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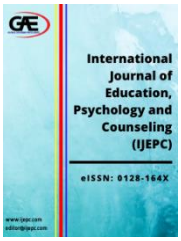

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INVESTIGATING THE RELATIONSHIP BETWEEN SELF-EFFICACY AND STUDENTS' LEARNING SATISFACTION WITH THE ONLINE LEARNING ENVIRONMENT

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Abstract:

Online learning has become important in education because of the changes brought about during the COVID-19 pandemic. The change in the conventional way of face-to-face learning to online learning also affects the satisfaction of learning for students. Therefore, this study aims to determine the relationship between student satisfaction and self-efficacy in online learning, and to examine the self-efficacy factors that most influence online learning satisfaction. A sample of 187 students from Diploma in Computer Science course was selected to complete an online survey questionnaire. The survey used in this study consists of an online learning self-efficacy questionnaire and an electronic learning satisfaction questionnaire. Data was analyzed using SPSS statistical tools. Descriptive statistics, including means and standard deviations, were used to summarize and describe demographic data. In addition, correlation analysis is used to find out the relationship between variables while regression analysis is used to analyze which factors most influence online learning satisfaction. The results show that all three factors

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show a significant relationship. This means that self-efficacy in learning, time management, and technology play an important role in student satisfaction in online learning. Meanwhile, self-efficacy in learning is the factor that most influences online learning satisfaction.

Keywords:

Online Learning, Learning Satisfaction, Self-Efficacy

Introduction

In 2020, the world was attacked by a virus called the coronavirus disease (COVID-19). The COVID-19 declared as a pandemic by the World Health Organization has affected all sectors including education. The COVID-19 pandemic has led to a global transition to online learning, introducing new challenges in education, particularly in sustaining student engagement and satisfaction. Self-efficacy is vital in determining how students manage online learning environments. Higher self-efficacy levels are associated with increased learning satisfaction, motivation, and academic achievement. However, inequalities in digital access, technical skills, and learning conditions intensify the obstacles students encounter, especially in underdeveloped areas. Understanding the relationship between self-efficacy and student satisfaction is essential for improving online learning experiences worldwide (Omotoy, 2023).

Advances in technology have driven the evolution of education towards online learning. With advanced technology, learning can happen anytime and anywhere if an electronic device is accessible. The percentage of Malaysians using the internet rose from 84.2% in 2019 to 89.6% in 2020, while computer usage increased from 72.1% to 80% over the same period (Looi, 2021). Online learning is defined as a type of mobile learning through mobile computing devices (Almutairi et al., 2020). Online learning is also known by several terms such as virtual learning, e-learning, and internet learning (Suhandiah et al., 2022). Effective and successful implementation of online learning or e-learning can be achieved if students have a willingness to learn online (Al-Fraihat et al., 2017; Hung et al., 2010). The study conducted by Ilias and Fauzi (2023) aims to determine how COVID-19 has affected student's relationships between peers, lecturers, and parents during online learning.

In the implementation of online learning, it is important to evaluate student satisfaction to evaluate its effectiveness. Topala and Tomozii (2014) stated that learning satisfaction reflects the feelings of students and the satisfaction they feel from their learning experience. The level of satisfaction with online learning plays an important role in adopting online learning methods especially for higher education students (Zhu, 2012). A previous study by Ke and Kwak (2013) showed that student satisfaction is the main indicator of learning achievement and the success of online learning systems.

Besides online learning satisfaction, online learning self-efficacy (OLSE) also needs further clarification. According to Bandura (1997), self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments. Self-efficacy is a component in successful online learning consisting of at least three areas such as learning, technology and social interaction. However most existing studies of online self-efficacy focus only on the technological aspect (Shen et al., 2013). The concept of self-efficacy

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applicable in various areas such as e-learning, technology use, and time management, can be influenced by educational factors (Aldhahi et al., 2022). Zimmerman and Kulikowich (2016) developed the online learning self-efficacy scale (OLSES) to measure online learning self-efficacy for students with and without online learning experience because it is not only focused on technology use.

It is important for policymakers, institutions, students, and academics to understand the goal of Malaysian higher education institutions to continually adopt online learning platforms. Therefore, the purpose of this research is to identify the relationship amongst the three factors of online learning self-efficacy including learning, time management, and technology and online learning satisfaction, and to examine which online learning self-efficacy factors that influence the most on online learning satisfaction.

Literature Review

Online Learning Satisfaction

The global pandemic of COVID-19 necessitated lockdowns in many countries, forcing educational institutions to switch to online learning modalities including Malaysia. Affected by this situation, the educational system in Malaysia has evolved from a traditional approach to an online distance learning (ODL) model. ODL is a form of virtual education facilitated through the internet and various technological devices, including computers, laptops, notebooks, tablets, and smartphones (Crow and Murray, 2020). In determining the success of online learning, learning satisfaction is the most critical indicator that needs to be measured. It is influenced by users' perceptions of course usability, the website platform's quality, and the expected achievement level (Roque-Hernández et al., 2023).

Challenges encountered by students in online courses include issues related to digital literacy, conceptual understanding, technical problems, and ease of access (Gillett-Swan, 2017). Susanti et al. (2020) proposed that online learning should combine more creative and engaging approaches, as well as easy to understand methods, to improve students' learning effectiveness. To enhance student learning satisfaction, educators should present digital content in an engaging and effective way while encouraging positive communication in the virtual classroom (Muhibbin et al., 2022). Moreover, universities and educators should implement strategies to improve the quality and students' satisfaction with online learning. This can be achieved by organizing seminars, webinars, or workshops to educate both lecturers and students on effectively using online technologies and platforms (Mohd Noor, 2023).

Online Learning Self Efficacy – Learning

Online learning self-efficacy refers to an individual's belief in their ability to succeed in specific situations or accomplish a task required of online learners. Bandura's social cognitive theory identifies academic self-efficacy as an important component of the learning system that significantly impacts an individual's development (Bandura, 1986). Sriwiyanti and Yusoff (2021) revealed that self-efficacy is an important variable affecting student engagement in learning. Enhancing students' self-efficacy in academic skills leads to increased participation and positive attitudes toward the online learning environment. This is also confirmed by Womble (2008) that self-efficacy significantly predicts students' learning satisfaction within online learning environments.

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Cho and Jonassen (2009) identified two dimensions of online self-efficacy, namely self-efficacy in interacting with instructors and self-efficacy in contributing to the online community. Their research shows that students with high levels of self-efficacy tend to use active interaction strategies, including writing, responding, and reflecting. According to Liu and Duan (2022), various factors can significantly enhance an individual's cognitive engagement in an online learning environment, including learner-related factors, peer-related factors, and technological factors.

Online Learning Self Efficacy – Time management

In online learning, self-efficacy particularly in time management is essential for a student's success. It requires having the confidence to manage time effectively and meet educational demands. There are some strategies of online learning self-efficacy related to time management. A study by Tsai et al. (2008) found that effective time management strategies, including goal setting, prioritizing tasks, and using calendars or planners are strongly associated with increased levels of self-efficacy in online learners. Students who employ these strategies are generally more confident in their ability to complete assignments on time.

Zimmerman et al. (1992) emphasized that to manage time effectively, students should set specific goals, attribute outcomes to strategy use, and feel confident to complete tasks within the given time. Poor time management, may reflect deficiencies in behavioral, environmental, or personal self-regulatory processes. In addition, Zimmerman et al. (1996) created a program aimed to assist students develop time management strategies to enhance their self-efficacy. Time planning and management were considered key components of their learning strategies instruction and were identified as a primary objective of the program.

Moreover, Terry and Doolittle (2008) examined the use of a web-based tool designed to boost student self-efficacy in a time management strategy. Their findings revealed that although the tool improved students' reported time management behaviors, there were no significant changes in student self-efficacy or self-regulated learning. Additionally, self-regulated learners with high self-efficacy typically demonstrate better time management skills and achieve higher academic performance (Zimmerman and Kitsantas, 2005).

Online Learning Self Efficacy – Technology

Concerns about online learning often revolve around technology. Some students worry about their own ability to navigate and effectively use new online tools and platforms, especially if they lack prior experience. This concern will influence their level of self-efficacy. According to Artino (2008), students who possess greater self-efficacy in computer-based learning tend to report higher levels of satisfaction with their learning experiences. Research by (Chen, 2014) declared there is a close connection between technology self-efficacy and students' academic performance and success in online settings. Moreover, Downey and Kher (2015) noted in their research that individuals with high technology self-efficacy are less likely to worry about using technology, allowing them to accomplish tasks more effectively with technological tools.

Technology self-efficacy involves students using technology tools to take charge of their learning process, either independently or with help. This includes identifying their learning needs, finding resources, setting learning goals, choosing learning strategies, and assessing their learning outcomes (Pan, 2020). Rahman et al., (2023) stated that technology self-efficacy can enhance students' confidence in achieving learning objectives. It involves an approach

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where students are motivated to take self-responsibility, monitor their own progress, and manage their learning processes to ensure successful outcomes.

Technology self-efficacy can influence students' perceptions on the usefulness (PU) and ease of use (PEU) of online learning, which is affecting its effectiveness. Previous research has identified both direct and indirect correlations between technology's PU, PEU, and technology self-efficacy. Abdullah and Ward (2016) demonstrated that technology self-efficacy directly contributes to building the correlation between PU and PEU. Furthermore, the research by Rezaei et al., (2020) stated that technology self-efficacy is one of the key criteria for explaining PEU which influences PU.

Numerous studies have demonstrated a positive relationship between self-efficacy and students' learning satisfaction in online environments. Research shows that students with higher computer self-efficacy has been identified as a significant predictor with online learning satisfaction and academic performance (Sang, 2023). Additionally, Aldhahi et al. (2022) found that both e-learning and time management self-efficacy have a direct impact on students' satisfaction with their online learning experiences, particularly during emergency transitions to remote learning. These findings are consistent with research by Wu (2023), which emphasizes the role of self-efficacy in predicting students' success in online learning environments.

Conceptual Framework

The conceptual framework shows the variables considered in this research study. The variables are the self-efficacy in learning, time management and technology as well as students' satisfaction with online learning. Figure 1 depicts the relationship between online learning self-efficacy and online learning satisfaction among students.

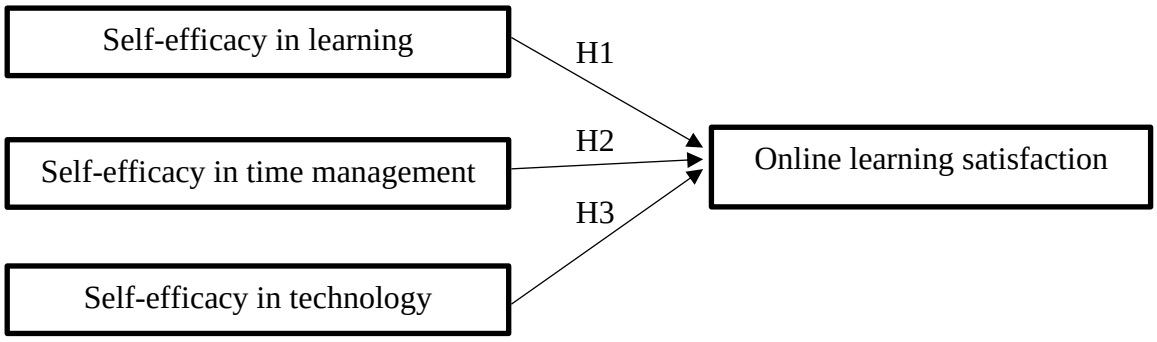

Figure 1: Conceptual Framework

The Present Study

Literature reviews indicate that various factors significantly impact students' satisfaction with online learning. Given that previous studies have explored different contexts, it is also crucial to examine students' satisfaction specifically in relation to online learning self-efficacy. This study intended to identify the relationship between self-efficacy focused on three factors (learning, time management, technology) and students' satisfaction with online learning. It also examined which self-efficacy factors that influence the most on online learning satisfaction. The findings of the analysis would answer the research question as follows:

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RQ 1: What is the relationship between self-efficacy in learning and online learning satisfaction?
RQ 2: What is the relationship between self-efficacy in time management and online learning satisfaction?
RQ 3: What is the relationship between self-efficacy in technology and online learning satisfaction?
RQ 4: What is the most significant self-efficacy factor that influences online learning satisfaction among students?

Based on the three factors online learning self-efficacy (learning, time management, technology) in OLSE questionnaire, the researcher developed three null hypotheses for this study. The summary of the hypothesis statement as follows:

Hypothesis 1: There is no significant relationship between students' self-efficacy in learning toward online learning satisfaction.
Hypothesis 2: There is no significant relationship between students' self-efficacy in time management toward online learning satisfaction.
Hypothesis 3: There is no significant relationship between students' self-efficacy in technology toward online learning satisfaction.
Hypothesis 4: There is no significant relationship between students' self-efficacy in learning, students' self-efficacy in time management and students' self-efficacy in technology toward online learning satisfaction.

Methodology

Data collection will be conducted using structured survey questionnaires and analysed using the Statistical Package for Social Sciences (SPSS) statistical tool. In this study, the dependent variables are online learning self-efficacy related to aspects of learning, time management and technology, and the dependent variable is students' satisfaction on online learning. Participants will provide ratings on their overall technology skills, time management and general perceptions of online education. Using the sample size formulas proposed by Krejcie and Morgan (1970), this study involves 187 respondents from a population of 367 Diploma in Computer Science students from Universiti Teknologi MARA, Kedah Branch.

Instrument

The study utilized a survey consisting of demographic information, an OLSE questionnaire adapted from studies by Zimmerman and Kulikowich (2016) and an e-learning satisfaction questionnaire by Wang (2003), which have been extensively used in related research. The survey was completed online via google form to rate 22-item instruments to assess the three domains related to OLSE such as self - efficacy in learning, time management, and technology. The scale items were measured using a five-point Likert scale, where 1 denoted "strongly disagree" and 5 denoted "strongly agree". Before the analysis, the instrument needs to be tested for the consistency or stability of measurement by using Cronbach's alpha test and normality test. Subsequently, quantitative data analysis will be conducted using statistical software packages known as Statistical Package for the Social Sciences (SPSS), commencing with descriptive analysis. This includes mean, standard deviation, and frequency distribution to summarise the data based on respondents' demographics, experiences online learning, and each factor related in this study. Then, the quantitative approach seeks to provide essential data for evaluating the self-efficiency factors that affect the online learning satisfaction among students.

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Analysis, Discussion and Findings

In this discussion, the findings obtained from the analysis based on the questionnaire were explained. In this part, the results were generated from the questionnaire derived from 187 respondents. The data were analysed using SPSS. The results of this study support that the relationship between self-efficacy positively affects the online learning satisfaction.

Reliability

Reliability was evaluated by assessing the internal consistency of the items representing each factor using Cronbach alpha. Table 1 represents the Cronbach alpha to validate the reliability of the questionnaire. The internal consistency of the questionnaire was sufficient, with 0.950, 0.936, 0.892, 0.968 and 0.976 for self-efficacy in learning, self- efficacy in time management, self-efficacy in technology and online learning satisfaction respectively. These results showed the instrument's reliability. Therefore, these questionnaires are reliable and valid.

Table 1: Reliability Test

Variables	No of Items	Cronbach's Alpha	Cronbach's Alpha Item Deleted
Online learning satisfaction	9	0.950	0
Self-efficacy in learning	10	0.936	0
Self-efficacy in time management	5	0.892	0
Self-efficacy in technology	7	0.968	0
All items	31	0.976	0

Descriptive Statistics

Table 2 indicates the demographic profile of 187 university students. Based on Table 2, the majority of students who participated in this research study are 107 (57.2%) males, while 80 (42.8%) are from the female group.

Table 2: Respondent's Gender

Gender	Frequency	Percent
Male	107	57.2
Female	80	42.8
Total	**187**	**100**

Table 3 presents the experience of online learning. All the participants have experienced online learning in their study life.

Table 3: Experience of Online Learning

Have you ever faced online learning	Frequency	Percent
Yes	187	100
No	0	0
Total	**187**	**100**

Table 4 provides the result of the mean and standard deviation for each group variable. Most participants agreed that self-efficacy in technology is the most influence factor during online learning with the highest mean 4.02. Second factor is self- efficacy in learning with a mean = 3.70 and lastly self- efficacy in time management with mean = 3.67.

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Table 4: Mean for each Group Variables

Variables	Mean	Standard Deviation
Online learning satisfaction	3.82	0.78
Self-efficacy in learning	3.70	0.75
Self-efficacy in time management	3.67	0.71
Self-Efficacy in technology	4.02	0.76

Correlation Analysis

This research used the Pearson correlation coefficient to find out the relationship between the variables. The strength of the relationship between independent and dependent variables is calculated. Table 5 demonstrates the correlations between independent variables, which are self- efficacy in learning, self-efficacy in time management, and self-efficacy in technology, and dependent variables, which is online learning satisfaction. The finding indicated that every independent variable and online learning satisfaction have significantly correlated. The relationship between all the independent variables and online learning satisfaction is 0.787,0.757,0.765 which indicates that there is a strong positive relationship between these four variables.

Table 5: Correlation's Result

	Online Learning Satisfaction
Online learning satisfaction	**1**
Self-efficacy in learning	**0.787****
Self-efficacy in time management	**0.757****
Self-efficacy in technology	**0.765****

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

Analysis of Variance

Table 6 shows R^2 value indicates that 71.8% of the variance in online learning satisfaction can be explained by self-efficacy in learning, self-efficacy in time management and self-efficacy in technology. Meanwhile, another 28.2% can be explained by other factors not included in this research.

Table 6: Model Summary

Model	R	R Squared	Adjusted R Squared
1	0.848	0.718	0.714

Table 7 highlights F-test value is 155.645 at significant level. Based on the result, the regression model was well fit, and the independent variables are useful in explaining the variance of the dependent variable

Table 7: ANOVA

Model	Sum of squares	df	Mean square	F	Sig.
Regression	81.221	3	27.074	155.645	<0.001
Residual	31.832	183	0.174		
Total	113.053	186			

a. Dependent variable: Online Learning satisfaction
b. Predictors: (Constant), Self-efficacy in Learning, Self-efficacy in Time Management, and Self-efficacy in Technology.

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Regression Analysis

In this study, the multiple regression analysis estimates the relationship between the two sets of variables that are the dependent variable (online learning satisfaction) and the independent variable (self-efficacy in learning, self- efficacy in time management and self-efficacy in technology). Table 8 concludes that all the independent variables influence the online learning satisfaction because the significance value is less than 0.00 for the independent variables. With a 1% increase in the self-efficacy in learning, time management and technology, the online learning satisfaction will increase by 0.354%, 0.295% and 0.331% respectively. From the table, the highest beta is self- efficacy in learning, which is 0.354, followed by self-efficacy in technology which is 0.331, and lastly is the self- efficacy in time management which is 0.295. Hence, the highest beta clarified the most influence factor between the other independent variables and dependent variables. As for this study, all three independent variables are significant. The regression equation is predicted (Online learning Satisfaction) = 0.094 + 0.354*(Self-efficacy in learning) + 0.295*(Self-efficacy in time management) + 0.331*(Self-efficacy in technology).

Table 8: Coefficients

Model	Unstandardized Coefficient		Standardized Coefficients	t-value	Sig.
	B	SE			
(constant)	0.094	0.177		0.530	0.597
Self-efficacy in learning	0.354	0.071	0.340	4.970	<0.001
Self-efficacy in time management	0.295	0.070	0.269	4.186	<0.001
Self-efficacy in technology	0.331	0.063	0.323	5.235	<0.001

a. Dependent variable: Online Learning satisfaction

Confirmation of Hypothesis

Table 9 summarizes the overall result for this research study. All hypotheses were rejected as the result showed at the p-value < 0.05 level of significance, all the variables positively affect students' satisfaction in online learning.

Table 9: Summarize Hypothesis Result

	Hypotheses	Decision
H1:	There is no significant relationship between students' self-efficacy in learning toward online learning satisfaction.	Rejected
H2:	There is no significant relationship between students' self-efficacy in time management toward online learning satisfaction.	Rejected
H3:	There is no significant relationship between students' self-efficacy in technology toward online learning satisfaction.	Rejected
H4:	There is no significant relationship between students' self-efficacy in learning, students' self-efficacy in time management and students' self-efficacy in technology toward online learning satisfaction.	Rejected

Conclusion

The three domains of OLSE revealed in this study consist of learning, time management and technology. All the factors played significant roles in influencing students' satisfaction during the transition conventional to remote learning. The results of this study indicate that self-

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efficacy in learning, self-efficacy in time management, and self-efficacy in technology were strongly correlated with online learning satisfaction. Of all the factors, the most important factor that influences online learning satisfaction according to the independent variables is self-efficacy in learning. Research by Shen et al. (2014) states students with various online courses are more likely to have higher online learning self-efficacy to complete an online course, but the online experiences are not significantly related. Gunawardena et al. (2010) found that online learning self-efficacy as the most significant factor influencing student satisfaction, a result that aligns with research by Aldhahi et al. (2022).

The findings indicate a self-efficacy in technology contributed to online learning satisfaction. These findings are consistent with a previous study by Getenet et al. (2024), which revealed that students with higher self-efficacy in digital literacy tend to experience greater satisfaction in online learning environments, as they feel more capable of managing the online learning process. Similarly, Li and Yang (2022) found that positive self-efficacy in using technology enhances students' motivation, which directly contributes to improved satisfaction in online learning. The research results highlight that students' self-efficacy in time management plays a significant role in their online learning satisfaction. The result is supported by earlier research by Fuzi et al. (2024), which found that self-efficacy in time management positively influences online learning satisfaction by enabling students to better organize their learning activities and meet deadlines efficiently. Time management self-efficacy is a significant predictor of online learning satisfaction, as students who are confident in their time management abilities tend to reduced anxiety and improved academic performance (Julaihi et al., 2022).

Our findings may also assist instructors and the education sector to provide proactive strategies and approaches to enhance all aspects of students' self-efficacy, thereby enabling them to adapt to the evolving online learning environment. Several limitations are presented in this study. First, the participants are asked to voluntarily participate in the survey, thus there might not be all of them take part in this study and it limits the generalizability of the results. Then, the respondents involved in this study are only focused from the same background of education and program studies. To improvise the study, participants from different programs or faculty should be considered before distributing the questionnaire.

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