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The Predictors of Students' Satisfaction and Academic Achievements in Online Learning Environment in Higher Education

Tuong Cao Dinh[+],
Phuong Bao Ngoc Nguyen
Thu Truc Thi Nguyen
Xuyen My Thi Ngo
An Trung Le Nguyen

FPT University, Vietnam
[+]*Corresponding author ● Email: tuongdc@fe.edu.vn*

ABSTRACT
Student satisfaction is crucial in remote education course evaluation because it is linked to the quality of online programs and student academic performance. Meanwhile, self-regulated learning is crucial in both traditional and online learning environments since it involves the ability to organize, manage, and control their learning process. In this study, the authors tested the correlations between student satisfaction and academic achievement involving student characteristics, self-regulated learning, and Internet self-efficacy. Data were collected from 750 undergraduate students responding to an online survey questionnaire. To examine the correlation between factors in this research, a correlation analysis approach in SPSS 25 was utilized. Qualitative data were coded using MAXQDA in order to figure out other factors affecting student satisfaction. The results of the research showed Internet self-efficacy, self-regulated learning, student satisfaction, and academic achievement were significantly correlated with each other whereas gender and students' prior experience online were perceived to highly correlate with those constructs as well. Qualitative results indicated factors impacting students' satisfaction in online learning and supported most part of the quantitative results. Pedagogical implications and limitations of the study are also discussed.

1. INTRODUCTION

Online learning has become more ubiquitous than ever before due to the unexpected expansion of the global Covid-19 pandemic, especially in higher education (Andrew, 2021), and was forecast to become mainstream by 2025 (Palvia et al., 2018, p. 233). One of the fundamental advantages of online learning over traditional classroom-based learning is its flexibility in terms of time and location (Waschull, 2001) while staying effective and efficient (Weichhart et al., 2018). Many educational institutions have started to employ online resources to deliver educational information to students in recent years. In most parts of the world, including Vietnam, participation in regular classes is becoming increasingly difficult owing to the uncertainty of whether the pandemic will be controlled or worsened. Online learning platforms such as Zoom, Google Meets, and others are progressively gaining popularity since they make the learning process more convenient. However, an inclusive answer for successful online learning remains an open subject for research.

There are various factors that decide whether or not online learning is effective and efficient. Self-regulation (SR) and self-efficacy (SE) are important components that contribute to the successful implementation of online-based learning (Peechapol et al., 2018; Rakes & Dunn, 2010; Schunk, 1991; Sun et al., 2008; You & Kang, 2014; Yukselturk & Bulut, 2007). As aforementioned, mandatory online courses are becoming more common in the

curriculum (Cohen & Baruth, 2017). As a result, students must attend these classes in order to complete their degree requirements. Self-regulated learning (SRL) is an important skill to have in this learning process. This trait enables people to adapt their behavior in order to succeed in online learning. SE is also a necessity for this type of learning. SE in online context denotes the confidence of people in attending online courses in particular, which leads to more opportunities to participate in the online learning and to interact with another agency on learning and satisfaction with this procedure as well (Liang & Tsai, 2008a; Tsai et al., 2011). Online learning requires learners to be confident in performing Internet-related actions and be willing and able to self-manage their learning process (Sun & Rueda, 2011; Tsai et al., 2011).

While there are numerous studies and empirical data on learners' autonomy in traditional, classroom-based environments, as well as a clear association between learners' autonomy and academic success (Russell, 2013), the authors' literature reviews indicates that there's still a dearth of research on the topic that SRL and SE correlate regarding students' satisfaction and academic achievements in online contexts.

The present study aims to a) examine the correlation among students' characteristics (gender, university, age, and experience), self-regulated learning strategies, Internet self-efficacy, online satisfaction, and academic achievements, and b) search for specific reasons that lead to their satisfaction when studying online.

To fulfill these aims, we proposed three research questions:

1. Do differences in students' characteristics (gender, university, age, and experience) lead to differences in their Internet self-efficacy, self-regulated learning strategies, student satisfaction, and academic achievement?

2. Do students' self-regulated learning strategies and Internet self-efficacy correlate with their satisfaction and academic achievement in online learning?

3. What are other particular factors influencing their satisfaction (if any) when they study online?

2. LITERATURE REVIEW

2.1. Students' Characteristics

Gender is one of the factors that many scholars are concerned about regarding online learning (Harvey et al., 2017; González-Gómez et al., 2012; Park & Kim, 2020; You & Kang, 2013). These studies showcased contradictory findings. Age is another students' characteristic that was investigated in the issue of online learning (Garcia & Qin, 2007; Ke & Kwak, 2013; Ke & Xie, 2009; Ransdell, 2010). The study by Garcia and Qin (2007) indicated that given the pedagogical effectiveness, young or older students valued online learning. Nevertheless, learners' satisfaction was not different among students of different ages (Ke & Kwak, 2013; Ke & Xie, 2009) while older students performed better in online learning compared to younger students (Ransdell, 2009). Prior experience in online learning has been well documented in online achievements (e.g., Cho & Kim, 2013; Shen et al., 2013; Tyler-Smith, 2006; Jan, 2015; Moore et al., 2002). However, the role of this factor seems to be inconclusive in an online environment.

2.2. Self-Regulated Learning strategies

According to Winne and Hadwin (2010), SRL is the intentional and planned adaptation of learning activities to meet learning objectives. Burman et al. (2015) stated SRL as one of the aspects of self-regulation which is more strongly associated with educational objectives. Metacognition (thinking about one's thoughts), strategic action (planning, monitoring, and assessing personal development against a standard), and motivation to learn are all used to lead learning (Boekaerts & Corno, 2005; Butler & Winne, 1995; Perry et al., 2006; Winne & Perry, 2000; Zimmerman, 1990). Learners that have better self-regulatory skills are more likely to succeed in online learning environments (Artino, 2008; Artino & Stephens, 2009; Barnard-Brak et al., 2010; Hodges & Kim, 2010; Matuga, 2009; Shea & Bidjerano, 2010).

Pintrich's (2000) theoretical framework is based on the SCT theory (Bandura, 1986; Zimmerman, 1989), which enriched the concept of self-regulated learning by detailing self-regulated learning into four phases: (1) planning, (2) self-monitoring, (3) controlling, and (4) reflection or evaluation. Each of these four phases includes cognitive, motivational/affective, behavioral, and contextual. Pintrich (2000) described these phases as reflecting a general sequence that learners go through as they perform specific tasks; however, these phases are not hierarchically or linearly structured. The four phases can occur at the same time and in different ways, resulting in many interactions between the various processes and components. Self-regulation could therefore affect the satisfaction of the student. Some studies concentrated on the positive correlation between students' satisfaction and SRL (Ejubovic & Puška,

2019; Puzziferro, 2008). A large number of studies focused on how self-regulation influences outcomes like academic success or achievement (Bell, 2006; Hargis, 2000; McManus, 2000; Shih & Gamon, 2001; Yukselturk & Bulut, 2005).

Based on the prior research on self-regulation in the online learning environment, we consider the following factors which have a correlation to students' satisfaction and academic achievements in their online learning (definitions are provided as follows):

Self-evaluation (SEV): Judging the quality of their work, for the purpose of doing better work in the future. Comparing progress against goals that they established before (Schunk, 2005).

Task strategies (TS): Determining student performance, even a simple task (Locke et al., 1984). Organizing, planning and transforming one's own study time (time management) and tasks (i.e., timing, sequencing, pacing, rearrangement of instructional materials) (Effeney et al., 2013; Zimmerman & Pons, 1986).

Goal setting (GS): Establishing specific and viable objectives or aims for learning (Moellerv et al., 2012).

Elaboration (EL): "Connecting newer and older knowledge strategy", combining new materials with previous ones to advance their concepts of issues (Niemi et al., 2003) and supplementing or selecting information to make it further meaningful and remarkable (Weinstein et al., 2011).

Environment structuring (ES): Selecting a comfortable area to study, eliminating distractions, focusing their attention, arranging their surroundings and promoting the accomplishment of learning goals without interruptions (Corno, 1993).

Help-seeking (HS): Asking other people for help, such as the instructor or peers, or consulting external help and resources (Pintrich, 1999; Richardson et al., 2012). Obtaining assistance from others online (teachers, peers, etc.) to reduce an academic challenge or overcome an impasse and interact via learning management systems or social media (Broadbent & Lodge, 2021).

2.3. Internet Self-efficacy

Internet self-efficacy (ISE) is a self-evaluation of one's capacity to plan and carry out Internet-related activities that produce the desired outcomes (Eastin & Larose, 2000). With the rise of online learning, it becomes more and more vital to examine ISE as a predictor of online learning success (Liang & Tsai, 2008b; Tsai et al., 2011).

Students' Internet experiences and capacities can vary significantly (Kaminski et al., 2009). Previous research has revealed that ISE increases learners' motivation (Alenezi et al., 2010; Liang & Wu, 2010), learning process (Gangadharbatla, 2008; Tsai, 2012) and learning outcomes (Tsai et al., 2011). Learners who have high ISE are more likely to have good academic performance (DeTure, 2010; Joo et al., 2000; Thompson et al., 2002) and SAT.

Students' Satisfaction

In this study, satisfaction refers to students' perspectives of their learning. It is the result and outcome of an educational system and is a positive antecedent of students' loyalty (Marzo et al., 2005). Elliot and Shin stated students' satisfaction (Elliott & Shin, 2002) as students' disposition based on subjective evaluations of educational outcomes and experiences. Students' satisfaction was considered as one of the key criteria to determine the quality of online programs (Yukselturk & Yildirim, 2008). Dhaqane and Afrah (2016) also illustrated that student satisfaction has a strong relationship with academic achievement in a positive way.

2.4. Academic Achievement

Tian et al. (2018) stated academic achievement is the level of progress obtained by students by learning over a period of time under the guidance of teachers and based on their prior experiences in aspects such as knowledge, skills, attitude, and values.

From the aforementioned literature review, we proposed the hypotheses below:

H1: Students' characteristics (age, gender, type of university sector, experience) correlates with Internet Self-efficacy (ISE)

H2: Students' characteristics (age, gender, type of university sector, experience) correlates with Self-Regulated Learning (SRL)

H3: Students' characteristics (age, gender, type of university sector, experience) correlates with Students' satisfaction (SS)

H4: Students' characteristics (age, gender, type of university sector, experience) correlates with Academic achievement (AA)

H5: Self-Regulated Learning (SRL) correlates with Students Satisfaction (SS)

H6: Self-Regulated Learning (SRL) correlates with Academic Achievement (AA)

H7: Internet Self-Efficacy (ISE) correlates with Student Satisfaction (SS)

H8: Internet Self-Efficacy (ISE) correlates with Academic Achievement (AA)

H9: Students' Satisfaction (SS) correlates with Academic Achievement (AA)

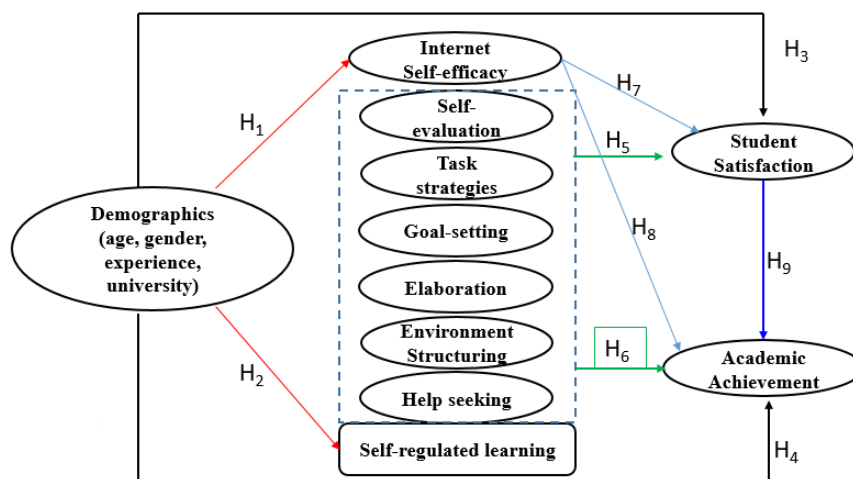These hypotheses are illustrated in Figure 1 below:

Figure 1. The proposed research model

3. MATERIALS AND METHODS

3.1. Research design

This study employed a convergent mixed-methods design, in which quantitative and qualitative data were collected at the same time, but the data analysis was performed separately to see if the findings of the two data confirm or not (Creswell & Creswell, 2018).

In this study, a questionnaire survey with 40 items which were measured with a five-point Likert scale, ranging from "1-Strongly Disagree" to "5-Strongly Agree", and open-ended questions, for example, "What factors are you not satisfied with online courses?", and "What factors are you satisfied with online courses?".

3.2. Participants

The participants in this study were undergraduate students from four universities in the Mekong Delta, namely FPT University Can Tho, Can Tho University, Nam Can Tho University, and F-Polytechnic College.

For the participant's recruitment, cluster sampling is used. Cluster sampling is useful for researchers whose subjects are fragmented over large geographical areas since this sampling saves time and money (Davis, 2005).

3.3. Research instruments

The research instrument in this article was survey questionnaires adapted from previous studies. In particular, Part 1 of the questionnaire, which was self-devised, comprised of the items featuring the participants' demographic information, such as university, gender, age, major, number of online courses they have taken, and factors that caused them to feel satisfied or unsatisfied with their online learning. Part 2 included items aiming to identifying factors influencing students' satisfaction and academic achievements in the online learning environment. The items related to students' Internet Self-Efficacy, satisfaction, and academic achievement were adapted from Ejubović and Puška (2019); those related to students' Self-evaluation, task strategies, goal-setting, elaboration, environment structuring, help-seeking were adapted from Kizilcec et al. (2016), and Barnard-Brak et al. (2010). This section consisted of 39 modified 5-point Likert-scaled items starting from Strongly disagree to Strongly agree.

3.4. Data collection procedures

Piloting phase

Prior to official data collection for analysis, a pilot test was conducted with sixty-five students who have studied online courses at FPT University in Can Tho Campus. This phase is essential to ensure the internal reliability of the items of the instrument and to help evaluate the respondent's comprehension as well. The Cronbach's Alpha of variables used in the piloting phase were all above 0.7, indicating that the instrument was reliable.

Table 1. Reliability Statistics of Piloting Phase

Variables	Cronbach's Alpha	No. of Items
Internet Self-Efficacy	.846	4
Self-evaluation	.750	5
Task Strategies	.838	6
Goal Setting	.734	5
Elaboration	.775	3
Environment Structuring	.797	4
Help Seeking	.784	4
Satisfaction	.830	4
Academic Achievement	.866	4

The actual research data collection procedures

Due to the Covid-19 pandemic outbreak during our data collection, in this phase, we first emailed our acquainted students and lecturers to ask for help with questionnaire delivery to their friends and their students, who had experience in online learning. The content of the email, in Vietnamese, included information about the research purpose, the specific time of the data collection, and their consent to voluntarily participate in the research. Once completing the questionnaire, the data were automatically saved in the platform of Google Sheets which can only be obtained by the research team. As a result, 764 responses were obtained, of which 750 were qualified for data analysis. Table 2 below indicates the reliability of the questionnaire in the actual data collection phase.

Table 2. Reliability Statistics of the instrument

Variables	Cronbach's Alpha	No. of Items
Internet Self-Efficacy	.824	4
Self-evaluation	.784	5
Task Strategies	.835	6
Goal Setting	.867	5
Elaboration	.833	3
Environment Structuring	.803	4
Help Seeking	.805	4
Satisfaction	.883	4
Academic Achievement	.867	4

3.5. Data analysis

To examine the correlation between factors in this research, a correlation analysis approach in SPSS 25 was utilized. Qualitative data were coded using MAXQDA in order to figure out other factors affecting student satisfaction.

4. RESULTS AND DISCUSSION

4.1. General statistical information

After data filtration for errors and/or duplicated responses, 750 responses were qualified for data analysis. The information about students' characteristics, including their gender, age, university, university years, major, online courses that they have experienced, was shown in Table 3 below.

Table 3. Descriptions of participants in the study (N=750)

University	Frequency	Percent (%)
FPT Can Tho university	268	35.7
Can Tho university	223	29.7
Nam Can Tho university	138	18.4
FPT Polytechnic	121	16.1

Gender		
Male	322	42.9
Female	428	57.1
Age	**Frequency**	**Percent (%)**
18-20	219	29.2
From 20-22	519	69.2
Above 22	12	1.6
Year		
First-year	31	4.1
Second-year	144	19.2
Third-year	287	38.3
Seniors	288	38.4
Course		
None	49	6.5
Under 3	251	33.5
From 3-5	248	33.1
Above 5	202	26.9
Experience		
New to online learning	20	2.7
Familiar with some themes	404	53.9
Familiar with most topics	244	32.5
Expert in online learning	82	10.9
Total	750	100

4.2. Hypothesis testing

4.2.1. Do differences in students' characteristics (gender, university, age, and experience) lead to differences in their Internet self-efficacy, self-regulated learning strategies, student satisfaction and academic achievement?

Gender issues were found to relate to differences in SS and ISE, but not in SS and SRL. Particularly, male students tended to have satisfaction and confidence in their ability to study online compared to female partners (see Table 4). However, this difference was not significant (ISE_{Mean_Male} vs. ISE_{Mean_Female}: 3.95 vs. 3.82; SS_{Mean_Male} vs. SS_{Mean_Female}: 3.57 vs. 3.42).

Table 4. One-way ANOVA analysis for the gender factor

Test of Homogeneity of Variances					**ANOVA**	**WELCH**
	Levene Statistic	df1	df2	Sig.	Sig.	Sig.
ISE	0.136	1	748	0.713	0.019	0.019
SS	0.120	1	748	0.729	0.038	0.040
AA	3.495	1	748	0.062	0.062	0.066
SRL	4.021	1	748	0.045	0.84	0.846

In terms of university issue and age, there was no difference among students of the four universities towards SRL, AA, SS, and ISE (see Tables 5 and 6).

Table 5. One-way ANOVA analysis for the university factor

Test of Homogeneity of Variances					**ANOVA**
	Levene Statistic	df1	df2	Sig.	Sig.
ISE	0.758	3	746	0.518	0.356
SS	0.660	3	746	0.577	0.056
AA	1.513	3	746	0.210	0.061
SRL	1.217	3	746	0.303	0.502

Table 6. One-way ANOVA analysis for the age factor

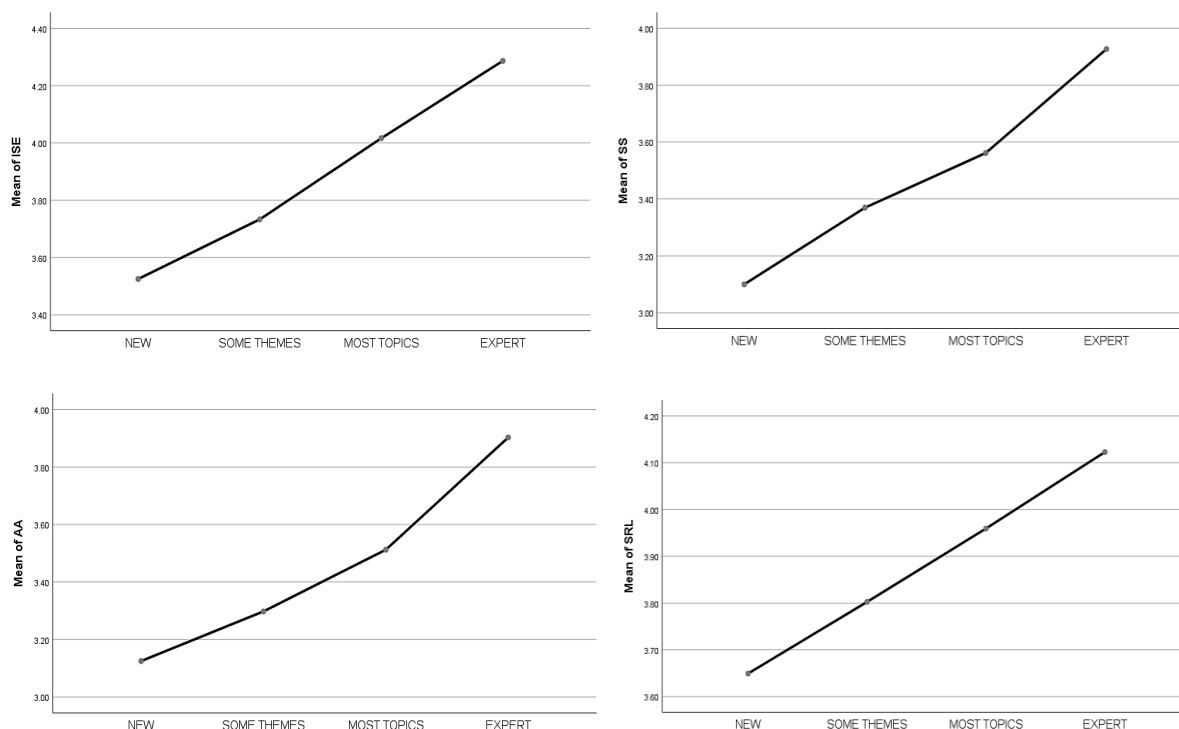| Test of Homogeneity of Variances					ANOVA	WELCH
	Levene Statistic	df1	df2	Sig.	Sig.	Sig.
ISE	0.136	1	748	0.011	0.369	0.456
SS	0.120	1	748	0.017	0.967	0.967
AA	3.495	1	748	**0.243**	**0.739**	0.802
SRL	4.021	1	748	0.008	0.085	0.096

Figure 2. One-way ANOVA analysis for the experience factor

To understand how students' experience impacts their levels of Internet self-efficacy, satisfaction, academic achievement, and self-regulated learning, we asked them to answer the question "Please identify your experience with online learning" with four options, namely a) new to online learning, b) familiar with some themes of online learning, c) familiar with most topics of online learning, and d) an expert on online learning. As can be seen from Figure 2, the more students study online, the more they positively value this learning and teaching modality regarding self-regulated learning, Internet self-efficacy, satisfaction, and academic achievements.

In summary, the following hypotheses were supported:

H1: Students' characteristics (gender, experience) correlates with Internet Self-efficacy (ISE)

H2: Students' characteristics (gender, experience) correlates with Self-Regulated Learning (SRL)

H3: Students' characteristics (gender, experience) correlates with Students' satisfaction (SS)

H4: Students' characteristics (gender, experience) correlates with Academic achievement (AA)

4.2.2. Do students' self-regulated learning strategies and Internet self-efficacy correlate with their satisfaction and academic achievement in online learning?

In order to examine the correlation between students' SRL and ISE and satisfaction and academic achievement, a Pearson correlation was run. The result indicated that they are positively and closely correlated with each other (see Table 7 below):

Table 7. Correlations between Student's SRL, ISE and AA and SS

Correlations		SS	AA	ISE	SRL
SS	Pearson Correlation	1	.735**	.576**	.655**
	Sig. (2-tailed)		.000	.000	.000
AA	Pearson Correlation	.735**	1	.522**	.600**
	Sig. (2-tailed)	.000		.000	.000
	N	750	750	750	750

**. Correlation is significant at the 0.01 level (2-tailed).

To summarize, the following hypotheses were confirmed:

H5: Self-Regulated Learning (SRL) correlates with Students Satisfaction (SS)

H6: Self-Regulated Learning (SRL) correlates with Academic Achievement (AA)

H7: Internet Self-Efficacy (ISE) correlates with Student Satisfaction (SS)

H8: Internet Self-Efficacy (ISE) correlates with Academic Achievement (AA)

H9: Students' Satisfaction (SS) correlates with Academic Achievement (AA)

4.2.3. What are other particular factors influencing their satisfaction (if any) when they study online?

Table 8. Factors affecting student satisfaction in online learning

Code Segment	Frequency	Percentage (%)
Convenience	314	36.34
Flexibility	141	16.32
Saving	136	15.74
Learning Quality	100	11.57
Assistance	64	7.41
Self-awareness	52	6.02
Interaction	28	3.24
Academic Achievement	18	2.08
Technical Skill	11	1.27
TOTAL	864	100.00

Participants stated that convenience, flexibility, saving, learning quality, assistance, self-awareness, interaction, academic achievement, and technical skill are those factors that can impact their satisfaction towards online learning. From the gathered qualitative data, slightly above one-third of respondents supposed convenience was the major factor while technical skill ranked bottom (1.27%). Interestingly, the four factors, namely assistance, self-awareness, interaction, and academic achievement, were confirmed to influence their online learning satisfaction, which was quite consistent with the result from the quantitative analysis. Specifically, assistance and interaction were ranked the same as help-seeking, while self-awareness similar to self-evaluation and technical skill to Internet self-efficacy and Academic achievement obviously stated in research.

4.3. Discussion

The current study illustrates that gender is a case to be concerned in relation to students' Internet self-efficacy and satisfaction in online learning. This finding is in line with Park and Kim's (2020) study while it is not supported by other studies by Harvey et al. (2017) and González-Gómez et al. (2012). Albeit the differences were small, it also raises the importance of equipping students' ability to use the Internet for their online learning.

In terms of online learning experience, the finding of the current study is in line with a study conducted by Jan (2015), Tyler-Smith (2006), yet inconsistent with Cho and Kim (2013), More et al. (2002). In addition, other constructs of the proposed model, namely self-regulated learning, students' satisfaction, academic achievement, and

internet self-efficacy, were significantly correlated with each other. This result lent support for studies by Artino (2008), Artino and Stephens (2009), Barnard-Brak et al. (2010), Hodges and Kim (2010), Matuga (2009), Shea and Bidjerano (2010). This study confirmed that learners who have better self-regulatory skills are more likely to succeed in online learning environments. In the same vein, learners who have high ISE are more likely to have good academic performance (Dhaqane & Afrah, 2016).

This can be deduced from these results that when students feel confident about their capacity to study online, they would be more likely to be satisfied and succeed in online learning. Similarly, this finding has pedagogical implications for educators, university managers, and teachers to prioritize encouragement for students' self-confidence in online learning.

5. CONCLUSION

The aims of the study were to examine the correlations of students' characteristics, namely age, type of educational institutions, gender, and prior experience of online learning, and other constructs: Internet self-efficacy, self-regulated learning strategies, satisfaction, and academic accomplishments in particular. The findings of this study proved that Internet self-efficacy, self-regulated learning, student satisfaction, and academic achievement are significantly correlated with each other. As discussed in previous research, student satisfaction was most correlated to academic achievement, and this study gave one more piece of evidence to emphasize this argument. Students' characteristics were examined in this study as well, and some factors that can impact students' satisfaction in an online learning environment were also identified.

The study utilized One-way ANOVA, Pearson correlation analysis to test these relationships. This study provides pedagogical implications for educational stakeholders, such as educators, university managers, and instructors in implementing online courses in which the important roles of Internet self-efficacy and self-regulated learning play on students' satisfaction and academic achievements.

The current study acknowledges some limitations. Firstly, although the sample size of the study is high, it is the issue of imbalance of the participants from the four educational institutions that may lead to a difference in the study results of these issues. Secondly, most of the participants of the study were from the Mekong Delta; thus, this study is finite in generalizing to the other contexts, inside or possibly outside Vietnam. Thirdly, the study primarily employed self-reported survey questionnaires, which may suffer from the overestimation and/or underestimation of respondents, which is raised by Cole and Gonyea (2010). Finally, this study only considered the correlation between variables, and did not perform analytical methods such as regression, linearity and confirmation of paths as well as the role of variables in the model.

Conflict of Interest: No potential conflict of interest relevant to this article was reported.

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