



Is Iranian University Students' Computer Self-efficacy a Strong Contributor to Learning Anxiety? A Mixed-methods Investigation

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Abstract

The contributions of computer self-efficacy (CSE) to university students' learning anxiety (LA) in online classes (OCs) has largely remained unexplored in the higher education context of Iran. Thus, this mixed-methods study aimed to inspect the correlation between Iranian university students' CSE and LA from both quantitative and qualitative perspectives. For this purpose, a total of 290 undergraduate students, including male students ($n = 64$) and female students ($n = 226$) for the quantitative part and a sample of 18 undergraduate students, consisting of male students ($n = 7$) and female students ($n = 11$) for the qualitative part were chosen through a random sampling method at Ayatollah Borujerdi University, Iran. The participants were asked to fill out a Computer Self-Efficacy Questionnaire, an Anxiety in Online Classes Questionnaire, and a reflective written statement. The collected data were analyzed using a Pearson correlation coefficient test, a multiple regression analysis test, and a thematic coding approach. Findings documented that the participants' CSE and LA were negatively correlated in OCs. Additionally, the results indicated that the participants' LA was mainly affected by advanced and beginning factors of CSE. Furthermore, the qualitative findings yielded five overarching themes, including 'high CSE leads to more risk-taking', 'high CSE leads to increased motivation', 'high CSE leads to useful experiences', 'high CSE leads to accessing additional knowledge sources', and 'high CSE leads to increased self-regulation'. The study concludes by offering some implications for pertinent stakeholders.

Keywords: Computer self-efficacy, Iranian university students, Learning anxiety, Mixed methods investigation

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Introduction

Undoubtedly, education has been immensely affected by educational technologies over the recent decades. One of these educational technologies is computers which are found everywhere today. This rapid, extensive application of computers in education has brought about both advantages and disadvantages for users (Jiang et al.,

2022; Schlebusch, 2018; Vimalkumar et al., 2021). As one of such disadvantages, students have to keep themselves updated continuously to use new computer technologies. In fact, if they cannot adapt themselves to these non-stop developments, they cannot adequately benefit from the computer technologies, such as the Internet, word processing, e-mailing, presentation

applications, and excel spreadsheets (Grant et al., 2009). Reliance on computers to execute academic tasks makes it essential for university students to foster their computer knowledge and skills. As Sam et al. (2005) noted, to facilitate the development of computer knowledge and skills, university students should shape positive attitudes toward computers, foster high computer self-efficacy (CSE), and relieve learning anxiety (LA).

Given that willingness to use computers in OCs is highly affected by CSE and LA, it is quite essential to determine the levels of CSE and LA among university students. CSE, in simple terms, is a university student's beliefs about his/her knowledge and skills in using computers to achieve academic objectives (Compeau & Higgins, 1995). In other words, as Hagger and Chatzisarantis (2005) stressed, university students with high CSE are good at solving computer problems, making good decisions with computers, and collecting and using information. Anxiety in OCs, sometimes called computer anxiety (CA), is defined as university students' "feelings of frustration, potential of embarrassment, disappointment, and fear of the unknown when they are working with computers" (Saadé & Kira, 2009, p. 15). According to Simesk (2011), LA may act as a hurdle when university students attempt to learn about computer use and information.

As the COVID-19 pandemic exploded and disseminated abruptly, all universities have been locked down in Iran. In a sense, OCs were used instead of face-to-face classes (Azizi & Rezai, 2021). This unique condition calls for urgent studies to explore the different aspects of OCs (Churi et al., 2021). One of these aspects worth investigating is the correlation between university students' CSE and LA in OCs. However, a cursory review of the available literature discloses that this topic has received scant attention in the Iranian higher education contexts. Thus, the current mixed-methods research is an early attempt to disclose the correlation between university students' CSE and LA in OCs in the Iranian higher education context. The hope is that the results of this study can further our understanding of the kind and magnitude of the relationship between Iranian university students' CSE and LA, as well as to disclose how their LA is affected by their CSE in OCs. Moreover, it is hoped that the pertinent stakeholders can take advantage of the results of the study such that they can establish a fruitful educational setting for university students.

Literature Review

Conceptual Framework of Computer Self-efficacy

One of the concepts that has received considerable attention in online education in recent years is CSE (Islam et al., 2015; Jiang et al., 2021). It is defined in relation to self-efficacy (Bandura, 1977, 1997). According to Bandura (1997), self-efficacy can be defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). In other words, it is an individual's confidence in his/her abilities to accomplish a task so that he/she can reach a particular outcome (Zhang & Espinoza, 1998). Self-efficacy may affect an individual's effort, engagement, and persistence to achieve a specific outcome. It is one of the bedrocks of Bandura's Social-cognitive theory (1988). SCT was proposed to account for the roles played by self-regulatory, self-reflective, cognitive, and vicarious processes in adapting human behaviors. In a sense, SCT is predicated on the assumption that humans are self-regulating and proactive (Moos & Azevedo, 2009).

Given these definitions, the term 'CSE' was adapted by Venkatesh and Davis (1996). In simple terms, they define CSE as an individual's judgment of his/her capabilities to use computers and information technologies. With respect to educational technology, CSE is "student's beliefs in their capabilities to use a computer for their learning and research" (Islam et al., 2015). Along with this definition, as Jiang et al. (2021) noted, CSE is connected to university students' belief in their abilities to use computers and information technology to facilitate their learning in OCs. Students with high CSE like computers and working with them (Gurcan, 2005). Compeau and Higgins (1995) demonstrated that the students who privileged high CSE were more determined to overcome problems emerging during computer use.

A range of studies has offered strong evidence that CSE is a strong contributor to students' performance in virtual learning environments (Dong et al., 2020; Wang et al., 2019; Zhu & Mok, 2020). For example, the results of Sam et al. (2005) and Konerding et al. (2007) evidenced that those students who felt they had enough computer knowledge and skills got less anxious in OCs. In contrast, the students feeling they lacked the required computer knowledge and skills got more anxious in OCs. Particularly, the recent studies disclosed that CSE directly affects students' LA in OCs (Achima & Al Kassimb, 2015; Alenzi et al., 2010; Celik & Yesilyurt, 2013; Drundell & Haag, 2002; Hauser et al., 2012;

Simsek, 2011). That is, it seems that students with high CSE may get less anxious in OCs.

Learning Anxiety in Online Classes

It has been over three decades that OCs have been using around the world. To benefit from OCs, university students need to have high digital literacy (Bolliger & Halupa, 2012). This digital literacy includes the capabilities of university students to work with different computer hardware and software (Ozdamar-Keskin et al., 2015). One of the key factors shaping university students' digital literacy is LA. LA is viewed as "a combination of negative emotional responses, including apprehension, fear, worry, and agitation to learn something new" (Dörnyei, 2009, p. 20). As an individual encounters a threatening situation, he/she learns these responses from direct experiences. According to Eysenck and Calvo (1992), LA is of two kinds: worry and cognitive arousal. As LA generates worries, it distracts an individual from a task. On the other hand, when LA produces cognitive arousal effects, it adversely affects an individual alertness and ability to perform a task. Therefore, as Eysenck and Calvo (1992) noted, an individual's processing efficiency is influenced by the combination of worry and cognitive arousal. This, in turn, influences the individual's mental performance and state of mind.

When it comes to computer use, anxiety is called CA. In the past literature, CA has been addressed from diverse perspectives and, thus, there has existed a consensus over its definition. In this regard, Chua et al. (1999) considered CA as a complex psychological construct. They defined CA as "a kind of state anxiety, which can be changed and measured along multiple dimensions" (p. 611). For Oetting (1983), CA is the uneasiness, apprehensiveness, and fearfulness that an individual feels when he/she interacts with computers. Additionally, Howard and Smith (1986) defined CA as "the tendency of a particular person to experience a level of uneasiness over his or her impending use of a computer" (p. 18). Maurer and Simonson (1984) stressed that the individuals who suffer from CA avoid computers and their places, have extreme caution with computers, have negative attitudes toward computers, and try to reduce using computers.

In SCT, the assumption is that students' thought, behavior, and affect are adversely affected by their LA (Banduara, 1988; Liu et al., 2019; Paul & Glassman, 2017). Put it simply, students' LA plays a crucial role in their learning engagement (Liu et al., 2022). In online learning, as noted by Xu et al. (2020), learning engagement is a multidimensional concept including three main components: cognitive, emotional, and

behavioral. According to Chi and Wylie (2014), cognitive engagement deals with constructing knowledge in learning processes. Emotional knowledge reflects learners' emotional reactions to learning contexts and contents (Liu et al., 2022; Xu et al., 2020). Also, as underscored by Fredricks et al. (2004), behavioral engagement deals with learners' contributions to learning activities by giving priority to the quality of learning rather than quantity of learning. As Paul and Glassman (2017) stressed, high LA creates some huge problems for a student, such as maladaptive thought processes (e.g., Learning in OCs is not easy to me), physical discomfort (e.g., racing heartbeat), and avoidance of attending OCs altogether (e.g., I do not use OCs to learn new things). When a student suffers from LA accompanying negative self-evaluative thoughts, he/she cannot keep the task-related cognitive processing. The reason for this, as Derakshan and Eysenck (2009) noted, is that students' intentional resources are devoted to suppressing intrusive thoughts rather than doing task at hand. That is why the significance of LA in OCs should not be ignored. If does so, students will be deprived of many learning advantages (Paul & Glassman, 2017).

Empirical Studies on the Effects of Computer Self-efficacy on Learning

Here, some studies investigating the effects of CSE on learning are critically reviewed to make the way for the present research. In a study, Drundell and Haag (2002) investigated the relationship between CSE, CA, attitudes toward the Internet and reported experience with the Internet among the Romanian university students ($n = 76$). Their findings evidenced that CSE played a significant role in the students' CA, attitudes toward the Internet, and reported use of the Internet. Moreover, in another study, Embi (2007) was interested in determining the levels of CA, CSE, and computer applications usage among Malaysian counting faculty members ($n = 368$). The results revealed that the participants with high CSE suffered from a lower level of CA. Additionally, in another research by Saadé and Kira (2009), the effects of CA on perceived ease of use and the mediating influence of CSE on their correlation were investigated in OCs. A total of 645 university students completed some questionnaires, including self-efficacy, anxiety, and perceived ease of use. Their findings indicated that the participants' CSE significantly affected the mediating role of anxiety on perceived ease of use. Furthermore, in research by Simsek (2011), the relationship between elementary and secondary students' and teachers' CA and CSE was examined. The results evidenced that the participants' CA and their CSE were positively correlated.

In addition, Alenzi et al. (2010) examined the effects of enjoyment, CA, CSE, and the Internet experience in Saudi Arabia University students' ($n = 402$) intention on using e-learning. Their findings showed that the participants' intention to use e-learning was significantly affected by enjoyment, CSE, and CA. Furthermore, in the research by Hauser et al. (2012), the correlation between CSE changes and CA was investigated. The findings evidenced that there existed a negative correlation between CSE and CA in OCs. Besides, the results indicated that by reducing students' anxiety, their CSE improves significantly. Moreover, Celik and Yesilyurt (2013) inspected the effects of attitudes toward technology, perceived CSE, CA, and the attitude toward doing computer-supported education on each other among pre-service teachers ($n = 471$). Their findings disclosed that the participants' attitudes toward using computer-supported education were highly affected by their attitude towards technology, perceived CSE, and CA. Besides, in the research by Kuo and Belland (2019), the correlations between CSE and the Internet self-efficacy and academic self-efficacy were examined among African American adult students. Their findings evidenced that the participants' CSE and the Internet self-efficacy were significantly correlated with their academic self-efficacy. Finally, Putra (2021) examined the effects of students' CSE and their interest in using accounting software. The findings disclosed that the participants' interest in using accounting software was highly affected by their CSE.

The above-reviewed studies disclose that the relationship between university students' CSE and LA in OCs is understudied in the higher education context of Iran. In a sense, considering what Iranian publications have produced, the correlation between university students' CSE and LA in OCs is understudied. In response to this gap, the present study purported to explore the relationship between university students' CSE and LA from quantitative and qualitative perspectives in OCs. To achieve these aims, the research questions below were investigated:

RQ1. Is there any significant correlation between Iranian university students' computer self-efficacy and learning anxiety in online classes?

RQ2. Which computer self-efficacy factors determine Iranian university students' learning anxiety in online classes?

RQ3. How does high computer self-efficacy relieve Iranian university students' learning anxiety?

Method

Research Design

To get an inclusive understanding of the correlation between Iranian university students' CSE and LA in OCs during the COVID-19 pandemic, this study adopted a sequential explanatory mixed-methods design. The underlying reason for gathering both quantitative and qualitative data was to reach triangulation. In triangulation, by gathering both quantitative and qualitative data, researchers aim to obtain different but complementary perspectives on the same topic (MacKey & Gass, 2015). As Riazi (2016) noted, triangulation is a convergence model helping researchers to validate, confirm, or corroborate quantitative results with qualitative ones. Accordingly, this research purported to disclose the correlation between Iranian university students' CSE and LA in OCs during the COVID-19 pandemic by gaining both quantitative and qualitative perspectives.

Setting and Participants

This research was conducted at University of Ayatollah Ozma Borujerdi, Iran, in spring 2021. As the study was conducted during the COVID-19 pandemic, university students had to use different types of technology to attend the online classes, such as computer and laptop technologies and learning management system (LMS). The researchers used a random sampling method to choose the target participants. This method is used to grant the same chance to all individuals in a population to be selected for an empirical study (Dörnyei, 2007). The researchers selected a total of 290 undergraduate university students majoring in English linguistics, applied linguistics, social sciences, civil engineering, mathematics, law, physics, and electronics. They were both male ($n = 64$) and female ($n = 226$) undergraduate students who aged from 19 to 27 years old. Their mean age was 23. They were freshman ($n = 40$), sophomore ($n = 70$), and junior ($n = 180$). For the qualitative part, 18 students who took part in the quantitative part were chosen through a random sampling method. They entailed both male ($n = 7$) and female ($n = 11$) undergraduate students, aged from 20 to 26 years, and they were freshman ($n = 4$), sophomore ($n = 6$), and junior ($n = 10$). The researchers selected the participants due to their availability. After receiving the permission from the Education Deputy of University of Ayatollah Ozma Borujerdi, the researchers accessed the links of WhatsApp groups established during the COVID-19 pandemic. Through the WhatsApp groups, the researchers shared a podcast voice with university students to detail the purposes of this study and invite the

willing participants. Then, the willing students declared their consent to participate in the study and then, the questionnaires were sent in digital formats to the participants. As the questionnaires started with written consent in Persian, the willing participants signed it before moving to the next section where they could respond to the questionnaires' items. For the qualitative part, the researchers sent a reflective written statement to 23 participants. In general, eighteen students responded to the reflective written statement and turned it back. It should be underscored that the participation of the participants was voluntary and they were allowed to withdraw from the study as they wanted. Additionally, the participants' responses were kept confidential and they were informed about the final results. It should be stressed that the present study gained ethical approval by the Research Ethics Committee of University of Ayatollah Ozma Borujerdi.

Instruments

Two questionnaires and a reflective written statement were used to gather the data. The first instrument was the Computer Self-Efficacy Questionnaire (CSEQ), constructed and validated by Murphy et al. (1989), including 32 items and gauges students' self-efficacy in using computers. It includes three skill levels: beginning level computer skills (16 items) (e.g., "I feel confident choosing a data file to view on a monitor screen."), advanced level computer skills (13 items) (e.g., "I feel confident troubleshooting computer problems."), and mainframe computer skills (3 items) (e.g., "I feel confident logging off the mainframe computer system."). It comprised five-point Likert scale items, ranging from 1 = strongly disagree to 5 = strongly agree.

The next instrument was the Anxiety in Online Classes Questionnaire (AIOCQ), developed and validated by Bolliger and Halupa (2012). Including 17 items, AIOCQ gauges students' LA in OCs in terms of three factors: computer (6 items) (e.g., "I am quite relaxed when I work with computers."), the internet (5 items) (e.g., "I get nervous about getting lost in cyberspace."), and online course (6 items) (e.g., "I am apprehensive about enrolling in online courses."). It included five-point Likert scale items ranging from 1 = strongly disagree to 5 = strongly agree.

Regarding the reliability of the instruments, the questionnaires were administered to a group of 25 university students who looked like the participants of the main study. The results of internal consistency calculated using Cronbach's Alpha yielded 0.84 for CSEQ and 0.92 for AIOCQ, respectively. Regarding validity, it was checked out through experts' judgment strategy. In doing so, the researchers invited to

university professors in Applied Linguistics at Lorestan University to examine if the instruments had an acceptable level of face validity and content validity. They, overall, conformed that they were valid enough to be used in the present study.

The third instrument was a reflective written statement exploring the participants' perceptions of the role of CSE on their LA in OCs. In exact words, 23 participants were invited to reflect upon the following prompt:

Dear students,

You are kindly invited to write a short report on your perceptions and experiences with the effects of computer self-efficacy on your learning anxiety in online classes. Accordingly, your report is supposed to be a comprehensive reflection on how computer self-efficacy may have affected your learning anxiety in online classes. A report with nearly 400-600 words in length would be sufficient.

It should be noted that the researchers recruited two experienced experts in translation to translate the questionnaires and the reflective written statement into Persian. Afterward, a back-translation was done to ensure that the contents in both the English and Persian formats were the same. The underlying reason for translating the questionnaires was to increase the readability of the items and, consequently, promote the credibility of their answers.

Data Collection Procedures

The researchers took some distinct steps to gather the required data. In the first step, two experienced translation experts were invited to translate the questionnaires and the reflective written statement into Persian. In the second step, two university professors specialized in educational psychology at Lorestan University were invited to assess the questionnaires and the reflective written statement in respect of the required validity for the present study. Based on the professors' comments, some items were modified regarding wording, content, and ambiguity. In the third step, the reliability and validity of the questionnaires were measured. Concerning the reliability, the researchers administered them to a sample of 65 undergraduate university students at University of Ayatollah Ozma Borujerdi. The results of the internal consistency calculated through Cronbach Alpha yielded 0.86 for CSEQ and 0.91 for AIOCQ, respectively. Regarding the validity, the researchers used the experts' judgment strategy. For this purpose, they invited two university professors of educational psychology at Lorestan University to evaluate the questionnaires in terms of face and content validities. In general, they approved that the

questionnaires were appropriate fit for the purposes of this study. In the fifth step, fifteen students responded to the questionnaires and the reflective written statement. They were asked to report if the contents of the items were comprehensible enough. In light of their points, some minor modifications were made to the items. In the sixth step, as noted above, the researchers sent the digital formats of the questionnaires to the participants via WhatsApp. The participants had enough time to carefully respond to the items of the questionnaires. If they face a problem filling out the questionnaires, they could call the researchers. After the implementation of the quantitative part, the researchers implemented the qualitative part of the study. For this purpose, the reflective written statement was sent to 23 of the participants who had completed the questionnaires via WhatsApp. They were invited to present their conceptions of the role of CSE in LA in OCs. Their responses were stored in a database and were translated into English by two experts in translation.

Data Analysis

The researchers used SPSS version 22 to analyze the quantitative data. Coupled to the common descriptive statistics, such as mean and standard deviation, inferential statistical methods, like Pearson correlation analysis test and multiple regression analysis test were used. In a sense, the Pearson correlation analysis test was run to verify the kind and amount of the correlation between the university students' CSE and LA in OCs. And, the multiple regression analysis test was employed to verify how much of the variation in the university students' LA in OCs could be attributed to the factors composing their CSE.

Concerning the qualitative data, two translation experts translated the participants' responses into English. Then, the data of the reflective written statements were analyzed through a thematic coding analysis by following the principles and procedures recommended by Braun and Clarke (2006). In doing so, at first, the researchers went through the participants' responses as much as required to become familiar with

them. Then, they gave considerable attention to the intended factors and coded the responses carefully to diagnose and verify particular features in the collected data. This, in turn, allowed them to extract the most recurrent concepts and themes. Next, the attempt was made to identify the recurrent themes by considering the central concepts coded previously and presented in the respondents' answers. Afterward, the prevalence of the themes was determined through relevant coded data that emerged from the database. Next, the already-existing theoretical foundations were referred to go beyond the data description to make correct interpretive judgments about the prominent themes. It should be mentioned that the researchers took some steps to measure the credibility and consistency of the findings. The member checking strategy was used to measure the credibility of the findings. To this end, the researchers invited one-third of the participants to check out if the extracted themes and excerpts matched their intended meanings. Overall, the participants reported a high correspondence between their intended meanings and the emerged themes and excerpts. And, the consistency of the findings was gauged by recruiting two coding analysts. They were asked to examine the accuracy of the coding procedures. The result of their inter-rater reliability was 0.87, quite acceptable for the purposes of this study.

Findings

Quantitative Results

The first research question examined whether there existed any significant correlation between the Iranian university students' CSE and LA in OCs. Before running the Pearson Correlation Coefficient, the normality assumption was checked out using the Kolmogorov-Smirnov test. Its results on the CSE scale ($KS_{(290)} = .40, p \square .05$) and LA scale ($KS_{(290)} = .39, p \square .05$) showed that normality assumption was met. Afterward, the descriptive statistics of CSE and LA were calculated, summarized in Table 1. As observed, for the university students' CSE, M (93.06) and SD (17.94), and for their LA, M (90.18) and SD (17.01) were estimated, in turn.

Table 1

Results of Descriptive Statistics of the University Students' Computer Self-efficacy and Learning Anxiety in Online Classes

	N	Mean	Std. Deviation
Computer Self-efficacy	290	93.06	17.94
Learning Anxiety	290	90.18	17.01

The results of the correlation between the university students' CSE and LA in OCs are reported in Table 2.

Table 2*Results of Pearson Correlation between Students' Computer Self-efficacy and Learning Anxiety in the Online Classes*

		Learning Anxiety
Computer Self-efficacy	Pearson Correlation	-.41
	Sig. (2-tailed)	.000
	N	290

As shown in Table 2, a moderate negative correlation existed between the university students' CSE and LA in OCs with the coefficient of 41% ($r = -.41, p < 0.01, N = 290$). It means that the university students with high CSE, felt less anxious in OCs.

The second research question inspected which CSE factors determine the Iranian university students' LA in OCs. For this purpose, a multiple regression analysis was run. However, prior to running this statistical procedure, the collected data were checked for the assumptions. First, the linearity assumption was

checked. The relationship between the sub-components of CSE on the scatterplot matrix was tested, and no curvilinear relationship was found. In addition, the Kolmogorov-Smirnov test was applied to test the normality assumption. The calculated results were *beginning* (KS = 0.41), *advanced* (KS = 0.48), and *mainframe skills* (KS = 0.51), all greater than the significance level ($p > 0.05$). These results ensured the researchers that the required assumptions were met. Afterward, they used a multiple regression analysis.

Table 3*Results of Multiple Regression Analysis on the Effects of Computer Self-efficacy Dimensions on Learning Anxiety*

	Sum of Squares	df	Mean Square	F	Sig.	R	R ²
Regression	68061.728	3	22687.24	83.995	.000	.60	.36
Residual	77250.756	286	270.10				
Total	145312.484	289					

As observed in Table 3, the results documented that the regression model reached the statistical significance ($F = 83.995, p < 0.001$). Additionally, the value of R^2 (0.36) was significant, which implies that 36% of the variance

in the university students' LA in the OCs can be accounted for by CSE dimensions. The next step was determining the factors highly contributing to the prediction of the participants' LA in OCs.

Table 4*Results of Multiple Regression Analysis for University Students' Computer Self-efficacy Dimensions*

Dimensions	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	41.10	4.27		22.01	.000
Beginning	2.88	.61	.33	12.32	.000
Advanced	2.71	.55	.42	10.41	.000
Mainframe skills	1.75	.62	.27	8.66	.060

Dependent variable: Learning Anxiety

As reported in Table 4, regarding the Beta values of CSE sub-components, the university students' LA is mostly affected by *advanced* ($\beta = .42, p < .001$) and *beginning* ($\beta = .33, p < .001$). However, the factor of *mainframe skills* ($\beta = .27, p > .001$) did not significantly contribute to the participants' LA.

Qualitative Results

The third research question explored how high CSE relieved LA. The participants' responses were subjected to the thematic coding analysis, and the findings yielded five overarching themes: 'high CSE leads to more risk-taking', 'high CSE leads to increased motivation', 'high CSE leads to useful experiences', 'high CSE leads to

accessing additional knowledge sources', and 'high CSE leads to increased self-regulation'.

High CSE leads to more risk-taking

The first prominent theme emerged from the university students' responses was 'high CSE leads to more risk-taking'. The participants stressed that as they privilege high CSE, they can take more risks in OCs. In this respect, one of the university students commented:

"I think that an integral part of learning is risk-taking. When I am familiar with computers and their technologies, I feel that I am capable enough to search for new subjects. In turn, this makes me courageous to take more risks in my study".

Corroborating with the previous statement, the university students highlighted when they benefit from high CSE, they get more interested in personal initiatives. The following excerpt shows this clearly:

"This is a reality that when I have high computer self-efficacy, I feel confident in using computers and new applications. Being equipped with this competence, I dare to take more risks".

High CSE leads to increased motivation

Another theme gaining huge attention by the university students was 'high CSE leads to increased motivation'. They pinpointed that by knowing more about computers and technology, they get more motivated to continue learning. To support this, one of the university students remarked:

"With high computer self-efficacy, I feel that I have the needed device to achieve my learning purposes. This makes me motivated to study more since I know that I can reach my objectives".

Additionally, the participants stressed that the increased motivation makes the way for them to achieve higher satisfaction with OCs. In this respect, one of the university students stated:

"Since I do not know a lot about computers, I feel that I do not have the required skills to use them appropriately. Accordingly, this makes me unmotivated in the online classes. And as I am not motivated in the online classes, I do not feel satisfied with them. So, I feel anxious in the online classes."

High CSE leads to useful experiences

The other recurring theme catching the participants' attention was 'high CSE leads to useful experiences'. They pinpointed that one of the essential factors letting them have useful experiences in OCs is high CSE. In this regard, one of the participants quoted:

"As I feel confident in using computers, I try to have new learning experiences. Actually, I get more useful experiences when I engage in different ways. This makes me feel less anxious in the online classes."

Consistent with the previous statement, one of the university students noted:

"I feel that computer self-efficacy has significant effects on my learning experiences. Having been familiar with different computer applications, I can gain more experiences in my learning. Therefore, I can fill my knowledge gaps and consolidate my learning".

High CSE leads to accessing additional knowledge sources

The other theme that emerged from the collected data was 'high CSE leads to accessing additional knowledge sources'. The participants raised this point that as they have more knowledge and skills in using computers, they can have better access to additional knowledge sources. In this regard, one of the university students commented:

"In the online classes, as I feel confident in using computers, I try to search more sites presenting different knowledge sources. When I face a learning difficulty, I surf the net to find its answers provided by other teachers and students. In this way, I have no limitation in improving my learning and I can remove my learning difficulties. This all relieves my stress in the online classes."

Resonating with the former statement, one of the university students noted:

"Accessibility to supplementary knowledge sources is deeply dependent on my knowledge and skills in using computers. For example, as I can't use the computer applications effectively, I can't find appropriate short clips teaching the educational materials I have a problem with. Hence, sometimes I get confused and lose my control."

High CSE leads to increased self-regulation

The last theme gaining remarkable attention by the participants was 'High CSE leads to increased self-regulation'. They noted that they had become more autonomous learners by relying on their computer knowledge and skills. In this respect, one of the university students remarked:

"My computer knowledge and skills allow me to take advantage of the convenience and flexibility of online classes. They provide me enough freedom to take charge of my learning responsibilities. I mean, I can regulate my learning to strengthen my abilities and mitigate my weaknesses".

Further, the participants pinpointed that in OCs, they can progress based on their talents and interests. The following excerpt shows this clearly:

“In contrast to conventional classes, I can study based on my interests and talents. I mean that since I feel confident in using computers, I can achieve more learning opportunities to meet my needs. As such, I can regulate my reading and, accordingly, I feel comfortable with online classes”.

Discussion

The first research question inspected if there was any significant correlation between the Iranian university students' CSE and LA in OCs. The findings evidenced that the university students' CSE and LA were negatively correlated in OCs. In other words, the results indicated that the university students who felt competent in using computers and technology information got less anxious in OCs. The findings might be interpreted from this perspective that the university students with higher CSE possessed the required computer knowledge and skills to handle more effectively the learning activities in OCs. As Hagger and Chatzisarantis (2005) noted, the findings may be discussed from the view that the university students who believed in their abilities to use computers, they might have been in a better position to make correct decisions and solve learning problems in OCs. This, accordingly, might have assisted them to control their LA.

The second research question examined which CSE factors determined the Iranian university students' LA in OCs. The results documented that the university students' LA was mainly affected by the *advanced* and *beginning* factors. However, the *mainframe skills* factor did not make a significant contribution to the prediction of the participants' LA. The findings disclosed that when the university students were capable of using advanced and beginning computer and information technology skills, they might have felt less anxious in OCs. For example, it may be imagined that as a university student was capable of using computers to write a letter or essay, he/she might have handled the demanding assignments. In this way, he/she might not have got anxious in doing the assignments and met the class educational requirements. Additionally, as Jex and Bliese (1999) argued, the findings may be interpreted from this view that the university students with low CSE might have considered working with computers as stressful; while the university students with high CSE might have regarded working with computers as a challenge. Therefore, they might have brought their whole potential into full practice to control the hurdles.

The third research question explored how CSE relieved LA. The qualitative findings yielded five overarching themes, including 'high CSE leads to more risk-taking', 'high CSE leads to increased motivation', 'high CSE leads to useful experiences', 'high CSE leads to accessing additional knowledge sources', and 'high CSE leads to increased self-regulation'. The results disclosed when the university students were equipped with high CSE, it might have positively affected their performance in OCs. The findings of this research may be discussed from this perspective that the university students with high CSE may have got more motivated to continue learning in OCs. This, in turn, may have relieved their LA.

The findings of the research are congruent with those of Embi (2007), revealing a negative correlation between Malaysian counting faculty members' CSE and LA. Additionally, the results of the study lend support to those of Saadé and Kira (2009), reporting that university students' CSE had a significant effect on the mediating role of LA and perceived ease of use. Furthermore, in line with the findings of the study, Simek (2011) found that elementary and secondary students' and teachers' CA was negatively correlated with their CSE. Moreover, the results of the study lend credence to those of Celik and Yesilyurt (2013), disclosing that attitudes toward using computer-supported education were highly affected by their attitude toward technology, perceived CSE, and CA. Finally, the results of the study are consistent with those of Amri and Alasmari (2021), reporting a positive correlation between university students' anxiety and their perceived self-efficacy in OCs during the COVID-19 pandemic.

The findings may be discussed from the view that the university students' self-efficacy might have influenced their expectations concerning use effectiveness and emotional reactions when they used computers to learn something new. The university students' with high CSE might have more fun and less LA when using computers; thus, it might have significantly influenced their LA and self-expectations. This argument receives support from the previous studies (e.g., Chien, 2012; Shih, 2006), showing that computer users' self-expectations and performance were positively related to their CSE.

One more possible explanation for the findings may be attributed to the view that if university students did not feel competent in using computers and information technology, they would shape negative attitudes toward computers. Accordingly, these attitudes may have adversely affected their digital literacy development, their interests in using computers, and their perceived ease of computer use (Compeau & Higgins, 1995; Elasmari & Carter, 1996; Harrison & Rainer, 1992; Venkatesh et al., 2000). In other words, in line with

Howard and Smith (1986), it might be argued that as the university students might have shaped negative attitudes toward computers, it may have increased their resistance and acted as an obstacle to their engagement with computers. Another line of explanation for the findings may be ascribed to this view that as the university students were not competent enough to work with computers, they may have faced many problems attending to and using OCs effectively. This, in turn, may have acted as a hurdle to their personal and academic development (Beckers et al., 2007). Thus, it was not bizarre to see that they might feel anxious in OCs.

To provide more explanations for the findings, we can refer to the technology satisfaction model (Islam, 2014). In line with this model, it might be argued that the participants who enjoyed high CSE, might have had high perceived ease of use and found using computers useful (Bin et al., 2020; Jiang et al., 2021). Thus, they might have had more strong intentions and more positive attitudes toward using computers in OCs. With the increased use of computers, they might have done their assignments well and controlled better their LA (Islam & Sheikh, 2020). Additionally, it may be argued that having high CSE directly affected the university students' perceived ease of use and usefulness. This, in turn, might have led to their technology satisfaction. Therefore, students who were satisfied technologically, they might not have felt anxious in OCs (Islam, 2016, Islam et al., 2018).

Another line of explanation for the findings may be ascribed to this view that the university students with high CSE might have interacted with computers with confidence (Igbaria & Ivari, 1995). These interactions might have allowed the participants to surf the net freely, interact with other students and teachers, access additional knowledge sources like e-books, magazines, and journals, and have more useful learning experiences, all leading to more promising achievements. These more promising achievements might have decreased their LA in OCs. Moreover, the findings of the study may be justified from this perspective that CSE might have predicted LA, which, accordingly, might have predicted their performance (Morony et al., 2013). Particularly, the university students with high CSE might have been more inclined to complete a task, while the university students with low CSE might have been inclined to give up the task (Azizi et al., 2022). Finally, along with Achima and Al Kassimb (2015), it can be argued that the university students with high LA might have avoided using computers. This might have been due to their possible embarrassment, fear of the unknown, and feeling of frustration (Olatoye, 2009). Taken together, it

may be argued that CSE might have acted as a strong predictor for the university students' LA in OCs.

Another perspective which may be used to justify the results of the research is from self-regulated learning (Zimmerman & Schunk, 2001). Along with the findings of the study, it may be argued that the online learning might have led to self-regulated learning because it incorporated metacognitive, cognitive, and motivational dimensions of learning. This argument receives support from the previous studies (e.g., Sun & Rueda, 2012; Wang & Lin, 2007; Wolters et al., 2005), reporting that as the learners had less direct encouragement from the teachers, they were more self-regulated learners. And, the final line of discussion of the findings of the study may be offered with the help of self-determinism theory (SDT) (Deci & Ryan, 1985). Aligned with this theory, it may be argued that because online learning could fulfill the participants' needs, they might have become motivated to act and demonstrate greater positive outcomes in OCs. In other words, since this education setting could satisfy the participants' needs in terms of autonomy (i.e., having a personal endorsement of one's action deriving from self), relatedness (i.e., the self-confidence in the capability to do the intended task), and relatedness (i.e., having positive interpersonal relationships with others), they might become more motivated to achieve better outcomes. As the participants' level of motivation increased, they might have raised their self-efficacy in completing the learning activities. This, accordingly, might have relieved their LA (Deci & Ryan, 2002).

Conclusions

As mentioned above, this mixed-method study explored the correlation between Iranian university students' CSE and LA from quantitative and qualitative perspectives in OCs. The findings disclosed the university students' CSE and LA was negatively correlated in OCs. Furthermore, the findings indicated that the university students' LA was mainly affected by the *advanced* and *beginning* factors. Additionally, the qualitative findings yielded five overarching themes, including 'high CSE leads to more risk-taking', 'high CSE leads to increased motivation', 'high CSE leads to useful experiences', 'high CSE leads to accessing additional knowledge sources', and 'high CSE leads to increased self-regulation'. The results evidenced that CSE is a significant factor in determining the university students' LA in OCs. The results led to this conclusion that the university students who privileged high CSE were more interested in working with computers and were less anxious compared to the university students with lower CSE.

The results of this study can be beneficial for pertinent stakeholders in different ways: First, university officials need to design and hold a comprehensive training program on computer use and information technology to improve university students' CSE. In this training program, university students are supposed to acquire the required knowledge and skills to use computers appropriately. Second, university syllabus designers should admit the significance of computer use and information technology in the modern world and assign a course. This course can be obligatory for all university students and cover the necessary learning materials on computer applications and computer literacy (Schlebusch, 2018). Third, university instructors need to provide more qualified online learning classes by including some tips to hone their teachers' CSE. As such, they should regularly offer some practical tips to address their students' CSE and LA problems. Fourth, university students should improve their CSE by acquiring new computer use and information technology. To do so, they can benefit from the self-instruction strategy. As there is a mass of programs on the internet, they can use them to promote self-directed learning. Likewise, as a good level of CSE can be raised with more experience and usage, university students should expose themselves to computers on a regular basis. Moreover, the findings of the study may be useful to determine the areas of weaknesses in university students' CSE to allow improvements to be made to decrease those inadequacies. Finally, the results of the study may help determine if university students are exposed sufficiently to computers and if they are receiving enough training to welcome current computer and information technology developments.

Some suggestions for further research are recommended considering the limitations of the present study. As this research included just one state university in Iran to select the intended participants, further research is required to include larger samples from other universities across the country. In this way, the generalizability of the findings of the study may be increased. Besides, since the present study was cross-sectional, a longitudinal study is needed to disclose how the correlation between university students' CSE with LA will change over a particular period of time. Additionally, more studies are needed to explore the role of university students' gender, age, major, and socioeconomic status in determining their CSE. In addition, as the sample of the present study was limited to university students, further research can address the correlation between university teachers' CSE and their CA in OCs. Furthermore, as the present study was formulated and completed in a university setting, interested researchers can securitize the relationship

between primary and secondary teachers' and students' CSE with LA in school settings. Finally, to expand our understanding of the roles of CSE in OCs, further studies can address its relationship with other factors, such as technology motivation and technology satisfaction among university students.

Conflicts of Interest

No conflicts of interest declared.

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