



Students' Perception of Higher Institutional Support Towards Online Learning Satisfaction: The Mediating Effect of Self-regulated Learning

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Abstract. The emergence of the COVID-19 pandemic has altered the global educational process. Many higher education institutions (HEIs) have quickly shifted the learning mode from physical classrooms to online platforms. Undoubtedly, self-regulated learning (SRL) is the key element that influences student satisfaction in online learning, yet students frequently struggle with the notion of online learning. Thus, it is crucial for learning institutions to facilitate and support their SRL skills. This study aims to examine the influences of perceived institutional support on students' online learning satisfaction. SRL is served a mediating role. The stimulus–organism–response (S-O-R) model was adopted to support this study. A total of 420 students from private HEIs have voluntarily taken part in the online survey. By using structural equation modelling (SEM) together with bootstrapping, the results proved that students who perceive greater institutional support reported higher online learning satisfaction. Further, institutional support does affect students' SRL, which in turn affects the level of online learning satisfaction. This implies that it is important for students to integrate SRL into online learning environments to improve their satisfaction. The study is significant for educational institutions to improve the platform design, pedagogical practice, and online course design in the future.

Keywords: Learning satisfaction · Institutional support · Self-regulated learning · S-O-R model · Online learning · Higher institutions

1 Introduction

Conventional face-to-face teaching had been the primary mode of course delivery in Malaysian higher education institutions (HEIs) prior to the COVID-19 pandemic (Tukiman et al., 2020). The outbreak of the disease has subsequently transitioned instruction delivery into a new normal in which online learning has become the predominant approach for all educational institutions around the world. Likewise in Malaysia, the learning environment has changed abruptly, and students are attempting to use multimedia tools for learning (Yang et al., 2021). Although online learning is not new in HEIs, students engage in intensive online study for the first time in a socially isolated condition.

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Online learning is considerably different from traditional education. Traditional face-to-face classes have fixed times for learners to attend and receive teaching content in the classroom. For online learning, learning resources are often kept online and made available for use whenever needed with limited time constraints. Students decide “when” and “where” they access and process content. Thus, the form of self-regulation is required to achieve the learning objectives as defined by the students or instructors for the corresponding online courses (Pedrotti & Nistor, 2019). This is because online learning demands learners to handle more responsibility for their learning behaviours without instructors' direct supervision (Artino, 2008; Barnard et al., 2009; Langegård et al., 2021; Szopiński & Bachnik, 2022).

Nonetheless, many students experienced difficulties to regulate their time, attention, and effort. They claimed that they were not as motivated to study when switching to online learning mode (Trout, 2020). Students' mental health and learning engagement also declined significantly due to difficulties in managing resources, and their overall educational experience suffered dramatically (Biwer et al., 2021). As such, educational institutions must unpack the question of whether students are satisfied with the online learning mode. Besides, institutions should put on the best practices in online teaching and course design (Wandler & Imbriale, 2017). This is because they play an important role to facilitate the students' satisfaction with online learning process (Razinkina et al., 2018). By providing students the support to promote their self-regulated learning (SRL) during the online learning process, they will become more engaged and successful due to having positive educational experiences.

2 Literature Review

Several studies on online learning had previously been performed to explore students' interaction, self-regulation, readiness, engagement, performance, satisfaction as well as acceptance and use of online learning (Aguilera-Hermida, 2020; Hamdan et al., 2021; Rafique et al., 2021; Rajabalee & Santally, 2020). However, there is little literature on institutional support that influences SRL and students' satisfaction in online classes (Zhou et al., 2021). Past research examines the influences of the social support system and interaction on learning satisfaction (Zhang et al., 2021). From an online learning perspective, this gap appears to be more obvious. Hence, the current study objective is to highlight institutional support, showing how the stimulus-organism-response (S-O-R) model may be utilised to examine students' online learning satisfaction.

2.1 Theoretical Background

The S-O-R model was created by Mehrabian and Russell (1947) for environmental psychology to explain the above relationships. To determine the outcome of an event, the S-O-R model relied on three key elements: stimulus, organism, and reaction. This model described those stimuli (S) as environmental factors that trigger cognition and emotion of humans (O), which then influence their behavioural responses (R) (Mehrabian & Russell, 1947). In short, the model stated that psychological changes or behavioural responses of an individual are triggered by external factors. Subsequently, the individual

processes this stimulus inductively and adapts the psychological interaction to result in the desired response (Zhang et al., 2021).

Many scholars had developed S-O-R models in accordance with situational circumstances. The S-O-R theory is applicable to this study as it has been used widely to study online learning (Khan et al., 2017; Ngah et al., 2022; Yang et al., 2021; Zhai et al., 2020). For instance, Khan et al. (2017) used the S-O-R model to describe the decision-making process of university students to adopt a learning management system (LMS) by incorporating system atmospheric and interpersonal factors as stimuli. The stimulus in the study contributed to creating a flow experience in the minds of students for the adoption of the online platform for learning interaction. Further, Yang et al. (2021) also conducted research that drew on the S-O-R model to explain e-learning student engagement. The study proposed that stimuli of perceived control, peer referents, and perceived closeness in e-learning positively affected learners' well-being and self-efficacy, thereby increasing their enthusiasm for learning. The S-O-R model also explained college students' e-learning engagement during the pandemic period. Zhai et al. (2020) also asserted that the S-O-R theory is well applicable to online learning environments when discussing students' behaviours.

2.2 Conceptual Framework

The S-O-R theory is adapted to this study as it is supple enough to allow researchers to create their own models depending on their research context as long as they maintain the original S-O-R idea (Ngah et al., 2022). The researchers introduced the S-O-R model and stipulated institutional support as a stimulus (S) since it comes from students' learning environments. Institutional support acts as an external environment that will influence students' SRL (O) as it is the students' cognition or emotions which are associated with their responses. Lastly, online learning satisfaction was the response (R) of students.

Figure 1 indicates the proposed conceptual framework concentrates on how perceived institutional support improves the level of online learning satisfaction, and how

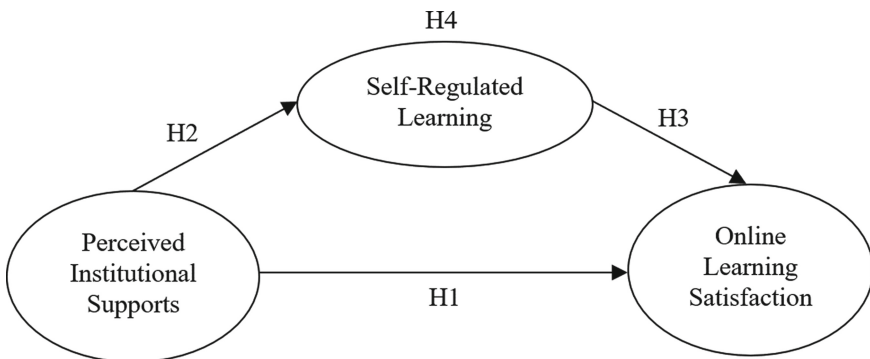


Fig. 1. Proposed Conceptual Framework

SRL mediates the relationship between perceived institutional support and online learning satisfaction. This study also includes institutional support in the model as an environmental stimulus and assumes that perceived institutional support is relatively associated with the SRL of students, which in turn affects students' online learning satisfaction.

2.2.1 Online Learning Satisfaction

The success or failure of online education largely depends on how satisfied students are with their education. Online learning satisfaction was learners' level of pleasure and fulfilment with various aspects of learning services obtained in an online learning course. Additionally, it was also referred to as their perceived value of online education and online course experience (Lim et al., 2020). Earlier research on online learning had indicated that satisfaction eventually enhanced online learning continuance intention, loyalty, performance, GPA, persistence, and retention (Gopal et al., 2021; Pham et al., 2019; Rajeh et al., 2021; Sembiring, 2015; T. Wang et al., 2021). To fulfil the learning needs of online students and establish an effective learning environment, an increasing amount of research had been done to examine the elements that affect online learning satisfaction.

In a sample of 588 students studying business or hotel management courses at Indian universities, Gopal et al. (2021) discovered that factors such as course design, quality of instructor, expectation of students, and prompt feedback positively affected students' satisfaction. Besides, Pham et al. (2019) investigated the e-learning service quality among 1232 college students at a university in Vietnam. The researchers discovered a positive association between student satisfaction and overall e-learning service quality in terms of the system, instructor, course materials, administration, and support. Other variables, such as online learning self-efficacy (Aldhahi et al., 2021), interaction in the classroom (Baber, 2020), the Internet, motivation, self-motivation, loss of interest, use of online exams for assessment, class time, and platform (Basuony et al., 2021) had been found to significantly influence students' online learning satisfaction.

Among the several aspects that affect students' satisfaction with online learning, institutional support in an online programme can be viewed as the main element. Although past studies had proven the positive effect of institutional support on student satisfaction (Amoozegar et al., 2017; Ayuni & Mulyana, 2019), the mechanism underlying this relationship has not received adequate attention in the literature. As specified by Wong et al. (2019), an important factor for learners' online learning success was their ability to self-regulate their own learning. Therefore, the current study built an S-O-R model by arguing that students' SRL in online learning can explain the relationship between perceived institutional support and their learning satisfaction.

2.2.2 Perceived Institutional Support

In online learning, perceived institutional support was the support that values the interaction and involvement of instructors and students via a system (Khan et al., 2017). Institutional support in the current study was the resources, opportunities, privileges, and services offered by an educational institution to its students (Stanton-Salazar, 2011).

A high-quality teaching and learning experience in online programmes at a HEI required comprehensive institutional support services that were purposefully designed and available for online education, similar to the kinds of well-established services available to on-campus students (Pedro & Kumar, 2019). Ahmed et al. (2014) explored the influence of perceived institutional support on teachers' responsive behaviour and students' satisfaction and performance, and they discovered that perceived institutional support positively affected students' satisfaction and performance. Besides, Amoozegar et al. (2017) exposed the impact of institutional support such as technical, administrative, and university support on online course satisfaction at research universities in Malaysia. Researchers revealed that institutional support was a strong factor that was positively and significantly related to online course satisfaction.

Furthermore, Ayuni and Mulyana (2019) conducted a study regarding the significance of institutional support and outcome value in the online learning context. According to the findings, service quality, which included support service, administration service, system quality, and teaching quality, directly influenced student satisfaction toward experience, learning process, and usage of the online tutorial. Students were highly satisfied with the online tutorial programme because the institution provided an easy-to-use user interface navigation, a good online tutorial programme design, online library services, real-time interaction tools, and quick response in handling technical problems and complaints, etc. Pedro and Kumar (2020) also designed some frameworks regarding institutional support for quality online teaching which can improve students' online learning experience. The frameworks included specific forms of administrative and academic support for online students, for example, online tutoring services, online library support services, special needs support, and others.

Based on the above discussion, institutional support is assumed to enhance students' satisfaction with online learning. Hence, the hypothesis is proposed:

H1: Perceived institutional support has a significant and positive effect on online learning satisfaction.

2.2.3 Self-regulated Learning

Due to the high degree of learning autonomy and the physical absence of instructors in online learning, students must quickly become masters in managing their own learning processes. As stated by Zimmerman (2015), "self-regulated learning involves metacognitive, motivational, and behavioural processes that are personally initiated to acquire knowledge and skill" (p. 541). Self-regulation processes were referred to as the "self-initiated cognitions or emotions that can affect learning and performance positively or negatively, such as setting effective or ineffective goals" (p. 541). Some of the other important self-regulatory processes that influence learning outcomes include modification of learning strategies, goal setting, time management, resource-oriented learning, self-monitoring, self-reflection, help-seeking, and regulation of feedback (Barnard-Brak et al., 2010; Rowe & Rafferty, 2013).

These behaviors include but are not limited to goal setting, time management, task strategies, environment structuring, and help-seeking.

The self-regulation aspect had attained great importance in online learning literature (Barnard et al., 2008; C.-H. Wang et al., 2013; Zhu et al., 2020). Thus, SRL was seen as an important factor in successful online learning. For example, Hsu et al. (2009) studied how students self-regulated their learning in an online class and exposed that the physical environmental factors (e.g., grade book, online calendar, and course content in various digital formats) strongly influenced students' SRL behaviours (e.g., planning and note-taking). Besides, the social environmental factors (e.g., instructor response/feedback) also influenced students' behaviours (e.g., asking questions) in the context of the online Class Help Desk. Liaw and Huang (2013) also demonstrated that students' SRL can be fostered by creating an interactive online learning environment to stimulate learning motivation. In addition, Wong et al. (2019) discovered that providing students with support such as an integrated support system, feedback, and prompts can foster their SRL in online learning.

In the study of Zhao and Chen (2016), they conducted a comparative study at two universities to figure out the association between the e-learning environment and students' self-regulation. The findings indicated that e-learning environment factors such as communication quality and information quality significantly influenced students' SRL in both universities. By using user satisfaction and communication quality as the mediating variables, service quality, and system quality also had an impact on self-regulation. Additionally, both universities offered first-year students with extensive individualised support and tutorship in terms of study guides, which improved first-year students' SRL in online learning contexts.

Accordingly, SRL is employed as a critical ability that students may develop through external stimuli such as institutional support during the online learning process. Thus, the hypothesis is proposed:

H2: Institutional support has a significant and positive effect on SRL.

In an online learning setting, understanding how SRL affects student satisfaction is vital since the nature of online learning demands students stay disciplined and motivated (Lim et al., 2020). SRL skills are seen as vital in an online learning environment, as students who regulate various learning strategies can increase their chance of success and overall satisfaction in online learning. These learners are more skilled in regulating and adapting their learning process to suit various learning settings.

Puzziferro (2008) discovered that students with high levels of self-regulated expressed better online course satisfaction than those in the lower SRL group. C.-H. Wang et al. (2013) also indicated that SRL which included motivation and learning strategies predicted course outcomes such as course satisfaction and achievement in online learning. Ejubović and Puška (2019) proved that SRL factors such as environment structuring, social dimension, metacognitive strategies, and computer self-efficacy had positive influences on students' satisfaction and academic performance in an online setting. According to Zalli et al. (2019), SRL strategies that included planning, time management as well as self-evaluation significantly impacted the learning satisfaction of students in a Massive Open Online Course (MOOC). Similarly, Lim et al. (2020) investigated 497 undergraduate students taking blended learning courses and found that SRL abilities attributed to online learning satisfaction. Since students' SRL is crucial for

predicting online learning satisfaction (Zhou et al., 2021), online learning satisfaction will be the intended response influenced by SRL in this study. The following hypothesis has been made according to the above discussion:

H3: SRL has a significant and positive effect on online learning satisfaction.

In congruence with the S-O-R model, the variable that represents the organism may also act as a study mediator. Thus, this research attempts to enhance the predictive power of the S-O-R model by including students' SRL as a mediator for the relationship between perceived institutional support and online learning satisfaction.

As emphasised above, Pintrich (2000) asserted that self-regulatory activities played a mediating role between environmental and personal factors as well as actual performance or achievement. In other words, it was not only the contextual aspects of the learning environment that influenced achievement, or just humans' personality, demographic, or cultural characteristics that directly affected achievement, but also the ability of the humans to self-regulate their motivation, cognition, and behaviour, which represented a mediator between the context, person, and achievement. Thus, Pintrich (2000) referred SRL to as "an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment" (p. 453). SRL implicated the basic cognitive system in this definition (Paul R. Pintrich & Zusho, 2002).

Previous research had also found that students preferred and were more satisfied with embedded asynchronous audio feedback as compared to text-only feedback in online courses (Ice et al., 2007). The feedback helped learners better understand their learning status, and thus students adopted self-regulate strategies to enhance their learning (Wong et al., 2019). It was also crucial for instructors to maintain participation and regular communication in classes, encourage student engagement, and design well-organised courses. This can improve students' perceptions of satisfaction and learning (Gray & Diloreto, 2016). Bojuwoye et al. (2014) also found that students explained their struggles when the environment was unfavourable for obtaining support. The researchers revealed that students received and utilised a variety of learning supports from their institutions, instructors, and classmates. The learning support helped students meet their social, emotional, and academic needs by removing learning barriers, fostering supportive learning environments, raising students' self-esteem, and boosting their academic engagement and performance. Since self-regulated learners were regarded as actively engaged in the learning process (Wolters & Taylor, 2012), students with high levels of self-regulation are often more autonomous in regulating their learning, increasing their chance of succeeding in online classes. This is further reflected in learning satisfaction. Therefore, in this study, SRL is an important component in the S-O-R model, acting as the model's mediator and it is proposed that:

H4: SRL has a mediating effect on the positive relationship between perceived institutional support and online learning satisfaction.

3 Research Methodology

3.1 Sampling and Data Collection

Students enrolled in different private HEIs across Malaysia were the target population. There were 33 private HEIs involved in the research. An online survey was conducted between March 2021 to August 2021. A non-probability sampling technique where snowball sampling was applied to collect information from students. An online questionnaire was made available to respondents through Google Forms, a free Google application that allows researchers to conduct online surveys. The Google Form's URL was distributed to the students through online-based platforms such as WhatsApp, Facebook, and Microsoft Teams. The respondents were requested to share the online survey with their friends. Participants were informed that the online survey was totally anonymous and on a voluntary basis. Ultimately, 455 responses were collected. Incomplete online survey forms were removed from the dataset before the data analysis. The study yielded a total of 420 complete and usable responses. The profile of the respondents is shown in Table 1.

Table 1. Respondent Profile

Variable	Item	Frequency (N = 420)	Percentage (%)
Gender	Male	125	29.8
	Female	295	70.2
Age	18 years old and below	7	1.7
	19–22 years old	312	74.3
	23–26 years old	84	20.0
	27–30 years old	9	2.1
	31 years old and above	8	1.9
Level of study	Foundation	16	3.8
	Diploma	5	1.2
	Bachelor's degree	363	86.4
	Master's degree	30	7.1
	Doctoral degree	6	1.4
Internet connectivity	Excellent	30	7.1
	Fair	171	40.7
	Good	178	42.4
	Poor	34	8.1
	Very poor	7	1.7

3.2 Questionnaire Design

The questionnaire was made up of three different parts. The first part involved screening questions such as Yes/No questions to qualify respondents who were studying at a private HEI and had experience in online learning. In the second part, questions for demographic profiles such as the level of study, age, and gender were included to give a comprehensive picture of the different characteristics of the students. In the third part, items for measuring perceived institutional support, SRL, and online learning satisfaction were included.

3.3 Instrument Development

Several measurement items were adopted from past studies in this research to guarantee the validity and reliability of each construct. Perceived institutional support was measured with seven items according to the work of Hirner (2008). The sample item included “My university provides a technical support centre equipped with hardware, software and trained staff”. SRL was measured with six items from the work of Barnard et al. (2009). The sample item included “I set short-term (daily/weekly) goals as well as long-term goals (monthly/semester/trimester) from time to time”. Online learning satisfaction was measured with seven items, which were adapted from Bolliger and Halupa (2012). The sample item included “I am satisfied with my performance in online courses”. The wording of items for all three constructs had been slightly adapted to suit the current online learning context. Each item in the constructs was scored on a 5-point Likert scale, where “1” represented “strongly disagree” as well as “5” represented “strongly agree”.

4 Data Analysis and Results

This study presented the partial least square structural equation modelling (PLS-SEM) with the use of Smart PLS 4 software. Under educational research, PLS-SEM has become an essential multivariate statistical modelling method in online learning (Lin et al., 2020). The study involved the steps of first assessing the measurement model to explore the reliability and validity of the questionnaire and subsequently assessing the structural model to confirm the hypothesised relationships between the variables.

4.1 Measurement Model Assessment

Since all three constructs in this study were reflectively measured, the model was assessed on its internal consistency reliability and validity. The results for factor loadings for each construct, reliability, and convergent validity are exhibited in Table 2. Each construct's loadings were all higher than the suggested threshold of 0.60 (Chin, 1998), thus there was confidence that each item was accounting for estimating the underlying construct. Cronbach's alpha and composite reliability (CR) were utilised to assess the variables' reliability. Each value of Alpha and CR surpassed the suggested value of 0.700 (Hair et al., 2011; Nunnally, 1978), implying that all the constructs had internal consistency. With regard to the existence of convergent validity, it was supported because the Average

Table 2. Item Loadings, Reliability, and Convergent Validity

Constructs	Items	Outer loadings	Alpha	CR	AVE
PIS	PIS1	0.885	0.910	0.909	0.59
	PIS2	0.650			
	PIS3	0.781			
	PIS4	0.762			
	PIS5	0.726			
	PIS6	0.815			
	PIS7	0.737			
SRL	SRL1	0.675	0.863	0.863	0.512
	SRL2	0.641			
	SRL3	0.781			
	SRL4	0.714			
	SRL5	0.734			
	SRL6	0.740			
OLS	OLS1	0.814	0.919	0.918	0.617
	OLS2	0.763			
	OLS3	0.820			
	OLS4	0.780			
	OLS5	0.901			
	OLS6	0.781			
	OLS7	0.611			

Note. PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction, AVE = Average Variance Extracted, CR = Composite Reliability

Variance Extracted (AVE) values were all more than 0.50 (Table 2), meaning that all the constructs captured more than 50% of their indicators' variance. In this study, criteria suggested by Fornell and Larcker (1981) and Heterotrait-Monotrait Method (HTMT) were utilised to determine the discriminant validity. Under the Fornell and Larcker (1981) criterion, discriminant validity was established because the square roots of constructs' AVE were more than the inter-correlations of other constructs (Table 3). For HTMT, discriminant validity was established as well because the values of HTMT shown in Table 4 were lower than 0.85 (Henseler et al., 2014).

4.2 Structural Model Assessment

The paths hypothesised in this study were reflected in the structural model. R^2 is used to explain the variance of a dependent variable (Benitez et al., 2020) and should be greater than or equal to 0.1 (Falk & Miller, 1992). Table 5 presents the results of R^2 values of

Table 3. Discriminant validity (Fornell and Larcker criterion)

	PIS	SRL	OLS
PIS	0.768		
SRL	0.607	0.716	
OLS	0.635	0.647	0.786

Note. The diagonal values (in bold) refer to the square root of Average Variance Extracted, PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction

Table 4. Discriminant validity (HTMT)

	PIS	SRL	OLS
PIS			
SRL	0.602		
OLS	0.631	0.64	

Note. PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction

Table 5. Model Explanatory Power

Predictor(s)	Outcome	R²	f²	Q²
PIS	SRL	0.369	0.584	0.283
PIS	OLS	0.512	0.19	0.333
SRL			0.222	

Note. PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction

0.369 and 0.512 for SRL and OLS respectively, showing that the predictive accuracy of the model was established.

Furthermore, the f^2 effect size is utilised to show the effect of a predicting variable on the R^2 value of an endogenous variable. The present study showed that PIS predicted SRL, while PIS and SRL predicted OLS. According to Table 5, the relative effect sizes (f^2) of the predictors were calculated and indicated that PIS had a large effect on the SRL ($>.35$), while PIS and SRL had medium effects on OLS ($>.15$) (Cohen, 1988). Moreover, Q^2 measures the predictive relevance of the endogenous variables. If the Q^2 value is above zero, this indicates that the model can be predicted accurately (Hair et al., 2017). Table 5 exhibits that predictive relevance for the variables in this model was established as the Q^2 values were above zero.

In further assessing the goodness of fit, hypotheses were examined to establish the significance of relationships. Hypotheses testing results meant for direct relationships

Table 6. Results of Structural Equation Modelling

Hypotheses	β	t-value	p value	Result
H1: PIS -> OLS	0.383	5.555	0.000	Supported
H2: PIS -> SRL	0.607	13.288	0.000	Supported
H3: SRL -> OLS	0.415	5.936	0.000	Supported

Note. PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction

Table 7. Mediation Results

	Total effects		Direct effects		Indirect effects			
	β	t-value	β	t-value	Hypothesis	β	t-value	p value
PIS -> OLS	0.635	14.508	0.383	5.555	H4: PIS -> SRL -> OLS	0.252	5.725	0.000

Note. PIS = Perceived Institutional Support, SRL = Self-Regulated Learning, OLS = Online Learning Satisfaction

are summarised in Table 6. H1 evaluates whether PIS significantly and positively affects OLS. The results displayed that PIS had a positive and significant impact on OLS ($\beta = 0.383$, $t = 5.555$, $p < .001$). Thus, H1 was supported. Besides, H2 evaluates whether PIS significantly and positively affects SRL. The results disclosed that PIS had a positive and significant impact on SRL ($\beta = 0.607$, $t = 13.288$, $p < .001$), supporting H2. H3 evaluates whether SRL significantly and positively affects OLS. The results disclosed that SRL had a positive and significant impact of OLS ($\beta = 0.415$, $t = 5.936$, $p < .001$), supporting H3. Table 6 displays a summary of the hypotheses testing results.

4.3 Mediation Analysis

This study ran a mediation analysis to determine the mediating effect of SRL. H4 evaluates if SRL mediates the relationship between PIS and OLS. The results showed that PIS had a significant total effect on OLS ($\beta = .635$, $t = 14.508$, $p < .001$). After introducing SRL into the model, the direct effect remained positive and significant ($\beta = .383$, $t = 5.555$, $p < .001$). Additionally, including SRL in the analysis produced a significant indirect effect ($\beta = .252$, $t = 5.725$, $p < .001$). Thus, H4 was accepted since the results revealed that SRL had a partial mediating effect on the relationship between PIS and OLS. This showed that the effect of PIS on OLS was partially passed via SRL. Table 7 displays the mediation results.

5 Discussion

The present study applied the S-O-R theory to examine the indirect effect of perceived institutional support on online learning satisfaction with SRL as a mediator in private

HEIs. This research fills the theoretical gap in previous studies on student satisfaction in online learning contexts and will strengthen theoretical generalisations.

The current study has proven that perceived institutional support positively affected their online learning satisfaction (H1). This means that in an online environment, when students receive support services from their educational institutions, they feel satisfied with the online learning process. The findings are aligned with the previous study on online learning (Amoozegar et al., 2017; Ayuni & Mulyana, 2019; Pedro & Kumar, 2020). For instance, Ayuni and Mulyana (2019) revealed that the service quality provided to the students directly influenced their satisfaction with an online tutorial. Therefore, educational institutions should provide quality support to assist students in the online learning context. Institutional support such as a quality online system ought to be updated with the most recent information for educators to effectively share and deliver the content. Besides, technical support should be offered to handle technical problems and facilitate the student's learning process in online courses. Without obtaining proper support from the institutions, students will struggle and experience a poor online learning process, thereby they will be unsatisfied with online learning. Thus, educational institutions should actively encourage students to complete online courses and increase online learning satisfaction by providing quality services.

This study also showed that perceived institutional support positively impacted SRL (H2). These findings signal the importance of institutional support in improving students' SRL. The results supported earlier research's view that successful online learning environments created by institutions guided students' SRL process (Hsu et al., 2009; Liaw & Huang, 2013; Zhao & Chen, 2016). Therefore, educational institutions should create an effective online learning environment for students to promote students' SRL. For example, educational institutions have to ensure an interactive online learning environment where students and instructors can communicate and interact among themselves effectively. Instructors should respond to students' online inquiries so that students can review their current online learning state by receiving feedback from the instructor, thereby taking steps to improve their learning.

As for H3, results showed that students' SRL influenced their online learning satisfaction, consistent with the findings in previous studies (Ejubović & Puška, 2019; Lim et al., 2020; C.-H. Wang et al., 2013; Zalli et al., 2019). The findings indicate that learners with SRL characteristics carry more active and positive learning styles, are able to establish effective objectives, identify resources, select learning strategies, and evaluate their learning performances. Consequently, they will be satisfied with online learning. Thus, students need to plan and specify their objectives to self-regulate their learning in online courses. The students should effectively manage their time during their studies and evaluate their learning progress throughout the online courses to increase their satisfaction.

Additionally, including SRL as a mediator in the model has further helped in determining under what conditions the perceived institutional support could enhance students' online learning satisfaction. Regarding the mediation effect (H4), the present study established that students' SRL partially mediates the relationship between perceived institutional support and students' online learning satisfaction. This indicates that institutional support is essential in improving students' SRL, which in turn will

help boost student satisfaction with online learning. Thus, educational institutions must create high-quality learning content, help online students in making plans, establishing their learning goals and study time, and simultaneously offering students the instrument to assess their progress.

6 Implications

6.1 Theoretical Implications

Most previous research on the S-O-R theory has concentrated on the significance of environmental stimuli; however, few have examined the influence of institutional support. The mediator "SRL" also played an important role as an organism. This study sought to fill up the gap and enhance the model's applications. Thus, this study proposed a new S-O-R model to discuss the influences of the factors on online learning satisfaction during the pandemic. The application of institutional support as a stimulus mediated by a student's SRL is one of the first ideas presented in the online learning environment. Since online learning has become a new normal for Malaysian HEIs, it is significant to understand the causes that may affect students' satisfaction with online learning. This study revealed that institutional support can predict SRL and online learning satisfaction of students. Lastly, the study discovered that SRL mediates the relationship between perceived institutional support and students' online learning satisfaction.

6.2 Practical Implications

As COVID-19 has a long-term effect on changing education from face-to-face to online, the research intends to deliver practical inspiration for educational top management to implement more online learning practices in the future. For example, online learning becomes a complement to face-to-face learning. The findings also provided insights and recommendations on areas of further effort for educational institutions, especially in those linked to the improvement of quality support in the online learning context and development of students' SRL abilities. Since institutional support has been found to affect students' SRL and online learning satisfaction, educational institutions should concentrate on giving students more thorough support to facilitate different SRL strategies that result in improved metacognitive understanding and academic performance. Educational institutions should promote learning methods that encourage students to master and control their learning process. The instructors are also important to facilitate students' learning process. Examining what makes students satisfied with online courses enables educational institutions to strengthen the quality of online learning delivery. Thus, creating an effective learning environment is significant as it affects students' SRL and online learning satisfaction.

7 Limitations and Future Research

Although this study contributed to the literature on online learning satisfaction and the S-O-R theory, there are several limitations that need to be considered. Since this study was

only for private HEI students; therefore, future studies could involve students from other HEI in Malaysia to better explore students' online learning satisfaction. This research also found students were satisfied with online learning using the S-O-R theory. Thus, future studies can expand the framework by considering new contributing elements to better understand students' satisfaction when using online learning systems. Besides, although the perceived institutional support was constructed in the online learning environment with reference to the S-O-R model and extracted important learning theories, other motivation theories, like social-cognitive theory as well as self-determination theory, can further be applied to stimulate higher education students' learning and further understand their behaviour in an online learning environment. Therefore, future research can make use of a variety of theoretical models to pinpoint the applicable supports that affect students' SRL and satisfaction.

8 Conclusion

It is important not to underestimate online learning satisfaction during the outbreak of COVID-19. The majority of educational institutions utilise online learning systems to continue the educational process. Given the present COVID-19 situation, this study sheds some light on the literature regarding students' online learning satisfaction by offering empirical information on the elements supporting online learning satisfaction among higher education students. By using SRL as a mediator, this study presented a framework in line with the S-O-R theory to determine the impact of perceived institutional support on online learning satisfaction among higher education students. Moreover, the results revealed that SRL can account for the relationship between institutional support and online learning satisfaction among private higher education students. This research contributed to a comprehensive understanding of the differences found in the literature regarding the effectiveness of institutional support on students' SRL to improve their satisfaction with online learning. For educational institutions, the findings are able to benefit instructors, administrators, and course designers because they can improve online course designs, pedagogical practices, and platform settings that make online classes more satisfying in the future.

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