effect mediated through strategy frequency and course participation	.062 (25%)
Indirect effect mediated through strategy frequency	.051 (21%)
Indirect effect mediated through course participation	.059 (24%)

Note: The percentage figures refer to percentage of the variance accounted for with regard to direct and indirect effects. The indirect effects account for 70% of the relationship.

6.5.4 The influence of the four factors of self-regulation on the participants' learning outcomes

After the complete model of self-control, strategy frequency, course participation, and the learning outcomes was conducted in the above section, self-regulated learning was tested again as a construct of four factors in PLS model. Based on the factor analysis, the four factors of self-regulated learning were generated as intrinsic orientation, performance orientation, metacognitive awareness, and self-management. A new model of the detailed construct of self-regulation and its impact on the participants' course participation and learning outcomes was tested.

6.5.4.1 Correlations between self-regulated learning, course participation, and learning outcomes

The participants' learning outcomes were significantly related to course participation, four factors of self-regulated learning — metacognitive awareness, self-management, intrinsic orientation, and performance orientation (Table 6.33).

Table 6.33
Pearson Correlations between the Four Factors of Self-regulated Learning, Course Participation, and Learning Outcomes

	1	2	3	4	5	6
1.Metacognitive awareness	–	.41**	.32**	.40**	.36**	.28*
2.Self-management		–	.26*	.28*	.31**	.34**
3.Intrinsic orientation			–	.37**	.17	.32**
4.Performance orientation				–	.26*	.29*
5.Course participation					–	.58**
6.Learning outcomes						–

Note. (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

6.5.4.2 Path modelling of the four factors of self-regulation on the participants' learning outcomes

A PLS model was run again to test the predictive influence of the participants' self-regulated learning and course participation on their learning outcomes. The initial model (Figure 6.22) described the initially expected relationships between the four factors of self-regulation, course participation, and learning outcomes.

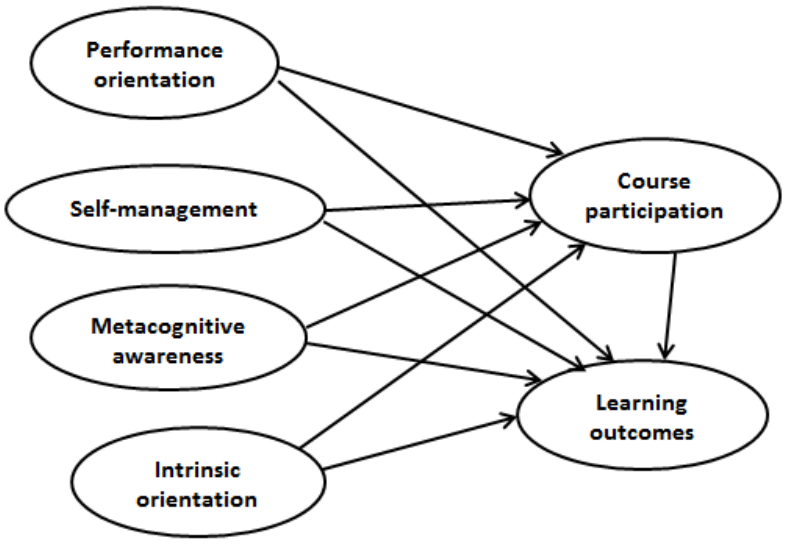

Figure 6.22 The initial model of the impact of the four factors of self-regulated learning on the participants' learning outcomes

Figure 6.23 presents the final depiction of the significant pathways of the relationships between self-regulation, course participation, and learning outcomes. All variables were entered into analysis, consistent with Figure 6.22. Non-significant pathways were trimmed to produce a parsimonious and descriptive model. Forty percent of the variance in learning outcome was predicted by self-regulation and course participation (R^2 = .40).

In the final path modelling, intrinsic orientation had a direct influence on learning outcomes. However, the direct paths from the other three factors of self-regulation (i.e., performance orientation, self-management, and metacognitive awareness) to learning outcomes were not significant, as the effects of these three factors were mediated through course participation. The direct and indirect effects of self-regulated learning on the participants' learning outcomes are demonstrated in Table 6.34.

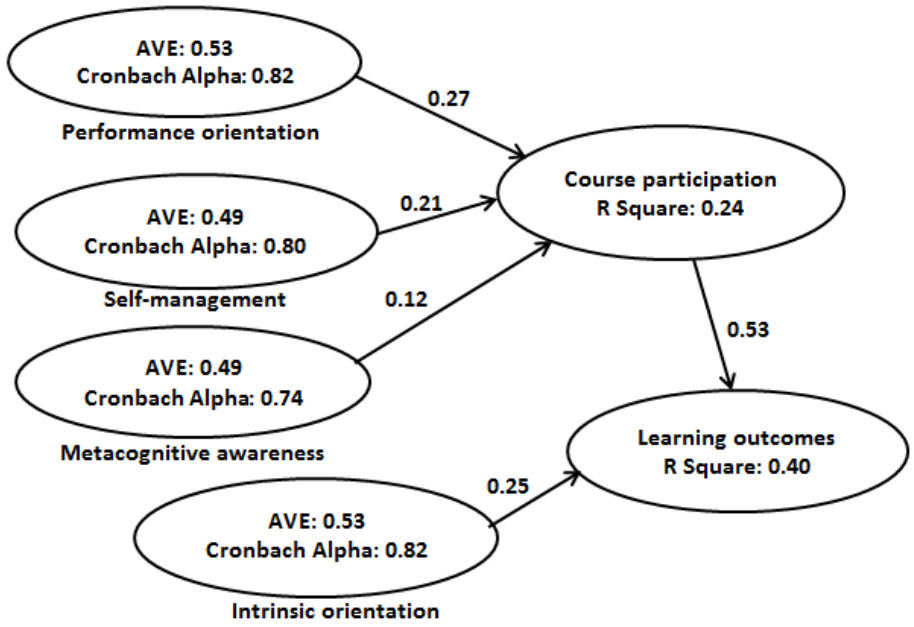

Figure 6.23 The final model of the impact of the four factors of self-regulated learning on the participants' learning outcomes

Table 6.34

Mediation Analysis: Impact of Self-regulation on Learning Outcomes

Performance orientation	
Bivariate correlation	.288
Total effect accounted for in the PLS model	.141
Direct effect (performance orientation to learning outcomes)	.030 (21%)
Indirect effect mediated through course participation	.111 (79%)
Self-management	
Bivariate correlation	.337
Total effect accounted for in the PLS model	.26
Direct effect (self-management to learning outcomes)	.16 (62%)
Indirect effect mediated through course participation	.10 (38%)
Metacognitive	
Bivariate correlation	.280
Total effect accounted for in the PLS model	.07
Direct effect (metacognitive awareness to learning outcomes)	.0
Indirect effect mediated through course participation	.07
Intrinsic orientation	
Bivariate correlation	.322
Total effect accounted for in the PLS model	.21
Direct effect (intrinsic orientation to learning outcomes)	.21
Indirect effect mediated through course participation	.0

Note. The percentage figures refer to percentage of the variance accounted for with regard to direct and indirect effects.

6.5.5 Combining two models of self-control and the four factors of self-regulation

Self-control and the four factors of self-regulation were tested together in another PLS model (Figure 6.24). It was found that, except intrinsic orientation, the other three factors of self-regulation were significantly predicted by self-control, such as (a) performance orientation; (b) self-management; and (c) metacognitive awareness. The effects of self-control and the above-mentioned three factors of self-regulation on learning outcomes were mediated through the participants' course participation. Intrinsic orientation was found to have a direct significant impact on the participants' learning outcomes.

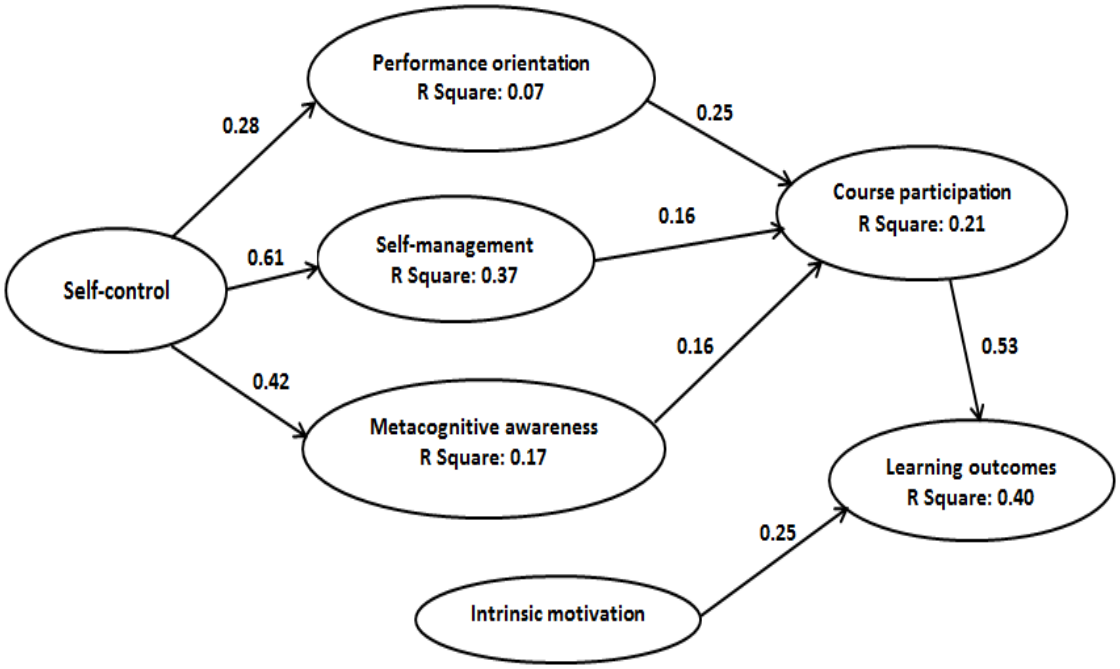

Figure 6.24 The model of the impact of self-control and the four factors of self-regulated learning on the participants' learning outcomes

6.5.6 Summary of Section 6.5

Section 6.5 presented the findings concerning the factors which significantly influenced the participants' learning outcomes by the end of the course. It was found that the participants' learning outcomes were significantly predicted by self-control, self-regulation, and course participation. The impact of self-control on their learning outcomes was mediated through self-regulated learning and course participation.

6.6 Factors which influenced the participants' attitudes at T2

The analysis on the factors which would influence the participants' attitudes at T2 was based on the data from the 74 participants' responses to the pre- and posttest and course participation. It was found that the participants' attitudes toward various aspects of the course at T2 were significantly influenced by their attitudes at T1 and motivational components of self-regulation. However, course participation did not significantly predict the participants' attitudes at T2.

In order to further test the influence of motivation on the participants' attitude changes from T1 to T2, the 94 participants, who completed both pre- and posttest, were divided into two groups with higher and lower scores of motivation. Paired sample *t*-test indicated that the

participants' with higher levels of motivation showed more positive changes in their attitudes at T2. Hence, motivation was found to contribute to the participants' attitude changes at T2. The detailed findings are provided as below.

6.6.1 Attitudes toward ICT usage at T2

The participants' ICT usage attitudes at T2 were correlated with several factors measured at T1, such as (a) their prior attitudes toward ICT usage, the subject area, and online learning components; (b) prior generalized attitudes; and (c) performance orientation (Table 6.35). Regression analysis showed that the participants' ICT usage attitudes at T2 were predicted by their prior attitudes toward ICT usage and the subject area at T1 and performance orientation together (Table 6.36).

Table 6.35

Pearson Correlations between the Factors at T1 and Attitudes toward ICT Usage at T2

Factors measured at T1	Attitudes toward ICT usage at T2
Attitudes toward ICT usage	.51**
Subject area attitudes	.45**
Generalized attitudes	.42**
Online learning components attitudes	.32**
Performance orientation	.23*

Note. (a) n = 74, (b) * p<.05, ** p<.01.

Table 6.36

Regression on Attitudes toward ICT Usage at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .51, R^2 = .26, *R* Square Change = .26, Sig. *F* Change = .001)					
ICT usage attitudes	.59	.12	.51	4.98	.001
Model 2 (*R* = .56, R^2 = .31, *R* Square Change = .05, Sig. *F* Change = .025)					
ICT usage attitudes	.44	.13	.38	3.32	.001
Subject area attitudes	.34	.15	.26	2.30	.025
Model 3 (*R* = .59, R^2 = .34, *R* Square Change = .04, Sig. *F* Change = .052)					
ICT usage attitudes	.43	.13	.37	3.31	.001
Subject area attitudes	.33	.15	.25	2.26	.027
Performance orientation	.16	.08	.19	1.98	.052

Note. (a) n = 74, (b) dependent variable: the ICT usage attitudes at T2

Based on the regression analysis (Table 6.36), the factors of (a) the attitudes toward ICT usage and the subject area at T1; (b) attitudes toward ICT usage at T2; and (c) performance orientation were tested again in PLS model. It was found that the participants' prior attitudes

toward ICT usage and the subject area and performance orientation significantly predicted their ICT usage attitudes at T2 (Figure 6.25).

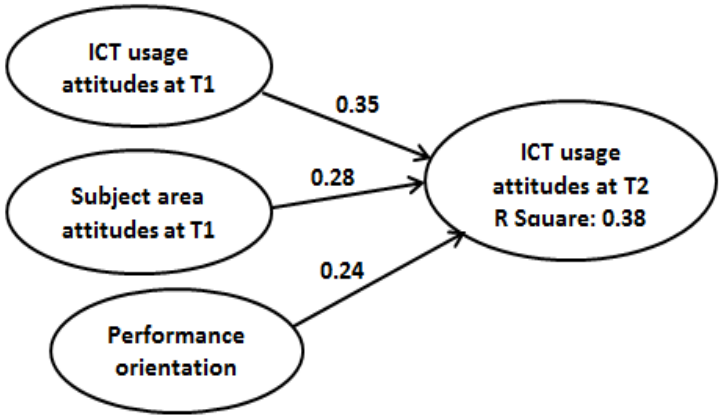

Figure 6.25 PLS model of the influence of ICT usage attitudes at T1, subject area attitudes at T1, and performance orientation on the participants' ICT usage attitudes at T2, n = 74

To investigate the role of performance motivation, high and low performance orientation groups were generated using a median split procedure among the 94 participants. One-way ANOVA analysis showed that the participants with higher scores in performance orientation evidenced more positive attitudes toward ICT usage at T2 than those with lower scores, F (1, 92) = 8.85, p = .004 (Table 6.37). The difference in the attitudes toward ICT usage among the two groups was not significant at T1. However, it was shown that the difference in ICT usage attitudes at T2 was larger than that at T1 (Figure 6.26 in Appendix 5).

Table 6.37
Comparison of Attitudes toward ICT Usage at T1 and T2 between the Two Groups (High and Low in Performance Orientation)

	Sum of squares	*F*	*Sig.*
ICT usage attitudes T1	17.50	2.07	.153
Subject area attitudes T1	5.39	.81	.371
ICT usage attitudes T2	71.86	8.85	.004**

Note. (a) n = 94

6.6.2 Attitudes toward the subject area at T2

The participants' attitudes toward the subject area at T2 were significantly correlated with their attitudes at T1 (i.e., attitude toward ICT usage, the subject area, online and traditional learning components, and online learning, and generalized attitudes), prior subject area experiences measured at T1, and intrinsic orientation (Table 6.38). A regression analysis indicated that the participants' prior subject area attitudes and intrinsic orientation predicted their attitudes toward the subject area at T2 (Table 6.39).

Table 6.38

Pearson Correlations between the Factors at T1 and Subject Area Attitudes at T2

Factors measured at T1	Subject area attitudes at T2
Subject area attitudes	.60**
Generalized attitudes	.51**
Online learning components attitudes	.42**
Subject area experiences	.41**
ICT usage attitudes	.39**
Intrinsic orientation	.38**
Online learning attitudes	.29*
Traditional learning components attitudes	-.26*

Note. (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

Table 6.39

Regression on Attitudes toward the Subject Area at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .59, R^2 = .35, *R* Square Change = .35, Sig. *F* Change = .001)					
Subject area attitudes	.67	.10	.59	7.00	.001
Model 2 (*R* = .66, R^2 = .44, *R* Square Change = .09, Sig. *F* Change = .001)					
Subject area attitudes	.59	.09	.52	6.54	.001
Intrinsic orientation	.24	.06	.31	3.89	.001

Note. (a) $n = 74$, (b) dependent variable: subject area attitudes at T2

Through the test by PLS model, it was found that the subject area attitudes at T1 and intrinsic orientation significantly influence the participants' subject area attitudes at T2 (Figure 6.27).

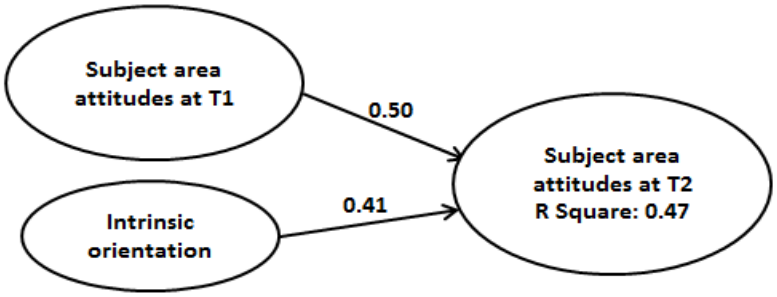

Figure 6.27 PLS model of the influence of the subject area attitudes at T1 and intrinsic orientation on the subject area attitudes at T2, n = 74

Two groups with higher and lower levels of intrinsic orientation were generated among the 94 participants using a median split procedure. It was then found through One-way ANOVA that the participants who scored higher in intrinsic orientation showed more positive attitudes toward the subject area at T2 than those with lower intrinsic orientation, F (1, 79) = 5.88, p = .018, to T2, F (1, 79) = 14.40, p = .001 (Table 6.40). It was shown that there was a significant difference in the subject area attitudes between the two groups at both T1 and T2, but the difference was larger at T2 than T1 (Figure 6.28 in Appendix 5).

Table 6.40

Comparison of Attitudes toward the Subject Area at T1 and T2 between the Two Groups (High and Low in Intrinsic Orientation)

	Sum of squares	*F*	*Sig.*
Subject area attitudes T1	38.77	5.88	.018*
Subject area attitudes T2	112.01	14.40	.001**

Note. (a) n = 94

6.6.3 Attitudes toward online learning components at T2

The participants' attitudes toward online learning components at T2 were strongly correlated with several factors at T1, such as prior attitudes toward online learning component, the subject area, ICT usage, and online learning, prior generalized attitudes, course expectations, intrinsic orientation, performance orientation, and metacognitive awareness (Table 6.41). Regression analysis indicated that the participants' online learning components attitudes at T2 were significantly predicted by their prior online learning components attitudes and intrinsic orientation together (Table 6.42).

Table 6.41

Pearson Correlations between the Factors at T1 and Online Learning Components Attitudes at T2

Factors measured at T1	Online components attitudes at T2
Online learning components attitudes	.52**
Generalized attitudes	.42**
Intrinsic orientation	.31**
Performance orientation	.28*
Subject area attitudes	.28*
ICT usage attitudes	.27*
Online learning attitudes	.27*
Course expectations	.25*
Metacognitive awareness	.23*

Note. (a) n = 74, (b) * p<.05, ** p<.01.

Table 6.42

Regression on Attitudes toward Online Learning Components at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .52, R^2 = .27, *R* Square Change = .27, Sig. *F* Change = .001)					
Online learning components attitudes	.54	.11	.52	5.15	.001
Model 2 (*R* = .57, R^2 = .33, *R* Square Change = .06, Sig. *F* Change = .017)					
Online learning components attitudes	.51	.10	.49	4.94	.001
Intrinsic orientation	.25	.10	.24	2.45	.017

Note. (a) n = 74, (b) dependent variable: online components attitudes at T2

The factors were tested in PLS model. It was found that the effects of online learning components attitudes at T1 and intrinsic orientation on the participants' attitudes toward online learning components at T2 were significant (Figure 6.29).

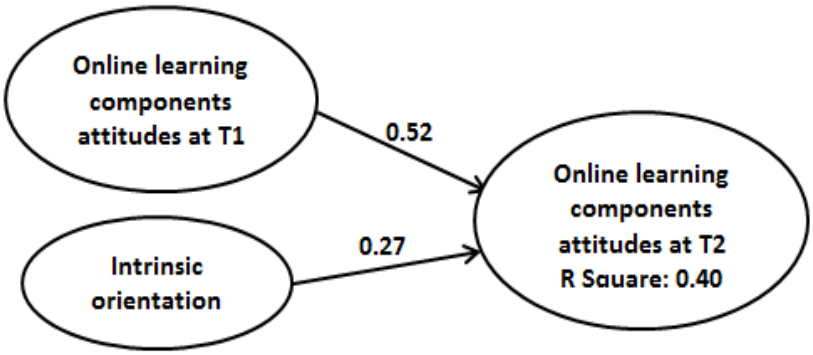

Figure 6.29 PLS model of the influence of the online components attitudes at T1 and intrinsic orientation on the online component attitudes at T2, n = 74

Two groups (higher and lower in intrinsic orientation) among the 94 participants were compared on their online learning components attitudes at both T1 and T2. The results from One-way ANOVA indicated that the participants who were higher in intrinsic orientation showed more positive attitudes toward online learning components at T2 than those in the lower group, F (1, 79) = 8.50, p = .005 (Table 6.43). This difference between the two groups was not significant at T1. However, the difference in online learning components attitudes between the higher and lower intrinsic orientation groups became larger at T2 (Figure 6.30 in Appendix 5).

Table 6.43
Comparison of Online Learning Components Attitudes at T1 and T2 between the Two Groups (High and Low in Intrinsic Orientation)

	Sum of squares	*F*	*Sig.*
Online learning components attitudes T1	15.31	.80	.375
Online learning components attitudes T2	143.80	8.50	.005**

Note. (a) n = 94

6.6.4 Attitudes toward traditional learning components at T2

The participants' attitudes toward traditional learning components at T2 were significantly correlated with their prior traditional learning components attitudes, metacognitive awareness, self-control, and prior online learning attitudes measured at T1 (Table 6.44). Based on the results of regression, only one factor — the participants' traditional learning component attitudes at T1 significantly predicted their attitudes toward traditional learning components at T2, β = .70, t (72) = 8.37, R^2 = .49, F (1, 72) = 70.10, p < .001. The other factors listed did not statistically add to this effect.

Table 6.44
Pearson Correlations between the Factors at T1 and Attitudes toward Traditional Learning Components at T2

Factors measured at T1	Traditional learning components attitudes at T2
Traditional learning components attitudes	.70**
Metacognitive awareness	.27*
Self-control	.27*
Online learning attitudes	-.26*

Note. (a) n = 74, (b) * p<.05, ** p<.01.

From T1 to T2, the majority of the participants were positive toward both online and traditional learning components. There was no significant difference between their attitudes toward the two modes of learning components. At T1, 94% and 95% of the participants were positive toward traditional and online learning components respectively. At T2, the situation remained approximately the same — 94% and 96% among the participants held favourable attitudes toward traditional and online learning components respectively.

6.6.5 Attitudes toward online learning attitudes at T2

The participants' attitudes toward online learning at T2 were correlated with several factors at T1, such as prior attitudes toward online learning, the subject area, online learning components, and ICT usage, prior generalized attitudes, course expectations, intrinsic orientation, and performance orientation (Table 6.45).

Table 6.45

Pearson Correlations between the Factors at T1 and Attitudes toward Online Learning at T2

Factors measured at T1	Online learning attitudes at T2
Online learning attitudes	.62**
Generalized attitudes	.54**
Online learning components attitudes	.44**
Intrinsic orientation	.33**
Subject area attitudes	.31**
Course expectations	.295*
Performance orientation	.28*
ICT usage attitudes	.28*

Note. (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

However, a regression analysis indicated that the participants' online learning attitudes at T2 were not significantly predicted by course expectations, prior ICT attitudes, prior attitudes toward the subject area, prior online learning components attitudes, and prior generalized attitudes.

The predictors for the participants' online learning attitudes at T2 were their prior online learning attitudes, intrinsic orientation, and performance orientation (Table 6.46). When the participants' attitudes toward online learning at T1 were controlled, the motivational components in self-regulation (i.e., intrinsic and performance orientation) influenced their

attitudes toward online learning at T2 at a significant level. This indicated that motivation significantly predicted the participants' online learning attitude changes from T1 to T2.

Table 6.46

Regression on Attitudes toward Online Learning at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .62, R^2 = .38, *R* Square Change = .38, Sig. *F* Change = .001)					
Online learning attitudes	.63	.09	.62	6.68	.001
Model 2 (*R* = .70, R^2 = .49, *R* Square Change = .10, Sig. *F* Change = .001)					
Online learning attitudes	.62	.09	.61	7.22	.001
Intrinsic orientation	.38	.10	.32	3.77	.001
Model 3 (*R* = .72, R^2 = .52, *R* Square Change = .03, Sig. *F* Change = .034)					
Online learning attitudes	.63	.08	.62	7.44	.001
Intrinsic orientation	.30	.11	.25	2.81	.006
Performance orientation	.25	.11	.19	2.17	.034

Note. (a) *n* = 74, (b) Dependent Variable: online learning attitudes at T2

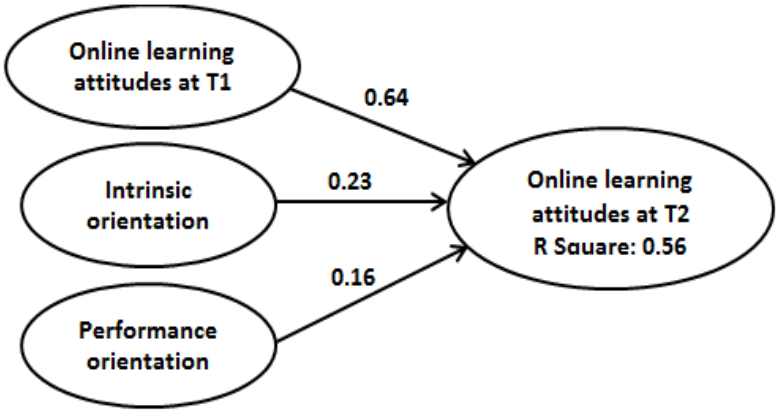

Figure 6.31 PLS model of the influence of online learning attitudes at T1, intrinsic orientation, and performance orientation on the participants' online learning attitudes at T2, *n* = 74

As intrinsic orientation was found to have more significant predictive effect on the participants' online learning attitudes at T2 (Figure 6.31), One-way ANOVA was conducted to test the impact of intrinsic orientation on their online learning attitudes at both T1 and T2 (Table 6.47). The differences in the online learning attitudes at both T1 and T2 between the two groups with higher and lower scores of intrinsic orientation were shown in Figure 6.32 (Appendix 5). The participants in the higher intrinsic orientation group showed more positive changes in their online learning attitudes at T2.

Table 6.47

Comparison of Online Learning Attitudes at T1 and T2 between the Two Groups (High and Low in Intrinsic Orientation)

	Sum of squares	*F*	*Sig.*
Online learning attitudes T1	5.39	.25	.617
Online learning attitudes T2	145.98	6.58	.012*

Note. (a) $n = 94$

6.6.6 Generalized attitudes at T2

The participants' generalized attitudes at T2 were significantly correlated with several factors at T1, including prior generalized attitudes, prior attitudes toward online and traditional learning components, the subject attitudes, online learning, and ICT usage, prior experiences of the subject area, course expectations, intrinsic orientation, and performance orientation (Table 6.48). However, regression analysis showed that the predictors for the participants' generalized attitudes at T2 were their generalized attitudes at T1, intrinsic orientation, and performance orientation (Table 6.49).

Table 6.48

Pearson Correlations between the Factors at T1 and Generalized Attitudes at T2

Factors at T1	Generalized attitudes at T2
Generalized attitudes	.62**
Online learning components attitudes	.55**
Subject area attitudes	.52**
Online learning attitudes	.45**
ICT usage attitudes	.44**
Intrinsic orientation	.34**
Performance orientation	.31**
Experiences with the subject area	.32*
Traditional learning components attitudes	-.24*
Course expectations	.23*

Note: (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

Table 6.49

Regression on Generalized Attitudes at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .62, R^2 = .38, *R* Square Change = .38, Sig. *F* Change = .001)					
Generalized attitudes	.64	.10	.62	6.62	.001
Model 2 (*R* = .70, R^2 = .49, *R* Square Change = .11, Sig. *F* Change = .001)					
Generalized attitudes	.63	.09	.61	7.12	.001
Intrinsic orientation	.80	.21	.33	3.84	.001
Model 3 (*R* = .72, R^2 = .51, *R* Square Change = .03, Sig. *F* Change = .027)					
Generalized attitudes	.62	.09	.60	7.15	.001
Intrinsic orientation	.64	.22	.26	2.92	.005
Performance orientation	.46	.23	.18	1.98	.052

Note. (a) *n* = 74, (b) Dependent Variable: generalized attitudes at T2

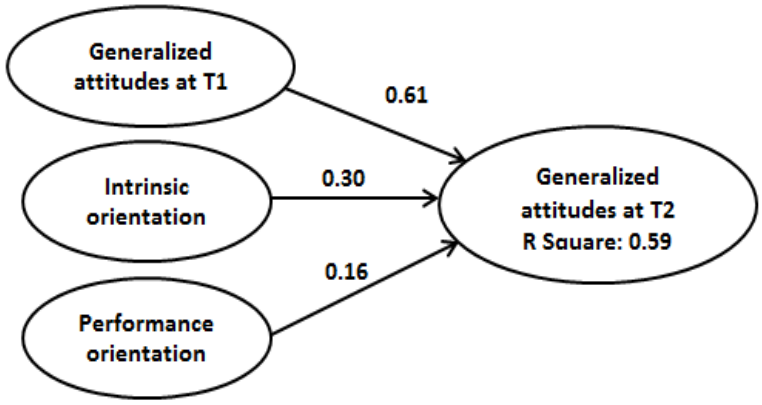

Figure 6.33 PLS model of the influence of the generalized attitudes at T1, intrinsic orientation, and performance orientation on the participants' generalized attitudes at T2, *n* = 74

As intrinsic orientation was found to have more significant predictive effect on generalized attitudes at T2 (Figure 6.33), One-way ANOVA was conducted to test the impact of intrinsic motivation on the generalized attitudes at both T1 and T2 among two groups of participants with higher and lower intrinsic orientation, as shown in Table 6.50. The group with higher levels of intrinsic orientation showed more increases in their generalized attitudes at T2 than the group with lower levels of intrinsic orientation (Figure 6.34 in Appendix 5).

Table 6.50

Comparison of Generalized Attitudes at T1 and T2 between the Two Groups (High and Low in Intrinsic Orientation)

	Sum of squares	*F*	*Sig.*
Generalized attitudes T1	75.07	.763	.385
Generalized attitudes T2	813.01	9.29	.003**

Note. (a) *n* = 94

6.6.7 Summary of Section 6.6

Section 6.5 depicts the findings about the factors which significantly predicted the participants' attitudes toward several aspects in the course at T2 (i.e., attitudes toward ICT usage, the subject area, and online and traditional learning components, online learning attitudes, and generalized attitudes). It was found that the participants' attitudes measured at T2 were significantly predicted by their prior attitude at T1 and motivation. Moreover, the participants with higher levels of motivation showed more positive changes in their attitudes at T2.

6.7 Factors which influenced the participants' ICT experiences at T2

It was showed that the participants' ICT experiences at T2 were significantly correlated with several factors at T1 (i.e., prior ICT experiences, performance orientation, prior attitudes toward ICT usage, course expectations, and metacognitive awareness) and online hours provided in the weekly reports (Table 6.51). As shown by regression analysis, the predictor of the participants' ICT experiences at T2 was found to be their prior ICT experiences at T1, $\beta = .67$, $t\ (72) = 7.56$, $R^2 = .44$, $F\ (1, 72) = 57.16$, $p < .001$.

Table 6.51

Pearson Correlations between the Factors at T1 and the Participants' ICT Experiences at T2

	ICT experience at T2
ICT usage at T1	.67**
Performance orientation	.35**
ICT attitudes at T1	.30*
Course expectations at T1	.28*
Metacognitive awareness	.25*
Online hours	.23*

Note: (a) $n = 74$, (b) * $p<.05$, ** $p<.01$.

6.8 Factors which influenced satisfied course expectations at T2

The participants' satisfied course expectations at T2 were significantly correlated with several factors at T1, such as initial course expectations, prior attitudes toward ICT usage, prior online learning components attitudes, and prior ICT experiences, intrinsic orientation, performance orientation, and metacognitive awareness (Table 6.52). It was found that the

participants' satisfied course expectations at T2 were significantly predicted by intrinsic orientation and initial course expectations at T1 (Table 6.53).

Table 6.52

Pearson Correlations between the Factors at T1 and the Participants' Satisfied Course Expectations at T2

Factors measured at T1	Satisfied course expectations at T2
Intrinsic orientation	.55**
Course expectations	.42**
Performance orientation	.34**
Metacognitive awareness	.34**
Prior ICT usage attitudes	.44**
Prior online components attitudes	.29*
Prior ICT experiences	.24*

Note: (a) n = 74, (b) * p<.05, ** p<.01.

Table 6.53

Regression on Satisfied Course Expectations at T2

Factors measured at T1	*B*	*Std. Error*	*β*	*t*	*Sig*
Model 1 (*R* = .42, R^2 = .18, *R* Square Change = .18, Sig. *F* Change = .001)					
Course expectations	.73	.18	.42	3.96	.001
Model 2 (*R* = .65, R^2 = .42, *R* Square Change = .24, Sig. *F* Change = .001)					
Course expectations	.59	.16	.34	3.72	.001
Intrinsic orientation	.70	.13	.50	5.41	.001

Note. (a) n = 74, (b) Dependent Variable: satisfied course expectation at T2

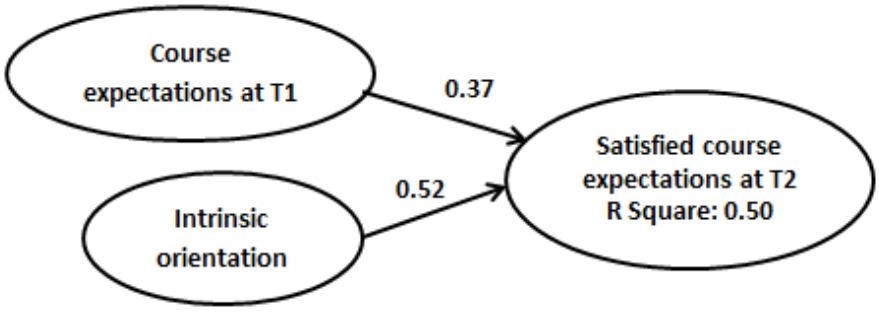

Figure 6.35 PLS model of the influence of course expectations at T1 and intrinsic orientation on the participants' satisfied course expectations at T2, n = 74

The two groups of participants (higher and lower in intrinsic orientation) were compared on their course expectations at T1 and satisfied course expectations at T2 by One-way ANOVA. A significant difference in the satisfied course expectation at T2 was found between the two groups, while the difference at T1 was not evidenced to be significant. It was also found that

the reductions in the satisfied course expectations were significant only for the lower intrinsic group (Table 6.54 and Figure 6. 36 in Appendix 5).

Table 6.54
Comparison of the Course Expectations at T1 and T2 between the Two Groups (High and Low in Intrinsic Orientation)

	Sum of squares	*F*	*Sig.*
Course expectation at T1	22.43	2.11	.151
Satisfied course expectation T2	431.11	16.51	.001**

Note. (a) $n = 94$.

6.9 Factors which influenced the participants' intention for future online learning

The participants' intention for future online learning at T2 was significantly related to their prior attitudes toward traditional learning components at T1 in a negative direction (Table 6.55). Based on the results of regression, the participants' attitudes toward traditional learning components at T1 were found to predict their intention for future online learning, $\beta = -.33$, t (72) = -2.91, $R^2 = .11$, F (1, 72) = 8.48, $p = .005$. In other words, the participants' traditional learning components attitudes at T1 predicted lower intention for future online learning at T2.

Table 6.55
Pearson Correlations between the Participants' Traditional Learning Components Attitudes at T1and Intention for Future Online Learning at T2

	Intention for future online learning
Traditional learning components attitudes at T1	-.28*

Note: (a) $n = 74$, (b) * $p<.05$.

6.10 Summary

This chapter provides detailed findings to the main research questions (i.e., the factors which significantly influenced the participants' learning outcomes and attitudes toward online learning by the end of the course). It was found that the participants' learning outcomes were significantly predicted by self-control, self-regulation, and course participation. The impact of self-control on the participants' learning outcomes was mediated through self-regulation and course participation.

The participants' attitudes toward online learning by the end of the course were significantly predicted by their prior online learning attitudes and motivation (intrinsic and performance orientation). The participants with higher levels of motivation showed more positive changes in their attitudes toward online learning by the end of the course, compared with those with lower levels of motivation.

Chapter 7: Results (II)

This chapter presents the findings based on the participants' answers to the open-ended questions in Phase One (the weekly reports and posttest) and Phase Two (the interviews). Firstly, the results about the participants' answers to the open-ended questions in the weekly reports are presented, which disclose the details of their course experiences. This is followed by the analysis of the participants' answers to the open-ended questions in the posttest. Finally, the themes of the statements provided by the participants in both Positive Change Group and Contrast Group during the interviews are generated.

7.1 Overview

This chapter presents the results analysed from the participants' answers to the open-ended questions in the weekly reports, posttest, and interviews. The results of the participants' answers to the weekly reports are provided in Section 7.2, which consists of the participants' perceived stress from the course, positive and negative attitudinal statements, and learning strategies they applied.

The participants' answers to the open-ended questions in the posttest are reported Section 7.3. The results in Section 7.3 include the participants' intentions for future online learning, perceived suitability of online learning, and suggestions for future online course development from the aspects of students.

Finally, regarding the interview results, themes are generated from the participants' answers to the interview questions and the findings are provided in Section 7.4. The results from the interviews present the participants' self-reported learning experiences through different types of interactions in the course, perceived learning outcomes, attitudinal statements about their course experiences in general, and intentions for the mode of future learning (e.g., totally traditional or online learning, or blended learning).

7.2 The results from the open-ended questions in the weekly reports

The weekly reports, which were submitted by 74 participants, contained four open-ended questions. These questions focused on: (a) the reasons for the participants' stress in the course; (b) which part(s) of the course they enjoyed or found valuable; (c) which part(s) of the course they did not enjoy or find valuable; and (d) learning strategies they used to make themselves learn better. Content analysis was used to code and identify the themes in the participants' answers. The reasons for the participants' stress were mainly reported as assignments, presentations, online forum tasks, workload, ICT usage, and learning tasks in the course. The participants' attitudinal statements about their course experiences each week (i.e., which parts of the course they liked or disliked) were coded as both positive and negative statements. The learning strategies that the participants applied were reported as more reading and researching, keeping up with work, self-management, asking for help, managing resources, and making plans.

The weekly reports were sent out to the participants for six times across the semester. The participants submitted the reports to the researcher on various frequencies. Therefore, the descriptive results shown in the following sections present the accumulated instances of the themes, which were generated from the participants' answers in all the weekly reports they submitted across six weeks.

7.2.1 Reasons for the stress in the course

7.2.1.1 Reason one — the assignments

The first reason for the participants' stress from the course was reported as the assignments. The participants claimed that their stress level increased when (a) they felt confused about the assignment requirements; (b) they encountered challenges while doing the assignments; and (c) the assignments were due (Table 7.1). The comments on the stress caused by the assignments were cited 52 times.

Table 7.1

Frequency of the Reasons for the Participants' Stress Caused by the Assignments

Generalized reasons	Tally	Detailed explanation	Instances
Being confused	25	I do not know how to do the assignments.	17
		Needing consistent information from the teachers about the assignment requirements	6
		Needing clear information about marking criteria	2
Challenging tasks in the assignments	15	Survey results are hard to interpret.	5
		No prior experiences of doing certain assignment in the course	5
		The referencing system is difficult.	2
		The data are not presented well.	1
		Difficulty in using assignment submission system	1
		Difficulty in breaking down the tasks of assignment to manage it	1
Being due soon	10	The assignments come with presentation together.	7
		Starting to do the assignment too late	1
		Making a mistake about the due dates of several assignments	1
		Still having one more assignment to do	1
Being worried	2	Worrying if the assignment was done right	2

Note. (a) $n = 74$, (b) The results were the aggregate instances of the statements provided by the participants across the session of six weeks, (c) Instances = frequency of the reasons mentioned by the participants

7.2.1.2 Reason two — the presentations

As a part of the course assessments, the presentations were reported to cause a certain level of stress among the participants. The factors, such as (a) the stress during the presentations; (b) being due; and (c) feeling confused about the task, were claimed to contribute to the participants' stress (Table 7.2). The comments on the stress caused by the presentations were cited 21 times.

Table 7.2

Frequency of the Reasons for the Participants' Stress Caused by the Presentations

Generalized reasons	Tally	Detailed explanation	Instances
Stress during presentations	10	Feeling stressed or nervous when doing presentations	7
		Worrying about the presentation after it was finished	2
		Encountering problems when doing the presentation	1
Being due soon			8
Feeling confused or having no idea about how to do the presentation			2
Difficulty in coordinating team work			1

Note. (a) $n = 74$, (b) Instances = frequency of the reasons mentioned by the participants

7.2.1.3 Reason three — the online forum tasks

The participants reported that the confusion between the online forum and blog tasks caused stress among them. The participants recalled that they were required to post their contributions to the online forums, but they were also asked to post some tasks to the blogs. Hence, the participants stated that they were confused about these two types of online tasks (Table 7.3). The comments on the stress caused by the online forum tasks were cited nine times.

Table 7.3

Frequency of the Reasons for the Participants' Stress Caused by the Online Forum Tasks

Generalized reasons	Tally	Detailed explanation	Instances
Feeling confused	7	Feeling confused about whether the tasks should be posted to the online forums or blogs	6
		Feeling confused about what to do with the blog every week	1
Being uninterested in the forum questions, which are compulsory tasks			1
Finding it difficult to answer the forum questions			1

Note. (a) $n = 74$, (b) Instances = frequency of the reasons mentioned by the participants

7.2.1.4 Reason four — the workload

Another reason for the participants' stress in the course was stated as their perceived workload brought by the tasks in the course, including (a) assignments; (b) online forum and blog tasks; (c) required reading materials; and (d) other commitments and issues. Meanwhile, besides the blended course in the present study, the tasks from other courses, which were taken by the participants, increased their workload as a whole, especially when several assignments from different courses were due at the same time. Finally, missing the tutorials was reported by the participants to draw them back behind the pace in the study and they needed to do more in order to catch up with their work (Table 7.4). The comments on the stress caused by the workload were cited 58 times.

Table 7.4

Frequency of the Reasons for the Participants' Stress Caused by the Workload

Generalized reasons	Tally	Detailed explanation	Instances
Workload from the online forum and blog tasks	24	The tasks are time consuming.	18
		Being left behind the forum and blog tasks	4
		Extra tasks on the online forum and blog	2
Other commitments or issues	16	The assignments from other courses in the university	14
		The commitment of employment	1
		Lack of skills in organizing my learning	1
Missing tutorials	7	Needing to catch up with the course, because of the absence from tutorials caused by illness or public holidays	7
The workload from the assignments	6	Spending a lot of time on the assignments	3
		A lot to do for the assignments	2
		Finding proper references for the assignments	1
The workload from readings	5	Keeping up with the reading tasks	3
		Searching for articles is difficult.	2

Note. (a) n = 74, (b) Instances = frequency of the reasons mentioned by the participants

7.2.1.5 Reason five — the ICT usage in the course

The issues of using ICTs were reported as another source of the participants' stress in the course, such as lack of prior ICT experiences, technical problems, and so on (Table 7.5). The comments on the stress caused by the ICT usage were cited 12 times.

Table 7.5

Frequency of the Reasons for the Stress Caused by the ICT Usage in the Course

Generalized reasons	Tally	Detailed explanation	Instances
Lack of prior experiences of using ICT tools			6
Technical problems	4	Issues about certain programs (e.g., Inspiration was not available and the online forum contributions could not be maintained when Moodle was updated)	2
		No Internet connection at home	1
		Slow Internet connection	1
A lot of time spent on certain websites during the lecture			1
Needing more practice on Smart Board			1

Note. (a) n = 74, (b) Instances = frequency of the reasons mentioned by the participants

7.2.2 Positive attitudinal statements in the weekly reports

Two open-ended questions in the weekly reports, which concerned the parts of the course the participants liked and disliked, addressed their course experiences. The participants' answers to these questions were coded as positive and negative attitudinal statements on different aspects of the course, including the tutorials, lectures, presentations, online forums, assignments, and learning activities. Some of the participants also provided reasons for their statements. Section 7.2.2 presents the detailed reasons for the participants' positive attitudinal statements.

7.2.2.1 Positive attitudinal statements about the tutorials

The participants' positive attitudinal statements about the tutorials were mainly reported as knowledge and skills acquisition and problem solving. For example, they claimed that they were provided with valuable resources and ideas in the tutorials, had opportunities to practise various ICT tools, and were able to clarify their confusion about the assessments and course materials by asking the teachers in the tutorials (Table 7.6). The detailed positive attitudinal statements about the tutorials were cited 23 times.

Table 7.6

Frequency of the Positive Attitudinal Statements about the Tutorials

Generalized statements	Tally	Detailed explanation	Instances
Knowledge and skills acquisition	15	Feeling interested in the tutorial materials and activities, which are relevant to and useful for my teaching	5
		Giving me inspiration about my own presentation	3
		Hands-on practice on ICT tools	3
		In-depth discussion in the tutorials	3
		Challenging my opinions	1
Problem solving	8	Providing information for the course assessments and clarifying my questions about the assignments	8

Note. (a) $n = 74$, (b) Instances = frequency of the positive statements by the participants

7.2.2.2 Positive attitudinal statements about the lectures

The participants indicated that the lectures were interesting and informative and provided useful information, concept, and resources for their current and future teaching. They also valued the resources provided in the lectures, such as good search engines and useful websites (Table 7.7). The detailed positive attitudinal statements about the lectures were cited 25 times.

Table 7.7

Frequency of the Positive Attitudinal Statements about the Lectures

Generalized statements	Tally	Detailed explanation	Instances
Being interesting, informative, and useful			11
Relevance	6	Being relevant to my future teaching	5
		Being useful for my presentation	1
Online resources	4	Good search engines	2
		Useful websites	2
Knowledge acquisition	4	Introducing the concept of using ICT tools	3
		New teaching concept brought by the guest lecturer	1

Note. (a) *n* = 74, (b) Instances = frequency of the positive statements by the participants

7.2.2.3 Positive attitudinal statements about the presentations

During the first tutorial in the course, the participants in each tutorial group were asked to choose one from eight presentation topics, as one of the course assessments. Generally, each presentation was completed by two to four students as a group. In the weekly reports, the participants commented that the presentations were interesting and the resources and information provided in their own or others' presentations were useful for their future teaching (Table 7.8). The detailed positive attitudinal statements about the presentations were cited 57 times.

Table 7.8

Frequency of the Positive Attitudinal Statements about the Presentations

Generalized statements	Tally	Detailed explanation	Instances
Being interesting, funny, enjoyable, engaging, informative, useful, and interactive			27
Knowledge acquisition	26	Learning about different topics	13
		A variety of practical, helpful, and new concepts	11
		Useful online resources	1
		Hands-on practice	1
Relevance	4	Being Relevant to my teaching	3
		Inspiring me for my own presentation	1

Note. (a) *n* = 74, (b) Instances = frequency of the positive statements by the participants

7.2.2.4 Positive attitudinal statements about the online forum tasks

The participants' positive statements about the online forum tasks were mainly reported as that the forum questions were interesting and valuable and promoted further learning and in-depth thinking. The positive attitudinal statements about the forum tasks were cited 45 times.

Table 7.9

Frequency of the Positive Attitudinal Statements about the Online Forum Tasks

Generalized statements	Tally	Detailed explanation	Instances
The forum questions are interesting and valuable.			27
Prompting further learning and in-depth thinking	15	Increasing information sharing and communication between the students	13
		Improving self-reflection	1
		Promoting further research	1
Relevance	3	Being relevant to my teaching	2
		Being relevant to the lecture content	1

Note. (a) n = 74, (b) Instances = frequency of the positive statements by the participants

7.2.2.5 Positive attitudinal statements about learning activities in the tutorials

The participants indicated that, by completing different learning activities in the tutorials, they became familiar with various online resources and ICT tools, which they did not know or were not confident about before. These online resources and ICT tools, which were reported to be relevant to and useful for their future teaching, included TurningPoint, search engines, Web publishing tools, multimedia tools, inspiration, database, and Wiki (Table 7.10). The detailed positive attitudinal statements about the learning activities were cited 98 times.

Table 7.10

Frequency of the Positive Attitudinal Statements about the Learning Activities in the Tutorials

Generalized statements	Instances
Learning about general and kid search engines	34
Hands-on practice on different ICT tools	33
Getting to know about more online resources	27
Exploring the concept of using ICT tools in teaching and learning	4

Note. (a) n = 74, (b) Instances = frequency of the positive statements by the participants

7.2.3 The negative attitudinal statements in the weekly reports

In addition to the positive attitudinal statements, the participants also provided negative statements about the tutorials, lectures, learning activities, online forum tasks, and

assignments. This section depicts the detailed findings of the reasons provided by the participants for their negative attitudinal statements.

7.2.3.1 Negative attitudinal statements about the tutorials

The participants' negative attitudinal statements about the tutorials mainly focused on the duration and time management in the tutorials. The participants suggested that the schedule of the tutorials should not be too long and the process of the activities in some tutorials should not be time consuming. Moreover, the participants commented that some tutorial activities should be connected with the theories introduced in the lectures and their future teaching (Table 7.11). The detailed negative attitudinal statements about the tutorials were cited 43 times.

Table 7.11

Frequency of the Negative Attitudinal Statements about the Tutorials

Generalized statements	Tally	Detailed explanation	Instances
Duration, time management, and schedule of the tutorials	19	Tutorials should not be too long.	10
		Slow process or too much time spent on one activity should be avoided.	5
		Activities were rescheduled, because of the cancellation of the previous week's tutorial.	3
		Conflict of the tutorial and employment commitment	1
Activities or events in the tutorials	15	The tutorial time should be used effectively, e.g., the blog and forum tasks can be completed at home.	6
		There should not be repetitive information in the tutorials.	4
		Expecting more challenging tasks in the tutorials	3
		Preferring to learn on my own pace in the tutorials	1
		The interruption by the students during teacher's instruction should be managed.	1
Affective perception	5	Being not interested	5
Knowledge acquisition	3	Having not learned much	2
		Needing more detailed information about the topics in the tutorials	1
Technical problems in the tutorials	1	Feeling frustrated, because being unable to practise some ICT tools	1

Note. (a) n = 74, (b) Instances = frequency of the negative statements by the participants

7.2.3.2 Negative attitudinal statements about the lectures

Regarding the lectures, the negative attitudinal statements included boringness, lack of knowledge acquisition, and confusing information provided in the lectures (Table 7.12). The detailed negative attitudinal statements about the lectures were cited nine times.

Table 7.12

Frequency of the Negative Attitudinal Statements about the Lectures

Generalized statements	Tally	Detailed explanation	Instances
Affective perception	5	Feeling uninterested, when the lectures were boring	5
Lecture information	3	Lecture information should be clarified.	1
		Lecture information should be in more details.	1
		Lecture information should be more insightful.	1
Knowledge acquisition	1	Having not learned much from the lectures	1

Note. (a) n = 74, (b) Instances = frequency of the negative statements by the participants

7.2.3.3 Negative attitudinal statements about the learning activities in the course

The participants' negative attitudinal statements about the learning activities mainly focused on the lack of interest in using ICT tools, technical problems, reading tasks, and the content of the tutorial activities (Table 7.13). The detailed negative attitudinal statements about the learning activities were cited 21 times.

Table 7.13

Frequency of the Negative Attitudinal Statements about the Learning Activities

Generalized statements	Tally	Detailed explanation	Instances
ICT use in learning	15	Dislike of or being uninterested in ICTs, e.g., dislike of computer usage, lack of interest in some programs, and perceived irrelevance of using database to future teaching	11
		Technical problems, such as slow Internet connection at home, logging-on problem, and unavailable software (e.g., Inspiration)	3
		Needing more hands-on practice on some ICT tools	1
Reading tasks	4	Challenges in locating readings	1
		Reading is boring.	1
		Dislike of reading	1
		Reading materials are hard and time consuming.	1
Content of the tutorial activities	2	The learning activities during the tutorials should be relevant to the topics in the lectures.	1
		The explanation for the learning activities during the tutorials should be more detailed.	1

Note. (a) *n* = 74, (b) Instances = frequency of the negative statements by the participants

7.2.3.4 Negative attitudinal statements about the online forums tasks

Regarding the online forum tasks in the course, the negative attitudinal statements, which were provided by the participants, included lack of interest, perceived difficulty level, feeling confused about the online forum tasks, heavy workload, lack of knowledge acquisition, irrelevance to future teaching, and time consumption (Table 7.14). The detailed negative attitudinal statements about the online forum tasks were cited 36 times.

Table 7.14

Frequency of the Negative Attitudinal Statements about the Online Forum Tasks

Generalized statements	Tally	Detailed explanation	Instances
Negative affective perception	12	Lack of interest in the forum questions	12
		Perceived high difficulty level of the online forum questions	
Heavy workload	9	Feeling overwhelmed by the compulsory tasks of the online forums every week	6
		Being left behind the forum tasks	3
The information of the forum tasks	7	Feeling confused about the forum and blog tasks	6
		Delay of the forum questions posted by teachers	1
Lack of knowledge acquisition	3	Repetitive questions	2
		The forum questions are too basic.	1
Irrelevance	3	The online forum questions should be related to the topics of the lectures.	3
Being time consuming	2		

Note. (a) n = 74, (b) Instances = frequency of the negative statements by the participants

7.2.3.5 Negative attitudinal statements about the assignments

The participants' negative attitudinal statements about the assignments in the course were mainly about the clarity of the information about the assignments, difficulty level, and the workload brought by the assignments (Table 7.15). The detailed negative attitudinal statements about the assignments were cited 31 times.

Table 7.15

Frequency of the Negative Attitudinal Statements about the Assignments

Generalized statements	Tally	Detailed explanation		Instances
Clarity of the assignment information	9	The information about the assignments needs to be consistent from different teachers.		5
		Feeling confused about the assignment requirements		2
		Needing more information about the assignments, because of no prior experiences		2
Difficulty level	9	Survey as a part of an assignment	Interpreting and understanding the survey results are challenging.	4
			Feeling overwhelmed by the survey results	1
		Referencing system	The referencing system is difficult.	2
			Dislike of the referencing system	1
		Technical problem	Needing the printed copies of the survey results	1
Workload	4	Perceived high level of workload brought by the assignments		3
		Doing assignments is time consuming.		1
Relevance	3	The assignments should be relevant to my teaching.		3
Dislike	2	Dislike of doing assignments		2
Knowledge acquisition	2	The assignments should help me to learn more.		2
Feeling tressed	2			

Note. (a) $n = 74$, (b) Instances = frequency of the negative statements by the participants

7.2.4 Learning strategies that the participants applied

In the weekly reports, the participants were asked to describe the learning strategies they applied to help them learn better. The main strategies reported by the participants included more reading and researching, keeping up with work, self-management (i.e., effort, time, and environment), asking for help, managing resources, and making plans (Table 7.16).

Table 7.16

Frequency of the Learning Strategies Applied by the Participants

Generalized reasons	Tally	Detailed explanation		Instances
More reading and researching	91	Further researching		38
		Further reading		22
		Revision	Practising ICT tools on my own computer	20
			Rereading	4
			Going through course materials (i.e., lecture slides and tutorial materials)	2
			Reading the assignment requirements in more depth	2
			Going through the notes	1
		Preparation	Reading before class	2
Keeping up with work	44	Keeping up with all the work		16
		Keeping up with the online forum tasks		15
		Finishing required readings on time		13
Self-management	33	Maintaining attendance in the lectures and tutorials		17
		Remaining effort in learning		6
		Managing study environment		5
		Managing study time		3
		Remaining active in the tutorials and presentations		2
Asking for help	28	Asking , discussing, or working with group peers		16
		Asking teachers questions		11
		Asking people outside of the school		1
Managing resources	14	Taking notes for the assignments in the lectures		5
		Listing all information for the assignments and everything needed to be done		5
		Creating resource folders		3
		Listing all questions which need to be answered		1
Making plans	2	Scheduling for the weekly tasks		1
		Making a plan about the assignments		1

Note. (a) n = 74, (b) Instances = frequency of the learning strategies reported by the participants

7.3 The results from the open-ended questions in the posttest

The open-ended questions in the posttest included (a) the participants' intentions for future online learning; (b) suitability of online learning; and (c) suggestions for future online course development. The main themes generated from the participants' answers to these questions are provided as below.

7.3.1 The participants' intentions for future online learning

7.3.1.1 The descriptive results

Among the 94 participants, 18% would study any subject online, 29% would only study the familiar subjects online, 38% were not sure about taking online courses, and 15% would not study any course online (Table 7.17).

Table 7.17

Frequency of the Intention for Online Learning

	Number	Percentage
No, I will not study any course online.	14	15%
Not sure.	36	38%
I will study online only in the subject area with which I am familiar.	27	29%
Yes, I will study online in any subject areas.	17	18%

Note. n = 94 (These were the individuals who participated in the posttest).

7.3.1.2 Reasons for the participants' intentions for future online learning

7.3.1.2.1 Reasons for "I will not study any course online."

The participants mainly attributed their choice of "I will not study any course online." to (a) a preference for face-to-face interactions; (b) less motivation in online learning; and (c) a preference for hands-on practice (Table 7.18).

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Table 7.18

Frequency of the Reasons for "I will not study any course online."

Reasons	Instances
Preferring to face-to-face interactions	14
Being less motivated in online learning	3
Preferring hands-on practice	3
Online learning is difficult.	1
Dislike of online learning	1

Note. Instances = frequency of the reasons mentioned by the 14 individuals, who claimed "I will not study any course online".

7.3.1.2.2 Reasons for "not sure"

The main reasons for the choice of "not sure" were stated as (a) a preference to face-to-face interactions; (b) depending on the subject area (i.e., whether the subject was complex or whether the course was beneficial, and the course duration); (c) issues of asking for help or

solving problems in online learning; and (d) depending on personal factors (commitment, time arrangement, and personal needs in learning) (Table 7.19).

Table 7.19

Frequency of the Reasons for "Not sure"

Reasons	Instances
Preferring face-to-face interactions	22
Depending on the subject area	11
Issues of asking for help or solving problems in online learning (i.e., lack of prompt reply or detailed explanation)	9
Depending on personal factors	7
Less motivation and engagement in online learning or more engagement in classroom learning	5
Willing to choose online courses if there is no option	4
Dislike relying on ICTs because of technical issues sometimes	4
Liking blended learning	3
Achieving better outcomes in traditional learning	3
Liking hands-on learning	1
Limited access to the Internet	1
Prior negative online learning experiences	1

Note. Instance = frequency of the reason mentioned by the 36 individuals, who claimed "not sure".

7.3.1.2.3 Reasons for "I will study online only in the subject area with which I am familiar."

As shown in Table 7.20, the most frequently stated reason for choosing familiar subjects for online learning was "depending on my familiarity with the subject area and its difficulty level", which was expressed by all 27 respondents. The participants elaborated on this reason in more details — if the subject was easy to understand or they had a certain level of background knowledge about the subject, they would learn it online. Otherwise, they would prefer to learn the subject in a classroom. The participants claimed that taking the familiar subjects online would be convenient and could save time and travel to universities.

Table 7.20

Frequency of the Reasons for "I will study online only in the subject area with which I am familiar."

Reasons	Instances
Depending on my familiarity with the subject area and its difficulty level	27
Saving time and travel to universities	7
Convenience and flexibility of online learning	7
Also liking face-to-face interactions	7
Liking hands-on learning	2
Online learning cannot replace teachers.	2
Online learning may avoid the discomfort brought by face-to-face interactions	1
Prior negative online learning experiences	1
Being less motivated in online learning	1

Note. Instances = frequency of the reasons and explanations mentioned by the 27 individuals, who claimed "I will study online only in the subject area with which I am familiar".

7.3.1.2.4 Reasons for "Yes, I will study online in any subject areas."

Seventeen participants reported that they would take any subject online in the future and their reasons were mainly stated as (a) convenience and flexibility provided by online learning; (b) saving travel; and (c) prior positive online learning experiences (Table 7.21).

Table 7.21

Frequency of the Reasons for "Yes, I will study online in any subject areas."

	Instances
Convenience and flexibility in online learning	7
Saving travel	6
Having prior positive online learning experiences	5
Liking using ICTs	3
Also liking face-to-face interactions	3
Easy communication with others	2
Following a tendency	2
Feeling comfortable with online learning	1
Loving challenges	1
Believing in my ability to learn online	1
Traditional mode of learning is boring.	1

Note. Instances = frequency of the reason mentioned by 17 individuals, which claimed "Yes, I will study online in any subject areas".

7.3.2 The participants' perceived suitability of online learning

7.3.2.1 Subject areas suitable to be taught online

The participants reported the subject area about using ICTs in education as the most suitable course to be taught online, followed by the subjects without much hands-on learning, literacy

and language studies, and the subject areas with a low level of difficulty or workload (Table 7.22).

Table 7.22

The Participants' Nomination: the Subject Areas Suitable to be Taught Online

	Instances
The subject areas about using ICTs in education	36
The subject areas without much hands-on learning	10
The subject areas of literacy and language studies	9
The subject areas with a low level of difficulty or workload	7
The subject areas with which I am familiar or of which I have background knowledge or prior experiences	5

Note. (a) $n = 94$, (b) Instances = frequency of the subject areas mentioned by the participants.

7.3.2.2 Subject areas less suitable to be taught online

The participants indicated that the subject areas of mathematics, literacy and language studies, and the subjects with hands-on learning or heavy theories, were less suitable to be taught online (Table 7.23).

Table 7.23

The Participants' Nomination: the Subject Areas Less Suitable to be Taught Online

	Instances
The subject areas of mathematics	33
The subject areas of literacy and language studies (e.g., English)	30
The subject areas with hands-on learning	25
The subject areas with heavy theories	15
The subject areas of science	8
The subject areas of physical education	6
The subject areas of technology design	5
The subject areas of teaching experience practicum	5

Note. (a) $n = 94$, (b) Instances = frequency of the subject areas mentioned by the participants

7.3.3 The participants' suggestions for future online course development

The participants were asked to provide suggestions for future online course development from their aspect (Table 7.24). Firstly, the participants indicated that there should be more efficient, precise, and clear course content, especially the information about course

assessments. Secondly, a blended mode of learning was recommended by the participants, as they claimed that they liked face-to-face interactions, which could occur in tutorials or regular meetings on the campus with teachers or other students. In addition, it was also recommended that the lectures should be published online with podcast. With respect to the course interface design, the participants indicated that the course website and online forum, which were well structured, clear, and easy to follow, could facilitate students' learning.

Regarding online communication, the participants recommended that frequent online communication between teachers and students and timely replies from teachers would be beneficial for students' learning. Concerning online discussion, the participants suggested that they preferred the questions for discussion to be relevant to lecture content.

Moreover, the participants stated that the course load (i.e., workload and difficult level) should be maintained at a reasonable level for online learning. They also claimed that online course content should be relevant to students' future profession. Finally, the participants also provided other suggestions about the future online course development, such as physical course materials, application of ICTs in the courses, consideration of students' differences in learning, and easy access from mobile phones.

Table 7.24

The Participants' Suggestions for Future Online Course Development

	Instances
Sufficient, precise, clear, and well-structured course content and information	21
There should be a blended mode for online learning.	18
Providing podcast lectures	8
Well-designed course website with easy access all the time	5
Frequent communication and timely replies from teachers	4
Relevance of online discussion to the lecture content	3
Reasonable course load	3
Relevance of course content to students' future profession	2
Providing physical course materials	1
Effective and proper usage of ICT tools in the course	1
Addressing students' differences in learning	1
Mobile learning (an easy access from mobile phones)	1

Note. (a) $n = 94$, (b) Instances = frequency of the suggestions mentioned by the participants

7.4 Results from the interviews among the participants in the Positive Change Group and the Contrast Group

Eight participants took part in the interviews. Four of them showed marked positive changes in their attitudes toward online learning and the other four did not display such changes. Therefore, the participants were divided into two groups — four in the Positive Change Group (PCG) and the other four in the Contrast Group (CG).

The interview questions explored the participants' learning experiences through four types of interactions in the course (i.e., student- content, student-interface, student-teacher, and peer interactions) and perceived learning outcomes. Finally, the participants were asked to provide attitudinal statements about their course experiences in general and the intentions for the mode of their future learning. Themes from the participants' answers to the interview questions were generated and the examples of the detailed statements by the participants were provided. The findings from the interviews may provide possible clues for the changes in the participants' online learning attitudes.

7.4.1 The participants' interactions with the course content

Regarding the participants' statements about their interactions with the online course content, the main themes that emerged from the PCG and the CG were (a) well-organized and clear course content; (b) perceived knowledge acquisition; (c) motivation in learning; (d) needing detailed information about the assessments; (e) a preference for learning to be driven by interests; (f) attribution of failure in learning; and (g) connection between theories and practices in the tutorials (Table 7.25 and 7.26).

Table 7.25

Frequency of the Themes Generated from the Participants' Statements about the Interactions with the Course Content

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Well-organized and clear course content	4	4
Theme 2: A high level of knowledge acquisition	4	1
Theme 3: Lack of knowledge acquisition	0	2
Theme 4: Feeling motivated to use online resources and be engaged in the learning activities	4	2
Theme 5: Lack of interest in the course	0	2
Theme 6: Needing more detailed information about the course assessments	2	4
Theme 7: A preference for learning to be driven by interest rather than compulsory assessments	2	0
Theme 8: Attribution of the failure to achieve a good result of the assessment to the lack of prior experiences	0	1
Theme 9: Concerns about the connection between theories in the lectures and hands-on practices in tutorials	0	1

Note. Instances = frequency of the themes generated from the participants' statements

Table 7.26

Examples of the Participants' Statements about the Interactions with the Course Content

Interviewer: Were there anything or aspects you liked, enjoyed, or valued about the course content? Which parts of the content facilitated your study? Or were there anything that you did not like, enjoyed, and valued about the course content?	
Theme 1: Well-organized and clear course content	
The PCG	Participant A: "The (online) course content was clear and it is always set out neatly and easy to find out. Nothing was made difficult about it."
The CG	Participant B: "The course content and assignment information were clear. I understood what they tried to say."
Theme 2: A high level of knowledge acquisition	
The PCG	Participant C: "Regarding some ICT tools, we thought we knew them, but we only knew a little. I found the things I learned from the course interesting and valuable. It was helpful for me to use them in my future teaching.
The CG	Participant E: "I learned more about ICTs in regard of how to teach children. The content on the course website provided useful resources for my future teaching, especially for teaching children."
Theme 3: Lack of knowledge acquisition	
The CG	Participant D: "There was nothing I gained from the course. I did not know what I got out of it. I had already known a lot of the knowledge shown in this course before. So it was like repeating the things I have known."
Theme 4: Feeling motivated to use online resources and be engaged in the learning activities	
The PCG	Participant A: "I liked that the course every week focused on different topics which were mainly about using ICTs. It made me be well prepared for future teaching. I also liked answering the questions in the online forum."
The CG	Participant E: "The content on the course website provided useful resources (e.g., some websites, search engines) for my future teaching. I like using these resources"
Theme 5: Lack of interest in the course	
The CG	Participant B: "I had never been into the subject, with couple of ICTs I struggled with. Sometimes, the tutorials did not provide information about the assignments. (I) Just wanted to finish the tasks." Participant S: "I did not find it interesting and I was not really engaged in the course. The lectures just provided the information about ICTs, but nothing relevant to the assignments. There was nothing I liked."
Theme 6: Needing more detailed information about the course assessments	
The PCG	Participant C: "Sometimes, the details of the assessment in the course could be interpreted differently, so it could be misleading…I could not get the details of the assignment requirements. So I needed to check with the teacher." Participant A: "Sometime, I got a bit confused of where we were meant to post our answers to the questions. I had to ask for more details about the requirements."
The CG	Participant B: "Because it (assignment) was a unit plan and it was our first unit plan, so we were not clear about how to do that… We were confused about what we should do — the forum or blog, as it was not clear about where we had to post the contribution." Participant E: "Sometimes, the assignment requirements were confusing and needed to be clarified by the teacher. Even the assignment requirements had been provided online, different people would interpret the requirements differently."
Theme 7: A preference for learning to be driven by interest rather than compulsory assessments	
The PCG	Participant C: "I preferred to learn from my interest. I posted questions because I was interested, but I did not like to be assessed."
Theme 8: Attribution of the failure to achieve a good result of the assessment to the lack of prior experiences	
The CG	Participant D: "I had not done the unit plan before and that was why I did not do it well."
Theme 9: Concerns about the connection between theories in the lectures and hands-on practices in the tutorials	
The CG	Participant B: "Sometimes, what we were doing in the lectures was not practised in the tutorials. What we talked about in the lectures should be practised in the tutorials."

7.4.2 The participants' interactions with the course interface

In regard to the participants' interactions with the course interface (i.e., various online learning components), the main themes generated from the participants' statements were (a) an easy access to the course through well-designed course website; (b) usage of the online forums; (c) hands-on practices on ICT tools; (d) convenience of online submission; (e) technical problems; and (f) lack of prior experiences of or interest in using ICTs (Table 7.27 and 7.28).

Table 7.27

Frequency of the Themes Generated from the Participants' Statements about the Interactions with the Course Interface

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: An easy access to the course through the course website	4	3
Theme 2: Well-designed course website	4	3
Theme 3: Effective use of the online forums	3	1
Theme 4: Insufficient use of the online forums	0	3
Theme 5: Liking hands-on practice on ICT tools	4	0
Theme 6: Convenience of online submission	2	1
Theme 7: Encountering technical problems	2	2
Theme 8: Lack of prior experiences of or interest in using ICTs	0	2

Note. Instances = frequency of the themes generated from the participants' statements

Table 7.28

Examples of the Participants' Statements about the Interactions with the Course Interface

Interviewer: Were there anything or aspects you liked, enjoyed, or valued about these online learning components? Or which aspects of the course interface facilitated your study? Or were there anything that you did not like, enjoyed, and valued about these components?	
Theme 1: An easy access to the course through the course website	
The PCG	Participant F: "I gained the resources through the course website and got all of the things for my assignments. I could do it on my own pace or time."
The CG	Participant E: "I could go there anytime and print the materials out with Moodle website. I could access the course later after the lecture."
Theme 2: Well-designed course website	
The PCG	Participant C: "The course webpages were set out well and easy to understand. Downloading was quick."
The CG	Participant D: "The course webpage design was fine and clear."
Theme 3: Effective use of the online forums	
The PCG	Participant A: "I liked how we used the forum to answer questions weekly, because it made me think about what I have learnt." Participant H: "A lot of people went there and asked questions. We could ask the teacher questions and the teacher answered our questions, which was good."
The CG	Participant B: "The weekly forum was good. It was helpful as I could track with other students and talked with them."
Theme 4: Insufficient use of the online forums	
The CG	Participant D: "The forum was not used as a class discussion. It was used as same as a blog — just posting our responses. No one really continued on the discussion. Participant P: "I do not think the online forum was really helpful at times. People just posted their answers to the forum questions. It was not really communicative with other students. We saw few people responding to others' address."
Theme 5: Liking hands-on practice on ICT tools	
The PCG	Participant A: "I learned how to use so many different programs (e.g., making web pages and movies), which I had never done before, so that was really helpful for my future teaching." Participant F: "The search engines helped me get to the specific sites, rather than just 'Google'. They gave me the pathways to get to the sites I was looking for."
Theme 6: Convenience of online submission	
The PCG	Participant C: "I valued the Assign IT and it was a great way of submitting the assignments. I did not have to go to university. It was a lot easier and quicker."
The CG	Participant G: "Assignment IT was easy to submit assignments and saved hard copies."
Theme 7: Encountering technical problems	
The PCG	Participant F: "The web page of the online forum counted the time down on me. If I spent more than five minutes, it would time out for me and I lost the work I had done. So I found that was not particularly helpful." Student C: "I could not have two email accounts logged on at the same time – home email and university email accounts. Participant A: "When I uploaded the assignment of large size, I had to try to change the file size and make it through."
The CG	Participant E: "I could not write directly on blogs, because, when I clicked the "back" button, everything I did was deleted. So I had to write in the word document and then transferred it into Moodle." Participant G: "When we checked grades from Assign IT, it was late sometimes."
Theme 8: Lack of prior experiences of or interest in using ICTs	
The CG	Participant B: "It was not my favourite subject area (ICTs) and those tools were just not a huge importance for me. A few of us knew little about ICTs and did not know how to do it. It was frustrating." Participant D: "I preferred making crafts on hands than just sitting there in front of a computer."

7.4.3 The participants' interactions with the teachers

7.4.3.1 The main purposes

The main purposes for the participants to interact with their teachers were reported as (a) receiving instruction in the lectures and tutorials; and (b) asking questions about learning tasks, assignments, and presentations.

7.4.3.2 The main methods

When the participants were on campus, they interacted with their teachers through face-to-face talk in the lectures, during tutorials, or at the meetings with their teachers in the teachers' offices. The interactions between the participants and their teachers off campus were mainly through email and the online forums.

7.4.3.3 The participants' statements about their online interactions with the teachers

The experiences reported by the participants about the online interactions with their teachers were summarized as (a) convenience of using email; (b) latency of the teachers' responses through email; (c) helpfulness of the teachers' responses through email; and (d) the teachers' involvement in the online forums (Table 7.29 and 7.30).

Table 7.29

Frequency of the Themes Generated from the Participants' Statements about the Online Interactions with their Teachers

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Convenience of using email	4	4
Theme 2: Receiving timely response from the teachers through email	4	2
Theme 3: Needing timely responses from the teachers through email	0	2
Theme 4: Receiving helpful responses from the teachers through email	4	3
Theme 5: Needing more detailed explanations from the teachers through email	0	2
Theme 6: Receiving encouragement and support from the teachers on the online forums	2	0
Theme 7: Needing the teacher's involvement on the online forums	0	1
Theme 8: Email communication is impersonal.	0	1

Note. Instances = frequency of the themes generated from the participants' statements

Table 7.30

Examples of the Participants' Statements about the Online Interactions with their Teachers

Interviewer: Were there anything or aspects you liked, enjoyed, or valued about the online interactions with your teacher? Or which aspects of the interactions facilitated your study? Or were there anything that you did not like, enjoyed, and valued about the interactions?	
Theme 1: Convenience of using email	
The PCG	Participant A: "I liked that I could always bring up questions at any time of the day or whenever I was at home doing homework (e.g., late at night)."
The CG	Participant G: "I can send emails to my teacher any time."
Theme 2: Receiving timely response from the teachers through emails	
The PCG	Participant C: "The teacher's replies on email were quick and I was happy for that."
The CG	Participant E: "I could get reply from the teacher within a day. It really made me feel good that I could get the timely reply when I studied at home and was stuck in some part of the assignment."
Theme 3: Needing timely responses from the teachers through email	
The CG	Participant B: "At the end the course, he (the teacher) did not respond to us. He was not that helpful in that sense — email. Participant G: "When using emails, I did not get prompt response from the teacher a lot of times and had to wait for a few days. It ended up that I had to ask the teacher face-to-face in the tutorials."
Theme 4: Receiving helpful responses from the teachers through emails	
The PCG	Participant F: "The teacher's replies (through email) were clear and helpful."
The CG	Participant D: "The teacher's explanation was helpful." Participant G: "The content of the email was helpful most of the time — he (the teacher) gave me the solutions and helped me out."
Theme 5: Needing more detailed explanation from the teachers through email	
The CG	Participant B: "By email, teachers could not answer the questions well or elaborate their answers. I could not find out more information or keep emailing back and forth." Participant E: "Sometimes the teacher's explanation was not clear enough and I had to bring the questions to the tutorials."
Theme 6: Receiving encouragement and support from the teachers on the online forums	
The PCG	Participant F: "He (the teacher) was good at encouraging us to express ourselves and contribute more to the forum." Participant C: "A lot of people went there (the online forum)…We could ask the teacher questions and the teacher answered our questions, which was good."
Theme 7: Needing involvement from the teachers on the online forum	
The CG	Participant D: "The teacher did not respond to the online forum, otherwise he would have known what was happening on the forum."
Theme 8: Email communication is impersonal.	
The CG	Participant B: "Online (email) sometimes is a bit impersonal. It is not human contact."

7.4.3.4 The participants' statements about face-to-face interactions with the teachers

Regarding the face-to-face interactions with the teachers, the participants mainly commented on (a) immediacy through face-to-face interactions; (b) easiness for understanding; (c) human factors; (d) interest in the teachers' instruction; (e) the teachers' arrangement of extra time to

answer students' questions; (f) needing consistent information between the teachers; and (g) needing clear and detailed explanation from the teachers (Table 7.31 and 7.32).

Table 7.31

Frequency of the Themes Generated from the Participants' Statements about the Face-to-face Interactions with their Teachers

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Immediacy through face-to-face interactions	4	4
Theme 2: Easiness for understanding	4	4
Theme 3: Human factors maintained in face-to-face interactions	2	2
Theme 4: Interest in the teachers' instruction in the lectures and tutorials	4	0
Theme 5: The teachers provided extra time to answer the students' inquiries in the tutorials.	1	0
Theme 6: Needing consistent information between the teachers	1	3
Theme 7: Needing clear and detailed explanation from the teachers	0	4
Theme 8: Difficulty in following the teachers because of a lack of prior ICT experiences	0	1
Theme 9: Needing more time to ask questions in the tutorials	0	1
Theme 10: Feeling reluctant to ask questions in front of other students	0	1

Note. Instances = frequency of the themes generated from the participants' statements

Table 7.32

Examples of the Participants' Statements about the Face-to-face Interactions with their Teachers

Interviewer: Were there anything or aspects you liked, enjoyed, or valued about the face-to-face interactions with your teacher? Or which aspects of the interactions facilitated your study? Or were there anything that you did not like, enjoy, or value about the interactions?	
Theme 1: Immediacy in face-to-face interactions	
The PCG	Participant A: "It was much quicker and easier to get answers, if I got them (the teachers) there, as I could just sit and have conversations."
The CG	Participant B: "I could get the answer straight away from the teacher by face-to-face talk."
Theme 2: Easiness for understanding	
The PCG	Participant C: "I found it easier to get my point across when I talked to someone. I could get more from the face-to-face discussion and I could speak more than I could write."
The CG	Participant G: "I enjoyed being able to ask questions through face-to-face contact, as I could go back and forth. If there was anything I did not understand, I could ask again."
Theme 3: Human factors maintained in face-to-face interactions	
The PCG	Participant H: "I could see the teachers and their facial expression or body language, which made me feel more comfortable. That gave me the sense of human contact."
The CG	Participant B: "In face-to-face talk, I could have eye contact and gestures...I am a social person."
Theme 4: Interest in teachers' instruction in the lectures and tutorials	
The PCG	Participant A: "The teacher's teaching in the tutorials was interesting and clear and could always catch my attention." Participant G: "I enjoyed the lectures provided by the teacher. There was something I had never thought of before."
Theme 5: Teachers provided extra time to answer the students' inquiries in the tutorials.	
The PCG	Participant C: "The tutor was always available and stayed around 10 minutes after the tutorials, if we had any questions. So that helped."
Theme 6: Needing consistent information between the teachers	
The PCG	Participant C: "I found that the guideline for the assignment was put online, but what the tutors asked for was different. How to establish what they exactly wanted was hard, because each tutor was essentially different in the requirements for the assignment."
The CG	Participant G: "The tutors from different tutorial groups had different information about the assignment requirements. The consistency between teachers was off." Participant E: "There should be more communication between the teachers before they talked to students. I did not think there was good communication between them, especially regarding the assessment and the online forum tasks."
Theme 7: Needing clear and detailed explanation from the teachers	
The CG	Participant G: "Sometimes the teacher did not give enough and clear information about the online forum requirements. Sometime, when I asked questions about the assignments, the things were not explained very clearly." Participant B: "We asked the teacher about the assignments, but we had to ask him a couple of times, because his responses were not very clear. So he had to explain a couple of times."
Theme 8: Difficulty in following the teachers because of lack of prior ICT experiences	
The CG	Participant B: "A few of us did not have much experience with ICTs. Sometime he (the teacher) went fast during the tutorials and we got confused. I had to ask him several times until I was clear."
Theme 9: Needing more time to ask questions in the tutorials	
The CG	Participant D: "It was hard to find the time for face-to-face talk with the teacher, because our tutorial was finished after 7:00 pm at night and I had limited time at university."
Theme 10: Feeling reluctant to ask questions in front of other students	
The CG	Participant D: "I do not like to ask questions in front of other students. I want to sit there quietly and try to figure things out myself… I do not like to chase the teacher after the lecture or tutorials; rather I prefer to work things out myself.

7.4.4 The participants' interactions with other students

7.4.4.1 Main purposes

The main purposes for peer interactions reported by the PCG and CG participants were (a) participation in the tutorials activities; and (b) asking questions to the tutorial group members about the online forum tasks, ICT usage, assignments, and presentations.

7.4.4.2 Main methods

When the participants were on campus, the interactions between them and other students occurred mainly through face-to-face talk in the tutorials or after the tutorials. The peer interactions off campus were mainly through email and the online forums. Additionally, some participants reported that they also used Facebook and SMS to communicate with other students.

7.4.4.3 The participants' statements about online interactions with other students

The participants' statements about their online peer interactions were summarized as (a) convenience of online communication; (b) frequent online communication; (c) timely responses from other students online; (d) support and help from other students online; (e) a larger group of recipients; (f) attaching files for collaboration; (g) lower levels of peer interactions in the online forums; and (h) reluctance to ask questions on the online forum (Table 7.33 and 7.34).

Table 7.33

Frequency of the Themes Generated from the Participants' Statements about the Online Interactions with Other Students

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Convenience of online communication	4	2
Theme 2: Frequent online communication	4	1
Theme 3: Receiving timely responses from other students online	4	1
Theme 4: Receiving support and help from other students online	4	2
Theme 5: Having a larger group of recipients through online communication	3	1
Theme 6: Being able to attach files for collaboration	1	0
Theme 7: Lower levels of peer interactions on the online forums	0	2
Theme 8: Feeling reluctant to ask questions on the online forum	0	1

Note. Instances = frequency of the themes generated from the participants' statements

Table 7.34

Examples of the Participants' Statements about the Online Interactions with Other Students

Interviewer: Were there anything or aspects you liked, enjoyed, or valued about the online interactions with other students? Or which aspects of the interactions facilitated your study? Or were there anything that you did not like, enjoy, or value about the interactions?	
Theme 1: Convenience of online communication	
The PCG	Participant H: "I could talk to people online without going to see them face-to-face, which saved time and was convenient."
The CG	Participant B: "It was really handy. I always went to Facebook and checked on there."
Theme 2: Frequent online communication	
The PCG	Participant C: "The communication (with other students) was regular and frequent." Participant A: "I always posted questions on the online forum. On the forum, we could talk to each other and ask questions. We always used the forum to exchange our idea."
The CG	Participant G: "I always talked to peers on email."
Theme 3: Timely responses from other students	
The PCG	Participant F: "In terms of online communication (e.g., email), the messages could be sent very easily. I always received replies quickly." Participant A: "I could get the responses quickly from everyone on the online forum."
The CG	Participant G: "I always got quick responses from other students through email, so I could organize things quickly and that was helpful."
Theme 4: Receiving support and help from other students online	
The PCG	Participant A: "I always got help from them, because lots of people got access to university online and everyone in my tutorial group wanted to help each other." Participant F: "By email, we could communicate the work (anything in the course, including assignment) we were doing. The members in my tutorial group always helped to clarify my questions."
The CG	Participant B: "When we did assignments, we would also use Facebook to talk, so we could compare with others and ask for help."
Theme 5: Having a larger group of recipients through online communication	
The PCG	Participant H: "I could send emails to a group of people."
The CG	Participant B: "The majority of the students in second year joined Facebook and there were over 100 people online, who can see my post online."
Theme 6: Being able to attach files for collaboration	
The PCG	Participant F: "I could attach documents in emails. I could communicate with others about our group work. With the attachment such as pictures and videos, everyone could contribute to the group work."
Theme 7: Lower levels of peer interactions on the online forums	
The CG	Participant G: "It supposed to be a forum for discussion, but people just posted their opinions. We saw few people responding to others' posts."
Theme 8: Feeling reluctant to ask questions on the online forum	
The CG	Participant B: "We did not want to put up thing on there like 'We do not understand it'. I considered that we were marked on there (the online forum). If we were confused about something, we did not put it there, as we did not want to sound silly in front of the teacher."

7.4.4.4 The participants' statements about face-to-face interactions with other students

The participants' statements about their face-to-face interactions with peers included (a) frequent communication; (b) instant responses; (c) easiness for understanding; (d) support and help from other students in the tutorials; (e) perceived friendly learning environments in the tutorials; (f) human factors; (g) smooth team work for the group presentations; (h) limited

time for face-to-fact talk in the tutorials; and (i) uneven contribution from the group members for the presentation (Table 7.35 and 7.36).

Table 7.35

Frequency of the Themes Generated from the Participants' Statements about the Face-to-face Interactions with Other Students

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Frequent communication with other students in the tutorials	4	0
Theme 2: Receiving instant responses	4	2
Theme 3: Easiness for understanding	4	1
Theme 4: Receiving support and help from other students in the tutorials	3	1
Theme 5: Perceived friendly learning environments in the tutorials	3	0
Theme 6: Maintained human factors	4	1
Theme 7: Smooth team work for the group presentations	4	2
Theme 8: Limited time to talk to other students in the tutorial	1	0
Theme 9: Uneven contribution for the group presentation	0	1

Note. (a) Instances = frequency of the themes generated from the participants' statements

Table 7.36

Examples of the Participants' Statements about the Face-to-face Interactions with Other Students

Interviewer: Were there anything or aspects you liked, enjoyed, valued about the face-to-face interactions with other students? Or which aspects of the interactions facilitated your study? Or were there anything you did not like, enjoy, or value about the interactions?	
Theme 1: Frequent communication with other students in the tutorials	
The PCG	Participant H: "I enjoyed the discussions in the tutorials, as we often had various topics of interest and I always exchanged my opinions with other students."
Theme 2: Receiving instant responses	
The PCG	Participant C: "I could get other students' replies and solve my problems immediately, as they were just there."
The CG	Participant D: "I could get answers quickly, which was easy to discuss by face-to-face talk than through email or on Facebook."
Theme 3: Easiness for understanding	
The PCG	Participant A: "I liked that I could make sure that I fully understood what other students said, because they were right there. If I still did not understand it, I could still ask them to explain it again."
The CG	Participant B: "I liked face-to-face talk, as I could ask more questions, which made it easy for me to understand other students' ideas."
Theme 4: Receiving support and help from other students in the tutorials	
The PCG	Participant A: "The students in my tutorial group were quite interactive and supportive to each other. My tutorial group was really good. Even in the tutorials, people would go around and help others if they needed help. Everyone was really helpful."
The CG	Participant E: "The students in my tutorial group always shared information about assignments and we helped each other."
Theme 5: Perceived friendly learning environments in tutorials	
The PCG	Participant F: "I always got help from the students in my tutorial group. I found that we formed friendships beyond just checking assignments...We supported each other."
Theme 6: Maintained human factors	
The PCG	Participant H: "Face-to-face talk gave me a feeling of human contact, which reminded me that I was not by myself in the course."
The CG	Participant E: "I like to talk with other students face-to-face, as I am very sociable."
Theme 7: Smooth team work for the group presentations	
The PCG	Participant C: "Everyone in my presentation group had the same contribution. We met as much as we could and everyone showed up in meeting. Everyone did their part and had equal contribution."
The CG	Participant E: "We had smooth group work and well scheduled meetings. We did not have any issue with the group work."
Theme 8: Limited time to talk to other students in the tutorial	
The PCG	Participant A: "Our tutorial finished around 5:00 and we went home straight away and there was no one around. So after class, there was no one to talk with, when I had questions."
Theme 9: Uneven contribution for the group presentation	
The CG	Participant G: "We had trouble with group work for the presentation. Some group members had problems of the attendance for group meetings and did not have enough contribution."

Furthermore, the participants from the PCG and CG reported differently about several online communication and social networking tools. The PCG participants showed higher levels of preference for the online forums and email; while the participants from the CG were more favourable about the usage of Facebook (Table 7.37 and 7.38).

Table 7.37

Frequency of the Positive Statements from the Participants about Different Online Communication and Social Networking Tools

Positive statements about different online communication tools	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Positive statements about Facebook	1	3
Positive statements about the online forums	4	0
Positive statements about Email	3	1
Positive statements about SMS	1	0

Note. (a) Instances = frequency of the statements made by the participants

Table 7.38

Examples of the Participants' Positive Statements about Different Online Communication and Social Networking Tools

	Positive statements from the participants about different online communication and social networking tools
Positive statements about Facebook	
The PCG	Participant C: "On Facebook, there were about one hundred students at the moment, which was a larger group than my own tutorial group. If we had a question, we could ask on the wall and anyone could reply.
The CG	Participant E: "Facebook is more popular and we could access it on our phones, so it is probably the best thing to use."
Positive statements about the online forums	
The PCG	Participant A: "I could post questions anytime to the online forum. In addition, we did not have too much to ask the classmates during the tutorials. If I still had questions after the tutorials, I could post it to the forum and receive help from others."
Positive statements about Email	
The PCG	Participant C: "I could send out emails to ask questions anytime when I had an access to the Internet, which was really convenient."
The CG	Participant G: "I always got quicker responses from other students through email, so I could organize things quickly and that was helpful."
Positive statements about SMS	
The CG	Participant G: "we were all in touch by SMS and it was convenient."

7.4.5 The participants' perceived learning outcomes

The participants perceived learning outcomes were indicated by their perception of the improvement in different aspects of learning after completing the course. Generally, compared with the CG participants, more participants from the PCG reported that they have improved critical thinking, application of various learning strategies, time management, usage of self-control strategies, and problem solving (Table 7.39 and 7.40).

Table 7.39

Frequency of the Participants' Perceived Improvement in Learning

Perceived improvement		Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Improvement in critical thinking	Yes	4	0
Improvement in using different learning strategies	Yes	4	
	No		2
	A little bit		1
Improvement in time management	Yes	3	1
	No	1	3
	A little bit		
Improvement in using self-control strategies	Yes	3	
	No	1	3
	A little bit		1
Improvement in problem solving	Yes	3	3
	No	1	1
	A little bit		

Note. (a) Instances = frequency of the statements made by the participants

Table 7.40

Examples of the Participants' Statements about the Perceived Improvement in Learning

Interviewer: Do you think you have become better in the following aspects?	
Improvement in critical thinking	
The PCG	Participant A: "The course content definitely opened my mind and helped me to use different thinking skills. Interacting with other students on the online forum and reading their responses helped me to make up my own opinions and improve my own answers. Sometimes, people posted controversial topics. This made me think about the problems in different ways, about which I might not have thought before."
The CG	Participant E: "I do not think the course developed my critical thinking skills."
Improvement in using different learning strategies	
The PCG	Participant A: "The lectures and tutorials helped me a lot to stay focused on the teacher's instruction and follow along what he was saying, especially when I took notes. I also learned to organize my assignments from the template given in the course."
The CG	Participant B: "A little bit. The unit plan, that we have never done before, made me learn how to construct a unit work — organizing and planning a lesson in a school setting." Participant E: "I have not learned the effective learning strategies from the course."
Improvement in time management	
The PCG	Participant F: "The assignments made me be aware of the importance of organizing my time well. I had everything on the diary, which helped me to know where I was going and when the assignments would be due." Participant H: "No. I am always well organized — making timetable for the course and keeping due date in my diary. I keep doing this all the time."
The CG	Participant B: "This course could contribute a little bit, e.g., managing my time for the assignments." Participant E: "I do not think this particular course changed anything. Instead, the whole experience of university study (different courses during different semesters) since the first year helped me to adjust my workload and improve myself in managing time."
Improvement in using self-control strategies	
The PCG	Participant C: "The weekly tasks improved my capability of self-control, as I needed to be motivated to do them and I think there were a lot of people fell down, because they left them so late. But I did them weekly." Participant H: "Before the course, I had been very good at self-control, so I just kept doing it in this course."
The CG	Participant D: "I am not happy with the result in this course, so I really want to improve that (self-control) for other courses. In this sense, my experience in this course made I change completely." Participant E: "I do not think that this particular course would change that (self-control)."
Improvement in problem solving	
The PCG	Participant C: "Yes. During the course, I needed to solve different problems and evaluate myself on how well I answered the forum questions."
The CG	Participant E: "I used a lot of problem solving for the assignments, e.g., researching in the library and the Internet, using different resources, and asking friends."

7.4.6 The participants' attitudinal statements about their course experiences in general

Regarding the course experiences, the participants from the PCG show positive attitudes in general, such as (a) knowledge acquisition from the course; (b) liking to use online learning resources and tools; and (c) frequent online and offline interactions with their teachers and

other students. On the other hand, the participants from the CG expressed some concerns about the course, such as (a) lack of knowledge acquisition; (b) lack of interest in the subject area; (c) needing more help from the teachers; (d) feeling confused about the course assessments; and (e) a preference for hands-on work and learning from textbooks (Table 7.41 and 7.42).

Table 7.41

Frequency of the Themes Generated from the Participants' Attitudinal Statements about their Course Experiences in General

The themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Knowledge acquisition from the course	4	0
Theme 2: Lack of knowledge acquisition from the course	0	2
Theme 3: Lack of interest in the subject area	0	2
Theme 4: Liking to use online learning resources and tools	4	0
Theme 5: Frequent online and offline interactions with the teachers and other students	4	0
Theme 6: Needing more help from the teachers	0	1
Theme 7: Feeling confused about the course assessments	0	1
Theme 8: A preference for hands-on work	0	1
Theme 9: A preference for learning from textbooks	0	1

Note. (a) Instances = frequency of the themes generated from the participants' statements.

Table 7.42

Examples of the Participants' Attitudinal Statements about their Course Experiences in General

Interviewer: How do you think about your course experiences in general?	
Theme 1: Knowledge acquisition from the course	
The PCG	Participant C: "Obviously, we learned it (the course) for a reason. The course told us more about how to use ICTs. I found the things that I learned from the course interesting and valuable. It was helpful for me to use that in my future teaching."
Theme 2: Lack of knowledge acquisition from the course	
The CG	Participant B: "I did not get anything out of it really. This feeling also did not help my attitudes."
Theme 3: Lack of interest in the subject area	
The CG	Participant D: "This course was the least favourite subject area last semester. I just did not enjoy it."
Theme 4: Liking to use online learning resources and tools	
The PCG	Participant H: "I have never used Moodle before. I enjoy using it and am happy that I can handle it."
Theme 5: Frequent online and offline interactions with the teachers and other students	
The PCG	Participant H: "The communication between the teacher and me made me happy. The communication with other students was fine. I felt that I was always supported by the teacher and other students."
Theme 6: Needing more help from the teachers	
The CG	Participant B: "The teacher was not the most helpful all the time — this did not help my attitudes as well. I had to try very hard to get to him and had to keep asking him to solve my problems."
Theme 7: Feeling confused about the course assessments	
The CG	Participant G: "Sometime when I asked the teacher questions about the assignments, the thing were not explained very clearly, even when I tried to prompt him a bit more."
Theme 8: A preference for hands-on work	
The CG	Participant D: "I like making crafts on hands, which are more physical. I prefer hands-on learning than just sitting there in front of computer."
Theme 9: A preference for learning from textbooks	
The CG	Participant D: "I really enjoy reading textbooks. I just like making notes on textbooks and learning from textbooks, rather than computers."

7.4.7 The intentions for the mode of future learning

All participants from both the PCG and CG preferred a blended mode for their future learning. The most frequently mentioned reasons for their preference included a need for face-to-face interactions and like of using online learning components. Other reasons were reported as positive prior online or blended learning experiences and a need for human factors or sociality (Table 7.43 and 7.44).

Table 7.43

Frequency of the Themes Generated from the Participants' Statements about their Intention for Blended Mode of Learning

Themes generated from the participants' statements	Instances cited by the PCG participants (n = 4)	Instances cited by the CG participants (n = 4)
Theme 1: Needing face-to-face interactions	4	4
Theme 2: Liking to use online learning components	4	4
Theme 3: Positive prior learning experiences in an online or blended environment	2	1
Theme 4: Needing human factors or sociality	2	2

Note. (a) Instances = frequency of the theme generated from the participants' statements.

Table 7.44

Examples of the Participants' Statements about their Intention for Blended Mode of Learning

Why did you choose a blended mode for your future learning?	
Theme 1: Needing face-to-face interactions	
The PCG	Participant A: "If there is something that I still do not understand during online learning, I can always talk to my teachers or classmates through face-to-face interactions. I can keep asking questions until I understand it, instead of waiting for the reply through email or keeping writing to them back and forth."
The CG	Participant E: "I like face-to-face talk, because I am a very sociable person. I need to go to the class to ask questions and get everything clarified."
Theme 2: Liking to use online learning components	
The PCG	Participant C: "I like the online resources and I could contact people even when we are not on campus."
The CG	Participant E: "I need the convenient access to the course materials online. So, at any time, like in the middle of doing my assignment, I can check the course website and review the lectures."
Theme 3: Positive prior learning experiences in an online or blended environment	
The PCG	Participant C: "I have done a totally online course before, I enjoyed it. So I am quite sure about using online learning tools."
The CG	Participant G: "I had a bended course before, which was better."
Theme 4: Needing human factors or sociality	
The PCG	Participant C: "I like the human contact, with facial expression and body language."
The CG	Participant E: "I like to be socialized and talk to people."

7.5 Summary

This chapter reported the results analysed from the participants' answers to the open-ended questions of the weekly reports, posttest, and interviews. The participants' stress in the course

was reported to be caused by the course assessments (i.e., assignments, presentations, and online forum), workload in the course, and some ICT usage during learning. In the weekly reports, the participants also made both positive and negative attitudinal statements about the course from several aspects, including the tutorials, lectures, presentations, the online forum tasks, and learning activities. In addition, several learning strategies, such as more reading and researching, keeping up with work, self-management (i.e., effort, time, and environment management), asking for help, managing resources, and making plans, were reported by the participants to help them better.

In the posttest, the participants' intentions for whether they would choose online learning were largely due to their preferences for face-to-face interactions, favour in the flexibility and convenience provided by online learning, and the difficulty level of the subject areas. In respect to the suitability of online learning, the subject areas relative to using ICTs in education and those without much hand-on practice were reported by the participants to be suitable for online learning. On the other hand, the subject areas such as mathematics, language and English study, and those with hand-on learning were regarded as less suitable to be taught online. Furthermore, the participants' suggestions for further online course development comprised clear and sufficient course content, a blended mode of learning, and podcast lectures.

With regard to the PCG and CG participants' answers to the interview questions, main themes from the participants' statements were generated for both groups. Generally, compared with the CG participants, the participants from the PCG showed more interest in the subject area, reported higher levels of course participation and knowledge acquisition, revealed higher levels of satisfaction with the interactions with their teachers and peers, and exhibited higher levels perceived learning outcomes. Finally, all participants from the PCG and CG expressed their preference for blended learning, because of their need for both face-to-face interactions in classrooms and flexibility and convenience provided by online learning components.

Chapter 8: Discussion

This chapter discusses the results in the present study concerning several factors' influence on the participants' learning outcomes and attitudes toward online learning in a blended course. Following on the course completion, eight participants were interviewed and their self-reported course experiences revealed the possible clues for the changes in their attitudes toward online learning. Then the implications for teaching and learning in an online or blended environment are provided. The limitations of the present study are discussed and suggestions for future research are provided finally.

8.1 Overview of the research questions

The present study aimed to explore a group of university students' learning experiences in a blended course and investigate the factors that might influence the students' learning outcomes and attitudes toward online learning by the end of the course. In this context, the present study attempted to answer the following main research questions:

Question One: Which factors may influence the students' learning outcomes in a blended course?

Question Two: Will there be any significant change in the students' attitudes toward online learning after taking the course?

Question Three: Which factors may influence the students' attitudes toward online learning by the end of the course?

8.2 Discussion of the findings to the research questions

8.2.1 The findings to Question One

This section discusses the results to the first main research question and its six subsidiary questions. The interpretation and discussion are also provided as below.

8.2.1.1 The finding to Question 1.1

Question 1.1: Will the students' course expectations at the beginning of the course influence their learning outcomes?

It was found that the relationship between the participants' initial course expectations and subsequent course outcomes was not significant in the present dataset. The reasons for investigating the relationship between course expectations and learning outcomes were argued earlier in this thesis (See Section 3.4). It was noted that, although a positive relationship between students' course expectations and learning outcomes was found in several studies (e.g., Bolin et al., 2005; Paechter et al., 2010), this relationship still remained unclear in other studies (e.g., Asunka, 2008; Holsapple & Lee-Post, 2006; Keasar et al., 2005).

The context and instruments of the present study were different from those in the previous studies. For example, the project of the present study was conducted among a group of university students in one single course and the instruments measuring the participants' course expectations particularly indicated their expectations of knowledge acquisition and improvement from this specific course. However, the study by Paechter et al. (2010) was conducted among over 2000 students who took the courses across various subject areas and the instruments in their study appeared generic, rather than focusing on the students' expectations from the specific courses.

Moreover, the instruments used in the previous studies addressed the students' course expectations from different angles. For instance, in the study by Bolin (2005), the students' course expectations were indicated by their motivation (i.e., a strong desire to learn) and perceptions of the possible benefits that the course would bring to them (i.e., the benefit for future profession). The items measuring students' course expectations in the research by Paechter et al. (2010) actually specified the students' perceived importance level of several aspects of an online course with six-point scale (ranging from "1 = Not important at all" to "6 = Very important"). Some items apparently represented the students' motivation to acquire knowledge and skills in the course.

Another important point to note is that the two projects (i.e., Bolin et al., 2005; Paechter et al., 2010) did report a positive relationship. But they both employed student self-reported achievement measures, whereas the present study used the participants' actual course results as their learning outcomes.

Finally, further studies are needed to investigate how the students' with different levels of course expectations will achieve different learning outcomes in an online or blended learning environment, as five research projects were located for the purpose of the present study. In some other research, the relationship between the students' course expectations and their learning outcomes was not further tested (e.g., Asunka, 2008; Holsapple & Lee-Post, 2006; Keasar et al., 2005). The finding of the present study provided some thought-provoking questions about how to further examine the relationship between students' expectations at the beginning of a course and their learning outcomes, especially when the motivational components were taken into consideration, such as how students' motivation and course expectations will interact with each other and then influence their learning outcomes.

8.2.1.2 The finding to Question 1.2

Question 1.2: Will the students' prior experiences influence their learning outcomes?

In the present study, the participants' prior experiences comprised their prior experiences of ICT usage, the subject area, and online learning. It was found that there was a non-significant relationship between the participants' prior experiences at the beginning of the course and their learning outcomes. Some researchers similarly found that students' prior experiences were not necessarily related to their learning outcomes in an online or blended environment (e.g., Gauss & Urbas, 2003; Hong, 2002; Lim & Morris, 2009; Paechter et al., 2010).

However, the finding in the present study contrasted with the results reported by LaPointe and Gunawardena (2004), Wang et al. (2001), Woodrow (1991), and Zwikael et al. (2013), who found that students' prior experiences of ICT usage, the subject area, or online learning were related to their learning outcomes.

It has been noted that, in the present study, the participants' prior ICT experiences may not be an issue for them to learn the subject area, as they reported a frequent access to computer and the Internet and were experienced with ICT use (See Table 6.13). This finding was supported by Gardner and Eng (2005) and McCrindle (2003), who found that university students used computer and the Internet as a part of their daily life and they were familiar with technology usage in learning. Additionally, the majority of the participants reported to have certain background knowledge of the subject area. It is possible to argue that the participants might have sufficient background knowledge for them to learning the subject area in the present study without the factor of prior experiences being of major importance.

It could be conceivably argued that a well-designed course and support from teachers or other students may facilitate a student's learning, regardless of the lack of his or her prior experiences in the ICT use, the subject are, or online learning (Gauss & Urbas, 2003; Hong, 2002). Although the majority of the participants did not have prior online learning experiences, they might receive help from their teacher and peers when they encounter problems. Meanwhile, given the well-designed learning activities, the experiences in the blended course could enhance the participants' online learning experiences to some extent.

It can be assumed that students' course experiences, such as course input, instructional factors (course design and teachers' support), and help from other students during learning, may be more important for students' online learning, compared with their prior experiences. Therefore, in the present study, the participants' prior experiences might not be a strong predictive factor on their learning outcomes, when the course was well-designed to facilitate their learning and the help from the teachers and other students was accessible.

8.2.1.3 The finding to Question 1.3

Question 1.3: Will the students' prior attitudes influence their learning outcomes?

In the present study, the participants' prior attitudes consisted of their prior attitudes toward ICT usage, the subject area, and online learning. It was found that there was a non-significant relationship between the participants' prior attitudes at the beginning of the course and their learning outcomes by the end of the course. This finding is consistent with those reported in several studies (e.g., Chen & Jang, 2010; Maki & Maki, 2000, 2002, 2003; Maki, Maki, Patterson, & Whittaker, 2000; Reynolds & Walberg, 1992).

However, the finding in the present study contrasted with other research (e.g., Beffa-Negrini et al., 2002; Loomis, 2000; Özgür & Tosun, 2010; Papasratorn & Wangpipatwong, 2006; Zwikael et al., 2013). For instance, Özgür and Tosun (2010) found that students' attitudes directly affected their success in online learning. The researchers suggested that it was important to appropriately meet student needs in order to help them to achieve desired learning outcomes.

It appeared that the instruments applied in the present study were different from those in the previous research, which reported inconsistent findings. For instance, the participants' learning outcomes in the present study were gauged by their actual course results, while the learning outcomes in other research were indicated by the students' self-reported learning

outcomes (Beffa-Negrini et al., 2002), expected learning outcomes (Papasratorn & Wangpipatwong, 2006), perceived improvement in learning (Zwikael et al., 2013), or one aspect of students' learning outcomes (i.e., withdrawal from the course) (Loomis, 2000). The differences in the instruments measuring learning outcomes may possibly explain the contrasting results in the present study, because, in some cases, the students' perceived learning outcomes may not always represent their actual course results (e.g., Astin 1993; Dumont & Troelstrup, 1980; Gonyea, 2005).

Furthermore, the non-significant influence of the participants' prior attitudes on their learning outcomes in the resent study had been reported by Maki and Maki (2000, 2002, 2003) and Maki et al. (2000). For instance, in the study by Maki and Maki (2002), two groups of students (25 and 50 in face-to-face and online groups respectively) were compared in terms of their learning outcomes and attitudes. The students from the online group outperformed those in the face-to-face group. However, despite the improved performance, the online-group students' course evaluation was lower than the evaluation by those in the face-to-face group.

Chen and Jang (2010) also found a non-significant relationship between the satisfaction of the students' needs during learning and their final grades in an online course. Although the satisfaction of the students' needs in the course significantly influenced their expected grades, it was shown that the students' actual final grades in the course were not significantly affected by the satisfaction of their needs in learning.

It could be noted that the context of the present study was a blended learning environment. The participants' attitudes toward online learning might not exhibit a significant impact on their learning outcomes, as their online learning attitudes merely indicated their perception of one aspect of the blended course delivery. It was also found in the study by López-Pérez et al. (2011) that the variables reflecting the students' attitudes toward blended learning, instead of their online learning attitudes alone, were correlated with the students' final marks. López-Pérez et al. assumed that the students' attitudes toward online learning alone did not affect their learning outcomes. Rather the joint effect (i.e., online and face-to-face learning activities) might possibly be explanatory of students' learning outcomes (Alexander, 1999; Crawford, Gordo, Nicholas, & Prosser, 1998; Donnelly, 2010; Mitchell & Forer, 2010).

Finally, the participants in the present study generally reported positive attitudes toward the ICT usage, the subject area, and online learning in the pretest, regardless of the results they

achieved by the end of the course (See Table 6.16). In the present study, some items measuring the participants' attitudes examined their interest, likeness, and perceived usefulness in learning. Although the majority of the participants held positive attitudes in the course at the beginning of the course, the factors which significantly influenced their course results actually were found to be self-control and self-regulated learning, whose influence was mediated through course participation.

8.2.1.4 The finding to Q 1.4, Q 1.5, Q 1.6

Question 1.4: Will the students' self-control influence their learning outcomes?

Question 1.5: Will the students' self-regulation in learning influence their learning outcomes?

Question 1.6: Will the students' course participation influence their learning outcomes?

Through regression analysis and PLS modelling, it was found that the significant predictors for the participants' learning outcomes were self-control, self-regulation, and course participation. The participants with higher levels of self-control achieved better learning outcomes. The impact of self-control upon the participants' learning outcomes was mediated through their application of self-regulated learning strategies and course participation.

The above results revealed that the participants' scores of self-control and self-regulated learning, which were obtained at the beginning of the course, significantly predicted their learning outcomes (i.e., the results that the participants achieved at the end of the course). This finding added to the construct validity of the scales used in the present research, which were based on the scales by Barnard et al. (2008), Lan et al. (2004), Pintrich et al. (1991, 1993), Pintrich and De Groot (1990), and Tangney et al. (2004).

Moreover, it is important to note that the statistical modelling established that the impact of the participants' self-control upon their learning outcomes was mediated through the application of self-regulated learning strategies and course participation. In essence, it was inferred that self-control, as a capacity, exerted its influence through activating self-regulated strategic learning. Then the participants' usage of self-regulated learning strategies (i.e., capability of applying different motivational, cognitive, and metacognitive learning strategies to achieve their learning goals) predicted their learning outcomes through the mediation of course participation, which consisted of several factors, such as the time spent for the course online, the number and length of their online forum contributions, and the number of the weekly reports submitted.

Similarly, Sharma, Dick, Chin, and Land (2007) found that the students with higher levels of self-regulation in learning (e.g., intrinsic goal orientation, self-efficacy, and environment management) were likely to receive better learning outcomes in an online course. Saba (2012) also reported that students' self-regulated learning in an online environment was related to their learning outcomes. Additionally, the impact of motivation on students' learning outcomes was found by Vallerand, Fortier, and Guay (1997) and Standage, Duda, and Ntoumanis (2006), that students' self-determination directly predicted their learning outcomes.

Ho and Kuo (2010) found that the positive influence of students' computer attitudes on their learning outcomes was amplified through the mediation of flow experience (i.e., feeling in control, focusing attention on activity, intrinsic interest, and curiosity). It can be assumed that some aspects of self-regulation construction (i.e., motivational factors) overlapped with certain attitudinal components (e.g., interest, confidence, likeness, and usefulness).

The relationship between the participants' course participation and learning outcomes found in the present study was consistent with the finding by Davies and Graff (2005), who investigated 122 first-year university students' learning outcomes in an online learning environment. They found that the students, who were more active in the course engagement, received better course results. In more recent research by Chen and Jang (2010), it was found that the students' final grades in an online course were significantly correlated to the number of times that they accessed the online course content.

It is also important to note that the relationships, which are significant on the basis of raw bivariate correlations, may not be articulated, once the key predictive factors are entered into statistical models. Such a notion is suggested through the present findings, in which the path analysis revealed that the direct impact of the participants' self-control on their learning outcomes was reduced to a non-significant level, when the indirect effects were taken into account. Moreover, the participants' performance orientation, which represented the participants' motivation to achieve good results in the course, appeared to be a significant predictive factor for their learning outcomes on the basis of bivariate relationships, but in fact the impact of this factor was mediated through the participants' course participation.

8.2.2 The findings to Question Two

Question Two: Will there be any significant change in the students' attitudes toward online learning after taking the course?

It was evident that there was a significant increase from 33.03 (mean value) to 34.83 with the effect size of 0.63 in the participants' attitudes toward online learning by the end of the course. It seemed that the experiences of completing the blended course possibly resulted in the positive changes in the participants' attitudes toward online learning. The reason may be that, by completing the course, the participants became more familiar with the subject area which was relevant to ICT usage, more competent in using different online learning resources and tools, and more capable of using the knowledge and skills learned from the course in their future teaching. In this sense, the experiences of the blended course increased the participants' exposure to more online learning resources and tools and the subject area knowledge, which might lead to the increases in their attitudes toward online learning.

It has been found that an online or blended learning environment exposes students to the activities involving the usage of different online learning components, which not only contributes to the increase in the students' confidence in using technologies (Billings, Connors, & Skiba, 2001; DeBourgh, 1999; Kenny, 2002; Leasure et al., 2000; Yucha & Princen, 2000), but also improves their course satisfaction (Anderson & Harris, 1997; Gunawardena & Zittle, 1997; Hillman, 1999; McDonald & Gibson, 1998; Murphy & Collins, 1997; Salmon, 1999).

The finding about the increases in the participants' online learning attitudes in the present study also accorded with the research by White, Troutman, and Chancey (1994), who investigated 163 university students' computer attitude changes in a course of "Computer in Education". It was concluded that the students' course experiences of using computers significantly correlated with the increase in their attitudes toward computer use. Another similar finding was reported by Jung et al. (2002), who surveyed 124 undergraduate students in an online course. The researchers found that the online learning experiences brought positive changes in the students' attitudes toward the Internet usage for learning.

In the more recent research by López-Pérez et al. (2011) among 1431 students in a blended learning environment, it was found that the blended course experiences had a positive effect in reducing the students' dropout rates and improving their examination results. Lei (2010)

indicated that blended learning experiences could be beneficial to reinforce students' understanding of the subject area knowledge and enhance and support their learning process.

A well-replicated finding from social psychology is that people's attitudes tend to increase in a positive direction through mere exposure. Based on this theory, the exposure to an attitude object, which referred to a referent object (e.g., an event or others' behaviour) to which people hold attitudes, can influence people's attitudes toward this object. The more experiences a person has with the attitude object, the more favourably he or she will evaluate the object (Bornstein & D'Agostino, 1992; Greenwald & Banaji, 1995; Janiszewski, 1993; Murphy et al., 1995; Zajonc, 1965, 2001). In the present research, the blended course provided the participants with a frequent exposure to a variety of online learning components and the concept of using ICTs in teaching and learning. The completion of the course may positively influence the participants' attitudes toward online learning and contributed to the significant increase in their online learning attitudes.

8.2.3 The findings to Question Three

This section discusses the results of the third main research question and its five subsidiary questions. The interpretation and discussion on the findings are also provided.

8.2.3.1 The finding to Question 3.1

Question 3.1: Will the students' course expectations at the beginning of the course influence their attitudes toward online learning by the end of the course?

There was a significant correlation between the participants' initial course expectations and attitudes toward online learning at the beginning of the course (at T1). Their course expectations at T1 were also found to be significantly related to the online learning attitudes by the end of the course (at T2). However, the regression analysis (See Section 6.6.5) indicated that the participants' course expectations at T1 did not significantly predict their online learning attitudes at T2, once their online learning attitudes at T1 were entered into the analysis. This indicated that the participants' initial course expectations did not significantly predict any increase in their online learning attitude at T2.

The significant correlation between the participants' course expectations and online learning attitudes was consistent with the study by Wu et al. (2010), who found that students' expectations in learning were relevant to their satisfaction with the course experiences.

Martins and Kellermanns (2004) and Shih (2006) also found that students' performance expectations were positively related to their course satisfaction.

In the present study, although there was a slight decrease in the participants' satisfied expectations at T2, it is noted that their course expectations still remained positive with the mean value staying above the natural middle point and the reductions in the satisfied course expectations at T2 were only significant among the participants with lower levels of intrinsic orientation. Generally, the participants' expectations at T1 and T2 remained on a positive direction (See Section 6.3.2.3). Especially regarding the satisfaction of their course expectations at the end of the course, the majority of the participants responded positively to the questions about satisfied expectations in the posttest.

8.2.3.2 The finding to Question 3.2

Question 3.2: Will the students' prior experiences influence their attitudes toward online learning by the end of the course?

It was found that the levels of the participants' prior experiences (i.e., prior experiences of ICT usage, the subject area, and online learning) did not significantly predict their online learning attitudes at both beginning and end of the course. This finding contrasted with the previous research concerning the relationship between prior experiences and students' attitudes in online learning (e.g., Cybinski & Selvanathan, 2005; Suanpang, 2007).

Three salient factors can be noted as relevant at this point. First of all, virtually most of the participants had frequent access to computer and the Internet. Hence, there were no significant differences among the participants in terms of their prior experiences of ICT usage. The non-significant relationship between the students' prior ICT experiences and online learning attitudes may be the result of a high level of familiarity with computer and the Internet usage (Gardner & Eng, 2005; McCrindle, 2003).

The non-significant relationship between students' prior ICT experiences and attitudes was also found by DeBourgh (1999). The researcher found that the students' lack of prior experiences of technology usage was not related to their use and acceptance of the technology and course satisfaction. DeBourgh suggested that the possible reason for the non-significant relationship might be that the students overcame the technological barriers, as they moved along with the course through the consultation with other students, teachers, and online experts. It was argued that providing adequate support to the students, who had less prior ICT

experiences, could help them to become competent with ICT usage and maintain a positive attitude.

Secondly, regarding the relationship between students' prior experiences of the subject area and their attitudes in an online learning environment, the reviewed studies mainly concerned the subject area relative to mathematics (Cybinski & Selvanathan, 2005; Suanpang, 2007). However, the subject area in the context of the present study was relative to ICT usage in teaching and learning, whose nature was the application of computer and the Internet. Therefore, to some extent, the participants' high level of familiarity with ICT usage might facilitate their learning, regardless of different levels of prior subject area experiences.

Finally, although the participants may differ in their prior online learning experiences, their prior experiences of computer and the Internet usage can possibly help them to learn the subject and get used to different online learning resources and tools (Jung et al., 2002; White et al., 1994). Sher (2009) found that at least one year of the Internet usage might be sufficient for students to feel comfortable with online learning.

Generally, it can be assumed that, in the present study, the high level of familiarity with ICT usage and the experiences of learning in a blended environment may benefit the participants in terms of improving their attitudes toward online learning, regardless of their prior experiences.

8.2.3.3 The finding to Question 3.3

Question 3.3: Will the students' course participation influence their attitudes toward online learning by the end of the course?

There was no significant relationship between the participants' course participation and their attitudes toward online learning by the end of the course. Although the participants' prior online learning attitudes and motivation were found to significantly predict their attitudes toward online learning by the end of the course, it is interesting to note that, in the present dataset, such effects were apparently not mediated through the participants' course participation.

Attitudes in a course may not simply dependent upon students' participation. The finding in the present study was consistent with several historical research findings. For instance, LaPiere (1934) suggested that attitudes did not always determine behaviour, because other factors, such as (a) situational factors (e.g., the norms which might make it impossible or

unacceptable to express attitudes); (b) characteristics of the attitudes themselves (e.g., whether the attitudes were based on direct or indirect experiences and whether the attitudes were strong); and (c) personal factors (e.g., the level of a person's self-monitoring), might moderate the effect of attitudes on behaviour (Brehm, Kassin, & Fein, 2005; Kassin, Fei, & Markus, 2010). Attitude and behaviour are at best only poorly aligned.

8.2.3.4 The finding to Question 3.4 and 3.5

Question 3.4: Will the students' prior attitudes influence their attitudes toward online learning by the end of the course?

Question 3.5: Will the students' self-regulation in learning influence their attitudes toward online learning by the end of the course?

Regarding Question 3.4, there was a significant correlation between the participants' prior attitudes and their attitudes toward online learning by the end of the course. The factors, which were significantly related to the participants' attitudes toward online learning by the end of course, included their prior attitudes toward ICT usage, the subject area, online learning components, and online learning in general. However, the significant predictor for the participants' online learning attitudes by end of the course was their prior online learning attitudes.

Owing to the nature of the course (i.e., ICT usage in teaching and learning), the items, which measured the participants' attitudes toward ICT usage, the subject area, and online learning components, were overlapped with the items of the online learning attitudes. Compared with the participants' prior attitudes toward ICT usage, the subject area, and online learning components, their prior online learning attitudes exerted a stronger impact on their online learning attitudes by the end of the course.

In respect to Questions 3.5, it was found that the participants' motivational components of self-regulation (intrinsic and performance orientation) significantly predicted their attitudes toward online learning by the end of the course.

When the factors of the participants' prior attitudes and self-regulation were analysed through regression analysis and PLS models, it was revealed that the factors which predicted the participants' attitudes toward online learning by the end of the course were (a) their prior online learning attitudes; and (b) intrinsic orientation and performance orientation. When the prior attitudes toward online learning were controlled, the participants with higher levels of

intrinsic and performance orientation showed more positive changes in their attitudes toward online learning by the end of the course. These three factors (i.e., prior online learning attitudes, intrinsic orientation, and performance orientation) explained 48% of the variance of the participants' online learning attitude by the end of the course.

The influence of the participants' prior online learning attitudes on their online learning attitude by the end of the course was consistent with the study by Wang et al. (2001) among 24 university students in an online course. They found that the students' prior technology attitudes continued to affect their attitude toward technology. The researchers suggested that the students' prior attitudes toward technology might also influence their selection of future course which involved technology usage.

With respect to the influence of motivation on the participants' attitudes toward online learning, the previous research has addressed how motivation could make a difference in students' attitudes toward using technology in learning. Venkatesh, Speier, and Morris (2002) attempted to develop an integrated model of technology acceptance, by reanalysing the data from two previous research projects by Venkatesh (1999) and Venkatesh and Speier (1999). Venkatesh et al. (2002) redefined the Technology Acceptance Model within a motivational framework. The resulting model revealed that extrinsic and intrinsic motivations significantly predicted the students' intention to use the technology. Further, Lee et al. (2005) found that both intrinsic (perceived enjoyment) and extrinsic motivation (perceived usefulness and ease of use) could significantly and directly affect the students' intention of learning online.

In general, the participants' prior online learning attitudes significantly influenced their attitudes toward learning online by the end of the course. Meanwhile, the participants with higher levels of motivation of self-regulated learning tended to display more increases in their online learning attitudes by the end of the course. The higher levels of motivation the participants showed in the course (e.g., high level of interest in or perceived value of learning, or strong intention of acquiring knowledge or achieve success in the course), the more positive attitudes they were likely to show toward online learning.

8.2.3.5 The learning experiences revealed from the open-ended questions

In the present study, it was found that the predictors for the participants' online learning attitudes by the end of the course were their prior online learning attitudes and motivation (intrinsic and performance orientation) measured at the beginning of the course. Although the influence of the participants' prior online attitudes and motivation was not found to be

mediated through their course participation, the results from the weekly reports, posttest, and interviews provided in-depth and detailed information about the participants' learning experiences in the course, which may possibly imply the potential causes of different levels of the participants' online learning attitude changes.

Furthermore, the participants raised several issues emerging in the course during the interviews, which may provide some suggestions for teaching and learning in an online or blended environment. The following sections elaborate on the findings from the open-ended questions in the posttest, weekly reports, and interviews and attempt to discuss how the participants' different learning experiences may contribute to their online learning attitude changes.

8.2.3.5.1 Perceived learning outcomes

As seen from the participants' answers in the weekly reports, knowledge and skills acquisition was commented as what they liked or valued about the course. More participants from the Positive Change Group (PCG) reported a high level of perceived learning outcomes than those from the Contrast group (CG), in terms of knowledge acquisition and improvements in several aspects of their learning.

Firstly, more participants in the PCG than the CG reported that they gained knowledge from the course. Secondly, more PCG participants claimed that they have improved themselves in critical thinking, application of effective learning strategies and self-control strategies, time management, and problem solving.

The relationship between perceived knowledge gains and students' attitudes was found by Swan et al. (2000b) that there were significant differences in the students' course satisfaction among the students with different levels of perceived learning in the online courses. The students with higher levels of perceived knowledge acquisition tended to be more satisfied with the course. Swan et al. have pointed out the importance of students' perceived learning outcomes (e.g., perceived knowledge acquisition and skill improvement) in developing their positive perception of online learning. Conrad and Donaldson (2004) also suggested that the acquisition of knowledge was critical for students' success an online learning environment. It can be noted that students' higher levels of perceived learning outcomes may possibly contribute to higher levels of course satisfaction, which may result in the increases in the students' attitudes toward learning in an online or blended environment.

8.2.3.5.2 Course participation

The participants claimed in the weekly reports that the effective application of various learning strategies helped them learn better in the course. For example, they were more engaged in their learning by doing more reading and researching, practice on ICT tools, managing study environment and time, and interacting with their teachers or peers for help seeking. The application of these learning strategies as self-regulatory learners possibly ensured that the participants exerted more effort to maintain a high level of course participation, which might contribute to better learning outcomes and more positive attitudes in the course.

The participants from the PCG and CG reported different levels of course participation, in terms of learning from the course content and using online learning tools. Compared with the CG participants, more participants in the PCG reported that they took advantages of the online learning tools and online course content to complete the course tasks and develop their knowledge.

The high levels of students' engagement in learning may help to increase their satisfaction with learning experiences in an online course (Bertea, 2009; Swan, 2002). Bertea (2009) carried out a research among 284 business students in an online course and found that the levels of the students' course participation had a direct impact on their attitudes toward online learning. Swan (2002) found a similar significant relationship between students' participation in learning and satisfaction with the online course. It may possibly be assumed that a high level of course participation through applying different learning strategies may help students learn better and develop more positive attitudes in online learning. Nevertheless, it needed to be noted that, as examined in the data from the 74 participants in the present study, course participation was not significantly related to attitudes.

8.2.3.5.3 Lack of interest in the subject area and excessive focus on the assignments

It was found that the participants in the CG showed less interest in the subject area and course content, compared with the PCG participants. Two participants in the CG commented that the course content was irrelevant to the assignments. For example, the lecture content and the workshop activities were commented as not being directly related to the assignments, but merely providing the information about the subject area. This suggested that these participants from the CG focused more on the completion of the assignments and most of their learning activities were targeted on the assignment completion.

On the contrary, the participants from the PCG focused on both gaining knowledge and keeping high standard for the learning tasks (e.g., assignments), rather than merely completing the assignments. Deci and Ryan (2000) found that the students, who were keen to extend their knowledge beyond the demand of immediate assignments, were more intrinsically motivated and tended to show more interest, excitement, and confidence in learning.

8.2.3.5.4 Lack of prior ICT experiences

As shown from the interview results, two CG participants recalled that they had little prior experiences with using the ICT tools in the course and found these ICT tools to be difficult for them. They felt that they could not cope with the hands-on practice on computers in the tutorials. The lack of prior ICT experiences may cause these participants' frustrations when using the ICTs in the tutorial activities and influence their attitudes toward online learning in the course. The issue of lack of prior ICT experiences was also found in the weekly reports as one of the reasons for the participants' stress in the course.

Moreover, it was apparent that the lack of prior ICT experiences might influence the participants' ICT usage. For instance, one participant from the CG recalled that she did not know about the library database, therefore her searching for information was limited. Another participant in the CG reported that a few students in her tutorial group were not familiar with some ICT tools in the course and were unable to understand the teacher during the tutorial practice. She stated that she felt frustrated to use the ICTs in the tutorials.

The issue of lack of prior ICT experiences was also reported by Thomerson and Smith (1996), who surveyed 495 college students. They concluded that the lower levels of prior experiences of technology usage caused the students' anxieties, frustration, dissatisfaction, and negative attitudes in the online course.

Similarly, Vernadakis et al. (2010) explored the relationship between 211 undergraduate students' prior computer experiences and attitudes toward an online course. It was found that the students with more computer experiences were more positive toward the online course. Prosser and Trigwell (1999) and Alexander, McKenzie, and Geissinger (1998) also suggested that students' prior ICT experiences could influence their view of the current learning situation, such as the acceptance of using new technology in learning. Schrum and Hong (2002) found that technology experience was one of the strategies for students' success in

online learning. The unfamiliarity with technologies could be regarded as a challenge for the inexperienced students to use the technologies in online learning.

It may be assumed that the participants' lack of prior ICT experiences may cause higher levels of perceived difficulty in ICT usage in the course, which may influence their attitudes toward online learning. As shown from the participants' answers to the posttest question concerning the intention for future online learning, perceived difficulty in learning online (e.g., difficulties in the subject area or ICT usage) was reported to be an issue which influenced their choices for online learning. The subject area in the present study was about using ICT in teaching and learning. Hence, participants' perceived difficulty in the course owing to the difficulty in ICT usage may impact upon their attitudes toward online learning and intention for future online learning.

The issue of perceived difficulty in online learning has also been reported by Lee (2010), who investigated 363 Taiwanese students' continuous intention for online learning. It was found that the students' perceived difficulty in online learning was related to their satisfaction with and attitudes toward online learning, which in turn predicted their intention for future online learning. Nguyen and Zhang (2011) also reported that students' perceived difficulty level of online learning was a major concern for them to choose to study online.

Generally, students may feel comfortable with using ICT tools during online learning, if they are familiar with ICT usage. Although most of the participants in the present study reported a high level of familiarity with ICT usage and the issue of lack of prior ICT experiences was reported with a low frequency of instances (e.g., two and six instances from the interviews and weekly reports respectively), such an issue, which might not be a concern for the majority of the participants, appeared to be an obstacle for those participants, who lacked prior ICT experiences, to learn with various ICT tools in the course.

8.2.3.5.5 Attitudes toward the usage of online learning tools in the course

All four participants from the PCG claimed that they enjoyed the hands-on practice on a variety of online learning tools in the tutorials. They stated that the experiences of using different online learning tools in the course helped them become more familiar with these tools and capable of using them.

On the other hand, two participants from the CG reported a lack of interest in using the online learning tools. The reasons provided by them included (a) the course was not their favourite

subject area; (b) lack of prior ICT experiences; (c) they preferred to make crafts on hands rather than through using computers; and (d) they preferred to learn from textbooks than computers. It was also found from the participants' weekly reports that the lack of interest in using ICTs was reported as one of the issues during learning.

Drennan et al. (2005) examined the relationship between 256 university students' usage of ICT tools and course satisfaction in a blended learning environment. It was reported that there was a significant relationship between the students' perceived easiness of ICT usage and course satisfaction. Kettanurak et al. (2001) carried out an investigation among 154 undergraduate students in an online course. It was found that the students, who had higher levels of control on and frequency of the usage of the interactive multimedia instruction system in the course, showed more positive attitudes toward online learning.

Some CG participants' preference for a traditional mode of learning (e.g., textbooks) was also reported by Faux and Blank-Hughes (2000), who found the students in their research preferred face-to-face instruction. In Faux and Blank-Hughes's study, 66 university students enrolled in a course with three modes of delivery, such as face-to-face, online, and blended modes. The number of students in each group was respectively 13, 12, and seven. In the online group, five students indicated that they were not able to learn well through using computer and the Internet. The primary theme generated from these five students' comments was that they preferred to attend face-to-face lecture and discussion rather than read the course material from computers.

As seen from the sections of 8.2.3.8.4 and 8.2.3.8.5, the participants in the CG reported a lack of prior ICT experiences and lower levels of interest in using ICTs. It seemed that the lack of prior ICT experiences and interest in ICT usage might not improve these participants' attitudes toward online learning.

However, the quantitative analysis in the present study revealed a non-significant relationship between the participants' prior ICT experiences and attitudes toward ICT usage and online learning. This may be the result that the majority of the sample group were familiar with and positive toward ICT usage. Leong, Ho, and Saromines-Ganne (2002) and Thurmond et al. (2002) also found that there was no significant influence from prior computer experiences on the students' overall satisfaction with online learning. Thurmond and Wambach (2004) reviewed the current literature on the interactions in online learning and indicated that the

students' lack of prior computer experiences did not necessarily lead to the negative experiences of ICT usage during online learning.

It has been noted by a number of researchers (e.g., Billings et al., 2001; Kenny, 2002; Leasure et al., 2000; Thurmond et al., 2002; Yucha & Princen, 2000) that students could build up their confidence about ICT use through the practice on ICTs in an online course, regardless of their unfamiliarity with ICTs before taking the course. In the present study, as the participants moved along in the course, their access to ICTs would be increased and their ICT experiences could be enriched. Thereby, the participants' attitudes toward ICT usage may be improved after completing the course, regardless of their prior ICT experiences. Hence, it may be assumed that the issue of lack of ICT experiences and interest in ICT usage, which was raised by the CG participants, might represent the situation of a small number of participants and could not be generalized for the whole group, given the majority of the participants were familiar with and positive toward ICT usage.

8.2.3.5.6 Attribution of failure in learning

One participant in the CG responded negatively to the course assessments apparently because of the lack of prior experiences. She claimed that she had never done the certain assignment before and had not been informed with details about how she could complete the assignment. She commented that she felt confused about the assignment requirements and experienced a high level of anxiety. She expected more clarifications on the assignment from her teacher. She attributed her failure to achieve a good result to the difficulty level of the assignment beyond her current experiences and insufficient information provided by the teacher, rather than the internal causes, such as insufficient effort to search for more information and communicate with her teacher to solve her confusion.

The above reasons, such as difficulty level and insufficient information from teachers, can be regarded as the external causes, which are unstable over time and uncontrollable (Hodges & Tech, 2004; McCombs, 1986). Attribution to the external causes cannot effectively motivate students or improve their learning. In contrast, attributing the errors or failure in learning to the controllable process, such as insufficient effort, ineffective use of learning strategy, or the lack of communication with teachers, can help students sustain their motivation and remain positive during learning process (Zimmerman, 2002).

8.2.3.5.7 Online interactions with the teachers

The participants from the PCG reported higher levels of online interactions with their teachers than those from the CG. All four participants in the PCG recalled their experiences of online interactions with the teachers positively. The relationship between student-teacher interactions and students' satisfaction was reported by Swan et al. (2000b) and Swan (2001). Swan (2001) found that the students, who reported higher levels of online interactions with their teachers, were more engaged in learning and satisfied with the course than those with lower levels of interactions with the teachers.

On the other hand, the participants in the CG expressed concerns about several aspects of online interactions with their teachers, such as needing timely responses and more detailed explanation from the teachers in email communication and perception of the impersonal online communication. For example, the CG participants commented that they needed timely responses from their teachers. The content in email communication generally could not be elaborated with abundant details and they normally did not ask back and forth through email. Therefore, some problems might remain unsolved during email communication. Additionally, some human factors, such as oral expression, eye contact, and gesture, were lost during email communications.

The above issues raised by the CG participants were also found in the results of the posttest and weekly reports. The participants' comments in the posttest showed their preference for face-to-face interactions, because of human factors, instant feedback, and richness in the content. The weekly report responses revealed the participants' concern about the clarity of the information provided by the teachers about the course assessments during online communication.

Nguyen and Zhang (2011) reported the similar findings of students' concerns about online courses, such as the lack of face-to-face communication during online learning. Several other researchers have noted that the lack of face-to-face contact in online learning may foster the feeling of being disconnected from other people in online learning (e.g., Atack & Rankin, 2002; Billings et al., 2001).

Debourgh (1999) found that students' satisfaction in an online course was related to several aspects of online interactions with their teachers, such as (a) promptly recognizing and responding to the students' questions; (b) encouraging the students' participation in the course; and (c) the accessibility of the teachers outside of class.

Hara and Kling (2001) also suggested that the lack of prompt or clear feedback from teachers might result in students' confusion, stress, and frustration during online learning. The delayed responses from teachers might lead to students' ambiguity about their performance. Similarly, Vrasidas and McIsaac (1999) reported that, when students did not received timely replies from the teachers online, they would feel discouraged and their participation in the course might be curtailed. El Mansour and Mupinga (2007) found that delayed responses from teachers could cause the feeling of isolation among students in an online learning environment.

Generally, the participants' experiences of interactions with their teachers during online learning might influence the perception of their course experiences. The teachers' frequent presence, timely feedback, and clear information were likely to develop the participants' positive attitudes toward online learning in the course.

8.2.3.5.8 Clarity of the teachers' explanation

In respect to the teachers' explanation, more participants from the CG expressed a need for clear explanation from the teachers than the PCG participants. All four participants from the CG emphasized the importance of receiving clear and sufficient information about the course assessments from the teachers. Similarly, the participants' answers in the posttest revealed that clear and precise information from the teachers was important for future online course development. Additionally, regarding the teachers' explanation on the assignments, more participants from the CG than the PCG emphasized the importance of providing consistent information by the teachers from different tutorials groups.

Clear information about course content and assessments provided by teachers has been found to be related to students' attitudes in an online course. For example, DeBourgh (1999) examined 44 students' satisfaction in an online graduate nursing program. It was found that the students' course satisfaction was related to whether the teachers could clarify the course materials by using various instructional techniques to help the students gain a better understanding of the topics in the course. Liu, Chen, Sun, Wible, and Kou (2010) also found the information about the course assessments and requirements provided by teachers was related to students' attitudes in an online learning environment.

Furthermore, it has been found that students' attitudes in an online course were related to their teachers' teaching competency, such as providing clear instruction, help, and support, encouraging students' participation in the course, and maintaining their motivation (Ali &

Elfessi, 2004; Anderson et al., 2001; Huckstadt & Hayes, 2005; Kurtz et al., 2003; Lee et al., 2011; Paechter et al., 2010; Russo & Benson, 2005; Tu & Corry, 2003). Hence, frequent communication with students, timely responses, and clear and sufficient information provided by teachers can facilitate students learning and develop their positive attitudes toward learning in an online or blended environment.

8.2.3.5.9 Online interaction with peers

The participants from the PCG reported higher levels of online interactions with peers in general and were more satisfied with their experiences of online peer interactions than those in the CG. Three PCG participants were positive toward the online interactions with their tutorial group members, except for one participant who commented that there were more peer interactions in Facebook than the online forum in the tutorial group.

On the other hand, three CG participants expressed their concerns about the lack of peer interactions on the online forums. They claimed that the students in their tutorial groups merely posted answers to the teachers' questions on the online forums and few students responded to others' contributions. Another participant in the CG addressed that the students in her tutorial group used Facebook more frequently than the online forum, because they were concerned that their online forum contributions were marked by the teacher. This individual openly stated that she would not use the online forum, since she did not wish to disclose her lack of understanding of the course content and did not want her operant ignorance to be registered and recorded.

Two main reasons were generated from the participants' comments on the insufficient use of the online forums. Firstly, the participants did not feel comfortable to be obliged to contribute to the online forums, as the forum questions were compulsory tasks in the course. Several participants claimed that they preferred the forum topics which could stimulate their interest. They would ask or answer questions when they felt there was a need. Some participants' comments in the weekly reports also showed a lack of interest to answer the compulsory questions.

The issue of setting up compulsory tasks on an online forum has been argued by Rozner (2000). Rozner explored the interactions among eight groups (each including two to four students) of high school students in an online forum moderated by a teacher. Rozner found that, when the teacher mainly focused on the assessment instead of creating a learning group, the students inclined to feel that their activity in the online forum should only fulfil the

assessment requirements and their social interactions might be limited. Thereby, the objective of collaborative knowledge construction might not be fully accomplished.

Similarly, the issue of lack of interactions in online discussion has been found by Vardi and Bunker (2001), who surveyed 50 university students in two blended courses. The researchers found the students did not collaborate with each other through online discussion. The students claimed that they did not see the value of online discussion, which contributed to a low level of interactions between them in the online discussion.

The second reason provided by the participants about low levels of peer interactions on the online forums was that being marked by the teachers caused their discomfort in online discussion, as they had to be careful about what they would post on the forums. The participants expressed that they felt reluctant to ask questions or speak freely, because their posts could be visible to their teachers. Tsur (2000) examined the influence of teachers' moderation on 11 students' participation in online discussion. Tsur found that the students were concerned about being marked on their online contributions. Tsur also suggested that social interactions among the students might be developed more easily when the students did not feel that they were being monitored.

In addition, some participants claimed that they preferred to use Facebook rather than the online forums in the course. As discussed above, some participants claimed that they did not feel relaxed and comfortable to post inquiries to the online forums. Instead, the friendly environment on Facebook with around 100 students in the course offered a quicker, freer, and more relaxing environment for them to interact with peers.

The frequent usage of Facebook reported by the participants in the present study was in accordance with the findings by Wood, Barnes, Vivian, Scutter, and Stokes-Thompson (2010) and Vivian and Barnes (2010). They surveyed 812 undergraduate and graduate students and found that 91% of the students were active users of Facebook (Wood et al., 2010; Vivian & Barnes, 2010). Mazman and Usluel (2010) found that Facebook was easy to use and facilitated students' learning through building a comfortable learning community.

Moreover, Vivian (2011) examined 110 university students' usage of Facebook for informal learning. The students claimed that the benefits brought by Facebook to their learning outweighed the issue of distraction. The benefits reported by the students included (a) being

affordable; (b) habitual; (c) usefulness and easy features; (d) availability; (e) accessibility; and (f) support for building the social network.

Kabilan, Aham, and Abidin (2010) investigated 300 university students' perception of using Facebook in language learning. The students reported that Facebook created an online learning environment to facilitate their English language learning in terms of (a) improving their language skills; and (b) increasing their motivation, confidence, and attitudes towards English learning.

Finally, the participants in the CG addressed that they felt a low level of sense of community in their tutorial groups, which might be relevant to the lack of peer interactions on the online forums. It was found that a high level of participation from the students in online discussion could help to create a strong sense of community among the students, such as having the feeling of belonging, being connected, sharing the same value and faith, and trusting the group members (McMillan & Chavis, 1986; Rovai, 2002).

Summarised from the participants' self-reported experiences of online peer interactions, it appeared that the levels of online peer interactions could possibly be related to the participants' attitudes toward learning in the course. Beffa-Negrini et al. (2002) found that online peer interactions strongly predicted students' course satisfaction. Similarly, Fulford and Zhang (1993) found a significant relationship between peer interactions and students' satisfaction in an online course. Fulford and Zhang reported that the participants, who had more frequent online communications with peers, perceived less isolation and displayed higher levels of satisfaction with learning in the course. It can be assumed that higher levels of peer interaction during online learning may increase students' perceived comfort and sense of community, which can contribute to more positive changes in their attitudes toward online learning.

8.2.3.5.10 The participants' team work through face-to-face interactions

One participant from the CG recalled an issue of uneven contributions from his group members for the presentation, as some group members were always absent from group meetings and did not contribute enough to their presentation.

Team work among students may be regarded as an intrinsic and integrated aspect of learning, as the students can construct knowledge through collaborative activities (Howe & Mercer, 2010). Oakley, Hanna, Kuzmyn, & Felder (2007) found that the students, who had positive

team work experiences, were likely to be more positive toward the course than those with negative team work experiences. Freeman and McKenzie (2002) found that students' dissatisfaction with team assessment was due to their perceived unequal contributions from the group members.

8.2.3.5.11 Technical issues

Two participants from the PCG reported their concerns about the technical issues, such as dysfunction of the online forum interface (i.e., their posts being lost), the incompatibility of university email accounts with their personal email accounts, and limitation for the size of assignments uploaded online.

Technical problems during online learning were also reported by Song et al. (2004), who examined 74 graduate students' perception about their online learning experiences. It was shown that technical problems were regarded as a substantial challenge for the students' learning. The students reported that technical problems took up too much of their time and they could not do anything when the problems occurred.

8.2.3.5.12 Summary of the participants' learning experiences

The findings from the posttest, weekly reports, and interviews may possibly provide some clues for different levels of the participants' online learning attitude changes, which were identified from the statements by the PCG and CG participants. Firstly, the participants with different levels of motivations in the course may participate in the course differently, which possibly contributed to their different learning outcomes and online learning attitudes by the end of the course. This finding was consistent with the studies by Bertea (2009), Paechter et al. (2010), Ryan and Deci (2000), Swan (2001), and Zhao and Kuh (2004).

Next, the students, who realized the importance and value of the subject knowledge, tended to be more motivated in learning and show more positive attitudes toward learning. Bassili (2008) found that the students, who considered the course interesting and important, were likely to be motivated to do well in the course and show more positive attitudes toward learning the lecture online.

Furthermore, the frequent online interactions between the participants and their teachers and timely feedback from the teachers were also important for the participants to remain positive toward learning in an online environment. It was found that the students with more positive experiences of online interactions with their teachers were likely to be more satisfied with the

course they took (Hara & Kling, 2001; Lee et al., 2011; Paechter et al., 2010; Swan et al., 2000b; Vrasidas & McIsaac, 1999). Additionally, Booth-Butterfield, Mosher, and Mollish (1992) and Arbaugh (2001) found that teachers' immediacy in responding to their students' inquiries could improve the students' attitude toward the subject in an online learning environment. Higher levels of teacher-student online communication can create an overall social climate to increase the interactivity between teachers and students and among students in an online learning environment, which can benefit students' learning (Melrose & Bergeron, 2006).

Finally, different levels of peer interactions through online communication or face-to-face interaction in a blended environment may result in the participants' different attitudes toward online learning. It was found that students' frequent communication with and support received from peers and smooth team work were related to their sense of being connected with other students and course satisfaction during online learning (Beffa-Negrini et al., 2002; McMillan & Chavis, 1986; Oakley et al., 2007; Rovai, 2002).

In sum, compared with the CG participants, the participants from the PCG generally showed higher levels of motivation in the course and more interest in the subject area, reported higher levels of course participation, revealed higher levels of satisfaction with the online interactions with their teachers and peers, and exhibited higher levels of perceived learning outcomes. Consequently, it is apparent that the PCG participants showed higher levels of satisfaction with their course experiences and more positive changes in the attitudes toward online learning than those in the CG. It may be assumed that different learning experiences in the course may contribute to different levels of changes in the participants' online learning attitudes.

8.3 Implications for teaching and learning in an online or blended environment

8.3.1 Improving self-regulatory skills in learning

It is commonly believed that self-control and self-regulation can influence students' success in learning (Pintrich & De Groot, 1990a; Pressley & Ghatala, 1990; Schunk, 1989; Williams & Hellman, 1998; Zimmerman, 1990a, 1990b; Zimmerman & Bandura, 1994). Students need to be more autonomous and proactive during online learning, because in such kind of learning environment, students' face-to-face interactions with their teachers and other

students may be decreased (Ally, 2004; Barnard et al., 2010). To achieve desired learning outcomes, students need to regulate not only their actions but also their underlying achievement-related cognitions, beliefs, intentions, and effects (Schunk, 1996).

However, not all students are well prepared for learning online. Bullen (1998) carried out interviews with 13 university students and a teacher. It was found that, although most of the students did think that they were prepared for self-discipline as required by the course, two students attributed their failure to complete the course to their inability to achieve self-discipline.

Students' self-regulatory skills may be improved after taking an online or blended course, given that the students can use different online learning components to facilitate their learning and communicate with their teachers and peers. However, students' self-regulatory skills were not automatically developed by simply immersing the students in an online learning environment (Barnard-Brak et al., 2010). The development of students' self-regulation needs to considerate the course design based on a sound pedagogical foundation. For example, teachers can facilitate, stimulate, guide, and challenge their students by empowering them with freedom and responsibility in order to keep the students self-motivated and develop their self-regulatory skills during online learning (Saba, 2012). Learning activities can also be organized to facilitate students' usage of cognitive and metacognitive strategies (Ley & Young, 2001). The following paragraphs discuss some methods, which may facilitate the development of students' self-regulatory skills during online learning.

Firstly, making full use of online learning tools may provide opportunities for students to develop their self-regulated learning skills (Barnard-Brak et al., 2010). Students can choose and personalize online learning content and tools which are available for them (McLoughlin & Lee, 2010). For example, online calendar can remind students of upcoming assignments and deadlines; different online communication and social networking tools can enhance communication between students and teachers for information exchange; and technical support can provide the services of troubleshooting for students to seek help.

Secondly, providing students with choices in learning can promote them to practise self-regulation. Young (1996) found that, when students were given the choices in their learning, they could exercise their self-regulation, which could achieve better learning outcomes. Young suggested that teachers could allow students to choose different topics for online

discussion and students were able to learn based on their interest and inquiries. It can be assumed that, driven by their interest, students will be more motivated to explore the concept and solve problems by using a variety of learning strategies in an online course.

Thirdly, compulsory learning tasks (e.g., assignments) can provide students with the practice which is necessary to routinize their self-regulatory skills (Zimmerman, 1998). For instance, in order to complete assignments, students can use different learning strategies, such as (a) researching; (b) applying critical thinking; (c) organizing, analysing, and synthesising the information; (d) problem solving; and (e) managing their study time, environment, and effort.

Fourthly, teachers can provide their students with constructive feedback, which may assist to improve students' affective responses, raise their interest in the course, improve their cognitive skills, and activate their meta-cognition (i.e., the awareness and control of cognition through planning, monitoring, and regulating cognitive activities) (Drago & Wagner, 2004; Saba, 2012).

Finally, teachers can also encourage students to self-evaluate their learning and discuss self-estimations with actual solutions (Stoeger & Ziegler, 2008). Students' confidence can be increased by self-evaluating their own work, discussing with their teachers and peers, and seeking out solutions for the improvement.

8.3.2 The design of course assessments

8.3.2.1 Online discussion as a compulsory task

Setting online discussion as an assessment can improve students' online participation (Benfield, 2002); however, the connection between online discussion and course assessment may also cause the discussion to be shallow and perfunctory (Howland & Moore, 2002). Feeling being monitored in online discussion may reduce students' perceived self-determination (Howland & Moore, 2002). Students normally participate in online discussion when (a) they are driven by inquiries and a need to pursue solutions for their questions; or (b) they feel a need to clarify controversial issues. Therefore, the assessment of students' online discussion needs to find a balance between task-oriented and self-directed approaches (Xie, 2006). Thomas (2002) has suggested that the students' online discussion could be evaluated both quantitatively and qualitatively when their online discussion was linked with the course assessment.

8.3.2.2 Teachers' involvement in online discussion

The issues reported by the participants about using the online forums and Facebook essentially reflected their attitudes toward teachers' involvement in online peer interactions. It appeared that some participants preferred to have peer-directed online discussion. Whereas, the others stated that online discussion should be encouraged and monitored by teachers.

There are both strengths and potential issues of teachers' moderation in online discussion. Teachers' moderation may guide their students' discussion toward a higher level of learning by promoting exchanges, shaping the major pattern of the online discourse, challenging assumptions, and correcting misconceptions (An & Levin, 2003; Anderson et al., 2001). More recently, Asterhan and Schwarz (2010) surveyed 74 students from three ninth-grade classrooms in a junior high school. The students' discussions were conducted in an online environment. Sixty-eight percent of the students indicated that the teachers' moderation was important for online discussion. The reasons for the students' favour in their teachers' moderation were reported as (a) keeping the students on tasks (e.g., supervising the activities and helping the students who were unable to manage the activities themselves); (b) scaffolding critical thinking and knowledge construction; and (c) guiding the collaboration.

However, teachers' moderation may cause online discussion to be teacher-centred (Light Nesbitt, Light, & White, 2000; Nickel, 2002). Students may feel less confident about expressing their ideas because of the authority and power carried by teachers (McConnell, 1994; Pearson, 1999).

It was shown in several research projects that there was a negative relationship between the frequency of teachers' moderation and students' participation in online discussion. Mazzolini and Maddison (2003) conducted a study among 2000 university students in an online astronomy program. It was found that there was a significant negative relationship between the teacher's postings and the students' average discussion thread length in the discussion forums. The researchers also found that the majority of the students were satisfied with their overall learning experiences, regardless of whether the teachers posted to the online discussion frequently or not. Finally, Mazzolini and Maddison raised a question about whether it was necessary for teachers to moderate students' online discussion.

Mazzolini and Maddison (2007) used archives which contained over 40000 postings by the students and teachers to nearly 400 discussion forums in online postgraduate courses. It was found the percentage of discussion threads started by the teachers were negatively correlated

with the length of the students' discussion threads (r = - 0.27) and posting rate (r = - 0.33). The percentage of teacher postings within a forum was significantly correlated with the length of the students' discussion threads in a negative direction ($r = -0.32$). There were no significant correlations between the percentage of teacher postings and the students' perceived usefulness of the forums or their overall satisfaction with their learning experiences.

It is worthwhile to investigate how to encourage students' online discussions without actually taking over in the process (Mazzolini & Maddison, 2007). Kearsley (2000) indicated that teachers needed to maintain a balance between too little and too much involvement. The teachers need to consider the proper time to moderate students' online discussion, such as when to make a comment, ask questions, or redirect the discussion.

When teachers moderate online discussion, their role needs to be limited to monitoring, but not intervening (Dysthe, 2002). Asterhan and Schwarz (2010) investigated 16 graduate students' participation in an online discussion. The researchers found that teachers' effective moderation included involvement, the speed of responses, being active in the discussion, keeping the discussion focused, and objectivity and neutrality. Oren, Mioduser, and Nachmias (2002) suggested that teachers' moderation skills included positive emotions, humour, encouragement and guidance for the productive direction of discussion, correcting mistakes, and promoting the exchanges between students.

In sum, it was found that there were both strengths and issues for teachers to moderate students' online discussion. Teachers' moderation in students' online discussion can be a vexed matter and it may be hard to reach a definite conclusion. Careful consideration needs to be taken on the design of online forum tasks to create a comfortable environment, which can facilitate students' interactions, develop their sense of community, and enhance their learning.

8.3.2.3 Clarity of course requirements

Providing sufficient and clear guidance on course tasks is important to clarify students' confusion about the course assessments. DeBourgh (1999) reported that providing clear expectations about the course assignments was related to students' satisfaction in an online course. Hara and Kling (2001) found that ambiguous instruction on the course website was a stress factor during students' learning. Teachers need to clarify the learning objectives and course requirements at the beginning of an online course. They also need to provide detailed explanation to their students' inquiries about the course assessments during the students' learning process.

8.3.3 High levels of participants' expectations or requirements regarding the course design

Students may have high level of expectations of or requirements on the course design based their prior learning experiences. One participant in the CG commented on the importance of combining the theories introduced in the lectures and the practice in the tutorials. With a sound background of ICT experiences and good academic achievement before taking the course, she had a high level of requirement for the course design. She expected the lecture content and weekly readings could be related to the hands-on practice in the tutorials.

Students will be motivated to learn, when they believe the knowledge provided in a course could be meaningfully related to their goals (Keller, 2008). Learning activities need to be relevant to a context of application such as authentic learning experiences (Duffy, Lowyck, & Jonassen, 1993). Therefore, the students, who have high requirements of course content design, may be very critical when evaluating their course experiences. Lower levels of relevance of course content to authentic practice and application may cause a decrease in students' motivation in learning and course satisfaction.

On the other hand, students may have unrealistic expectations of an online course, such as the immediacy of their teachers' response. Students' stress level may increase when they do not receive the teachers' responses within their expected duration, especially when their expectation for the latency of the teachers' reply is not realistic. The possible solutions that teachers can take may be: (a) informing students the reasonable duration for teachers' replies (e.g., within 48 hours) at the beginning of the course; (b) sending student an email automatically every time when teacher receive an email and informing the student that his or her email has been received and the teacher will reply within a short period of time; or (c) managing teachers' own time to ensure their email can be checked frequently and students' inquiries can be attended to within a reasonable period of time.

8.3.4 Students' preference for blended learning

Both the PCG and CG participants chose blended learning as their favourite learning mode in future. Two main aspects were identified from their statements. Firstly, online learning components provided the participants with an easy and flexible access to the course and facilitated their learning to a great extent. Secondly, the participants indicated that they needed face-to-face interactions with teachers and other students. They expressed their dislike of the feeling of isolation during online learning.

Harker and Koutsantoni (2005) found that blended learning was more effective in terms of student retention, while the students' achievement levels were similar in both blended and online learning groups. Dziuban et al. (2004) suggested that blended learning combined the effectiveness and socialization opportunities of traditional learning with the technologically enhanced learning in an online environment. In the research by Hoch and Dougher (2011), it was found that a shift was identified in the students' preferred mode of learning from 2009 to 2010 — an increased number of the students in their sample group preferred blended learning. Clayton et al. (2010) found that the students' preference for blended learning was mainly because of augmented learning (i.e., learning enriched by technologies), face-to-face interactions, and a flexible and convenient access to the course.

8.4 Limitations of the present study and suggestions for future research

The measurement of learning process factors in the weekly reports reveals some limitations in terms of collecting the detailed information about the participants' course experiences. It was of some difficulty to keep the participants responding to each of the weekly reports. Therefore, the participants completed the weekly reports on different levels of frequencies. Future research, which aims to investigate students' course experiences, can be designed with the purpose of obtaining more detailed and complete information about the students' course participation as a continuous process.

Secondly, an open-ended question was used in the weekly report to ask about the specific learning strategies that the participants applied in the course. Most of the participants provided brief answers to this question. Hence, this measurement did not obtain much detailed information about the participants' application of learning strategies. Additionally, learning strategies may vary across different subject areas. More investigations need to be carried out to construct the self-regulated learning strategies suitable for different subject areas in an online or blended environment.

The present study focused on the investigation of the participants' attitudes toward online learning in a blended course, rather than their attitudes toward the blended mode of learning. Future studies can be designed to investigate students' attitudes toward blended mode of learning and examine the joint effect of face-to-face and online learning experiences on their learning outcomes and attitudes.

Finally, the sample population was chosen in a subject relevant to ICT usage in education. The participants' attitudes toward the subject area were found to be significantly correlated to their attitudes toward ICT usage and online learning, because of the technology nature of the subject area. Future research can choose different subject areas, of which the topics do not overlap with ICT usage. Therefore, the possible influence of the students' attitudes toward ICT usage may be controlled.

8.5 Conclusion of the study

The present study aimed to investigate the factors which would influence students' learning outcomes and attitudes toward online learning in a blended environment. It was found that the participants' self-control, self-regulated learning, and course participation significantly influenced their learning outcomes. The participants, who reported higher levels of self-control capability and self-regulated learning, achieved better learning outcomes. More importantly, the results supported that the influence of self-control on the participants' learning outcomes was mediated through their use of self-regulated learning strategies and course participation.

It was apparent that the blended course experiences significantly changed the participants' attitudes toward online learning in a positive direction. The participants' online learning attitudes by the end of the course were significantly predicted by their prior attitudes toward online learning and motivation (i.e., intrinsic and performance orientation). Moreover, the participants with higher levels of motivation displayed more increases in their online learning attitudes than those with lower levels of motivation.

As shown from the interview results, the participants in the PCG showed more interest and higher levels of motivation in learning, reported more participation in the course, and displayed higher levels of satisfaction with their interactions with the teachers and peers than the CG participants. The PCG participants also perceived higher levels of learning outcomes and showed more positive perception of their course experiences and more positive changes in their attitudes toward online learning by the end of the course. It can be assumed that, in the present study, the participants with higher levels of motivation tended to participate more in the course, reported more positive course experiences, and then showed more positive attitudes toward learning by the end of the course.

In a sum, self-control and self-regulation were found to be important for the participants to achieve better learning outcomes. The participants who were more capable of self-control and self-regulation showed higher levels of course participation, which thereby contributed to better learning outcomes. Meanwhile, the participants became more positive toward online learning after taking the blended course. Their prior online learning attitudes predicted their attitudes toward online learning by the end of the course. It also needs to be noted that the participants' motivation in regulated learning also played an important role in influencing their online learning attitudes, as the participants with higher levels of motivation showed more positive changes in their online learning attitudes by the end of the course. It can be important for students to remain self-controlled and self-regulated during learning in an online or blended environment, in order to achieve desired learning outcomes and develop positive attitudes toward learning.

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Appendices

APPENDIX 1

Ethics approval

Zhu, Yue - zhuyy009

From:	no_reply@unisa.edu.au
Sent:	Monday, 21 February 2011 10:02 AM
To:	Zhu, Yue - zhuyy009
Cc:	Zhu, Yue - zhuyy009; Gregory Yates; Researchcompliance@unisa.edu.au
Subject:	Human Ethics: Application approved
Follow Up Flag:	Flag for follow up
Flag Status:	Flagged

Dear Applicant

Re: Ethics protocol "University Students' Attitudes toward Online Learning in a Blended Learning Environment"

Thank you for submitting your ethics protocol for consideration. Your protocol has been considered by the E1 Committee Review Group.

I am pleased to advise that your protocol has been granted ethics approval and meets the requirements of the National Statement on Ethical Conduct in Human Research. Please note that the E1 Committee Review Group's decision will be reported to the next meeting of the Human Research Ethics Committee for endorsement.

Please regard this email as formal notification of approval.

Ethics approval is always made on the basis of a number of conditions detailed at http://www.unisa.edu.au/res/forms/docs/humanresearchethics_conditions.doc; it is important that you are familiar with, and abide by, these conditions. It is also essential that you conduct all research according to UniSA guidelines, which can be found at http://www.unisa.edu.au/res/ethics/default.asp

Please note, if your project is a clinical trial you are required to register it in a publicly accessible trials registry prior to enrolment of the first participant (e.g. Australian New Zealand Clinical Trials Registry http://www.anzctr.org.au/Survey/UserQuestion.aspx) as a condition of ethics approval.

Best wishes for your research.

Vicki Allen
Executive Officer
UniSA's Human Research Ethics Committee CRICOS provider number 00121B

This is an automated email and cannot be replied to. Please direct your query to the relevant person.

APPENDIX 2

Information sheets

University of South Australia

Information Sheet

Project title: University Students' Attitudes toward Online Learning in a Blended Learning Environment

Dear course coordinator,

I would like to request your permission for the data collection for my PhD research project in your course "Information and Communication Technologies in Learning and Teaching" in the Study Period Two of 2011. The research is about university students' attitudes toward online learning in a blended-learning environment. Especially it will investigate the relationships between university students' attitudes toward online learning and several factors, such as prior experiences, prior attitudes, course expectations, self-control, self-regulation, course experiences, and learning outcomes. The study aims to explore the possible measures that students might undertake to improve and mould their positive attitudes toward online learning, and help them to achieve better learning outcomes. The results of this research may be helpful for the educators to find out students' attitudes toward online learning in details and what they are supposed to do to improve the situation of their online education according to the different responses of their students.

Around 150 students (over 18 years old) in your course will be chosen as a convenient sampling to participate in a two rounds of questionnaires, which be conducted at the beginning and the end of the Study Period Two in 2011. The participants' name and e-mail address will be recorded so that we can match the responses on these two occasions. Each round of the questionnaires will take them about 20 minutes to finish. Following the questionnaire survey, some participants may be invited to be engaged in an interview survey, which would ask more detailed information about their attitudes toward online learning. During the interview survey, their answers will be audiotaped. The recording of the interviews will be transcribed into typed text.

All information collected as part of the study will be retained for five years and be treated in accord with principles of confidentiality. The raw data will be locked in a filing cabinet drawer and the electronic data will be stored in the computer with password protection in the

researcher's office. Access to the data and results will be restricted to the principal researcher and supervisors. All records containing personal information will remain confidential and no information which could lead to identification of any individual will be released. The data will be treated statistically and will be reported only on statistical trends. Thus, the data will be individually non-identifiable.

I would greatly appreciate your approval for my study. If approved, I will carry out the research in a professionally appropriate manner. A brief report of groups can be available for them through email if they request. The participants may withdraw from the research at any time without affecting their completion of the course.

Thank you for considering this request. This project has been approved by University of South Australia's Human Research Ethics Committee. If you have any ethical concerns about the project, please contact the Executive Officer of this Committee, Tel: +61 8 8302 3118; Email: vicki.allen@unisa.edu.au

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University of South Australia

Information Sheet

Project title: University Students' Attitudes toward Online Learning in a Blended Learning Environment

Dear Participants,

I would like to request your consent to participate voluntarily in a research project, which will contribute toward my PhD study. The research is about university students' attitudes toward online learning in a blended-learning environment. Especially it will investigate the relationships between university students' attitudes toward online learning and several factors, such as prior experiences, prior attitudes, course expectations, self-control, self-regulation, course experiences, and learning outcomes. The study aims to explore the possible measures that students might undertake to improve and mould their positive attitudes toward online learning, and help them to achieve better learning outcomes. The results of this research may be helpful for educators to find out students' attitudes toward online learning in details and what educators might do to improve the situation of their online education according to the different responses of their students.

You will be invited to participate in the questionnaire survey, mainly involving two rounds of questionnaires (pre-test and post-test), which will be conducted at the beginning and the end of the Study Period Two of 2011. Your name and e-mail address will be recorded so that we can match your responses on these two occasions. Each round of the questionnaires will take you about 20 minutes to finish. Following the questionnaire survey, you may be invited to participate in an interview survey, which would ask more detailed information about your attitudes toward online learning. During the interview survey, your answers will be audiotaped. The recording of the interviews will be transcribed into typed text.

All information collected as part of the study will be retained for five years and be treated in accord with principles of confidentiality. The raw data will be locked in a filing cabinet and the electronic data will be stored in the computer with password protection in the researcher's office. Access to the data and results will be restricted to the researcher and her supervisors.

All records containing personal information will remain confidential and no information which could lead to identification of any individual will be released. The data will be treated statistically and will be reported only on statistical trends. Thus, the data will be individually non-identifiable.

I would greatly appreciate your participation in the study. If approved, I will carry out the research in a professionally appropriate manner. A brief report of groups can be available for you through email if you request. You may withdraw from the research at any time without affecting your completion of the course.

Thank you for considering this request. This project has been approved by University of South Australia's Human Research Ethics Committee. If you have any ethical concerns about the project or questions about your rights as a participant, please contact the Executive Officer of this Committee, Tel: +61 8 8302 3118; Email: vicki.allen@unisa.edu.au

Yue Zhu

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Dr. Wing Au

Principal supervisor

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APPENDIX 3

Consent forms

University of South Australia

CONSENT FORM

Project title: University Students' Attitudes toward Online Learning in a Blended Learning Environment

Researcher's name & contact details: Yue ZHU

School of Education, Magill Campus

University of South Australia

St Bernards Rd, Magill 5072

Phone: 8302 4205

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Email: Yue.Zhu@postgrads.unisa.edu.au

Supervisor's name & contact details Dr. Wing AU

Principal supervisor

School of Education, Magill Campus,

University of South Australia

Phone: 8302 4506 or Email: Wing.au@unisa.edu.au

- I have read the Course Coordinator Information Sheet and the nature and purpose of the research project have been explained to me. I understand and agree that this project to be carried out among the students of my course.

Name of course coordinator.....Dr. Wing Au.....

Signed.....**Date**.....30-Oct-2010

I have provided information about the research to the course coordinator and believe that he understands what is involved.

Researcher's signature and date.....30-Oct-2010

This project has been approved by the University of South Australia's Human Research Ethics Committee. If you have any ethical concerns about the project or questions about your rights as a participant please contact the Executive Officer of this Committee, Tel: +61 8 8302 3118; Email: Vicki.allen@unisa.edu.au

University of South Australia

CONSENT FORM

Project title: University Students' Attitudes toward Online Learning in a Blended Learning Environment

Researcher's name & contact details: Yue ZHU

School of Education, Magill Campus

University of South Australia

St Bernards Rd, Magill 5072

Phone: 8302 4205

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Email: Yue.Zhu@postgrads.unisa.edu.au

Supervisor's name & contact details: Dr. Wing AU

Principal supervisor

School of Education, Magill Campus,

University of South Australia

Phone: 8302 4506 or Email: Wing.au@unisa.edu.au

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.
- I understand the purpose of the research project and my involvement in it.
- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.
- I understand that while information gained during the study may be published, I will not be identified and my personal information will remain confidential.
- The results for the research will be locked in the researcher's office securely and the access to the data will be restricted to the principal research and supervisors.
- I understand that I might be audiotaped during the interview, if I participate in the interview after the questionnaire survey.

Name of participant…….....

Signed…….**Date**…….

I have provided information about the research to the research participant and believe that he/she understands what is involved.

Researcher's signature and date……...

This project has been approved by the University of South Australia's Human Research Ethics Committee. If you have any ethical concerns about the project or questions about your rights as a participant please contact the Executive Officer of this Committee, Tel: +61 8 8302 3118; Email: Vicki.allen@unisa.edu.au

APPENDIX 4

Instruments

University Students' Attitudes toward Online Learning in a Blended Learning Environment (Pretest)

Section A. Student background information

Q1. Your given name:

Q2. Your surname:

Q3. Your email address:

Q4. Your gender:

○ Female ○ Male

Q5. Your age group:

○ 15-20 years old ○ 21-25 years old ○ 26-30 years old ○ 31-35 years old ○ 36 years old or above

Q6. Your highest educational level:

○ Below Bachelor ○ Bachelor ○ Master ○ PhD

Q7. With which of the following target groups do you identify:

○ English-speaking background ○ Non-English speaking background

Q8. I expect that, (please click in one from the five circles from "Unlikely to happen" to "Very likely to happen".)

	Unlikely to happen1	2	Uncertain3	4	Very likely to happen5
I will get a good grade.	○	○	○	○	○
I will improve my computer and the Internet skills.	○	○	○	○	○
I will enjoy this course.	○	○	○	○	○
I will learn more about the subject area.	○	○	○	○	○

	Unlikely to happen1	2	Uncertain3	4	Very likely to happen5
I will have an access to the course material outside of class time.					
I will learn more effectively by using online learning tools.					
I will have more communication with others by using online learning tools.					
I will have more self-control on my study.					

Other (please specify)

Q9. How frequently do you use the followings? (Please click one from the following choices.)

	Never	Rarely	Once a month	Once a week	A few times a week	Everyday
Computer application software, e.g., Word processing, database systems, Spreadsheets, and presentation graphics						
Publishing tools, e.g., desktop publishing and Web publishing						
Email						
Social network services (based on individual), e.g., MySpace, Facebook, Twitter, Video conferencing, and Skype						
Online community services (based on group), e.g., Wiki, bulletin board system, Weblogs, online forum, YouTube, and chat rooms						
Web search engines for general purpose, e.g., Google, Alltheweb, Yahoo! , Ask.com, and Being						
Web search engines for academic purpose, e.g., online academic journals, Google Scholar, Eric, online library, and Academic Search						

Q10. How familiar are you with the subject area of "Information and Communication Technology in Learning and Teaching"?

○ Not familiar at all ○ Somewhat familiar ○ Quite familiar ○ Very familiar

Q11. How many online courses (without face-to-face instruction) have you taken before?

Section B. Questions about yourself

Q12. Your study methods part 1 (Please click one from the following choices.)

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
If I study in appropriate ways, I will be able to learn better.	○	○	○	○	○
If I try hard enough, I will understand what I am learning.	○	○	○	○	○
I am confident that I can understand the most complex material in a course.	○	○	○	○	○
I am confident that I can do an excellent job on the assignments and tests in a course.	○	○	○	○	○
I try to relate ideas in one topic to those in other topics whenever possible.	○	○	○	○	○
When I study a course, I practise saying the material to myself over and over to help me remember.	○	○	○	○	○
When I study a course, I read my class notes and the course readings over and over again.	○	○	○	○	○
When I study a course, I pull together information from different sources, such as lectures, readings and discussions.	○	○	○	○	○
When reading for a course, I outline the material to help me organize my thoughts.	○	○	○	○	○
When reading for a course, I try to relate the material to what I've already known.	○	○	○	○	○

Q13. Your study methods part 2

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
When studying a topic, I try to make everything fit together.	○	○	○	○	○
When I study a course, I always go over my class notes and make an outline of important concepts.	○	○	○	○	○
I always make simple charts, diagrams, or tables to help me organize the course material.	○	○	○	○	○
I try to play around with the ideas of my own related to what I am learning in a course.	○	○	○	○	○
I always treat the course material as a starting point and try to develop my own ideas about it.	○	○	○	○	○
During class time, I often miss important points because I am thinking of other things.	○	○	○	○	○
If course readings are difficult to understand, I change the way I read the material.	○	○	○	○	○

Q14. Your study methods part 3

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
Before I study new course material thoroughly, I often skim it to see how it is organized.	○	○	○	○	○
I always ask myself questions to make sure that I understand the material I have been studying in a course.	○	○	○	○	○
I often find that I have been reading for a course but do not know what it is all about.	○	○	○	○	○
Before I begin studying, I think about the things I will need to do to learn.	○	○	○	○	○
When I study a course, I set goals for myself in order to direct my activities in each study period.	○	○	○	○	○

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
When I am reading, I stop once in a while and go over what I have read.	○	○	○	○	○
I work on practice exercises and answer the questions at the end of each chapter even when I do not have to.	○	○	○	○	○
I usually study in a place where I can concentrate on my course work.	○	○	○	○	○
I make good use of my study time.	○	○	○	○	○
I find it hard to stick to a study schedule.	○	○	○	○	○
I make sure that I keep up with the weekly readings and assignments for a course.	○	○	○	○	○
I still work hard to do well in a class even if I do not like what I am doing.	○	○	○	○	○

Q15. Your study methods part 4

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
When the course work is difficult, I either give up or only study the easy parts.	○	○	○	○	○
Even when the course materials are dull and uninteresting, I manage to keep working until I finish.	○	○	○	○	○
I often set aside time to discuss a course material with other students.	○	○	○	○	○
Even if I have trouble learning a course material, I try to do the work on my own without help from anyone.	○	○	○	○	○
When I cannot understand a course material, I ask other students in my class.	○	○	○	○	○
I am persistent in getting help from my teachers or tutors.	○	○	○	○	○

Q16. Your study methods part 5

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
I think I am able to use what I have learnt in this course in other courses.	○	○	○	○	○
I feel it is important to learn the course material in this course.	○	○	○	○	○
Understanding the subject matter of a course is very important to me.	○	○	○	○	○
I prefer the course materials that really challenge me, so I can learn new things.	○	○	○	○	○
The most satisfying thing for me in a course is trying to understand the content as thoroughly as possible.	○	○	○	○	○
When I have the opportunity in a course, I choose the course assignments that I can learn from even if they do not guarantee a good grade.	○	○	○	○	○
When studying a course, getting a good grade in a class is the most satisfying thing for me.	○	○	○	○	○
If I can, I want to get better grades in a class than most of other students.	○	○	○	○	○
I want to do well in a class because it is important to show my ability to my family, friends, employer, or others.	○	○	○	○	○
When I take tests, I think of the consequences of failing.	○	○	○	○	○
I have an uneasy, upset feeling when I take an exam.	○	○	○	○	○
I set a high standard for my assignments in a course.	○	○	○	○	○
I set short-term goals (daily or weekly) as well as long-term goals (monthly) for the semester.	○	○	○	○	○
I keep a high standard for my learning.	○	○	○	○	○

Q17. The following items are about yourself in general.

	Not like me at all	Probably not like me	Unsure	Somewhat like me	Very much like me
I am good at resisting temptation.	○	○	○	○	○
I have a hard time breaking bad habits.	○	○	○	○	○
I am lazy.	○	○	○	○	○
I say inappropriate things.	○	○	○	○	○
I do certain things that are bad for me, if they are fun.	○	○	○	○	○
I refuse things that are bad for me.	○	○	○	○	○
I wish I had more self-discipline.	○	○	○	○	○
People would say that I have iron self-discipline.	○	○	○	○	○
Pleasure and fun sometimes keep me from getting work done.	○	○	○	○	○
I have trouble concentrating.	○	○	○	○	○
I am able to work effectively toward long-term goals.	○	○	○	○	○
Sometimes I cannot stop myself from doing something, even if I know it is wrong.	○	○	○	○	○
I often act without thinking through all the alternatives.	○	○	○	○	○

Section C. Your attitudes

Q18. Your attitudes toward ICT use (Please click one from the following choices.)

	Strongly disagree	Disagree	Agree	Strongly agree
I am interested in computer and the Internet use.	○	○	○	○
Computer and the Internet are useful for me.	○	○	○	○
I feel confident about computer and the Internet use.	○	○	○	○

	Strongly disagree	Disagree	Agree	Strongly agree
I am comfortable with computer and the Internet use.	○	○	○	○
I like using computer and the Internet.	○	○	○	○
Computer and the Internet use are difficult for me.	○	○	○	○
I feel anxious about computer and the Internet use.	○	○	○	○

Q19. Your attitudes toward the subject area of "Information and Communication Technology in Learning and Teaching"

	Strongly disagree	Disagree	Agree	Strongly agree
I am interested in this subject area.	○	○	○	○
This subject area is useful for me.	○	○	○	○
I feel confident about this subject area.	○	○	○	○
I feel comfortable with this subject area.	○	○	○	○
I like this subject area.	○	○	○	○
This subject area is difficult for me.	○	○	○	○
I feel anxious about learning this subject area.	○	○	○	○

Q20. Your attitudes toward online components in learning

	Strongly disagree	Disagree	Agree	Strongly agree
I am comfortable about learning online.	○	○	○	○
I am happy using email.	○	○	○	○
I am comfortable about participating in online discussion forum.	○	○	○	○
I enjoy searching material online.	○	○	○	○
I find online course material valuable.	○	○	○	○
I am comfortable about using the online	○	○	○	○

	Strongly disagree	Disagree	Agree	Strongly agree
communication tools, such as email and online discussion.				
I like to use online resources, e.g., online course material, for this course.	○	○	○	○
I like to use other online tools, such as Wiki, for this course.	○	○	○	○
I have a positive attitude toward online learning.	○	○	○	○
The IT help system, e.g., IT help, online support and student services, is not supportive to my study.	○	○	○	○
I cannot get timely feedback from others through email.	○	○	○	○
I do not like to participate in online discussion.	○	○	○	○
The online material is difficult for me.	○	○	○	○
I am anxious to learn this course online.	○	○	○	○

Q21. Your attitudes toward traditional components in learning

	Strongly disagree	Disagree	Agree	Strongly agree
I like learning things in a traditional environment, e.g., face-to-face lectures or tutorials.	○	○	○	○
I would like to read information from paper rather than a screen.	○	○	○	○
When I need help, I would really prefer face-to-face talk with teachers or other students.	○	○	○	○
I like hands-on training.	○	○	○	○
I prefer the instruction from a teacher rather than a computer.	○	○	○	○
I like sharing or exchanging my opinions with others through face-to-face talk rather than online communication.	○	○	○	○
I like cooperating or collaborating with others in a traditional group with face-to-face contact rather than the communication through the Internet.	○	○	○	○
With the support by online communication, I can finish my study without face-to-face contact with my teachers or other students.	○	○	○	○

Q22. Your general attitudes toward online learning

	Strongly disagree	Disagree	Agree	Strongly agree
People can learn successfully through online instruction.	○	○	○	○
Online learning provides a good learning environment.	○	○	○	○
Overall, online learning is enjoyable.	○	○	○	○
Online learning will eventually replace traditional teaching methods.	○	○	○	○
Online learning enhances students' interests in learning.	○	○	○	○
I prefer online learning to traditional instruction.	○	○	○	○
I have a favourable attitude toward online learning	○	○	○	○
I would be happy if I had to enrol in an online course in the near future.	○	○	○	○
I like online learning.	○	○	○	○
I am interested in online learning.	○	○	○	○
I feel confident about online learning.	○	○	○	○
I feel comfortable with online learning.	○	○	○	○
There are many disadvantages to learning online.	○	○	○	○
Overall, the traditional form of learning is more successful than online learning.	○	○	○	○
When I learn new materials, it is better to be in a traditional class than trying to learn online.	○	○	○	○
Online learning is difficult for me.	○	○	○	○
I feel anxious about learning online.	○	○	○	○

Thank you very much for your participation.

University Students' Attitudes toward Online Learning in a Blended Learning Environment (Posttest)

Section A. Student background information

Q1. Your given name:

Q2. Your surname:

Q3. You enrolled in this course as

○ a full-time student ○ a part-time student

Q4. Will your expectation of a good grade be satisfied in this course? (Please click one from the following five circles from "unlikely" to "very likely".)

	Unlikely1	2	Uncertain3	4	Very likely5
I probably will get a good grade.	○	○	○	○	○

Q5. Have your other expectations been satisfied in this course? (Please click one from the following five circles from "Did not happen" to "Yes it happened".)

	Did not happen1	2	Uncertain 3	4	Yes it happened 5
I improved my computer and the Internet skills.	○	○	○	○	○
I enjoyed this course.	○	○	○	○	○
I learned more about the subject area.	○	○	○	○	○
I had access to course materials outside of class time.	○	○	○	○	○
I learned more effectively by using online learning tools.	○	○	○	○	○
I had more communication with others by using online learning tools.	○	○	○	○	○
I had more self-control on my study.	○	○	○	○	○

Your other expectations (please specify)

Q6. How frequently do you use the followings now? (Please click one from the following circles.)

	Never	Rarely	Once a month	Once a week	A few times a week	Everyday
Computer application software, e.g., Word processing, database systems, Spreadsheets, and presentation graphics	○	○	○	○	○	○
Publishing tools, e.g., desktop publishing and web publishing	○	○	○	○	○	○
Email	○	○	○	○	○	○
Social network services (based on individual), e.g., MySpace, Facebook, Twitter, Video conferencing, and Skype	○	○	○	○	○	○
Online community services (based on group), e.g., Wiki, bulletin board system, Weblogs, online forum, YouTube, and chat rooms	○	○	○	○	○	○
Web search engines for general purpose, e.g., Google, Yahoo!, Ask.com, and Being	○	○	○	○	○	○
Web search engines for academic purpose, e.g., online academic journals, Google Scholar, Eric, online library catalogue, and Academic Search	○	○	○	○	○	○
Web search engines for kids, e.g., Kid Click, Ask Kids, Yahoo!KIDS, and Yippy	○	○	○	○	○	○

Section B. Your attitudes

Q7. Your attitudes toward ICT use (Please click one from the following choices.)

	Strongly disagree	Disagree	Agree	Strongly agree
I am interested in computer and the Internet use.	○	○	○	○
Computer and the Internet are useful for me.	○	○	○	○
I feel confident about computer and the Internet use.	○	○	○	○
I am comfortable with computer and the Internet use.	○	○	○	○
I like using computer and the Internet.	○	○	○	○
Computer and the Internet use are difficult for me.	○	○	○	○
I feel anxious about computer and the Internet use.	○	○	○	○

Q8. Your attitudes toward the subject area of "Information and Communication Technology in Learning and Teaching"

	Strongly disagree	Disagree	Agree	Strongly agree
I am interested in this subject area.	○	○	○	○
This subject area is useful for me.	○	○	○	○
I feel confident about this subject area.	○	○	○	○
I feel comfortable with this subject area.	○	○	○	○
I like this subject area.	○	○	○	○
This subject area is difficult for me.	○	○	○	○
I feel anxious about this subject area.	○	○	○	○

Q9. Your attitudes toward online components in learning

	Strongly disagree	Disagree	Agree	Strongly agree
I am comfortable learning online.	○	○	○	○
I am happy using email.	○	○	○	○
I am comfortable about participating in online discussion forum.	○	○	○	○
I enjoy searching materials online.	○	○	○	○
I find online course materials valuable.	○	○	○	○
I am comfortable about using the online communication tools, such as email, online discussion.	○	○	○	○
I like to use online resources, e.g., online course materials, for this course.	○	○	○	○
I like to use other online tools, such as Wiki, for this course.	○	○	○	○
I have a positive attitude toward online learning.	○	○	○	○
The IT help systems, e.g., IT help, online support and student services, are NOT supportive to my study.	○	○	○	○
I can NOT get timely feedback from others through email.	○	○	○	○
I do NOT like to participate in online discussion.	○	○	○	○
The online material is difficult for me.	○	○	○	○
I am anxious to learn this course online.	○	○	○	○

Q10. Your attitudes toward traditional components in learning

	Strongly disagree	Disagree	Agree	Strongly agree
I like learning things in a traditional environment, e.g., face-to-face lecture or tutorial.	○	○	○	○
I would like to read information from paper rather than a screen.	○	○	○	○
When I need help, I would really prefer face-to-face talk with my teacher, tutor or other students.	○	○	○	○

	Strongly disagree	Disagree	Agree	Strongly agree
I like hands-on training.	○	○	○	○
I prefer the instruction from a teacher/tutor rather than a computer.	○	○	○	○
I like sharing or exchanging my opinions with others through face-to-face talk rather than online communication.	○	○	○	○
I like cooperating or collaborating with others in a traditional group with face-to-face contact rather than the communication through the Internet.	○	○	○	○
With the support by online communication, I can finish my study without face-to-face contact with my teacher, tutor or other students.	○	○	○	○
It is NOT convenient to go to the campus to attend the lectures and tutorials every week.	○	○	○	○

Q11. Your general attitudes toward online learning

	Strongly disagree	Disagree	Agree	Strongly agree
People can learn successfully through online instruction.	○	○	○	○
Online learning provides a good learning environment.	○	○	○	○
Overall, online learning is enjoyable.	○	○	○	○
Online learning will eventually replace traditional teaching methods.	○	○	○	○
Online learning enhances students' interests in learning.	○	○	○	○
I prefer online learning to traditional instruction.	○	○	○	○
I have a favourable attitude toward online learning	○	○	○	○
I would be happy if I had to enrol in an online course in the near future.	○	○	○	○
I like online learning.	○	○	○	○
I am interested in online learning.	○	○	○	○
I feel confident about online learning.	○	○	○	○

	Strongly disagree	Disagree	Agree	Strongly agree
I feel comfortable with online learning.	○	○	○	○
There are many disadvantages to learning online.	○	○	○	○
Overall, the traditional form of learning is more successful than online learning.	○	○	○	○
When I learn new materials, it is better to be in a traditional class than trying to learn online.	○	○	○	○
Online learning is difficult for me.	○	○	○	○
I feel anxious about learning online.	○	○	○	○

Section C. Your intention for future online learning

Q12. If there are more online courses (the courses totally run online without any face-to-face contact) in the future, would you like to undertake these courses?

- ○ No, I will not study any courses online.
- ○ Not sure.
- ○ I will study online only in the subject areas which I am familiar with.
- ○ Yes, I will study online in any subject areas.

Please give detailed explanation or reasons for your answer.

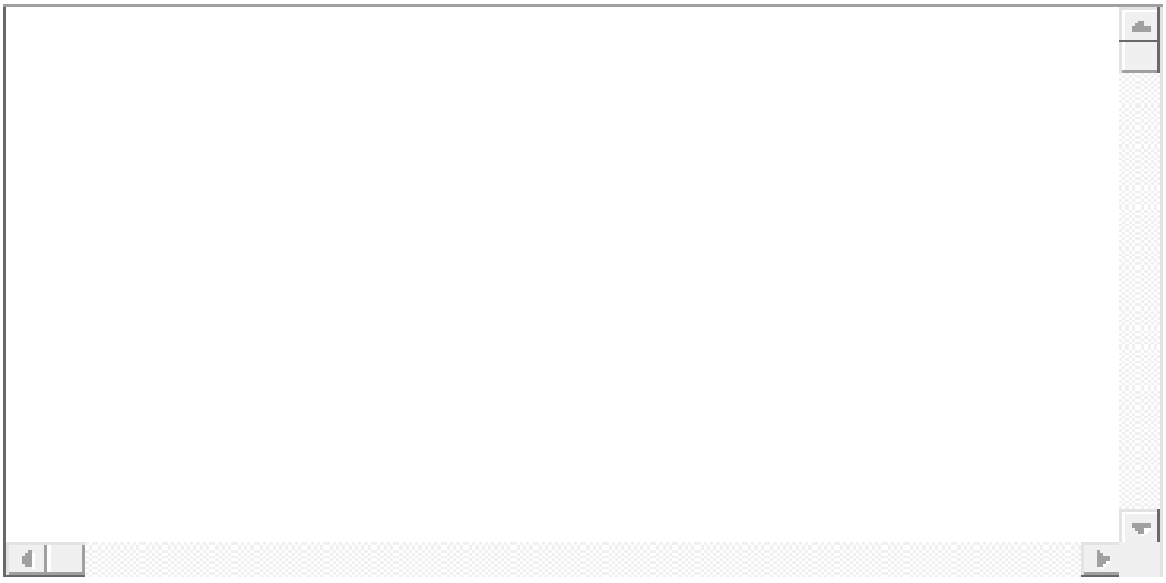
Q13. Which subject areas are MORE suitable for you to study online?



Q14. Which subject areas are LESS suitable for you to study online?



Q15. Please give your suggestions for the future online course development.



Thank you very much for your participation.

Weekly report questionnaire

What was last week like?

Section A. Your given name: _____ Your surname: _____.

Section B. Can you please estimate how many hours you spent last week on this course?

I spent _____ hours overall, and _____ of these hours were online.

Section C. Your learning experiences during last week

1. How difficult do you think the course was last week?

Very easy *Easy* *Bit difficult* *Very difficult*

2. How did you feel about the workload of the course last week?

Very low *OK* *Quite heavy* *Very high*

3. How stressful did you feel about the course of last week?

4. During last week, which part(s) of this course did you enjoy or find valuable?

5. During last week, which part(s) of this course did you not enjoy or value?

6. Is there anything you did to help yourself learn better in this course?

Interview

Student
Name
Interview details
Place
Time and date
Duration

Opening
Introduction: Hello…Thank you for agreeing to participate in the interview.
Purpose: The purpose of the interview is to examine the students' learning experience in a blended course in more details and depth. Further, it aims to explore the reasons for the changes in the students' attitudes toward online learning in a blended course.
Duration: The interview will take about 30 minutes.
Confidentiality: The interview data can only be accessed by the researcher and the supervisors. Any personal information will not be identifiable in the report of the study.

Interview questions

Section A. Learning experience

I. Your experiences of interacting with the course content

(Transition: Now I am going to ask you some questions about your experiences of learning the course content.)
In this course, you were able to access the course content online, e.g., course information book, course readings, lecture summaries, assessment guidance (assignments, group presentations, and weekly exercises or discussion).

1. Were there anything or aspects you liked, enjoyed, or valued about the course content? Or which parts of the content facilitated your study?

Cue: Why? How did they facilitate your study?

2. Were there anything or aspects you did not like, enjoy, or value about the course content? Was there anything problematic about the content?

Cue: Please elaborate on these particular contents.

3. When you encountered problems using online course content,

Q1: Who did you ask for help from (teachers or other students) or did you solve the problems by yourself?

Q2: When you asked help from others, did you get enough and timely help? How did they help you?

Q3: If you solved the problems by yourself, what did you do to solve the problems? (e.g., learning strategies)

II. Your experiences of interacting with the course interface

(Transition: Now I am going to ask you some questions about your experiences of using the course interface.)

In this course, you could access various online learning components, such as online enrolment, course web pages, online forum, email, online library, search engines, online assignment submission, and IT help and support.

1. Were there anything or aspects you liked, enjoyed, or valued about these components? Or which components facilitated your study?

Cues: Why? How did they facilitate your study?

2. Were there anything or aspects you did not like, enjoy, or value about these components? Or which components did you find problematic?

Cues: Why? Please elaborate on these tools.

3. When you encountered problems using these components,

Q1: Who did you ask for help from (teachers, other students, or university IT support)? Or did you solve the problems by yourself?

Q2: When you asked help from others, did you get enough and timely help? How did they help you?

Q3: If you solved the problems by yourself, how did you solve the problems? (e.g., learning strategies)

III. Your experiences of interacting with the teacher

(Transition: Now I am going to ask you some questions about your experiences of interacting with your teacher.)

1. What were the main purposes or reasons for you to contact or communicate with your teacher?

Give the following examples to the participant:

Assignments;

Group presentation;

Online forum tasks;

To arrange a meeting with the teacher;

Problems with the course contents (e.g., difficult theory, applications, classroom practices, or use of software);

Technical problems (e.g., enrolment, email, or student account);

Course attendance (e.g., illness absence);

Or others (please specify):

2. In which ways did you mostly contact or communicate with your teacher?

Give the following choices to the participant:

Face-to-face talk;

Email;

Phone call;

Others (Please specify):

3. Regarding the online interactions between you and your teacher, such as email and online forum,

3.1 Were there anything or aspects you liked, enjoyed, or valued about online interactions with your teacher? Which aspects of online interactions facilitated your study? (e.g., timely support, helpful for solving your problems, and encouragement)

Cues: Why? How did they facilitate your study?

3.2 Were there anything or aspects you did not like, enjoy, or value about online interactions with your teacher? Did you encounter any problems? (e.g., late response or insufficient help)

Cues: Why? Please elaborate on the reason or problems.

4. Regarding the face-to-face interactions between your teacher and you, such as face to face talk,

4.1 Were there anything or aspects you liked, enjoyed, or valued about? Or which aspects facilitated your study?

Cues: Why? How did they facilitate your study?

4.2 Were there anything or aspects you did not enjoy or value about? Did you encounter any problems?

Cues: Why? Please elaborate on the reason or problems.

5. If there were any problems during online or face-to-face interactions, what did you do to solve the problems (e.g., turning to other students for help or keeping trying to contact the teacher until the problems were solved)?

IV. Your experiences of interacting with other students

(Transition: Now I am going to ask you some questions about your experiences of interacting with other students.)

1. What were the main purposes for you to contact or communicate with other students?

Give the following choice to the participant:

Assignments;

Group presentation;

Online forum tasks;

To arrange a group meeting;

Problems encountered during reading course materials (e.g., difficult theory, applications, classroom practices, or use of software);

Technical problems (e.g., enrolment, email, or student account);

Or others (please specify):

2. In which ways did you mostly contact or communicate with other students?

Give the following choices to the participant:

Face-to-face talk;

Email;

Online forum;

SMS;

Phone call;

Others (Please specify):

3. Regarding the online interactions between you and other students (e.g., email or online forum)

3.1 Were there anything or aspects you liked, enjoyed, or valued about the interactions? Or what aspects facilitated your study? (e.g., timely support, helpful responses for solving your

problems, or a high level of engagement)

Cues: Can you please elaborate on these aspects?

3.2 Were there anything or aspects you did not enjoy or value about? Did you encounter any problems? (e.g., late response or insufficient help)

Cues: Can you please elaborate on these aspects?

4. Regarding the face-to-face interactions between you and other students

4.1 Were there anything or aspects did you enjoy or value about? Or what aspects facilitated your study?

Cues: Can you please elaborate on these aspects? How did these aspects facilitate your study?

4.2 Were there anything or aspects did you not enjoy or value about? Did you encounter any problems?

Cues: Can you please elaborate on these aspects?

5. If there are any problems during both online and face-to-face interactions, what did you do to solve the problems (e.g., stopping contacting them, turning to other students or teachers for help, or keeping trying to contact them until the problems were solved)?

Section B. Perceived learning outcomes

After this course,

1. Do you think you have become better with critical thinking?

Yes or no

Which parts or aspects of the course improved your critical thinking? (e.g., use of ICTs, group activities, reading course materials, communication with the teacher or other students)

2. Do you think you have become better with using different learning strategies?

Yes or no

Which parts or aspects of the course improved your application of learning strategies? (The above hints)

3. Do you think you have become better with managing your study time?

Yes or no

Which parts or aspects of the course made you better with managing your study time? (The above hints)

4. Do you think you have become better with using self-control strategies in learning?

Yes or no

Which parts or aspects of the course improved your self-control? (The above hints)

5. Do you think you have become better with problem solving?

Yes or no

Which parts or aspects of the course made your better with problem solving? (The above hints)

Section C. Attitudinal statements

1. How do you think about your course experiences in general? *Cue: usage of the course content and online learning components, the interactions with the teacher and other students, course input, and so on.*

2. Which mode of course delivery do you prefer for your future learning, totally traditional, totally online, or blended course? Why? Please elaborate your reasons.

APPENDIX 5

Line graphs

Line graphs about the participants' attitude changes from T1 to T2

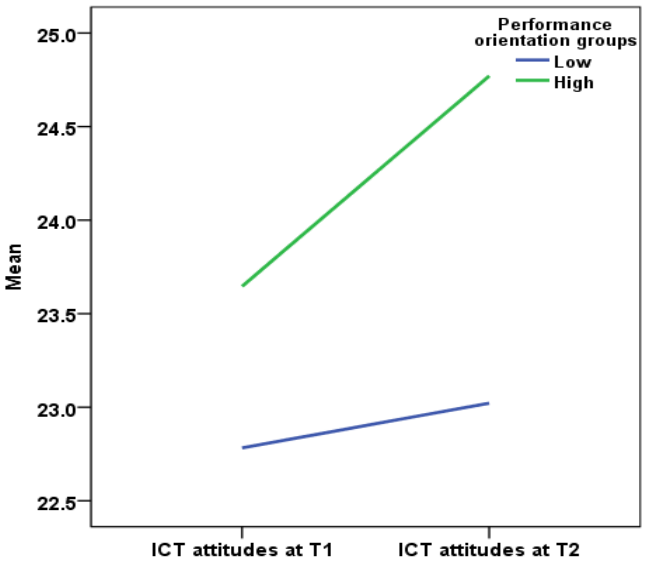


Figure 6.26 Line graph of the participants' attitudes toward ICT at T1 and T2 *Note. Low = Performance orientation low group, n = 46; High = Performance orientation high group, n = 48*

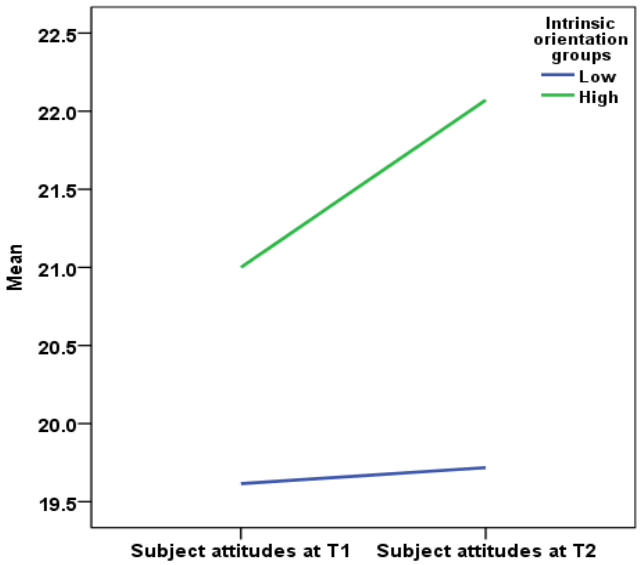


Figure 6.28 Line graph of the participants' subject area attitudes at T1 and T2 *Note. Low = Intrinsic orientation low group, n = 39; High = Intrinsic orientation high group, n = 42*

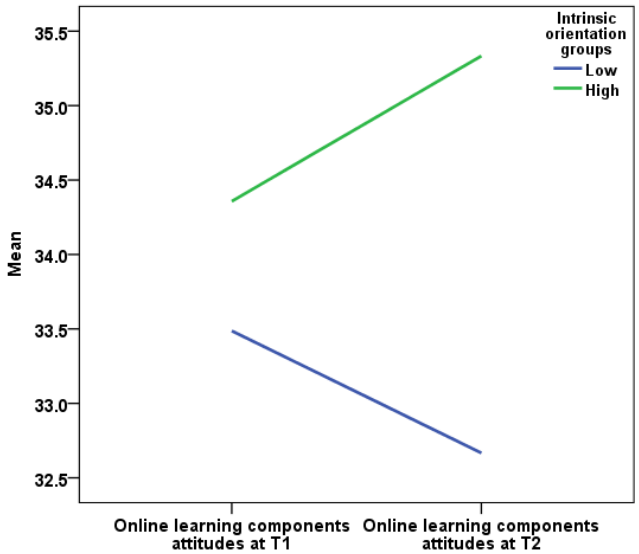


Figure 6.30 Line graph of the participants' online learning components attitudes at T1 and T2 *Note. Low = Intrinsic orientation low group, n = 39; High = Intrinsic orientation high group, n = 42*

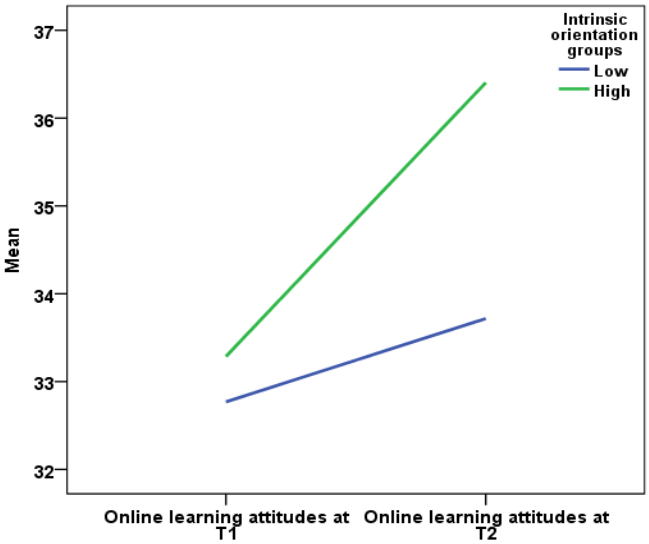


Figure 6.32 Line graph of the participants' online learning attitudes at T1 and T2 *Note. Low = Intrinsic orientation low group, n = 39; High = Intrinsic orientation high group, n = 42*

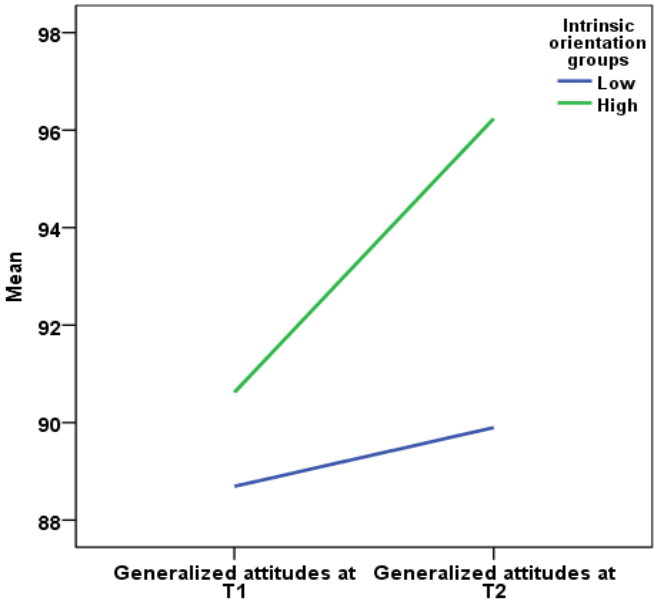


Figure 6.34 Line graph of the participants' generalized attitudes at T1 and T2 *Note. Low = Intrinsic orientation low group, n = 39; High = Intrinsic orientation high group, n = 42*

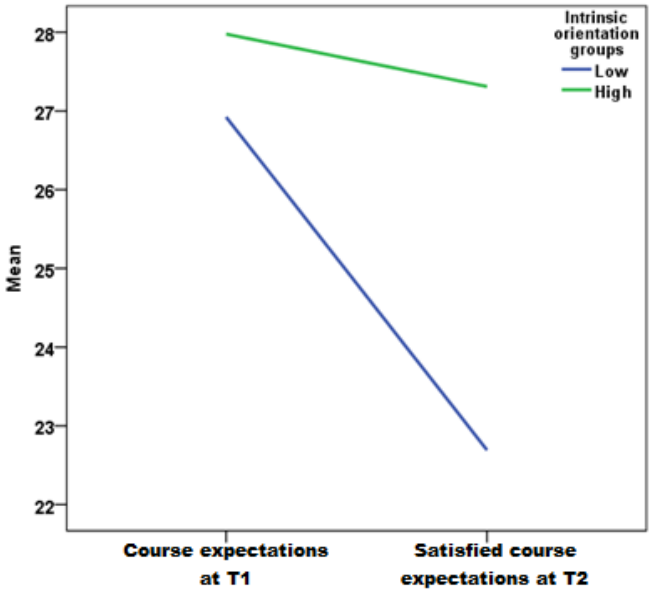


Figure 6.36 Line graph of the participants' course expectations at T1 and T2 *Note. Low = Intrinsic orientation low group, n = 39; High = Intrinsic orientation high group, n = 42*