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The Effect of Self-efficacy and Course Design Quality on Students' Satisfaction with Online Courses: A Structural Equation Modeling Approach

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Abstract

Students' satisfaction with online courses is considered as one of the most critical components in the continued use, as well as, adoption of e-learning applications. The study aimed at determining and analyzing the constructs that affect students' satisfaction. It examined the effect of students' self-efficacy and the quality of course design on students' satisfaction, mediated by their attitudes toward online courses. The study was conducted at University of Ha'il. Responses of 202 students were used for the data analysis. The collected data was analyzed using two steps in AMOS: The proposed measurement model was developed using confirmatory factor analysis (CFA), and the relationships were examined using structural equation modeling (SEM). The results revealed that both students' self-efficacy and the quality of course design had a significant positive effect on students' satisfaction, mediated by their attitudes towards online courses. The outcomes of this study can help decision-makers and policymakers in higher education take essential steps to enhance students' satisfaction with online courses and ensure that they continue to be used.

Introduction

The use of the internet among students around the world has become widespread. It provides students with a significant amount of information and the ability to download it quickly (Chiu et al. 2013). Students have also been provided with e-learning platforms by their institutions. The individual and group learning of students were conducted by using different types of tools. It is necessary to acknowledge that creating and preparing e-learning courses is a critical process for universities so that they can share knowledge worldwide with students. This notion of e-learning has been increased by the internet, as one of the most dynamic learning mediums. E-learning has become popular because of its ability and flexibility toward meeting students' expectations (Richardson, 2017). There are several factors that have led to utilize e-learning, including flexibility, ease of use, different features and cost (Khlaisang and Songkram, 2019). Moreover, the utilization of E-learning is essential for institutions and universities in higher education due to that it can provide alternative methods of developing students' skills, knowledge, and attitudes using various recent advanced technologies (Larbi-Siaw et al, 2016). Furthermore, e-learning has attracted interest, and it has quickly grown in the sector of higher education because it is applied anywhere and anytime; thus, students can control the learning process (Ke and Kwak, 2013).

Within the past two decades, many higher institutes and universities have offered online courses in which using internet is syllabus part and students receive credit when the course is completed (Cohen and Baruth 2017). It is a fact that e-learning is known for helping students to complete their studies more easily, especially when they require new skills and knowledge (Callaghan, 2018). According to Allen and Seaman (2016), it is essential for institutions in higher education to have a continuing strategy for development.

If universities and institutions of higher education are not prepared to adopt new approaches, they will be late, which will lead to reduced enrollment in these e-learning courses. Thus, most universities and institutes encourage and support e-learning and set a priority for improving such online courses. However, there are also some negative aspects of online courses. Some students do not attend them as they are not able to gain the same skills and knowledge as when they attend courses physically. Thus, it is also essential that online courses provides enhancement for students who study full-time, not only function as a support for learning.

The main objective of e-learning platforms is allowing many learners to be directly involved in learning independently based on their aims, past skills, and knowledge (Cohen and Baruth, 2017). But learners are different: not all of them have acquired the same skills, competencies, or knowledge. Thus, it is essential to conduct research regarding the given factors that can actually make an impact on satisfaction of students with online courses. Focusing on understanding these factors will help to ensure the successful ending of these online courses (Kauffman, 2015). Furthermore, the platforms of e-learning are different from each other in terms of their features and uses (Djouad and Mille, 2018). Thus, it is an essential duty for universities and institutions of higher education to find out regarding students' satisfaction and their experiences with with online courses (Li et al., 2016).

A study by Sun et al. (2008) determined that satisfaction of students with online courses can be defined as "the degree of perceived learner satisfaction with e-learning settings as a whole.". In addition, this perceived satisfaction can be considered as main key factor in whether the e-learning approach is adopted (Arbaugh, 2000). The satisfaction of students is an essential indicator for quality of the educational experiences in higher education. Thus, factors which affect satisfaction of students with online courses are the main focus of this research. Serenko (2011) stated that there are some factors—including course grade and environmental aspects, such as students' actual experience in class and the mode of delivery—that can influence their satisfaction.

In the literature, recent studies have established that investigating the perceived satisfaction of students during their e-learning courses is important (Hamdan et al., 2021). Furthermore, Recent research has revealed that the quick close of institutions and universities during the COVID-19 pandemic had a negative effect on students' achievement and satisfaction (Kuhfeld et al., 2020). Based on this, further studies are needed for examining other factors which can influence students' satisfaction with e-learning (Baber, 2020; Shahzad et al., 2021; Fawaz and Samaha, 2021). While the purpose is to determine satisfaction of students with given online courses, this study seeks to propose a theoretical framework to investigate some factors. Which could affect their satisfaction. It will assess the effect of attitudes, course design, and self-efficacy on students' satisfaction with online courses.

Literature Review

It is vital to understand that E-learning is one of the paradigms in which ICT is utilized for delivering contents of information and learning, training students using a specific arrangement (Sun et al., 2008). Furthermore, E-learning systems are built relying on delivering knowledge in an online environment, but it can also include other concepts, such as digital communication between users (Liaw and Huang, 2013). Moreover, there is a different view of e-learning: in addition to an approach to communicating information and knowledge for training and education, it can also be considered a medium for improving career achievement, allowing for integration of management system of human resources, and increasing learners' satisfaction and creativity (Uden et al., 2007). According to Sun et al. (2008), e-learning contained two primary approaches: content delivery/maintenance, as well as, content development. The research shows that the content development phase contains the following aspects: designing, planning, creating, and evaluating. These phases lead to delivery and maintenance of content. The e-learning process could be seen as iterative and has pros and cons (Khan, 2004). For instance, e-learning enables self-directed and cost-effective learning. However, it is accused of promoting a lack of social interaction between learners and leading to confusion and frustration, especially in higher education.

E-learning requires instructors to spend a significant amount of time focused on preparing a course (Zhang et al., 2012). Learning management systems are utilized in e-learning to deliver information and connect learners with instructors. For instance, they can enrich learners' experiences by providing them with online course outlets and content or facilitate instruction by delivering training and education (Bansode & Kumbha, 2012). Furthermore, online courses are extensively integrated in higher education which leads to deep understanding of the nature of students' engagement in these courses. The increased of students' engagement and satisfaction can be accomplished via purposeful design of online learning to gather with the strategic planning of the online courses (Tualaulelei et al., 2022). In addition, Nortvig et al. (2018) conceptualized students' satisfaction with the outcomes of e-learning as a factor in its success. Furthermore, Tang et al (2022) stated that students' poor outcomes is associated with their low satisfaction in learning.

Fleming et al. (2017) concluded that satisfaction with online courses in e-learning and its future uses rely on lower complexity, greater technical support for users, and the perceived uses of offered content. Furthermore, Sun et al. (2008) added that satisfaction with online courses is mainly based on other factors, for example, learners' anxiety about using computers, IT accessibility and quality, digital management tools, and instructors' attitudes. Moreover, communication network is important to minimize the possibility of confusion which may a core during online courses a long with training programs to enrich their competence (Darawong et al., 2022). Furthermore, Nortvig et al. (2018) identified the following factors that had an influence on satisfaction of students with online courses: digital community, positive engagement between teachers and learners, self-confidence among learners, convenient teaching environment with present educators, and quality course design.

Previous studies also developed theoretical models to examine the relationships between online courses in e-learning and other factors. For example, Gray and DiLoreto (2016) investigated students' satisfaction with an e-learning environment and perceived learning. Kuhfeld et al. (2020) found that the rapid close of institutes and

universities had negative effects on students' satisfaction and achievement during pandemic of COVID-19. Furthermore, Navarro et al (2021) found out that there is a significant effect of Task Technology Fit on students' behavior intention with using LMS which leads to students' satisfaction. However, more studies are needed to examine other factors which may affect satisfaction of students with online courses (Baber, 2020; Shahzad et al., 2021; Fawaz and Samaha, 2021). The study aims at theoretically identifying and examining the main factors which may affect students' satisfaction with e-learning. It will develop a model for examining the effects of students' attitudes toward e-learning, self-efficacy, and the course design quality on their satisfaction with online courses.

Research Hypotheses

H1: Self-efficacy of students has a positive effect on their attitudes toward online courses.
H2: Design quality of the course has a positive effect on students' attitudes to online courses.
H3: Positive attitudes for online courses among students have a positive effect on their satisfaction with online courses.

The proposed model is shown in Figure 1.

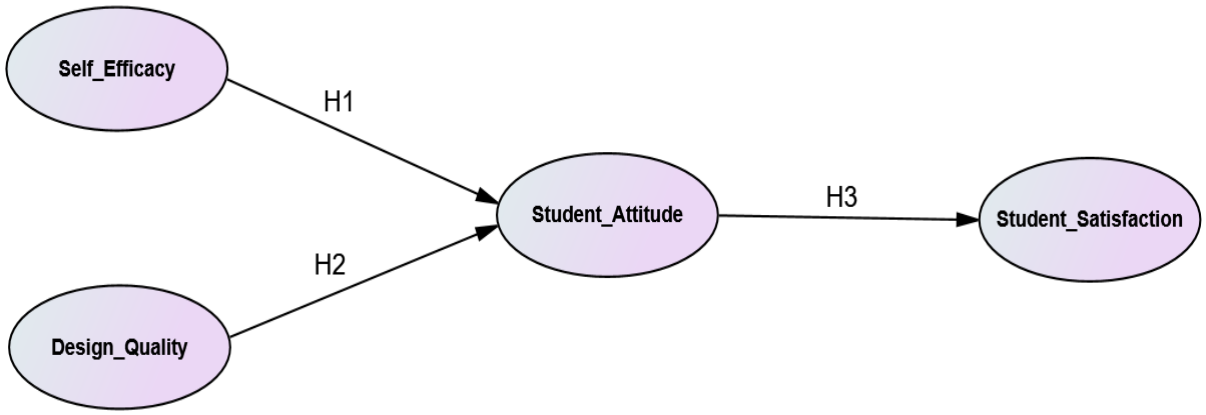

Figure 1. The Proposed Model

Method

Data Collection

The data was collected through an online survey that was developed and distributed using Google Forms. It was sent to the targeted students between October and December 2022. We sent over 250 invitations to students who registered in online courses in different colleges at Ha'il University. By using a simple random sampling, a total of 202 responses were selected and used for the final analysis. According to Kothari (2003), using a simple random sampling, each one in the targeted population can have an equal opportunity for being included. Even though SEM analysis is influenced by to sample size, the sample was suitable as indices of the goodness-of-fit for were met in the model (Kyriazos, 2018). The ethical approval for conducting this study was approved by research ethics

committee Ha'il University. The Institutional Review Board approval number of this study is H-2023-143.

Measures

There were two parts of the survey. The first one, which measured the respondents' demographic information, was self-designed, while the second part which measured the four latent constructs, was adapted relying on prior studies. The items that measured the quality design of courses were adapted from a study by Liaw and Huang (2013). The items which assessed self-efficacy of students were adapted and modified from studies by Hunga et al. (2010) and Ratten (2013). The items that measured students' attitudes toward online courses were adapted from a study by Suryani and Sugianingrat (2021). Finally, the items that measured students' satisfaction were derived from a study by Arbaugh and Duray (2002). For ensuring the validity content and suitability of scales, all items should represent the concept of scales and all items were adapted and used from main previous studies which were already validated and confirmed. Furthermore, all items have been examined and validated during the Confirmatory Factor Analysis (CFA).

Data Analysis

Two approaches were applied to analyze the data. A descriptive analysis using SPSS was applied to analyze the respondents' demographic information. Two steps in AMOS were applied: CFA to develop the measurement and SEM to analyze relationships of constructs in the model and testing research hypotheses. AMOS was used for testing the relationships between constructs in the model (Hair et al., 2014).

Results

Descriptive Analysis of Demographic Information

A total of 202 students' responses were analyzed. The demographic information of respondents is presented in the Table 1, including their college, gender, and number of taken online courses.

Table 1. Respondents' Demographic Information

		Frequency	Percent
Gender	Male	66	32.7
	Female	136	67.3
	Total	202	100.0
College	Education	57	28.2
	Business Administration	81	40.1
	Art	17	8.4
	Science	24	11.9
	Engineering and Computer Science	15	7.4
	Applied Medical Sciences	8	4.0

		Frequency	Percent
Number of online courses	1	11	5.4
	2	39	19.3
	3	44	21.8
	4	52	25.7
	5	33	16.3
	More than 6	23	11.4

Regarding gender, most of the students (136; 67.3%) were female, while 66 students (32.7%) were male. In terms of college, most students who participated were enrolling in College of Business Administration (81; 40.1%), followed by those enrolling in education college (57; 28.2%). Only eight students (4.0%) who participated were enrolled in the College of Applied Medical Sciences. Most students (52; 25.7%) had taken four online courses, followed by those who had taken three courses (44; 21.8%). Only 11 students (5.4%) had taken just one online course.

Structural Equation Modeling

Confirmatory Factor Analysis (CFA)

Pooled CFA was run in this analysis for assessing correlations between the constructs and check for measurement error. This is considered the most convenient and commonly used approach to validate constructs and measurement models (Awang, 2015). The values of pooled CFA are presented in Figure 2.

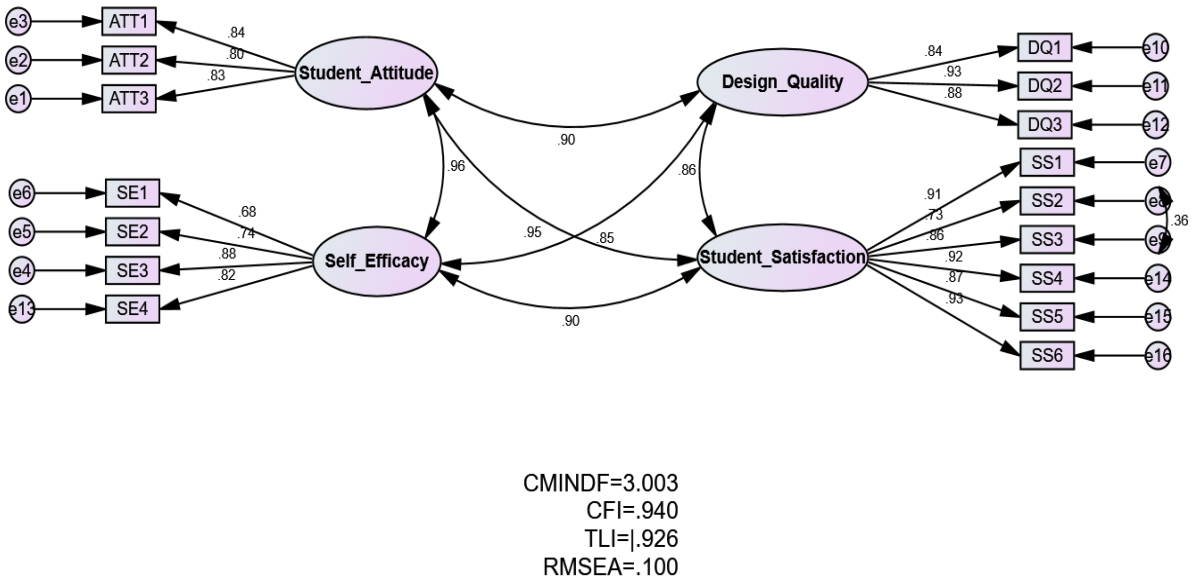

Figure 2. Pooled CFA

When every index of the given model reaches the necessary levels suggested by literature, the construct validity is confirmed. The values of the indices confirm that they all achieved the required values; thus, construct validity was attained (see Table 2).

Table 2. The Results of Indices in the First Run

Category Name	Index Name	Index Value	Acceptance Level	Decision	Reference
Absolute fit	RMSEA	0.100	<0.1	Accepted	(MacCallum et al., 1996)
Incremental fit	CFI	0.940	>0.90	Accepted	(Awang, 2015)
	TLI	0.926	>0.90	Accepted	(Awang, 2015)
Parsimonious fit	Chisq/df	3.003	<5.0	Accepted	(Awang, 2015)

Convergent validity then was assessed. When composite reliability (CR) and average variance extracted (AVE) reach the necessary levels "CR > 0.6 and AVE > 0.5", convergent validity is attained (Hair et al., 2010). The values of CR and AVE shown in Table 3 achieved the suggested value. Thus, Convergent validity was therefore attained.

Table 3. CR and AVE Values

	CR	AVE
Student Satisfaction	0.950	0.760
Student Attitude	0.860	0.673
Self-Efficacy	0.863	0.613
Design Quality	0.913	0.777

Standardized Estimate

Standardized estimate and unstandardized estimate are the two outputs of structural equation modeling. The items factor loading, the strength of relationships between constructs, and the R-squared values of the dependent factors are all examined using the standardized estimate. The critical ratio value is evaluated using the unstandardized estimate, which is also used to test research hypotheses. The standardized estimate is shown in Figure 3.

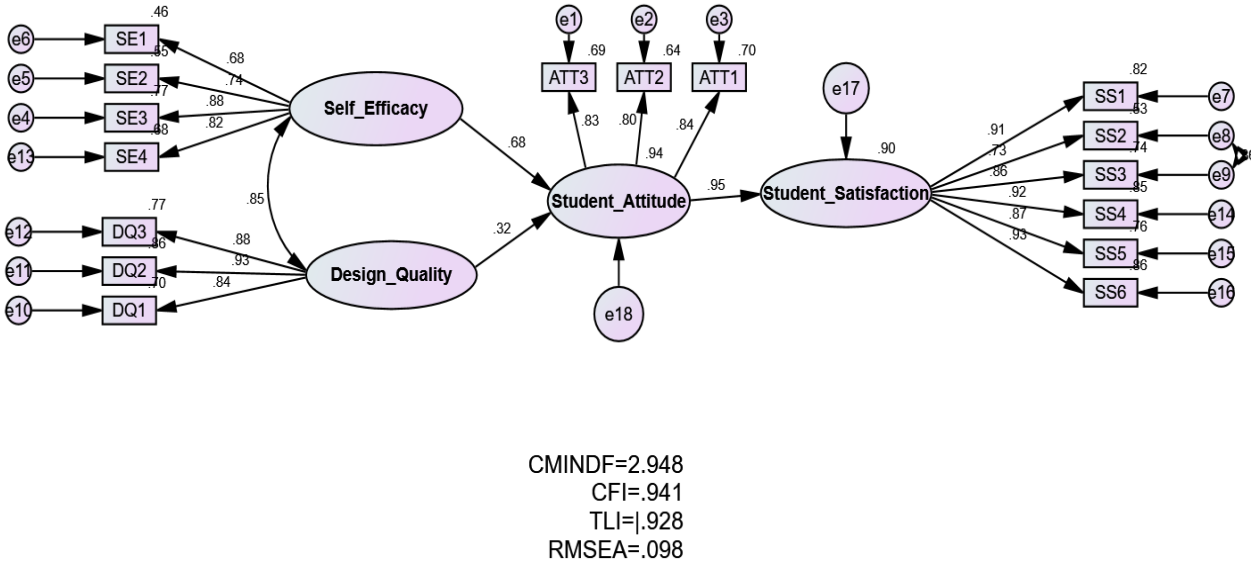

Figure 3. Standardized Estimate

As presented in Figure 3, the R-squared of dependent variable (students' satisfaction) was 0.90, which confirms that 90% of variance in satisfaction was explained by other factors: students' attitudes, students' self-efficacy, and the quality of course design. These results confirm the high explanatory power of the proposed model. According to Cohen (1988), the R-squared value is greater than 0.25 refers to a high explanatory power of the model.

Unstandardized Estimate

The critical ratio was evaluated using unstandardized estimate, and the study hypotheses were tested. The proposed model's unstandardized estimate is shown in Figure 4.

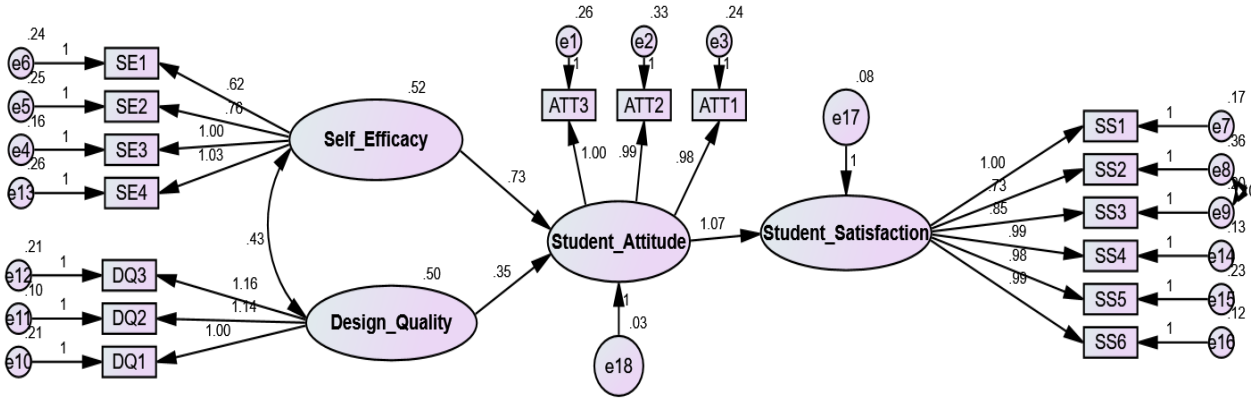

Figure 4. Unstandardized Estimate

Hypothesis Testing Results

The results showed that both self-efficacy and design quality had significant positive effects on students' attitudes ($\beta = 0.730$, $p < 0.01$); ($\beta = 0.351$, $p < 0.01$). Moreover, students' attitudes had a significant effect on their satisfaction with online courses ($\beta = 1.074$, $p < 0.01$). Thus, H1, H2, and H3 were supported. Table 4 presents the results of testing the research hypotheses.

Table 4. Hypothesis Testing Results

			Estimate	S.E.	C.R.	P	Results	Hypothesis
Student Attitude	<---	Self-Efficacy	.730	.099	7.384	***	Significant	supported
Student Attitude	<---	Design Quality	.351	.091	3.864	***	Significant	supported
Student Satisfaction	<---	Student Attitude	1.074	.069	15.480	***	Significant	supported

Discussion

Students' satisfaction in online courses is seen as one of the essential indicators of their quality by higher education institutions. This study focused on examining and assessing the factors which affect students' satisfaction in online courses: namely, self-efficacy, course design quality, and attitudes. The findings revealed that course design quality had a significant effect on students' satisfaction, which was mediated by their attitudes toward online courses. This means that the satisfaction of students in online courses is influenced by both their attitudes towards online courses and course design quality. The quality for internet connections, e-learning materials, and instructors significantly affect students' attitudes toward online learning, which, in turn, affect their satisfaction. The study results are in line with previous studies, such as those studies conducted by Sun et al. (2007) and Piccoli et al. (2001), who found that course design quality, internet, and e-learning materials were the main indicators of e-learning satisfaction. When students have a positive experience with these aspects, they develop a positive attitude toward online courses, which, in turn, positively affects their satisfaction.

Furthermore, the findings showed that the self-efficacy of students had a positive effect on their satisfaction in online courses, also mediated by their attitudes toward e-learning. These findings are supported by some prior studies, such as those by Yau and Leung (2018) and Tenhet (2013). When students have higher self-efficacy regarding e-learning, they are more likely to have positive attitudes toward online courses, which positively affects their satisfaction.

The findings showed that students' attitudes toward online courses had a positive direct effect on their satisfaction with online courses. As previously mentioned, students' attitudes toward online courses are affected positively by both self-efficacy and the quality of course design. These results are in line with previous studies, such as those by Arbaugh, (2002) and Adewole-Odeshi (2014). When students have positive attitudes toward online courses, they are more likely to be satisfied with them.

Implications

The study findings are worthy not only due to its new theoretical contribution (i.e., the proposed model) but also because of its practical implications, which may assist policymakers and decision-makers at higher education institutions. The findings explain how to ensure that students are satisfied with online courses by identifying the specific factors that affect their satisfaction. The findings confirm that the proposed model is applicable: these factors affect students' satisfaction with online courses at institutions and universities in higher education.

Furthermore, this study makes a theoretical contribution to the literature. To our knowledge, no previous studies have examined the effect of the factors in the proposed model simultaneously. The findings revealed that the course design quality has a direct effect on students' attitudes toward online courses and that these attitudes positively affect their satisfaction. Thus, when designing course content, instructors and designers should recognize the expected challenges which are associated with the design quality of online courses. For instance, they should consider different ways to allow students to participate, ensure that the user interface experience is

convenient, and develop relevant and clear content (Lewis, 2021). Furthermore, students' self-efficacy is essential and positively affects their attitudes toward and satisfaction with online courses. To ensure that students are satisfied with online courses, policymakers should focus on improving the quality of course design and increasing students' self-efficacy by providing them with appropriate training. By considering all of these factors, it is possible to ensure that students are satisfied with online courses, which will increase their implementation.

Limitations

This study, like other studies, as it has limitations. First, it only included participants from one university, the University of Ha'il. Thus, the results cannot be generalized. Future studies should conduct similar research at various universities to lead to more generalizable results. Furthermore, future studies can examine other factors which were not examined in the current proposed model. Moreover, this study applied a pure quantitative method. Future studies can apply mixed methods to gain a deeper understanding and explanation of relationships among constructs in the model. Similar studies can also be applied in different contexts to determine whether similar results are found.

Conclusion

This study confirms that students' self-efficacy and the course design quality had a significant effect on their satisfaction with online courses, which was mediated by their attitudes. These findings suggest that institutions and universities must focus improve the quality of course design and increasing students' self-efficacy as these factors are essential and contribute to positive attitudes toward and satisfaction with online courses. This study was limited to the University of Ha'il context and future research may focus on wider and different contexts.

References

Adewole-Odeshi, E. (2014). Attitude of students towards E-learning in South-West Nigerian universities: an application of technology acceptance model. *Library Philosophy and Practice (e-journal)*, *1035*(2014), 1-18.

Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Babson Survey Research Group. Babson College, 231 Forest Street, Babson Park, MA 02457.

Arbaugh, J. B., & Duray, R. (2002). Technological and structural characteristics, student learning and satisfaction with web-based courses: An exploratory study of two on-line MBA programs. *Management learning*, *33*(3), 331-347.

Awang, P. (2015). *SEM made simple: A gentle approach to learning Structural Equation Modeling*. MPWS Rich Publication, Bangi.

Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID-19. *Journal of Education and e-learning Research, 7*(3), 285-292.

Bansode, S. Y., & Kumbhar, R. (2012). E-learning Experience using Open Source Software: Moodle. *DESIDOC Journal of Library & Information Technology*, *32*(5).

Callaghan, R. (2018). Developing mobile teaching practice: A collaborative exploration process. *Technology, Knowledge and Learning*, *23*(2), 331-350.

Chiu, Y. L., Liang, J. C., & Tsai, C. C. (2013). Internet-specific epistemic beliefs and self-regulated learning in online academic information searching. *Metacognition and learning*, *8*(3), 235-260.

Cohen, A., & Baruth, O. (2017). Personality, learning, and satisfaction in fully online academic courses. *Computers in Human Behavior*, *72*, 1-12.

Cohen, J. (1988). The effect size. *Statistical power analysis for the behavioral sciences*, 77-83.

Darawong, C., & Widayati, A. (2022). Improving student satisfaction and learning outcomes with service quality of online courses: evidence from Thai and Indonesian higher education institutions. *Journal of Applied Research in Higher Education*, *14*(4), 1245-1259.

Djouad, T., & Mille, A. (2018). Observing and understanding an on-line learning activity: A model-based approach for activity indicator engineering. *Technology, Knowledge and Learning*, *23*(1), 41-64.

Fawaz, M., & Samaha, A. (2021, January). E-learning: Depression, anxiety, and stress symptomatology among Lebanese university students during COVID-19 quarantine. In *Nursing forum* (Vol. 56, No. 1, pp. 52-57).

Fleming, J., Becker, K., & Newton, C. (2017). Factors for successful e-learning: does age matter?. *Education+ Training*.

Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, *11*(1), n1.

Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., AL-Habashneh, S., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*, *35*(3), 713-725.

Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective* (Vol. 7). Pearson.

Hair, J. F., Gabriel, M., & Patel, V. (2014). AMOS covariance-based structural equation modeling (CB-SEM): Guidelines on its application as a marketing research tool. *Brazilian Journal of Marketing*, *13*(2).

Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, *23*.

Ke, F., & Kwak, D. (2013). Constructs of student-centered online learning on learning satisfaction of a diverse online student body: A structural equation modeling approach. *Journal of Educational Computing Research*, *48*(1), 97-122.

Khan, B. H. (2004). The people—process—product Continuum in e-learning: the e-learning P3 model. *Educational Technology*, *44*(5), 33-40.

Khlaisang, J., & Songkram, N. (2019). Designing a virtual learning environment system for teaching twenty-first century skills to higher education students in ASEAN. *Technology, Knowledge and Learning*, *24*(1), 41-63.

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher*, *49*(8), 549-565.

Kyriazos, T. A. (2018). Applied psychometrics: sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, *9*(08), 2207.

Larbi-Siaw, O., & Owusu-Agyeman, Y. (2017). Miscellany of students' satisfaction in an asynchronous learning environment. *Journal of Educational Technology Systems*, *45*(4), 456-475.

Lewis, E. (2021). Best practices for improving the quality of the online course design and learners experience. *The Journal of Continuing Higher Education*, *69*(1), 61-70.

Li, N., Marsh, V., & Rienties, B. (2016). Modelling and managing learner satisfaction: Use of learner feedback to enhance blended and online learning experience. *Decision Sciences Journal of Innovative Education*, *14*(2), 216-242.

Liaw, S. S., & Huang, H. M. (2013). Perceived satisfaction, perceived usefulness and interactive learning environments as predictors to self-regulation in e-learning environments. *Computers & Education*, *60*(1), 14-24.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*, *1*(2), 130.

Navarro, M. M., Prasetyo, Y. T., Young, M. N., Nadlifatin, R., & Redi, A. A. N. P. (2021). The perceived satisfaction in utilizing learning management system among engineering students during the COVID-19 pandemic: Integrating task technology fit and extended technology acceptance model. *Sustainability*, *13*(19), 10669.

Nortvig, A. M., Petersen, A. K., & Balle, S. H. (2018). A Literature Review of the Factors Influencing E-Learning and Blended Learning in Relation to Learning Outcome, Student Satisfaction and Engagement. *Electronic Journal of E-learning*, *16*(1), pp46-55.

Piccoli, G., Ahmad, R., & Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training. *MIS quarterly*, 401-426.

Ratten, V. (2013). Cloud computing: A social cognitive perspective of ethics, entrepreneurship, technology marketing, computer self-efficacy and outcome expectancy on behavioural intentions. *Australasian Marketing Journal (AMJ)*, *21*(3), 137-146.

Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, *71*, 402-417.

Serenko, A. (2011). Student satisfaction with Canadian music programmes: the application of the American Customer Satisfaction Model in higher education. *Assessment & Evaluation in Higher Education*, *36*(3), 281-299.

Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality & quantity*, *55*(3), 805-826.

Sun, J. C. Y., & Rueda, R. (2012). Situational interest, computer self-efficacy and self-regulation: Their impact on student engagement in distance education. *British journal of educational technology*, *43*(2), 191-204.

Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & education*, *50*(4), 1183-1202.

Suryani, N., & Sugianingrat, I. A. P. W. (2021). Student e-learning satisfaction during the Covid-19 pandemic in

Bali, Indonesia. *Jurnal Economia*, *17*(1), 141-151.

Tenhet Jr, T. O. (2013). *An examination of the relationship between tablet computing and student engagement, self-efficacy, and student attitude toward learning*. California State University, Fresno.

Tang, J., Wijaya, T. T., Weinhandl, R., Houghton, T., Lavicza, Z., & Habibi, A. (2022). Effects of micro-lectures on junior high school students' achievements and learning satisfaction in mathematics lessons. *Mathematics*, *10*(16), 2973.

Tualaulelei, E., Burke, K., Fanshawe, M., & Cameron, C. (2022). Mapping pedagogical touchpoints: Exploring online student engagement and course design. *Active Learning in Higher Education*, *23*(3), 189-203.

Uden, L., Wangsa, I. T., & Damiani, E. (2007, February). The future of E-learning: E-learning ecosystem. In *2007 Inaugural IEEE-IES Digital EcoSystems and Technologies Conference* (pp. 113-117). IEEE.

Yau, H. K., & Leung, Y. F. (2018). The relationship between self-efficacy and attitudes towards the use of technology in learning in Hong Kong higher education. In *Proceedings of the International MultiConference of Engineers and Computer Scientists, Hong Kong*.

Zhang, Y., Fang, Y., Wei, K. K., & Wang, Z. (2012). Promoting the intention of students to continue their participation in e-learning systems: The role of the communication environment. *Information Technology & People*.

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