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The Mediating Role of Self-Efficacy on Online Learning among Accounting Students

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ABSTRACT

This study examines the mediating role of self-efficacy in the effective online learning of accounting students. Specifically, this study examines whether self-efficacy can mediate the influence of student attitude towards online learning and course suitability for online learning in universities. This study uses a questionnaire distributed to students from public and private universities. Six hundred and sixty-two responses were received. Using mediation analysis, this study shows that self-efficacy serves as a mediator for the relationship between attitudes towards online learning and online learning. This study shows a significant direct influence between attitudes towards online learning and online learning. The results of this study indicate that the correlation between the appropriateness of the course and online learning is similar and has a statistically significant direct influence. This study also shows that self-efficacy partially complements the mediation of the correlation. The findings in this study provide additional insight into the various factors that can impact the effectiveness of online learning environments. These findings can assist universities in formulating strategies to optimise the content, activities, and assessments within such environments, thereby increasing their overall effectiveness. Furthermore, this study contributes to the existing literature by examining self-efficacy as a mediating role in an online learning environment in Malaysian universities.

Keywords: Attitude, Course Suitability, Online Learning, Self-Efficacy, Accounting
JEL Classifications: I2, M12, M41

1. INTRODUCTION

Advances in modern technology have led to changes in the methods by which information is disseminated and obtained. The spread of internet technology has significantly impacted educational institutions and the techniques of teaching and learning (Tauzalp and Bahcivan, 2020). Undoubtedly, technology has become an unstoppable catalyst for the development of conventional teaching and learning methods at many levels of the global education system. This is evidenced by the fact that universities within the education system have implemented and utilised various technologies such as artificial intelligence, big data, learning analytics, and cloud computing (Cheung et al., 2021). At the same time, online learning has become a significant trend in the education industry, especially in higher education, due to its remarkable development and the flexibility it offers. Students can conveniently access materials from anywhere in the world with a computer or mobile device and an internet connection. This allows for customisation according to the learner's own needs and preferences (Safsouf et al., 2020).

Studies have shown that the integration of technological devices into a challenging educational environment can lead to effective online learning (Yang et al., 2018; Safsouf et al., 2020; Ghani et al., 2024). An online learning environment allows students to conveniently access teaching materials and engage in interactions from any place and at any time. Online learning works like a system that provides timely learning recommendations, guidance,

and even support tools. Students are fully supported and receive personalised instruction that is specifically tailored to their individual requirements and pace of learning and aims to prioritise the learner by adapting learning paths (Safsouf et al., 2020). Online learning is also designed to facilitate the sharing of various communication technologies across different platforms (Onal and Ibili, 2017, Mohd Basar et al., 2021).

Universities have always made significant efforts to actively engage students in online learning, and the COVID-19 epidemic has amplified their considerable efforts (Fayez et al., 2021). However, there have also been complaints about poor internet connections, fatigue, limited social engagement, and insufficient technical skills, to name a few. The availability of distance learning resources and mastery of time management and technology could have a positive impact on an individual's academic performance in these circumstances (Taipjutorus et al.). Psychological considerations themselves can explain or justify a person's belief in their ability to perform certain activities. Self-efficacy serves as a reliable measure of academic performance and facilitates students' adaptation to new educational environments (Hayashi et al., 2004, Alivernini and Lucidi, 2011; Ratnawati et al., 2023; Al Ali and Wardat, 2024). Self-efficacy is widely recognised as a crucial psychological element that can change students' perceptions of the learning environment (Tauzalp and Bahcivan, 2020). It can be assumed that self-efficacy also has an impact on students' success in online learning.

The aim of this study is to investigate whether self-efficacy can mediate the effectiveness of online learning for accounting students. Specifically, the study investigates whether self-efficacy could act as a mediator between students' attitudes towards online learning and the suitability of the course for online learning in universities. The findings of this study can help Malaysian universities and academics develop effective online learning for accounting students. The next section, Section 2, provides a comprehensive literature review. Section 3 explains the research design used in this study, while Section 4 presents the results and discussion. The last section, Section 5, concludes this study.

2. LITERATURE REVIEW

The idea and concept of online learning have been a consistent subject of educational research for more than 20 years (Singh and Thurman, 2019). Online learning encompasses the broader field of distance education, which includes earlier technologies such as email courses, instructional television, and videoconferencing (Means et al., 2010). Cheung et al. (2021) define online learning as a learning environment that emphasises flexibility, effectiveness, efficiency, engagement, adaptability, and reflexivity. An online learning environment is a system that enables efficient and individualised learning by using various internet-connected devices (Hwang and Fu, 2018; Zhou and Wu, 2023; Wang and Dai, 2024), such as mobile phones and laptops, to enhance the teaching and learning process. Through the use of interactive and visual aids, the learning environment of the system is simple and tailored to the students' needs (Dhawan, 2020). Online learning can take place in synchronous or asynchronous situations. The synchronous learning environment is characterised by its organised nature, where students participate in live lectures, experience real-time interactions between lecturers and learners, and have the opportunity to receive immediate feedback (Ghani et al., 2024). In contrast, asynchronous learning environments are not sufficiently organised. In this particular educational environment, the learning material is not presented via live lectures or classrooms but via various learning platforms and forums (Oguguo et al., 2021). Immediate feedback and prompt responses are unattainable in such an environment. The integration of formal and informal learning approaches results in a versatile learning environment that provides students with fast and smooth experiences (Gros, 2016).

Teaching and learning in an online environment are very similar to processes in traditional educational environments. In both cases, teachers assess learners' needs, select subject matter, organise learning activities, and evaluate learning progress (Anderson et al., 2022; Tashtoush et al., 2023; Markonah and Kusnadi, 2024). However, the widespread influence of the Internet provides a very different setting for education and knowledge acquisition. The most intriguing aspect of this environment is its ability to change the temporal and spatial dimensions of educational work. In addition, the platform is able to accommodate many types of content, including multimedia, video, and text. This allows users to access teaching materials that utilise different media elements (Wilbert, 2014). The network's ability to retrieve extensive collections of information on a variety of topics, including content created by educators and peers, provides educational and study materials that were once found only in large research libraries and are now accessible in any home or workplace. The inclusion of multiple media and the ability for people and machines to interact, both in real time and at different times, create a communication-rich learning environment.

Perhaps one of the first studies on online learning was conducted by Choi et al. (2013). They focused on analysing students' perceptions of online learning in the context of university distance learning, specifically examining its definition, function, and values. A questionnaire study conducted among 1950 university students revealed that students perceive online learning as more engaging, interactive, and collaborative. In addition, it was found that students in their 40s and 50s, as opposed to students in their 20s and 30s, indicated that online learning was characterised by personalisation, human-like qualities, interactivity, convenience, stability, familiarity, less stress, and practicality. Safsouf et al. (2020) and Yang et al. (2018) have also investigated student satisfaction with online learning and whether it can lead to successful learning. Online learning is not only a system that allows students to access and engage with materials anywhere and anytime, but it also provides timely learning ideas, guidance, and resources. Online learning can be successful in universities when academics and students work together (Fayez et al., 2021). However, due to the limited bandwidth that restricts body language and paralinguistic cues, online learning cannot help to recognise students' biases and cultural viewpoints (Baruch, 2023).

Self-efficacy, an essential element of social-cognitive theory, refers to an individual's belief in his or her own ability to successfully

organise and execute the actions necessary to achieve a particular performance (Askar and Umay, 2001). Bandura (1977) defines self-efficacy as an individual's confidence in their ability to effectively carry out the necessary activities to cope with potential scenarios. The formation of an individual's perception of their ability to successfully carry out the necessary steps to achieve a particular goal can also affect their performance. Zimmerman (1995) highlights that self-efficacy refers to a person's assessment of their ability to perform a task and achieve favourable outcomes. Undoubtedly, self-efficacy is considered a crucial measure for evaluating the mastery of challenging activities that a person has not attempted before (Bandura, 1977). According to Shen et al. (2013), self-efficacy correlates not only with performance in online learning but also with students' previous online learning experiences and their gender. According to Lim (2001) and Azizi et al. (2022), there is a strong correlation between students' self-efficacy in computer use and their enjoyment and attitude towards future participation in online courses. In addition, Zimmerman and Kulikowich (2016) claim that students who have high levels of self-efficacy in online learning are more likely to succeed in online courses.

Studies have also shown that self-efficacy plays a decisive role as a psychological factor in online learning environments. One of the psychological factors is the students' attitude. Students' attitudes towards online learning can have a significant impact on the quality of the online learning environment. Several studies have been conducted to investigate students' attitudes towards online learning. For example, Adesanya and Odunola (2023) conducted a survey-based study to assess students' attitudes towards online learning. They found that students can effectively store, collect, modify, and evaluate data, leading to optimal pedagogical decisions. Since self-efficacy is known to influence students' academic performance, it could also play a role in influencing students' attitudes towards online learning. Ghani et al. (2024) conducted a questionnaire survey of 386 university students to determine whether students' attitudes can influence the online learning environment. Their study showed that there is a positive relationship between students' attitudes and the online learning environment. However, these studies did not investigate whether self-efficacy can influence the relationship between students' attitudes and the online learning environment.

According to the state of education research at this time, self-efficacy can mediate the effect of a course's suitability on the effectiveness of online learning. Gros (2016) emphasises the need to understand the educational environment, particularly how course design influences student action. Furthermore, identifying trends in student learning behaviour can be used to improve teaching and learning experiences in more constructive ways. Educators lack a comprehensive understanding of how to integrate the insights gained from learning analytics into their teaching practices to promote intelligent learning. Gros (2016) suggests that the field of learning design could provide a viable answer to this problem by enabling educators to effectively communicate the structure and goals of learning activities. Consequently, this may serve as a useful structure for examining data from learning analytics. Designing courses in a smart learning environment is crucial to enabling effective teaching and learning (Durall and Gros, 2014). However, there are few studies that have investigated the mediating role of self-efficacy on the impact of course suitability and online learning.

Figure 1 shows the research framework used in this study. Figure 1 shows that student attitude and course appropriateness can influence online learning. The framework also shows that self-efficacy can also influence online learning. This framework also emphasises the role of self-efficacy in mediating the relationship between student attitude and course availability for online learning. Based on this research framework, 7 hypotheses are developed as follows:

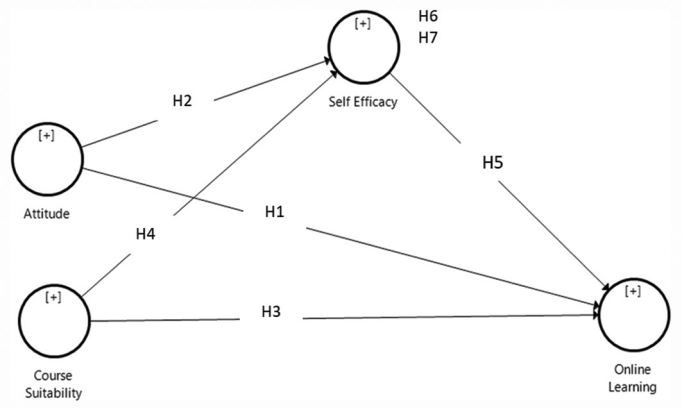
H1: There is a positive significant relationship between attitudes towards online learning and online learning among Malaysian universities students.
H2: There is a positive significant relationship between attitudes towards online learning and self-efficacy among Malaysian universities students.
H3: There is a positive significant relationship between course suitability and online learning among Malaysian universities students.
H4: There is a positive significant relationship between course suitability and self-efficacy among Malaysian universities students.
H5: There is a positive significant relationship between self-efficacy and online learning among Malaysian universities students.
H6: Self-efficacy will mediate the relationship between attitudes and online learning among Malaysian universities students.
H7: Self-efficacy will mediate the relationship between course suitability and online learning among Malaysian universities students.

3. RESEARCH METHODOLOGY

3.1. Sample Selection

Students from both private and public institutions in Malaysia were selected as participants for this study. The selection of these respondents is based on their eligibility, as they are individuals who are in a smart educational environment. In 2020, the total number of students in public and private universities in Malaysia will be approximately 592,680. According to the study by Krejcie and

Figure 1: Research framework



Morgan (1970), the recommended sample size for a population of 592,680 is 384 respondents. The respondents were selected on the basis of a random sample, regardless of the year of the study.

3.2. Research Instrument

In this study, the questionnaire was used as a research instrument. The questionnaire was developed based on a review of the literature. The questionnaire consists of eight sections. The first section contains demographic profile information about the respondents, such as age, gender, university, year of study, and cumulative grade point average (CGPA). In the second section, respondents are asked to share their experiences and satisfaction with the online learning platform. In the third section, respondents are asked to express their attitude towards online learning, such as whether it is easy to use, interactive, or enhances the learning process. In the fourth section, respondents are asked to give their opinion on the design and structure of the online course (suitability of the course). In the fifth section, respondents are asked to answer questions about their feelings towards the online learning platform used (feelings) and whether they feel comfortable and enjoy using the online learning systems. In the sixth section, respondents are asked to give their opinion on whether or not the online learning environment has improved their social relationships (social connection). In the seventh section, respondents are asked to indicate their satisfaction with the online learning systems (system satisfaction), e.g., whether they are well organised, flexible, and work well. Finally, in the eighth section, respondents are asked to indicate whether they are able to use online learning successfully (self-efficacy). This study uses a six-point scale from 1 (strongly disagree) to 6 (strongly agree). Table 1 summarises the sections of the questionnaire.

3.3. Data Collection

This study collected data from private and public universities in Malaysia by conducting a survey with a self-completed questionnaire. The surveys were sent to university students through various social networks, such as Facebook, WhatsApp, and Instagram. A total of 680 people participated in the survey. However, 8 responses were categorised as insufficient and excluded after the data was subjected to an outlier analysis. A total of 672 surveys were completed and found to be usable. The data was coded and analysed using PLS-SEM. According to Hair et al. (2014), the recommended rule for PLS-SEM is that the sample size should be ten times larger than the number of arrows pointing to a variable. This study has a total of 8 arrows pointing to the (endogenous) variables within the conceptual model. The requirement for the representatives would therefore be a total of 80 legitimate surveys. With a total of 672 responses, the sample size in this study clearly exceeds the required threshold.

4. RESULTS

4.1. Demographic Profile

Table 2 contains information that describes the participants in this study. Table 2 indicates that 74.4% of the participants are female, while the remaining 25.6% are male. The findings indicate that around 50% of the students are in their 3rd year, while 28.6% are in their 2nd year. Students in their 4th year and beyond constitute 8.0% of the overall student population, which is equivalent to the percentage of 1st-year students. According to the data shown in Table 2, 51.8% of the participants had a CGPA ranging from 3.00 to 2.49. Following that, 24.4% of the people own a CGPA ranging from 2.00 to 2.99. In addition, 23.2% of the participants possess a CGPA that surpasses 3.50, while the remaining 0.6% have a CGPA below 2.00.

4.2. Descriptive Statistics

Table 3 shows the descriptive statistics of students' attitudes towards online learning. In this study, there are eight statements related to students' attitudes towards online learning. Looking at the 8 statements, it can be seen that the respondents gave the highest mean score of 4.82 for the statement Att1, which says, "I find online learning easy to use." This is followed by the statement Att4, which says, "Using online learning is useful for teaching and learning" with a mean of 4.79, and the statement Att3, which says, "The online learning system provides all the necessary features that make learning easier for me" with a mean of 4.72. On the other hand, respondents gave the lowest mean for the statement Att2, which says, "Interacting with an online learning system does not require much mental effort from me" with a mean of 4.27.

Table 4 shows the descriptive statistics of course suitability and online learning. In this study, there are eight statements related to course suitability and online learning. Looking at the 8 statements, the results show that respondents gave the highest mean score of 4.79 for statement course7, which states: "The online learning system offers me different ways to access my learning (quizzes, written work, etc.)." This is followed by the statement Course6, which says, "The courses offered by the online learning system are accessible from anywhere" with a mean score of 4.74, and the statement Course5, which states, "The courses offered by the online learning system are available anytime" with a mean score of 4.67. On the other hand, respondents gave the lowest mean score for the statement Course1, which states, "The design of the online course is nice," with a mean score of 4.51.

Table 5 shows the descriptive statistics of self-efficacy and online learning. There are 21 statements on self-efficacy and online learning. Two statements received the highest mean, namely statement Exp9, which states "Learn to use a new type of technology effectively" and statement Exp13, which states "Browse the online course materials," both with a mean of 4.86. The second highest mean was given by the respondents for statement Exp12, which states "Search the Internet to find the answer to a course-related question," with a mean of 4.78. In addition, two statements received the third highest mean score from respondents, namely Exp16, which states "Complete a group project entirely online" with a mean score of 4.77. The statement Exp1, which states, "The online learning experience encourages me to take a new online course," received the lowest mean score at 4.34.

4.3. Measurement Model Analysis

The measurement model analyses the correlation between a hidden variable and its observable signs. This study then assesses the

Table 1: Questionnaire items

Category	Code	Statement
Section 1 Demographic		Age, Gender, University, Year of Study and CGPA
Section 2 Usage of online learning platform (Online Learning)	Exp1	The online learning experience encourages me to take a new online course.
	Exp2	I recommend other people to use online learning systems.
	Exp3	I am satisfied with my decision to take this online course.
	Exp4	I am satisfied with the performance of the online learning system.
	Exp5	I look forward to the experience of using the online learning system.
	Exp6	The online course contributed to the success of my training.
	Exp7	The online learning system helped me succeed.
Section 3 Attitude towards online learning (Attitude)	Att1	I find the online learning easy to use
	Att2	Interacting with online learning system does not require a lot of mental effort from me
	Att3	The online learning system provides all the required features which makes my learning task easy.
	Att4	The use of online learning is useful for teaching and learning.
	Att5	The online learning system has helped me increase my productivity.
	Att6	Using the online learning system allows me to learn quickly.
	Att7	I have confidence in the security level of the online learning system.
	Att8	I can count on the level of security offered by the system.
Section 4 Design and structure of online course (Course Suitability)	Course1	The online course design is nice.
	Course2	The design of the online course is attractive.
	Course3	The courses offered by the online learning system are rich in quantity.
	Course4	The courses offered by online learning system are always updated.
	Course5	The courses offered by the online learning system are available all the time.
	Course6	Courses offered by the online learning system are available from anywhere.
	Course7	The online learning system offers me different ways to access my learning (quiz, written work etc.).
	Course8	Diversity of evaluation allows me to obtain better results.
Section 5 Feeling towards online learning environment (Feelings)	Feel1	I feel comfortable with online learning environments.
	Feel2	I am more efficient in my learning when I use the online learning system.
	Feel3	Working on a computer/laptop makes me uncomfortable and stressed**
	Feel4	Using the online learning system makes me feel uncomfortable and stressed**
	Feel5	I find pleasure in using the online learning system.
	Feel6	I find it fun to use an online learning system.
Section 6 Perceptions that online learning environment improve social connection (Social Connection)	Social1	Using the online system has improved my social status.
	Social2	The online learning system gives me the opportunity to interact with my classmates.
	Social3	The online learning system gives me the opportunity to interact with my instructor.
	Social4	The communication tools in the online learning system are effective (chat room, email etc.)
	Social5	People who are important to me (family, lecturers or friends) think I should use the online learning system.
	Social6	People who influence my behaviour think I should use the online learning system.
	Social7	The people around me who use the online learning have more notoriety than those who do not use it.
Section 7 Satisfaction on the online learning systems (System Satisfaction)	Sys1	I am satisfied with the quality of the online system.
	Sys2	The quality of the online system influences my academic performance
	Sys3	The online learning system is well organised
	Sys4	I can easily find the required information on the online system.
	Sys5	The online system uses all the presentation modalities I need for my learning (text, figures, audio and video).
	Sys6	I have the possibility of using different devices to access the online course (computer, tablet and smartphone).
	Sys7	The online learning system provides the same functionality even if I use different devices.
Section 8 Students' belief in their ability to use online learning successfully (Self-efficacy)	Eff1	Navigate online course materials efficiently
	Eff2	Communicate effectively with my lecturer via e-mail
	Eff3	Communicate effectively with technical support via e-mail, telephone, or live online chat.
	Eff4	Submit assignments to an online drobox.
	Eff5	Overcome technical difficulties on my own.
	Eff6	Navigate the online grade book.
	Eff7	Manage time effectively
	Eff8	Complete all assignments on time.
	Eff9	Learn to use a new type of technology efficiently
	Eff10	Learn without being in the same room as the lecturer.
	Eff11	Learn without being in the same room as other students.
	Eff12	Search the Internet to find the answer to a course-related question.
	Eff13	Search the online course materials
	Eff14	Communicate using asynchronous technologies (discussion boards, e-mail, etc.)
	Eff15	Meet deadlines with very few reminders
	Eff16	Complete a group project entirely online.
	Eff17	Use synchronous technology to communicate with others (such as Skype).
	Eff18	Focus on schoolwork when faced with distractions
	Eff19	Develop and follow a plan for completing all required work on time
	Eff20	Use the library's e online resources efficiently.
	Eff21	When a problem arises, promptly ask questions in the appropriate forum (e-mail, discussion board, etc.)

**Items removed as part of the measurement model evaluation due to low factor loadings (<0.600)

accuracy and consistency of the constructs. Reliability refers to the assessment of the internal coherence of the constructs, while validity refers to the assessment of whether a scale accurately measures the intended concept. Reliability was assessed using Cronbach's alpha and composite reliability (CR). In this study, the criteria established by Hair et al. (2020) were used, which state that both Cronbach's alpha and CR should be above 0.7 and 0.708, respectively. Convergent validity and discriminant validity were used to assess construct validity. Convergent validity refers to the items that belong to the same concept, while discriminant validity refers to the items that belong to different constructs. Convergent validity assesses the extent to which an item that measures a particular construct correlates with other items that also measure the same construct. The measurement is determined using external loading and the average variance extracted (AVE). Hair et al. (2014) suggest that each item must achieve a minimum value of 0.708 in external loading to be considered appropriately loaded. However, items with an external loading value between 0.4 and 0.7 may still be considered retained if the AVE value is above 0.5. The results for internal consistency, reliability, and convergent validity, which are shown in Table 6, all achieved the required value.

Table 2: Demographic profile

Item	n	Percent
Gender		
Male	172	25.6
Female	500	74.4
Year of Study		
Year 1	54	8.0
Year 2	192	28.6
Year 3	372	55.4
Year 4 and above	54	8.0
CGPA		
Below 2.0	4	0.6
2.00-2.99	164	24.4
3.00-3.49	348	51.8
3.50-4.00	156	23.2

Next, discriminant validity was examined to determine whether an item designed to measure a specific construct does not correlate with items used to measure other constructs. It is tested using three approaches, namely cross-loading, in which the item loadings for the respective constructs are highest (Hair, Hollingsworth, Randolph & Chong, 2017), the Fornell and Larcker criterion (Fornell and Larcker, 1981), and heterotrait monotrait (HTMT), in which the value should be below 0.90.

In this study, discriminant validity was tested using Fornell and Larcker's criterion and the HTMT. The Fronell-Larcker criterion is one of the most frequently used techniques for testing the discriminant validity of measurement models. According to this criterion, discriminant validity is given if the AVE value is greater than the squared correlation coefficient with other variables on the diagonal (Hair et al., 2017; Nhan et al., 2022; Ahadin et al., 2023; Wu et al., 2023). This means that the square root of the AVE of a construct must be greater than the correlation between the construct and any other construct. As shown in Table 7, the AVE values for attitude (0.872), course suitability (0.922), online learning (0.938), and self-efficacy (0.882) are higher than the AVE values of the other constructs. The discriminant's validity is therefore given.

In addition, the HTMT was also used to assess discriminant validity, as suggested by Henseler, Ringle, and Sarstedt (2015). Table 8 shows that all HTMT values were <0.90. Therefore, the discriminant validity of the model is adequate. It can be concluded that both the convergent and discriminant validity of the measurement model can be demonstrated for the variable scale used in this study.

4.4. Multicollinearity and Model Fit

Before evaluating the structural model, the presence of multicollinearity and model fit must be assessed. The calculation of the path coefficients linking the constructs is based on a series of regression analyses. Therefore, researchers must ensure that collinearity problems do not distort the regression results. The variance inflation factor (VIF) can be used to identify the problem

Table 3: Students' attitude on online learning and online learning

Code	Statement	Mean	SD
Att1	I find online learning easy to use	4.82	1.11
Att2	Interacting with an online learning system does not require much mental effort from me	4.27	1.28
Att3	The online learning system provides all necessary features which makes my learning task easy.	4.72	1.11
Att4	Using online learning is useful for teaching and learning.	4.79	1.11
Att5	The online learning system has helped me increase my productivity.	4.49	1.18
Att6	Using the online learning system allows me to learn quickly.	4.43	1.18
Att7	I have confidence in the security level of the online learning system.	4.49	1.20
Att8	I can count on the level of security offered by the system.	4.42	1.15

Table 4: Course suitability and online learning

Code	Statement	Mean	SD
Course1	The design of the online course design is nice.	4.51	1.04
Course2	The design of the online course is attractive.	4.53	1.05
Course3	The courses offered by the online learning system are rich in quantity.	4.59	1.03
Course4	The courses offered by online learning system are always updated.	4.62	1.07
Course5	The courses offered by the online learning system are available anytime.	4.67	1.09
Course6	The courses offered by the online learning system are accessible from anywhere.	4.74	1.08
Course7	The online learning system offers me different ways to access my learning (quiz, written work etc.).	4.79	1.07
Course8	Diversity of evaluation allows me to obtain better results.	4.63	1.08

Table 5: Self-efficacy and online learning

Code	Statement	Mean	SD
Exp1	The online learning experience encourages me to take a new online course.	4.34	1.25
Exp2	I recommend other people to use online learning systems.	4.51	1.18
Exp3	I am satisfied with my decision to take this online course.	4.52	1.17
Exp4	I am satisfied with the performance of the online learning system.	4.51	1.16
Exp5	I look forward to the experience of using the online learning system.	4.56	1.11
Exp6	The online course contributed to the success of my training.	4.49	1.16
Exp7	The online learning system helped me succeed.	4.49	1.20
Eff1	Navigate online course materials efficiently	4.65	1.02
Eff2	Communicate effectively with my lecturer via e-mail	4.48	1.12
Eff3	Communicate effectively with technical support via e-mail, telephone, or live online chat.	4.60	1.11
Eff4	Submit assignments to an online drobox.	4.71	1.07
Eff5	Overcome technical difficulties on my own.	4.55	1.07
Eff6	Navigate the online grade book.	4.56	1.05
Eff7	Manage time effectively	4.66	1.11
Eff8	Complete all assignments on time.	4.76	1.07
Eff9	Learn to use a new type of technology efficiently	4.86	1.03
Eff10	Learn without being in the same room as the lecturer.	4.71	1.12
Eff11	Learn without being in the same room as other students.	4.72	1.11
Eff12	Search the Internet to find the answer to a course-related question.	4.78	1.08
Eff13	Search the online course materials	4.86	1.03
Eff14	Communicate using asynchronous technologies (discussion boards, e-mail, etc.)	4.71	1.07
Eff15	Meet deadlines with very few reminders	4.69	1.06
Eff16	Complete a group project entirely online.	4.77	1.05
Eff17	Use synchronous technology to communicate with others (such as Skype).	4.70	1.05
Eff18	Focus on schoolwork when faced with distractions	4.57	1.09
Eff19	Develop and follow a plan for completing all required work on time	4.71	1.06
Eff20	Use the library's e online resources efficiently.	4.57	1.10
Eff21	When a problem arises, promptly ask questions in the appropriate forum (e-mail, discussion board, etc.)	4.65	

Table 6: Measurement model

Category	Code	Loading	Cronbach's Alpha	CR	AVE
Online Learning	Exp1	0.889	0.977	0.981	0.880
	Exp2	0.935			
	Exp3	0.956			
	Exp4	0.955			
	Exp5	0.942			
	Exp6	0.946			
	Exp7	0.941			
Attitude	Att1	0.865	0.954	0.962	0.760
	Att2	0.728			
	Att3	0.898			
	Att4	0.904			
	Att5	0.897			
	Att6	0.901			
	Att7	0.881			
	Att8	0.888			
Courses Suitability	Course1	0.897	0.975	0.979	0.851
	Course2	0.917			
	Course3	0.931			
	Course4	0.936			
	Course5	0.920			
	Course6	0.921			
	Course7	0.932			
	Course8	0.924			
Self-Efficacy	Eff1	0.887	0.986	0.987	0.777
	Eff2	0.845			
	Eff3	0.876			
	Eff4	0.866			
	Eff5	0.831			
	Eff6	0.870			
	Eff7	0.879			
	Eff8	0.916			
	Eff9	0.903			
	Eff10	0.880			
	Eff11	0.883			
	Eff12	0.857			
	Eff13	0.891			
	Eff14	0.905			
	Eff15	0.882			
	Eff16	0.896			
	Eff17	0.903			
	Eff18	0.876			
	Eff19	0.919			
	Eff20	0.850			
	Eff21	0.893			

Table 7: Discriminant validity using Fornell and Larcker

Variable	Attitude	Course Suitability	Online Learning	Self-Efficacy
Attitude	0.872			
Course Suitability	0.740	0.922		
Online Learning	0.739	0.780	0.938	
Self-Efficacy	0.732	0.814	0.791	0.882

of multicollinearity in the study. According to Hair et al. (2014), a VIF value of more than 5.0 indicates a potential collinearity problem. Table 9 shows that the VIF value for each construct is below 5.0, which means that there is no collinearity problem between the constructs.

Next, the model fit was tested in this study using two parameters: the standardised root mean square residual (SRMR) and the normed fit index (NFI). The SRMR is defined as the difference between the observed correlation and the correlation matrix implied by the model, with values of <0.08 (Hu and Bentler, 1998; Nordin et al., 2024; Khairuddin and Ishak, 2023) being considered a good fit. The NFI, on the other hand, is an incremental fit measure that calculates the Chi-squared value of the proposed model and compares it to a meaningful benchmark (Bentler and Bonett, 1980). NFI values above 0.8 usually indicate an acceptable fit. Table 10 shows that the SRMR value in this study was 0.037 (<0.08) and the NFI value was 0.839 (above 0.8), which means that the data fit the model acceptably.

4.5. Structural Model Analysis

After analysing the measurement model, this study examined the structural model to test all hypotheses, including the mediation

analysis. A structural model defines the relationship between the different constructs in a model. To evaluate the structural model, Hair et al. (2017) suggested looking at the R2, beta (β), and corresponding t-values via a bootstrapping procedure with a replicate sample of 5000. The results in Table 11 show that all hypotheses testing the direct relationship between the constructs are supported. The table shows that the relationship between attitude and online learning (β = 0.357, t = 4.907, P < 0.05), attitude and self-efficacy (β = 0.287, t = 4.040, P < 0.05), course suitability and online learning (β = 0.516, t = 7.178, P < 0.05), course suitability and self-efficacy (β = 0.602, t = 8.858, P < 0.05), and self-efficacy and online learning (β = 0.364, t = 4.681, P < 0.05) are positive and significant.

4.6. Mediation Analysis

Mediation occurs when a third variable (mediator) comes between two related constructs. This means that a change in the exogenous construct causes a change in the mediator variable, which in turn leads to a change in the endogenous construct in the PLS path model. The results of the PLS-SEM algorithm and the bootstrapping procedure in SmartPLS include the direct effect, the total indirect effect, the specific indirect effects, and the total effect. Therefore, it is possible to perform a mediator analysis (e.g., as suggested by Hair et al., 2014) and analyse both simple and multiple mediation models (i.e., parallel and serial mediation).

To analyse a mediator model and determine the type of mediation (full mediation, partial mediation, or no mediation), Zhao et al. (2010) propose a model as shown in Figure 2, which is also proposed by Hair et al. (2014) for PLS-SEM. H1 to H5 are hypotheses to test the direct relationship between the constructs, while H6 and H7 represent the indirect effect (mediating role) of self-efficacy. To analyse these two mediating relationships in this study, the significance of the indirect effects of attitude towards self-efficacy in online learning (H6) and course suitability towards self-efficacy in online learning (H7) was tested. Table 12 summarises the results.

This study concludes that self-efficacy mediates the relationship between attitude towards online learning and online learning (β = 0.104, t = 4.130, P < 0.05) (H6). The type of mediation is complementary partial mediation, as the direct effect between attitude towards online learning and online learning was also statistically significant (H1). Consequently, H6 is supported. There are similar results for the relationship between course suitability and online learning, where the direct effect was also statistically significant (H3). After mediation analysis, this study concludes that self-efficacy also partially mediates this relationship in a complementary manner (β = 0.219, t = 3.930, P < 0.05). Therefore, H7 is supported. The results of this study provide empirical support for the mediating role of self-efficacy in the model of online learning. More specifically, self-efficacy represents a mechanism underlying the relationship between attitude towards online learning and online learning, and course suitability and online learning.

Hair et al. (2014) also suggest that, in addition to the basic measurements mentioned above, researchers should also report the coefficient of determination (R2), predictive relevance (Q2), and effect sizes (f2). As Sullivan and Feinn (2012) noted, a P-value can inform the reader whether there is an effect, while R2 indicates the variance in each of the endogenous constructs. As a rule of thumb, R2 values of 0.75, 0.50, and 0.25 can be considered significant, moderate, and weak, respectively (Hair et al., 2014). When reporting and interpreting studies, both the substantive significance (effect size) and the statistical significance (p-value) are important results that must be reported.

As shown in Table 13, the R2 values indicate that attitude towards online learning and course appropriateness explain 70% of self-efficacy (R2 = 0.700), while attitude towards online learning, course appropriateness, and self-efficacy explain 71% of online learning (R2 = 0.707). Therefore, both results are significant. The predictive relevance (Q2) of the model was also assessed using the blindfolding procedure. According to Hair et al. (2013), predictive relevance is given if the Q2 value of the construct is above zero (Q2 <0). As shown in Table 13, self-efficacy (Q2 = 0.537) and online learning (Q2 = 0.613) each have acceptable values for predictive relevance. Consequently, it is reasonable to assume that the exogenous variables can predict the endogenous variables.

The effect size (f2) shows the significance of the exogenous variable that contributes to the dependent variable R2. Based on

Table 8: Discriminant validity using HTMT

	Attitude	Course suitability	Online learning
Course Suitability	0.76 3		
Online Learning	0.761	0.799	
Self-Efficacy	0.751	0.831	0.805

Table 9: Multicollinearity

Constructs	Online learning	Self-efficacy
Attitude	2.485	2.212
Course Suitability	3.421	2.212
Self-Efficacy	3.336	

Table 10: Model fit

Criteria model fit	Saturated Model
SRMR	0.037
NFI	0.839

Table 11: Results of hypothesis testing

H	Relationships	Beta	t-values	p-values	Decisions
H1	Attitude -> Online Learning	0.357	4.907	0.000	Supported
H2	Attitude -> Self-efficacy	0.287	4.040	0.000	Supported
H3	Course Suitability -> Online Learning	0.516	7.178	0.000	Supported
H4	Course Suitability -> Self-efficacy	0.602	8.858	0.000	Supported
H5	Self-efficacy -> Online Learning	0.364	4.681	0.000	Supported

Figure 2: Mediation analysis procedures

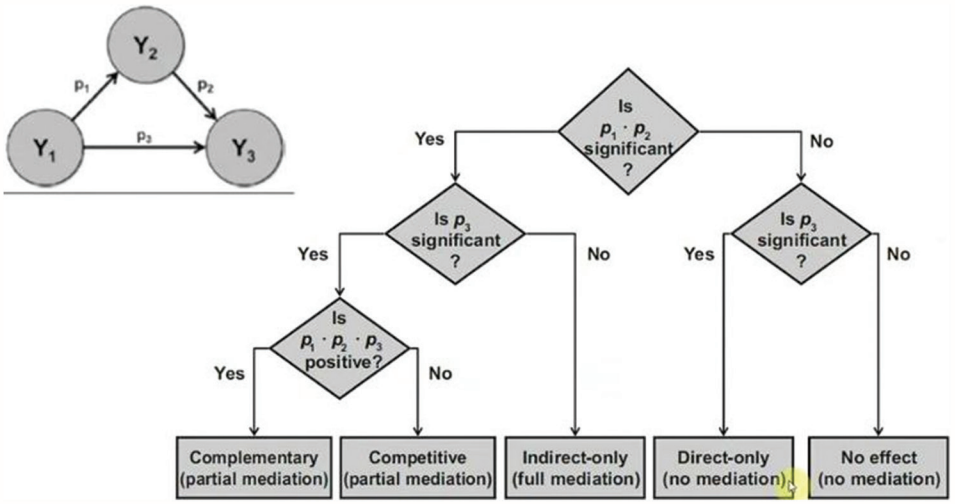
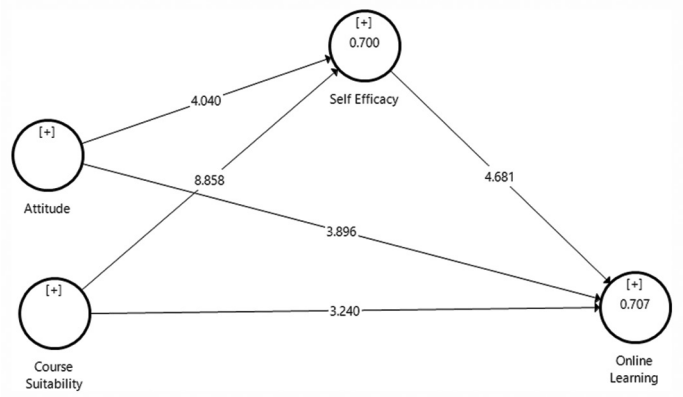


Figure 3: Bootstrapping results



the rule of thumb proposed by Hair et al. (2013), the size of f2 can be identified by the categories of weak, moderate, and strong effect with thresholds of 0.02, 0.15, and 0.35, respectively. Thus, an f2 value of <0.02 means that there is no effect (f2<0.02) (Hair et al., 2017). Table 14 shows that there are weak effects in the relationship between attitude towards online learning and online learning (f2 = 0.088) and course suitability and online learning (f2 = 0.088). In contrast, attitude towards online learning and self-efficacy (f2 = 0.124) and self-efficacy and online learning (f2 = 0.135) have a moderate effect, while course suitability and self-efficacy (f2 = 0.547) have a strong effect. Therefore, Figure 3 was developed to illustrate the model development from this study.

Table 12: Results of mediation analysis

H	Relationships	Effect	Beta	t-values	P-values	Decisions
H1	Attitude -> Online Learning	Direct	0.357	4.907	0.000	Supported
H6	Attitude -> Self-Efficacy-> Online Learning	Indirect	0.104	4.130	0.001	Supported
H3	Course Suitability -> Online Learning	Direct	0.516	7.178	0.000	Supported
H7	Course Suitability -> Self-Efficacy-> Online Learning	Indirect	0.219	3.930	0.000	Supported

Table 13: Results of R2 and Q2

Constructs	R2	Adjusted R2	Q2
Self-Efficacy	0.700	0.698	0.537
Online Learning	0.707	0.704	0.613

Table 14: Results of effect size (f2)

Relationship	f2	Effect Size
Attitude -> Online Learning	0.088	Weak
Attitude -> Self-efficacy	0.124	Moderate
Course Suitability -> Online Learning	0.088	Weak
Course Suitability -> Self-efficacy	0.547	Strong
Self-Efficacy -> Online Learning	0.135	Moderate

5. CONCLUSION

The aim of this study is to investigate the influence of self-efficacy on the efficiency of online learning for accounting students. It aims to investigate whether self-efficacy serves as a mediator between students' attitudes towards online learning and the suitability of courses for online learning in universities. Based on the mediation analysis approach mentioned above, this study shows that self-efficacy serves as a mediator for the relationship between attitudes towards online learning and online learning. The mediation found in this case is categorised as complementary partial mediation, as the statistical analysis revealed a significant direct influence between attitude towards online learning and online learning. The results indicate that the correlation between the appropriateness of the course and online learning is similar and has a statistically significant direct influence. Based on the results of the mediation analysis, this study shows that self-efficacy partially complements the mediation of the correlation.

Nevertheless, this study also has major disadvantages. The

projected student population in Malaysia for the year 2020 is estimated to be 592,680, taking into account both private and government educational institutions. A total of 386 responses were obtained from the student participants in this study. While the current sample size is sufficient to represent the population, increasing the number of responses could lead to more reliable and robust results. In addition, three different characteristics were selected in this study to investigate their potential impact on the effectiveness of a smart learning environment.

To summarise, the findings of this study provide empirical evidence of the mediating factor of self-efficacy in the context of online learning. Self-efficacy is a specific process that explains the relationship between a person's attitude towards online learning and their suitability for online courses on online learning. The findings of this study can help universities and researchers develop efficient and intelligent learning environments in Malaysian universities.

REFERENCES

Adesanya, A.O., Odunola, O.O. (2023), E-learning participation among senior secondary students during COVID19 pandemic lockdown in Epe local government area of Lagos State. Library Philosophy and Practice, 7589.

Ahadin, A., Safiah, I., Yunus, M., Suartama, I.K., Solehudin, M., Hastuti, W.D. (2023), Different domiciles in online learning during the COVID-19 pandemic. Journal of Education and E-Learning Research, 10(3), 380-388.

Al Ali, R., Wardat, Y. (2024), Exploring the impact of Kahoot! as a collaborative gamified mathematics learning platform for Jordanian junior school gifted students. Journal of Asian Scientific Research, 14(2), 227-236.

Alivernini, F., and Lucidi, F. (2011), Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study, Journal of Educational Research, 104(1), 241-252.

Anderson, S., Sommerhoff, D., Schurig, M., Ufer, S., Gebhardt, M. (2022), Developing learning progress monitoring tests using difficulty-generating item characteristics. An example for basic arithmetic operations in primary schools. Journal for Educational Research Online, 14(1), 122-146.

Askar, P., Umay, A. (2001), Perceived computer self-efficacy of the students in the elementary mathematics teaching programme. Hacettepe University Journal of Education, 21, 1-8.

Azizi, Z., Rezai, A., Namaziandost, E., Ahmad Tilwani, S. (2022), The role of computer self-efficacy in high school Students' e-learning anxiety: A mixed-methods study. Contemporary Educational Technology, 14(2), ep356.

Bandura, A. (1977), Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Baruch, B. (2023), The impact of remote learning on the English acquisition of K12 multilingual learners: Evidence from public schools in Delaware, PhD Thesis, Notre Dame of Maryland University.

Bentler, P.M., Bonett, D.G. (1980), Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88(3), 588-606.

Cheung, S.K.S., Lam, F.K, Phusavat, K., Yang, H.H. (2021), Shaping the future learning environments with smart elements: Challenges and opportunities. International Journal of Educational Technology in Higher Education, 18(1), 6-16.

Choi, H, Woo, Y., Jung, H (2013), Students' perception of smart learning in distance higher education. The Journal of the Korea Contents Association, 13(10), 585-595.

Dhawan, S. (2020), Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems, 49(1), 5-22.

Durall, E., Gros, B. (2014), Learning analytics as a metacognitive tool. In: Proceedings of the 6th International Conference on Computer Supported Education CSEDU, Barcelona.

Fayez, A., Ghabban, F., Ameerbakhsh, O. (2021), Advantages and Challenges of Smart Learning in Higher Education Institutions in Saudi Arabia. Creative Education, 12, 974-982.

Fornell, C., and Larcker, D. F. (1981), Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Ghani, E., Muhammad, K., Mohd Ali, M., Johari, R.J., Sukmadilaga, C. (2024), Factors influencing effective smart learning environment in Malaysian universities. Journal of Asian Scientific Research, 13(4), 195-208.

Gros, B. (2016), The design of smart educational environments. Smart Learning Environment, 3, 1-11.

Hair, J. F., Hollingsworth, C. L., Randolph, A. B., and Chong, A. Y. L. (2017a), An updated and expanded assessment of PLS-SEM in information systems research. Industrial Management and Data Systems, 117(3), 442-458.

Hair, J.F. Jr., Sarstedt, M., Hopkins, L., Kuppelwieser, V.G. (2014) Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. European Business Review, 26, 106-121.

Hair, J.F., Howard, M.C., Nitzl, C. (2020), Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. Journal of Business Research, 109(1), 101-110.

Hair, J.F., Ringle, C.M., Sarstedt, M. (2013) Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. Long Range Planning, 46, 1-12.

Hayashi, A., Chen, C., Ryan, T., Wu, J. (2004), The role of social presence and moderating role of computer self-efficacy in predicting the continuance usage of e-learning systems. Journal of Information Systems Education, 15(2), 139-154.

Henseler, J., Ringle, C. M., and Sarstedt, M. (2015), A new criterion for assessing discriminant validity in variance-based structural equation modelling. Journal of the Academy of Marketing Science, 43(1), 115-135.

Hu, L.T., Bentler, P.M. (1998), Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychological Methods, 3(4), 424-453

Hwang, G.J., Fu, Q.K. (2018), Trends in the research design and application of mobile language learning: A review of 2007-2016 publications in selected SSCI journals. Interactive Learning Environments, 27, 567-581.

Khairuddin, N.K., Ishak, M.S.I. (2023), Islamic crowdfunding model for empowering student entrepreneurship program in Malaysia. International Journal of Applied Economics, Finance and Accounting, 16(1), 56-65.

Krejcie, R.V., Morgan, D.W. (1970), Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607-610.

Lim, C.K. (2001), Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. American Journal of Distance Education, 15(2), 41-51.

Markonah, M., Kusnadi, K. (2024), The role of investment knowledge, student perceptions, and technological advances in affecting investment interests in sharia capital markets. Edelweiss Applied

Science and Technology, 8(4), 325-335.
Means, B., Toyama, Y., Murphy, R., Bakia, M., Jones, K. (2010), Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies. Available from: https://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf
Mohd Basar, Z., Mansor, A.N., Jamaludin, K.A., Alias, B.S. (2021), The effectiveness and challenges of online learning for secondary school students: A case study. Asian Journal of University Education, 17(3), 119-130.
Nhan, P.N.T., Lan, N.M., Hien, T.H., Phuong, N.T.T., Phi, N.T.N. (2022), The relationship between online learning and student satisfaction with training quality in private universities during the COVID-19 pandemic. Journal of Education and E-Learning Research, 9(1), 8-16.
Nordin, N., Hamid, N.A., Rasit, Z.A., Razak, F.A., Mohamad, A.B. (2024), Examining determinants of book-tax difference: Insights from Malaysian multinational corporations. Journal of Ecohumanism, 3(3), 16-26.
Oguguo, B.C.E., Ocheni, C.A., Adebayo., F.K. (2021), Students' achievement in online test and measurement course in synchronous and asynchronous e-learning platform. European Journal of Open Education and E-Learning Studies, 6(2), 137-152.
Onal, N., Ibili, E. (2017), E-learning environment. In: Sahin S., Uluyol C., editors. Information Technology in Education. Ankara: Pegem Akademi, p520-538.
Ratnawati, R., Rokhman, M.T.N., Rochayatun, S., Meldona, M., Rahayu, Y.N. (2023), Financial attitude and financial performance of export MSMEs: Financial well-being as a mediating. International Journal of Applied Economics, Finance and Accounting, 16(1), 77-85.
Safsouf, U., Mansouri, K., Poirier, F. (2020), Development of a Measurement tool to Evaluate the Learning Experience in an e-Learning System. Presented at the 14th International Conference e-Learning 2020, Zaghreb, Croatia.
Shen, D., Cho, M.H., Tsai, C.L., Marra, R. (2013), Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction. The Internet and Higher Education, 19, 10-17.
Singh, V., Thurman, A. (2019), How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). American Journal of Distance Education, 33(4), 289-306.
Sullivan, G.M., and Feinn, R. (2012), Using effect size-or why the p value is not enough, Journal of Graduate Medical Education, 4(3), 279-282.
Taipjutorus, W., Hansen, S., Brown, M. (2012), Linking between Learner Control and Self-Efficacy of Online Learners in a New Zealand Postgraduate Online Programme. Joint AARE APERA International Conference, Sydney, Australia.
Tashtoush, M.A., Wardat, Y., Al-Ali, R., Al-Saud, K. (2023), The impact of cyberbullying on student motivation to learn: Insights from Abu Dhabi Emirate schools. Humanities and Social Sciences Letters, 11(4), 461-474.
Tauzalp, N., Bahcivan, E. (2020), The online learning self-efficacy scale: Its adaptation into Turkish and Interpretation according to various variables. Turkish Online Journal of Distance Education, 21(1), 31-44.
Wang, Q., Dai, Y. (2024), The influence of outdoor training on college students' professional competitiveness: The mediating role of self-efficacy. International Journal of Innovative Research and Scientific Studies, 7(1), 18-26.
Wilbert, J. (2014), Tools for learning progress monitoring: Quality criteria and challenges with regard to interpretation. In: Hasselhorn M, Schneider W, Trautwein U., editors. Tests und Trends: 12: Lernverlaufsdiagnostik. Göttingen: Hogrefe. p281-308.
Wu, X., Wider, W., Wong, L.S., Chan, C.K., Maidin, S.S. (2023), Integrating the technology acceptance model on online learning effectiveness of emerging adult learners in Guangzhou, China. International Journal of Education and Practice, 11(2), 129-140.
Yang, J., Pan, H., Zhou, W., and Huang, R. (2018), Evaluation of smart classroom from the perspective of infusing technology into pedagogy. Smart Learning Environment, 5, 20.
Zhao, X., Lynch, J. Jr., Chen, Q. (2010), Reconsidering baron and Kenny: Myths and truths about mediation analysis. Journal of Consumer Research, 37(2), 197-206.
Zhou, S., Wu, W. (2023), A study on the relationship between higher vocational students' perceived teacher support and learning engagement: The chain mediation of academic self-efficacy and professional commitment. Nurture, 17(4), 595-606.
Zimmerman, B.J. (1995), Self-efficacy and educational development. In: Bandura, A., editor., Self-Efficacy in Changing Societies. UK: Cambridge University Press.
Zimmerman, W.A., Kulikowich, J.M. (2016), Online learning self-efficacy in students with and without online learning experience. American Journal of Distance Education, 30(3), 180-191.