Impact of Internet Self-Efficacy and Self-Regulated Learning on Satisfaction and Academic Achievement in Online Learning: A Case Study in Vietnam

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Abstract—The unexpected prolonged expansion of the Covid-19 pandemic has urged numerous educational institutions worldwide, including Vietnam, to offer online courses. Identifying factors that impact student satisfaction and academic achievement, hence, becomes crucial in online learning environments. The current study examines the impact of students' self-regulated learning and Internet self-efficacy on these two learning outcomes in an online environment. The proposed research model consists of two exogenous variables including students' Internet self-efficacy and self-regulated learning, and two endogenous variables, namely students' satisfaction and academic achievement. 710 students from four universities in Vietnam voluntarily participated in this study by completing an online survey questionnaire. The data analysis was performed by Partial Least Square Structural Equation Modeling (PLS-SEM). The results indicated that Internet self-efficacy, goal setting, and help-seeking have direct positive effects on both student satisfaction and academic achievement. Self-evaluation positively affected student satisfaction while it did not have an impact on student academic achievement. Elaboration, environment structuring, and task strategies did not have a statistically significant relationship with student satisfaction as well as their academic achievement. Students' satisfaction has a direct positive impact on their academic achievement. Pedagogical implications and limitations of the study are also deduced.

Keywords—self-regulated learning, Internet self-efficacy, student satisfaction, academic achievement, online learning

1 Introduction

Despite certain stated downsides such as limited social interaction, a sense of isolation, and insufficient tutorial supervision, [1], online learning has grown widespread in education at all levels, especially at tertiary education level [2], and was predicted to become dominant by 2025 [3]. One of the primary benefits of online learning over traditional classroom-based learning is its versatility in terms of time and place [4], while still retaining its effectiveness and efficiency [5]. The unexpected prolonged expansion

of the Covid-19 pandemic has urged numerous educational institutions worldwide, including Vietnam, to offer more online courses and employ online learning platforms such as Zoom, Google Meets, Microsoft Teams, and others to provide education for students.

In the online learning process, students' self-regulated learning (SRL) is considered an important skill that enables students to adapt their behavior in order to succeed in online learning and achieve higher academic results [6]. Learners who lack confidence in their ability to utilize the Internet may be less interested in their studies and have fewer possibilities to connect with their instructors or classmates, resulting in dissatisfaction with online learning [7]. Moreover, time management, planning, and self-evaluation are those of the most tremendous challenges students face in online courses [8]. Nevertheless, few studies investigated the effects of technology or Internet self-efficacy and/or self-regulated learning on students' satisfaction in online learning modalities to date (e.g., [9-10]). In addition, although SRL has been well documented in the literature over the last three decades, the effects of SRL strategies on academic achievements remained inclusive [11]. Thus, this research aims at answering the two main questions below:

- RQ1: To what extent does Internet self-efficacy predict students' satisfaction and academic achievement in higher education?
- RQ2: To what extent do self-regulated learning strategies predict students' satisfaction and academic achievement in higher education?

2 Research model and theoretical framework

2.1 Student satisfaction (SS)

Due to the unpredicted expansion of COVID-19, there is a discernible increase in the number of Vietnamese universities shifting to online teaching and learning [12]. Examining students' satisfaction with their online learning experience is essential it helps educators to assist students with their learning progression [13]. Student satisfaction may influence students' perceptions of instructional quality [14] and attitudes toward future online course learning [15]. According to research, high levels of satisfaction have a high positive association with academic progress and result [16-17]. Based on prior research results, this study proposes that:

- H1: Student Satisfaction (SS) directly affects Academic Achievements(AA)

2.2 Academic Achievement (AA)

Academic achievement can be characterized as a grade on an assignment, a course grade, or one's grade point average (GPA) depending on the subject [18]. In online environments, students' self-regulation has been found as an underlying factor in tackling their poor academic attainment [19-20]. There was a favorable association between learner profiles as self-regulators and academic outcomes in terms of GPA in one correlational study [19]. Students who were classed as great self-regulators were more

likely to have high GPAs, albeit this did not infer causation. While it is possible that learners with higher GPAs are more likely to utilize SRL strategies, researchers are still trying to figure out whether particular SRL strategies or collections of SRL strategies resonate with academic outcomes [17]. Furthermore, higher performers were faster to complete tasks and outperformed lower performers when it came to setting goals [21]. While higher performers were more likely to use goal-setting tactics, lower performers scored higher on task strategies, time management, seeking help, and self-evaluation [21].

2.3 Factors contributing to student satisfaction and academic achievement

Internet self-efficacy (ISE). Initiated by Albert Bandura [22], self-efficacy (SE) is a widely accepted concept that refers to an individual's belief in his ability to accomplish a certain behavior or task in a specific situation. In the context of online learning, Internet self-efficacy (ISE) refers to one's capacity to use the Internet that helps produce the desired outcomes [23]. With the rise of online learning, it becomes more and more vital to examine ISE as a predictor of online learning success [24].

Previous research on the impact of ISE on learners' academic achievements is scanty [25], but the result is inclusive. Chang et al.'s [26] study reported a positive impact of ISE on students' grades. Similar results were found Kuo et al.'s [27] study, while another study indicated that students with higher levels of ISE had better performance than those of lower levels [28]. However, some other studies did not find a relationship between ISE and students' academic performance [29].

The literature also reviews the scarcity and ambivalence results of research examining the relationship between ISE and satisfaction. In particular, few articles identified a significant positive but weak correlation between ISE and satisfaction [30-31]. Furthermore, ISE was found to be a poor predictor of student satisfaction [30-31], with the exception of study by Kuo et al. [32].

Based on the aforementioned studies, this research proposes the hypotheses below:

- H2: Internet Self-Efficacy (ISE) directly affects Student Satisfaction (SS)
- H3: Internet Self-Efficacy (ISE) directly affects Academic Achievements (AA)

Self-regulated learning (SRL) in online learning in higher education. According to Winne and Hadwin [33], self-regulated learning (SRL) is the intentional and planned adaptation of learning activities to meet learning objectives. One of SRL's most distinguished researchers, Zimmerman [34], defined SRL as "self-generated thoughts, feelings, and actions that are planned and cyclically tailored to the achievement of personal goals" (p.14). To be successful, students need to be actively engaged in their learning process, employing and placing emphasis on corresponding self-regulated learning strategies [35].

In online learning environments, students are supposed to take more responsibilities and autonomy [36], especially in asynchronous learning contexts [37]. Learners that have better self-regulatory skills are more likely to succeed in online learning environments [38-40]. Šteh and Šarić [41] concluded that SRL can be learned and can lead to

more meaningful learning, greater satisfaction and higher learning outcomes for students.

Some recent studies confirmed the impact of SRL on academic outcomes [35][42-44] albeit different SRL strategies exerted different effects. The correlation between SRL and satisfaction has also been recently examined [9] [45]. The results indicated a positive and good predictor of student satisfaction.

Although most of these findings are positive, the results can be different when the population or setting alters [44] since SRL are quite contextual-dependent [46]. After performing a literature research, we consider that the following dimensions which are believed to best accurately reflect SRL and suitable for the context of this study, these factors are self-evaluation, task strategies, goal-setting, elaboration, environment structuring, and help seeking.

Self-evaluation (SEV). Self-regulated learners engage in self-evaluation when they compare progress against goals which they established before [47]. Self-evaluation is a potentially powerful technique because of its impact on student performance [48]. Previous studies indicated a positive association between self-evaluation and academic goal attainment [19][49], as well as found that this factor was a component of self-regulated learning which predicts student satisfaction [49-50].

Based on these discussed findings, this study proposes the hypotheses below:

- H4: Self-evaluation (SEV) directly affects Student Satisfaction (SS)
- H5: Self-evaluation (SEV) directly affects Academic Achievements (AA)

Task strategies (TS). Task strategies was defined as organizing, planning and transforming one's own study time (time management) and tasks (i.e., timing, sequencing, pacing, rearrangement of instructional materials) [51]. Weinstain and Mayer [52] stated that the purpose of task strategies possibly affect learners' motivation, or by the way they select, obtain, then establish new understanding to reach various goals. The previous research's result demonstrated the positive influence of task strategy on learner behavior and academic performance [52]. A study by Binali et al. [53] found that students with low self-regulation such as task strategies, time management, help-seeking, and self-evaluation demonstrated low engagement in their online study. This finding implies that they were not satisfied with online learning since student engagement has a positive correlation with satisfaction [54-55]. Therefore, this study proposes the hypotheses below:

- H6: Task strategies (TS) directly affect Student Satisfaction (SS)
- H7: Task strategies (TS) directly affect Academic Achievements (AA)

Goal-setting (GS). Goal-setting occurs at the early stages of self-regulation in the task analysis processes. Setting a goal entail deciding on a precise aim that will serve as a guide and direction for a student as they progress through their educational journey. Goal-setting was identified as strongly connected to academic achievement on online learning [18][49], had an direct and indirect impact on achievement and satisfaction [56-57], with the exception of a study by Ejubovic and Puska [36]. Based on the aforementioned literature review, the following hypotheses were proposed:

- H8: Goal-setting (GS) directly affects Student Satisfaction (SS)
- H9: Goal-setting (GS) directly affects Academic Achievements (AA)

Elaboration (EL). Elaboration refers to the ability to retrieve prior knowledge, combine and/ or relate it to new information in order to make the learning materials more memorable or meaningful [58]. Some studies found that elaboration was a good predictive of students' grades [59], while there was not any correlation between elaboration on goal attainment [13][52]. Meanwhile, elaboration indicated a moderate correlation with academic outcomes [60]. In correlation with student satisfaction, elaboration was found to be positively correlated [61]. Therefore, the following hypotheses are proposed:

- H10: Elaboration (EL) directly affects Student Satisfaction (SS)
- H11: Elaboration (EL) directly affects Academic Achievements (AA)

Environment Structuring (ES). Learners' efforts to select a comfortable area to study, eliminate distractions, focus their attention, and arrange their surroundings such that they promote the accomplishment of learning goals without interruptions are referred to as environment structuring [62]. Zimmerman and Pons [63] believed that better environmental management abilities had a beneficial influence on achievement and satisfaction. This was confirmed by Ejubovic and Puska's [36] study. In a similar vein, Li [64] showed an indirect effect of ES on students' academic outcomes while ES also predicted students' satisfaction when studying online. Based on these positive results, the hypotheses were proposed below:

- H12: Environment Structuring (ES) directly affects Student Satisfaction (SS)
- H13: Environment Structuring (ES) directly affects Academic Achievements (AA)

Help seeking (HS). Help-seeking refers to ask other people for help, such as the instructor, peers, or consulting external help and resources [65-66].

Compared to other SRL strategies, help-seeking had a low correlation with student academic achievement [49], while it had a strong association between help-seeking and student satisfaction in a synchronous online learning environment [67]. In contrast, a study by Binali et al. [53] indicated that students with low self-regulation such as help-seeking, or task strategies showed a low-engagement in their study. This can be inferred that they were not satisfied with their online study. The following hypotheses were proposed:

- H14: Help seeking (HS) directly affects Student Satisfaction (SS)
- H15: Help seeking (HS) directly affects Academic Achievements (AA)

2.4 Research model

After assessing preliminary literature, researchers have provided conflicting evidence regarding the relationship among SRL, ISE, SS and AA. In addition, there is no prior research that has examined these variables simultaneously. Therefore, the current

study was designed to examine a hypothesized model (Figure 1), based on previous empirical studies.

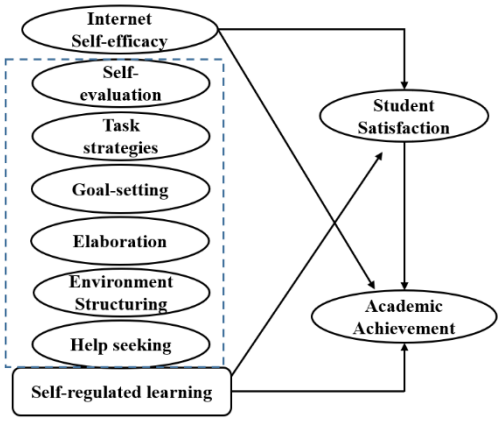

Fig. 1. The proposed research model

3 Method

3.1 Participants

The current study aimed to obtain the confidence level of 95% and the margin of error with 5%. The participants of the study were 710, recruited from four universities and colleges in Mekong Delta from 11-28, September, 2021. Because of the COVID-19 pandemic, an email of introduction and information, a link to the Questionnaires and a Consent Form were sent to students of these four universities.

Cluster sampling was employed for the participant's recruitment. This technique is useful in terms of saving time and money for cases in which participants are located over large geographical areas [68].

3.2 Research instruments

Questionnaire survey adapted from previous studies was employed in the present study. In particular, the items related to students' Internet Self-Efficacy, satisfaction, and academic achievement were adapted from Ejubović and Puška [36]; those relevant to students' self-evaluation, goal-setting, task strategies, help-seeking, elaboration, and environment structuring were adapted from Kizilcec et al. [49] and Barnard-Brak et al. [19]. There were 39 modified 5-point Likert-scaled items, in total, starting from Strongly disagree to Strongly agree.

3.3 Data collection and analysis

The questionnaire was administered to sixty-five students who have studied online courses at FPT university Campus in Can Tho for the piloting phase. This is to ensure the internal reliability of the items of the instrument and to evaluate the respondents' comprehension as well. The Cronbach's Alpha of the variables were all above 0.7, indicating that the instrument was reliable for further data collection and analysis.

Due to the Covid-19 pandemic outbreak, we emailed our students and lecturers to help administer the survey questionnaires with Vietnamese equivalents as well to their friends and their students who had experienced in online learning, respectively. The content of the email, in Vietnamese, included information about the research purpose, data collection time, and their consent to voluntarily participate in the research. Once completing the questionnaires, the data were automatically saved in the platform of Google Sheets which can only be obtained by the research team. Of 764 responses were obtained, 710 were qualified for data analysis. Table 1 below indicates the reliability of the questionnaire in the actual data collection phase.

Smart-PLS 3.0 was utilized to measure the correlation between the observed variables and latent variables through a reflective measurement mode.

4 Results

4.1 The reliability and validity of the instrument

Outer loadings of scale give evidence about the explaining of items toward constructs in the model. If this index is under 0.7, it means the item cannot be used and discarded out of scale. In this study, there were two observed variables under this standard as SEV2 (0.596) and SEV5 (0.636), hence, they were discarded from the scale. Other items were acceptable since they were all above or equal to 0.7 (see Table 1). After discarding these two items, three other items in SEV construct increased their loading beyond 0.8. Therefore, the scale had a great explanation.

Table 1. Measurement model parameter estimation

Dimensions	Items	Factor loading	Cronbach's Alpha	CR	AVE
Internet Self-efficacy	ISE1	0.784	0.803	0.871	0.627
	ISE2	0.812			
	ISE3	0.803			
	ISE4	0.768			
Self-evaluation	SEV1	0.808	0.726	0.845	0.645
	SEV3	0.802			
	SEV4	0.800			
Task Strategies	TS1	0.716	0.815	0.866	0.519
	TS2	0.704			
	TS3	0.706			
	TS4	0.769			

	TS5	0.713			
	TS6	0.715			
Goal-setting	GS1	0.816	0.851	0.894	0.629
	GS2	0.804			
	GS3	0.843			
	GS4	0.795			
	GS5	0.700			
Elaboration	EL1	0.875	0.817	0.891	0.731
	EL2	0.821			
	EL3	0.868			
Environment Structuring	ES1	0.792	0.795	0.865	0.618
	ES2	0.780			
	ES3	0.856			
	ES4	0.709			
Help-seeking	HS1	0.795	0.781	0.859	0.603
	HS2	0.790			
	HS3	0.754			
	HS4	0.767			
Student Satisfaction	SS1	0.825	0.874	0.914	0.726
	SS2	0.839			
	SS3	0.860			
	SS4	0.884			
Academic Achievement	AA1	0.860	0.855	0.903	0.699
	AA2	0.855			
	AA3	0.856			
	AA4	0.770			

Table 1 indicated that the scale of this study had a high reliability because all constructs had Cronbach's Alpha greater than 0.7 and CR above 0.8. AVE values are bigger 0.5, hence all constructs' convergent validity is ensured.

To test the constructs' discriminant validity Heterotrait–monotrait (HTMT) (Table 2) were performed. All values are smaller 0.85, thus their discriminant validity is ensured (Kline, 2015) [74].

Table 2. Heterotrait–monotrait ratio of correlations

Dimension	AA	EL	ES	GS	HS	ISE	SEV	SS	TS
AA									
EL	0.445								
ES	0.457	0.754							
GS	0.605	0.732	0.666						
HS	0.539	0.725	0.697	0.668					
ISE	0.561	0.728	0.58	0.609	0.573				
SEV	0.561	0.7	0.59	0.825	0.616	0.785			
SS	0.807	0.525	0.484	0.653	0.564	0.633	0.731		
TS	0.535	0.83	0.663	0.818	0.761	0.694	0.84	0.596	

4.2 Structural Equation Modelling Analysis

Collinearity analysis. To avoid collinearity issues, the variance inflation factor (VIF) should be lower 3 (Hair et al., 2019). It could be concluded that collinearity of the formative indicators in this study did not occur (see Table 3).

The model in this study was reasonably well-fitted in general (SRMR = 0.057 < 0.08, RMS_theta = 0.118 < 0.12) (Hair et al., 2019).

Table 3. Evaluating collinearity of scale and model fit

Dimension	AA	SS	Model fit
AA			SRMR = 0.057 NFI = 0.795 RMS_theta = 0.118
EL	2.584	2.583	
ES	1.919	1.818	
GS	2.492	2.375	
HS	1.918	1.892	
ISE	1.916	1.814	
SEV	2.861	2.765	
SS	1.792		
TS	3.151	3.148	

Measuring the value of R2. The R^2 value is used to evaluate the explanatory ability of the model. The R^2 value is between 0 and 1. The higher the value, the higher the explanatory power. When the R^2 value is close to 0.50, the model has a moderate explanatory power. When the R^2 value is close to 0.75, the model has a high degree of explanatory power. It can be seen from Table 4 that R^2 value of AA and SS was 0.523 and 0.452 respectively, which means the R^2 value in this study was moderate.

Table 4. R2 value

Dimensions	R^2	R^2 Adjusted
AA	0.523	0.517
SS	0.452	0.447

Goodness-of-Fit. To ensure that the model adequately describes the empirical data, the Goodness-of-Fit (GoF) is used as an index for the entire model fit. The GoF is calculated by using the equation:

$$GoF = \sqrt{AVE * R^2} \tag{1}$$

The GoF values range from 0 to 1, with 0.10 (small), 0.25 (moderate), and 0.36 (large) indicating global path model validation. A good model fit implies that a model is parsimonious and plausible. Table 5 reveals that the GoF index of AA and SS for this study model were 0.604 and 0.572, indicating that empirical data fits the model satisfactorily and has significant predictive power when compared to baseline values.

Table 5. GoF value

Dimensions	GoF
AA	0.604
SS	0.572

Effect size. Effect size (f^2) used to determine the effect of exogenous factors on endogenous variables. While the normalized regression coefficient cannot evaluate whether the effect was strong or not, f^2 will have suggested thresholds to evaluate. Cohen (1988) recommended that $f^2 < 0.02$ was extremely small or no effect, $0.02 \leq f^2 \leq 0.15$ was a small effect, $0.15 \leq f^2 \leq 0.35$ was normal effect and $f^2 \geq 0.35$ was a significant effect. f^2 values of EL, ES and TS were under 0.02, and they were proved to have no effect on AA and SS. Simultaneously, SEV had no effect on AA ($f^2 = 0.000$) and it had a small effect on SS ($f^2 = 0.054$). While, GS, HS and ISE were in range of extremely small effect on AA, they had small effect on SS when the f^2 of SS were higher than 0.02. The explanatory effect value f^2 of SS on AA is 0.348, which displays a large-effect explanatory (see Table 6). This represents that exogenous variables are very capable of explaining endogenous variables, with a high degree of explanatory effect value.

Table 6. Evaluating f2

Dimension	AA	SS
AA		
EL	0.002	0.000
ES	0.002	0.000
GS	**0.019**	**0.045**
HS	0.011	**0.020**
ISE	0.010	**0.050**
SEV	0.000	**0.054**
SS	**0.348**	
TS	0.001	0.002

Path coefficient analysis. All the direct paths were examined in Table 7. There were 8 paths accepted and 7 paths were rejected. Study found that EL, ES and TS had not any effect on SS and AA. Whereas, ISE, GS and HS influenced both SS and AA. SEV only affected SS ($p = 0.000$, $r = 0.263$). Lastly, SS had a significantly positive effect on AA ($p = 0.000$, $r = 0.551$).

Besides the direct paths in model, this study also examined indirect paths between AA and four exogenous constructs which affected SS. Table 8 revealed all acceptable indirect paths in model, and Table 9 was the summary of every single indirect effect between ISE, SEV, GS, HS and SS, AA. All four latent variables (ISE, SEV, GS and HS) had indirect effects on AA through SS with P-value 99%.

Table 7. Evaluating path coefficient

Path analysis	B	P Values	Result
SS → AA	0.551	0.000**	H1 Accepted
ISE → SS	0.224	0.000**	H2 Accepted
ISE → AA	0.095	0.014*	H3 Accepted
SEV → SS	0.263	0.000**	H4 Accepted
SEV → AA	-0.009	0.845	H5 Rejected
TS → SS	-0.056	0.279	H6 Rejected
TS → AA	-0.046	0.355	H7 Rejected
GS → SS	0.243	**0.000****	**H8 Accepted**
GS → AA	0.152	**0.003***	**H9 Accepted**
EL → SS	-0.016	0.748	H10 Rejected
EL → AA	-0.053	0.244	H11 Rejected
ES → SS	0.019	0.619	H12 Rejected
ES → AA	0.041	0.295	H13 Rejected
HS → SS	0.144	**0.001****	**H14 Accepted**
HS → AA	0.099	**0.010***	**H15 Accepted**

* significant at $p < 0.05$; ** significant at $p < 0.001$

Table 9 was the general result of both direct and indirect effect in the model. EL, TS and ES had no effect on SS and AA. ISE, GS and HS had a partially indirect effect on AA since their direct and indirect paths to AA were all proved. SEV was on the other side when it only affected AA through SS, therefore, it had a fully indirect effect on AA. At least, SS was demonstrated to have a significant direct effect on AA.

Table 8. Evaluating intermediary effect

Independent variable	Intervening variable	Dependent variable	Indirect effect	P Values
GS	SS	AA	0.134	0.000**
HS	SS	AA	0.080	0.001**
ISE	SS	AA	0.124	0.000**
SEV	SS	AA	0.145	0.000**

** significant at $p < 0.001$

Table 9. Total effects on academic achievement

Path	B	P Values	Effect type
EL → AA	-0.061	0.230	No effect
ES → AA	0.051	0.261	No effect
GS → AA	0.286	0.000**	Partial Intermediary
HS → AA	0.179	0.000**	Partial Intermediary
ISE → AA	0.219	0.000**	Partial Intermediary
SEV → AA	0.136	0.007*	Full Intermediary
SS → AA	0.551	0.000**	Direct
TS → AA	-0.077	0.182	No effect

* significant at $p < 0.05$; ** significant at $p < 0.001$

Hypothesis testing. From the results of Tables 12, 13 and 14, this study concluded that:

The path coefficient of student satisfaction (SS) to academic achievement (SS→AA) is significant at 0.00 level (β=0.551, P<0.01), hence H1 is accepted.

There is statistically significant influence, at the 99 percent confidence level, between ISE and SS (β=0.224, P<0.01). Furthermore, ISE has a direct positive effect on AA (β=0.095, P=0.014>0.01). Hence, H2-3 are accepted. ISE also has indirect positive effect on AA through SS (β=0.124, P<0.01) and total effect of ISE on AA is partial intermediary (β=0.219, P<0.01).

The path coefficients of self-evaluation to SS (SEV→SS: β=0.263, P=<0.01), and AA (SEV→AA: β=0.-0.009, P=0.845>0.05) are not significant at 0.05 level, so H4 is accepted and H5 is rejected. However, SEV has indirect positive effects on AA via its influence on SS (β=0.145, P<0.01) and total effect of SEV on AA is fully intermediary (β=0.136, P<0.01).

There is no statistically significant correlation between task strategies and both SS (β=0.-0.056, P=0.279>0.05), AA (β=-0.046, P=0.355>0.05), hence H6 and H7 are rejected.

There is statistically significant influence, at the 99 percent confidence level, between goal setting (GS) and both SS (β=0.243, P<0.01), AA (β=0.153, P<0.01), hence, H8-9 are accepted. Moreover, GS also has indirect positive effect on AA through SS (β=0.134, P<0.01) and total effect of GS on AA is partial intermediary (β=0.286, P<0.01).

There is no statistically significant correlation between elaboration and both SS (β=0.-0.016, P=0.748>0.05), AA (β=-0.053, P=0.244>0.05), hence H10 and H11 are rejected.

There is no statistically significant correlation between environment structuring and both SS (β=0.019, P=0.619>0.05), AA (β=0.041, P=0.295>0.05), hence H12 and H13 are rejected.

There is statistically significant influence, at the 99% confidence level, between help seeking (HS) and both SS (β=0.144, P<0.01), AA (β=0.099, P=0.01), hence, H14-15 are accepted. Besides, HS also has indirect positive effect on AA through SS (β=0.080, P<0.01) and total effect of ISE on AA is partial intermediary (β=0.179, P<0.01).

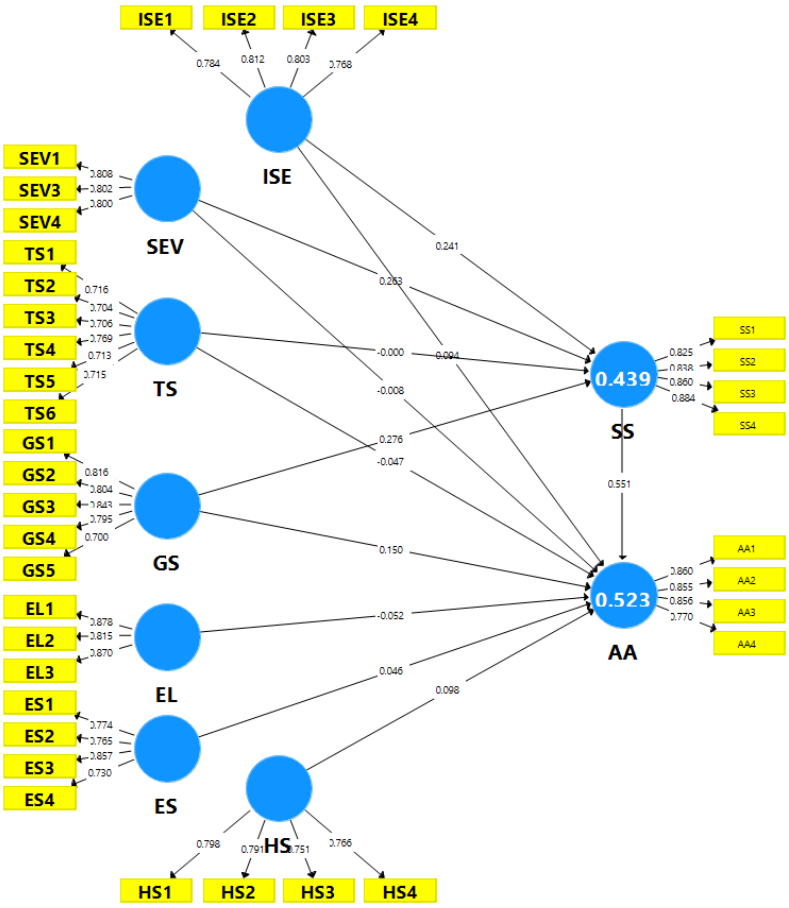

Fig. 2. Measurement model assessment

5 Discussion

In contrast to previous findings (e.g.,[19][36][49][63]), the results of this study indicated that EL, ES and TS did not have an effect on AA and SS. EL involves the ability to make a connection between former knowledge and the current information. This technique seems not to be helpful for online learning, and so should not be employed for online learners. Surprisingly, task strategies did not work for online learners of this study. That the participants from the four different universities were not satisfied with their grades was a matter to concern. It can be inferred that the testing may not have gone hand in hand with the learning and teaching. This study lends support to previous studies [36][56]. These studies indicated that low-engaged students seemed to be inactive in their learning, and so low interest in learning online as well. This could be a plausible explanation for this study's result. However, confirmation of this reason is beyond the scope of this research.

Goal setting strongly influenced AA and SS in this study, which was also supported by previous studies [24][66][77][78] [75], whereas ISE was also consistent with findings from other research [29]. It can be inferred that helping students with Internet skills could enhance their involvement in online learning, and so boost their satisfaction and/or learning performance.

In contrast with the previous study [49], this study confirmed a positive impact of HS on AA. This result resonates with other research [67]. In a similar vein, SEV had an indirectly positive influence on AA and SS, which lends support to previous research [49], but it does not predict student satisfaction in online learning setting.

Satisfaction had a great influence on achievement in online learning which was tied well with recent prior studies (e.g., [17]). Most respondents supposed online learning was interesting, enjoyable; and they would attend online learning courses continuously. This finding implies pedagogical implications for instructors as well as universities to pay heed to factors promoting students' satisfaction in their learning process.

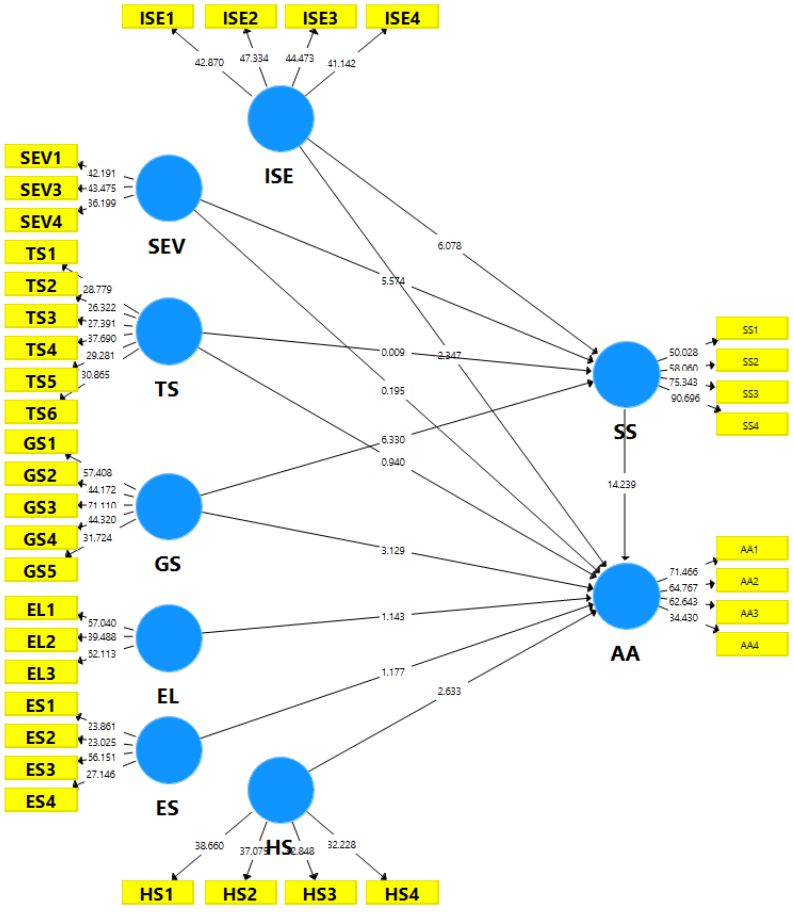

Fig. 3. Structural model assessment

6 Conclusions and limitations

The results confirm the impact of Internet self-efficacy on student satisfaction and academic achievement, as well as the roles of assistance factors during the student online learning process. Learning online is still in its infancy and students still fumble with this learning mode. Finding factors to enhance their Internet self-efficacy and provide aid during their online study are crucial to their satisfaction and academic outcomes. Hence, this study provides pedagogical implications for universities, educators, and instructors in implementing online courses. To the author's knowledge, this is the first study examining the combined effect of Internet self-efficacy and self-regulated learning on student satisfaction and academic achievement through the application of PLS-SEM techniques.

The current study acknowledges three limitations. Firstly, the employed self-reported survey questionnaires may be associated with overestimation and/or underestimation of respondents [70]. Secondly, the NFI index is not qualified, further studies can conduct more observed variables in the model to achieve a higher model fit. Finally, this study utilized a single design, namely quantitative method, which limited its deeper understanding of students' perception toward their perceived Internet self-efficacy, self-regulated learning in distance learning. It is recommended that qualitative data be conducted simultaneously in the future to better understand what factors adding to their satisfaction in online learning environment.

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