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The Effect of Distance Learning Delivery Methods on Student Performance and Perception

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Abstract.

The aim of this study was to investigate student perception and performance resulting from different distance learning delivery methods. An experimental research method was applied to determine students' views on synchronous and asynchronous delivery methods. This study was applied at the University of Ha'il, Deanship of Preparatory Year. The participants were 49 freshman female students. The results showed that there was a significant difference between student performance in both delivery methods—the synchronous delivery method and the asynchronous delivery method. In addition, there was also a significant difference in student perception in the two groups. Based on this, it is possible to do more research in order to understand the role of the Learning Management System (LMS) and identify how instructors integrate the technology in higher education and online learning. Continuous professional development is needed so that the instructors and students can be updated about new technology.

Keywords: student perception; performance; synchronous; asynchronous.

أثر التعليم عن بعد على التحصيل العلمي للطالبات و اتجاهاتهن نحوه

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مستخلص البحث:

هدفت هذه الدراسة في التعرف على اتجاهات الطالبات وتحصيلهن العلمي في تبني أسلوب التعليم المتزامن فقط و أسلوب التعليم الذي يشمل التعليم الغير متزامن و المتزامن. و استخدم الباحث في هذه الدراسة المنهج التجريبي لمعرفة آراء الطالبات نحو التعليم المتزامن و التعليم الغير متزامن و المتزامن. طبقت هذه الدراسة على طالبات السنة التحضيرية بجامعة حائل و البالغ عددهن 49 طالبة. و أشارت النتائج إلى أن ليس هناك فروقا ذات دلالة احصائية في التحصيل العلمي لصالح مجموعة التعليم الغير متزامن و المتزامن. و بالإضافة إلى ذلك، هناك فروقا ذات دلالة احصائية في اتجاهات الطالبات لصالح مجموعة التعليم الغير متزامن و المتزامن. و بناء على ذلك، أوصى الباحث بالقيام بعدة توصيات منها القيام بدراسات لمعرفة دور إدارة نظام التعلم في التعليم، و كيف يمكن لعضو هيئة التدريس دمج التكنولوجيا في التعليم العالي و التعليم الالكتروني. و قد أشارت النتائج أيضا بأهمية التدريب للطلاب و لأعضاء هيئة التدريس على استخدام التكنولوجيا و التعرف على المستحدثات التكنولوجية الحديثة.

الكلمات المفتاحية: اتجاهات الطلاب؛ التحصيل العلمي؛ التعليم المتزامن و الغير متزامن.

Introduction

Distance learning has become more flexible and effective in this century with the support of advanced technology (Abas, 2015; Rehn, 2017). This has resulted in increased development of distance learning, which has encouraged many universities and institutions to offer some online academic programs. These programs provide a good environment for students who cannot physically attend campus. Therefore, many universities and educational institutions provide online academic programs with different delivery methods, such as synchronous and asynchronous. This variation in delivery methods helps instructors and students interact with content and process the information in real time, or without interaction in real time (Stadler, Camargo & Maioli, 2017).

Many scholars have noted that synchronous and asynchronous learning are effective methods for students (Malinovski, Vasileva, Vasileva-Stojanovska & Trajkovik, 2014; Hopper, 2014; Townes-Young & Ewing, 2005; Clarke, 2015; Doggett & Mark, 2008; Al-Ahdal & Al-Hattami, 2014; Piki, 2010). There are many aspect of synchronous and asynchronous methods that can be beneficial to students in their learning, such as eliminating distance (Clarke, 2015), saving money (Doggett & Mark, 2008; Townes-Young & Ewing, 2005), increasing professional training (Piki, 2010; Hopper, 2014), and overcoming cultural challenges (Al-Ahdal & Al-Hattami, 2014). It is noted that most of the courses delivered by an online system can be conveyed through synchronous and asynchronous learning (Murphy, Rodríguez-Manzanares & Barbour, 2011; Oztok, Zingaro, Brett & Hewitt, 2013).

The literature is limited with respect to reviews that examine the different types of delivery methods in distance learning. Therefore, understanding the limitations and determinants of investigating the effects of asynchronous learning and synchronous learning will help in designing an effective system for both methods. Some studies showed 'no significant difference' between distance learning and face-to-face learning outcomes (Alavi, 1994; Webster & Hackley, 1997; Spooner, Jordan, Algozzine & Spooner, 1999). Additionally, most asynchronous research on distance learning is theoretical, focusing on discussions and surveys about student satisfaction.

Statement of the Problem

It is very important to have a better understanding of students' views concerning the two methods of distance learning. Culture is considered a challenge when female students have a male instructor in the two methods used: asynchronous and synchronous with asynchronous learning. In addition to the cultural aspect, the researcher needs trustworthy data to adapt distance learning methods in a way that will suit students' abilities and technology skills in future. Moreover, the result of this study will guide the director of the department in implementing a suitable professional development program to improve the instructors' technology skills and roles, and provide training courses for instructors who will teach distance courses.

The Purpose of the Study

This paper addresses student perceptions and performance regarding two distance learning delivery methods. Due to a lack of female teachers in the department, the director decided to replace the traditional face-to-face setting with another method of teaching. The purpose of the study is to examine the students' perceptions and performance in the course delivery methods—the synchronous method and the joined synchronous and asynchronous methods.

Research Questions

The research questions of this study are:

Research Question 1

- Are there any differences in student performance between the two delivery methods?

Research Question 2

- Are there any differences in student perception between the two delivery methods?

Literature Review

This study reviewed literature related to distance learning delivery methods (synchronous and asynchronous), student perception, and performance of these methods.

Distance Learning Methods

Distance learning focuses on moving from an instructor-centered learning mode to a student-centered learning mode (Deimann & Bastiaens, 2010). Bowers and Kumar, (2015) and Bhagat, Wu and Chang (2016) addressed the importance of distance learning in the designing of higher education institutions' plans and noted that it plays an essential role in delivering material to students. Furthermore, distance learning attempts to engage students in an active learning environment (Bhagat, Wu & Chang, 2016). Today, most universities have many different methods for delivering material to their students. Distance learning gained its fame from its ability to provide students with full access to the content and teaching at any time. Moreover, online courses introduce students to the concepts of self-learning, individual learning and full access to instruction (Anderson, 2008; Dilbeck, 2008).

Asynchronous delivery uses a variety of methods, for example emails, discussion groups, audio discussions and newspapers, to foster positive interactions with the lesson (Moore & Kearsley, 2012). In particular, the emails and discussion groups help learners communicate with each other, so that despite the teachers and students being separated by time and distance, they can still have strong interactions. Students also have sufficient time to access the content and get information on the lesson's objectives (Hrastinski, 2008).

Students are able to complete their online courses around their life commitments (work, family, etc.) with the asynchronous delivery method (Mulenburg & Berge, 2005), which results in a course arrangement that suits their learning objectives. Lehman & Conceição (2011) addressed the necessity of understanding the physiological, physical, emotional and social aspects of the participants in asynchronous learning environments, which should be regarded as priorities by online material designers. Furthermore,

asynchronous online programs cannot be effective if the student does not have basic skills in exploring course material, engaging in effective communication, and managing the technologies of the provided course (Motteram & Forrester, 2005).

Synchronous delivery provides students with partial involvement in a face-to-face learning context, as courses are conveyed through video and online conferences, as well as live chat. In addition, it allows learners to see their teachers and colleagues through webcams, and to share Microsoft Word or PowerPoint files when making a presentation (Lam, 2010). Further, this semi-interaction supports the instructors of both traditional and innovative methods (Gillies, 2008; Lawson, Comber, Gage & Cullum-Hanshaw, 2010). Han (2013) investigated the effects of live videoconference communication on student interaction; he found that it facilitated interaction between the instructor and the students, as the students felt as though the instructor was there with them.

In spite of the increasing use of asynchronous distance learning, research has focused on the synchronous and the mixed synchronous/asynchronous environments (Alavi, 1994; Alavi, Wheeler & Valacich, 1995; Webster & Hackley, 1997). These delivery methods help students interact with each other and with their instructors. Meyer (2003) stated that in online asynchronous discussion formats, "Almost every student mentioned how much time it took to read others' postings, think about a response, prepare a response, and check back later to others' contributions to the discussion" (p. 7). Kear (2004) also investigated student satisfaction in an asynchronous online learning setting and found that most of the sample benefited from asynchronous discussions. 79% of the sampled participants were satisfied with their discussions. Since there was not enough information about what creates an effective human moderation in synchronous distance learning, Asterhan and Schwarz (2010) focused on the relationship between the role of the moderation effect and the students' perception. The results showed that there was a contradiction in students' opinions about the role of online synchronous discussions in distance learning. Therefore, the researchers came out with a conclusion of providing real time support in distance learning for future research.

Student Performance

A review of the literature on synchronous and asynchronous communication tools showed that both of these distance learning delivery methods provide learners with positive effects that facilitate their learning (Mabrito, 2006; Skylar, 2009; Tolu, 2010; Zsiray, Smith & West, 2001; Cao, Griffin & Bai, 2009). Most of the teachers' concerns relate to the learning outcomes that they tend to achieve, as they focus on using different delivery methods for their lessons. Abdous & Yoshimura (2010) regarded the evaluation of various distance learning delivery methods as critical, stating that it was necessary for students to choose a learning delivery method that suited their interests.

Abdous & Yoshimura (2010) emphasized that it is essential to assess the effectiveness of different distance learning delivery methods in terms of overall student performance and satisfaction. Moreover, distance learning teachers should understand how students are affected by exposure to different delivery methods in a technological learning environment. Naaj, Nachouki and Ankit (2012) and Euzent, Martin, Moskal and Moskal (2011) addressed the connection between students' learning outcomes and the different methods of distance learning. For example, Buckley (2003) explored the effects of using three delivery methods, namely traditional classroom, web-enhanced, and web-based, on students' learning outcomes in midterm and final examination scores; he found no significant differences between the three mentioned methods. In addition, Jahng, Krug and Zhang (2007) reviewed the literature published between 1995 and 2004 in terms of the achievement differences between students; they found no significant differences between students using online distance learning and those in face-to-face settings. Larson and Chung-Hsien (2009) also evaluated the effect of face-to-face, blended, and online methods on students' final results in an MIS course and found no clear differences between those results.

In addition, Abdous & Yoshimura (2010) investigated the connection between the type of delivery method, learner satisfaction, and learning outcomes; their study revealed no obvious relation between delivery methods and students' learning satisfaction or outcomes. Furthermore, Carrol & Burke (2010) studied the differences between an online class and a face-to-face class; they showed weak differences in students' results in the final examination.

In contrast, Means, Toyama, Murphy, Bakia and Jones (2010) studied the effectiveness of online and classroom teaching from 1996 to 2008 and their research results showed that students performed better in online learning contexts compared to students in face-to-face learning. In addition, Naaj, Nachouki and Ankit (2012) investigated 153 students' satisfaction with using blended learning, face-to-face learning and videoconference learning. They found that students achieved better grades in the face-to-face learning mode.

Synchronous learning is regarded as essential in distance learning environment design and it has a positive effect on students' learning outcomes (Hrastinski & Keller, 2007). On the other hand, Parsad & Lewis (2008) focused on expanding the use of asynchronous tools in the design of distance learning courses. Asynchronous learning allows flexibility, as students can complete their tasks at their own convenience. Moreover, it permits more time for further contemplation and reflection (Hiltz & Goldman, 2005).

Comparing the two methods, Levin, He and Robbins (2006) suggested that synchronous learning develops students' critical reflection levels more than asynchronous online course delivery. In addition, Yang and Tang (2003) stated that a combination of asynchronous learning and in-class discussion resulted in better quality and quantity of discussion compared to students who participated only in asynchronous learning. Furthermore, asynchronous distance learning has many drawbacks that hinder students' learning, such as a lack of instant feedback (Schullo, Venable, Barron, Kromrey, Hilbelink, & Hohlfeld, 2005), feelings of isolation, and distance from the social environment (Vonderwell, 2003). Unlike previous studies, this paper focuses on using both synchronous and asynchronous methods in comparison to using only one method to examine the differences in students' perception and performance.

Studies have shown that students achieve better results in blended learning environments than in the traditional learning environment (Page, Meehan-Andrews, Weerakkody, Hughes & Rathner, 2017). A study by Page et al. (2017) reported that using synchronous and asynchronous styles in learning improved students' grades in contrast to the traditional learning style. A qualitative study by Ghazal, Samsudin and Aldowah (2015) looked at students' perception of the use of Skype-based videoconferencing. The

participants were post-graduate students at a university in Malaysia. The results revealed that the students' perceptions changed during the course because they gained a better understanding of the concept of synchronous learning and videoconferencing. By the end of the course the students acknowledged the benefits provided by synchronous learning.

Student Perception

Many scholars and educators have focused on examining and exploring students' perception of distance learning. For example, O'Brien, Hartshorne, Beattie & Jordan (2011) showed that many students were aware of and preferred online classes due to the flexibility of the delivery method of the online course. Additionally, the online environment made students feel comfortable and allowed them to receive positive feedback on their learning. Distance learning includes video and audio elements of instructional material and is regarded as the second-generation mode delivery of distance learning (Aoki, 2012).

Other studies explored the effects of learning styles on students' perceptions (Simpson & Du, 2004; Richmond & Liu 2005); these studies focused only on learners' success and attitudes in a traditional learning context. Offir, Bezalel and Barth (2007) found a direct correlation between students' perceptions of synchronous videoconferencing and asynchronous online learning and their cognitive style of learning. Some studies examined both synchronous and asynchronous learning and looked at student interaction in each method; these studies resulted in a need for constructivist learning models (Resta & Laferrière, 2007; Zapantis & Maniscalco-Feichtl, 2008). Meanwhile, other researchers examined the factors that affected the relation between student attitudes and perceptions in a synchronous videoconferencing environment; they concluded that it was necessary to control these factors and provide a learning environment with a constructivist learner-centered context (Euzent, P., Martin, T., Moskal, P. & Moskal, P., 2011). Moreover, the researchers focused on student interaction and engagement during the learning process to achieve positive attitudes. McFarland & Hamilton (2005), Poirier & Feldman (2004), and Summers, Waigandt & Whittaker (2005) found that students performed better in distance learning settings than students in a face-to-face learning environment. However, some studies found the opposite with regard to attitudes and perceptions (Edmonds, 2006).

Some studies regarded students' perceptions as essential in defining the instructional benefits of asynchronous discussion. As Walker and Arnold (2004) explored the benefits of using asynchronous learning themselves, they found that the asynchronous online setting enriched their learning experience. Additionally, Picciano (2002) studied students' perceptions and their relation to asynchronous postings and reported "*a strong relationship between students' perceptions of the quality and quantity of their interaction and their perceived performance in an online course*" (p. 12). However, Carrol and Burke (2010) stated that that no delivery method is more effective than any other in terms of students' perceptions and achievement.

A qualitative study by Coogle & Floyd (2015) examined students' perception of synchronous and asynchronous learning environments. The participants were comprised of 18 graduate students in a rural area attending a distance learning course. The results of the study showed that the students benefited from both learning styles. However, Doggett & Mark (2008) conducted a study to examine students' perceptions of videoconference learning and found that the instructor's way of teaching over videoconference resulted in the students' positive perception of videoconferencing. 64% of the students were comfortable asking questions during the videoconferences. However, the use of technology was a barrier to 57% of the students. Further, McBrien, Cheng & Jones (2009) examined students' learning experiences in a virtual learning environment. They conducted the study in six undergraduate and graduate courses and found that students faced various challenges in the virtual learning environment, such as technical issues and the pedagogical preferences of the students.

Method

The study was conducted at the University of Ha'il to investigate student performance and perceptions in different distance learning delivery settings. The study employed an experimental design and used two distance delivery methods (asynchronous method and synchronous with asynchronous method). The participants were female students on a physics course in the first semester of their preparatory year at a branch of the university. They were taught by a male instructor from the main campus. The course used the videoconference method for lectures and course discussions for the first seven

weeks of the semester, followed by videoconferencing with Blackboard for the next seven weeks. The students took an exam at the end of each seven-week period, and at the end of the course their grades were compared for the two delivery methods. There were 49 student participants in the videoconference group and 41 in the videoconference with Blackboard group. The reduced number of students in the second seven-week period was due to some students withdrawing from the course.

A survey was adapted from Doggett&Mark's (2008) study to collect data from the students in both groups. The same survey was used for both groups, but the name of the delivery method was adapted for each purpose (see Table 1).

Table 1.

Survey items of Doggett& Mark's study (2008).

- I am comfortable asking questions using the videoconferencing format.
- I would have felt more engaged in a normal class setting.
- The videoconferencing technology is a barrier to my interaction with the instructor.
- The purpose of using the videoconferencing technology is clear to me.
- The instructor uses videoconferencing technology appropriately.
- The instructor uses appropriate media with the videoconferencing to enhance learning.
- The use of videoconferencing technology in this course encourages me to continue discussions.
- The use of videoconferencing technology in this course encourages me to learn independently.
- The instructor encourages me to ask questions.
- The instructor establishes a rapport with participants.
- The instructor is able to facilitate our communication.

- If I had known this was going to be a videoconferencing class, I would not have taken it.
- The instructor is able to use the videoconferencing technology required for this course.
- I would take another course that used this technology.
- I would recommend this course using this technology.

Students' responses were collected by an electronic survey at the end of each method. The students responded to the questionnaire by using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Both surveys were translated into Arabic to help the participants participate without any language challenges.

Reliability/Validity

The researcher conducted a pilot study with 30 participants and found that the Pearson correlation coefficients between the variables were significant and that the alpha reliability of the videoconference with Blackboard survey was highly acceptable ($\alpha = 0.968$). Face and content validity were conducted for the surveys by experts in the field, who reviewed the items to ensure that the surveys would achieve the goal of the study.

Data analysis

SPSS software was used to analyze the data of student perception and student performance. Independent sample t-tests, mean and standard deviation scores were used to measure student perception and performance.

Results and discussion

This study aimed to investigate student perception and performance regarding two delivery methods (videoconference and videoconference with Blackboard) at the University of Ha'il. However, there are two main research questions behind this study.

General information about the participants

Both surveys had some general information about the students who took the course. The total number of participants in each group was 49 (videoconference group) and 41 (videoconference with Blackboard group). The percentages of preference of the two methods were 46.6% for the videoconference method and 53.4% for the videoconference with Blackboard method. Moreover, 30.61% of students in the videoconference group were repeaters (taking the course for a second time), as were 14.63% of students in the videoconference with Blackboard group.

Table 2

General information about the students

	Participant Numbers	Percentage of Preference	Percentage of Students Repeating the Course
Videoconference Method	49	46.6%	30.61%
Videoconference with Blackboard Method	41	53.4%	14.63%

Analysis of Research Question 1

- Are there any differences in student performance between the two delivery methods?

The descriptive statistics for the students' performance in the two groups, as measured by their grades, are presented in Table 3 below; the results show that the average grade for students in the videoconference with Blackboard (VC+BB) group (mean = 63.90) is much higher than the average grade for students in the videoconference (VC) group (mean = 42.33). The standard

deviation for the VC+BB group (SD = 16.83) is also lower than the standard deviation for the VC group (SD = 25.34).

Table 3

Number of students, mean and standard deviation for student performance in two methods

	Method	N	Mean	SD
Performance	VC+BB	41	63.90	16.83
	VC	49	42.33	25.34

Independent sample t-tests were conducted to determine if student performance was different between the two groups (see Table 4). The results of the t-test conclude that there is a statistically significant difference in the students' performance between the two groups: $t(88) = 4.69$, $P < 0.001$, Cohen's $d = 1.00$.

Table 4

Independent sample t-tests of two delivery methods based on student performance

	Methods	N	M	SD	t	df	Sig. (2-tailed)	Cohen's d
Performance	VC+BB	41	63.9	16.83	4.69	88	0.000	1.00
	VC	49	42.3	25.34				

Most previous studies showed that there is no significant difference between student performance and the various delivery methods (Naaj, Nachouki & Ankit 2012; Carrol & Burke, 2010; Larson & Chung-Hsien, 2009). However, the current results reveal that student performance is affected by the videoconference with Blackboard delivery method. This result is consistent with the study by Coogle and Floyd (2015) in which the students proved they could achieve better performance and improve their outcomes in a combined asynchronous and synchronous learning style. Moreover, Means et al. (2009) looked at two different delivery methods, namely the online method versus the face-to-face method, and found that the online method impacted the students' performance positively.

These results could be explained as a consequence of a well-designed distance course that uses asynchronous and synchronous methods to support student learning and achievement, especially for students in rural areas (Coogler & Floyd, 2015). Additionally, Page, et al. (2017) noted that certain factors impact student performance or help them be successful in their course, such as perceived quality of teaching, amount of content, teaching style and instructor confidence. Therefore, a setting with qualified instructors who can manage and facilitate the online material will help students gain knowledge and experience positive outcomes that influence their perception and performance. On the other hand, technical issues might affect student performance and perception, leading students to consider an online setting to be a barrier to interacting with the instructors (Doggett&Mark, 2008). In addition, Page, et al. (2017) thought at the beginning that the instructor was not active during the videoconference. Later, they understood that the students themselves had difficulties dealing with the technology.

Analysis of Research Question 2

- Are there any differences in student perception between the two delivery methods?

In order to answer this question, mean and standard deviation were calculated for each item of the surveys and the total of the items for student perception. An independent sample t-test was also run to see if there was any difference between the two distance learning delivery methods. In the videoconference with Blackboard method, the total mean of the students' perception, as reported in Table 5, was 3.87 (SD = 1.08), while in the videoconference only method the total mean of the students' perception was 3.25 (SD = 1.46).

Table 5

Mean and Standard Deviation based on the surveys of items of two delivery methods (videoconference with Blackboard method and videoconference method)

Videoconference with Blackboard Method			Videoconference Only Method		
Items	Mean	SD	Items	Mean	SD
1	3.90	2.55	1	3.22	1.12
2	3.95	2.68	2	3.20	1.46
3	3.76	2.42	3	2.92	1.55
4	3.66	2.84	4	3.80	1.10
5	4.10	2.79	5	4.12	1.25
6	3.83	2.97	6	3.78	1.21
7	3.80	2.47	7	3.86	1.31
8	3.90	3.01	8	2.08	1.19
9	3.98	2.76	9	3.04	1.38
10	3.59	2.41	10	3.41	1.21
11	3.88	2.63	11	3.61	1.51
12	3.66	2.62	12	3.51	1.28
13	3.83	2.48	13	3.82	1.27
14	4.22	3.11	14	2.02	1.23
15	4.05	2.93	15	2.31	1.58
Total items	3.87	1.08	Total items	3.25	1.46

An independent sample t-test was conducted to compare the two distance learning delivery methods (videoconference with Blackboard and videoconference only). There was a significant difference between the two groups: videoconference with blackboard ($M = 3.87$, $SD = 1.08$) and videoconference only ($M = 3.25$, $SD = 1.46$); $t(88) = 2.25$, $P = 0.027$, Cohen's

$d = 0.48$. These results suggest that the videoconference with Blackboard method has more of an effect on student perception than the videoconference method.

According to student responses, Items 8, 14, and 15 were considered extremely statistically significant in the two methods. Item 8 “The use of videoconferencing with Blackboard technology in this course encourages me to continue discussions” was significantly different: $t(88) = 3.89, P < 0.01$, Cohen’s $d = 0.80$. Item 14 “I would take another course that used this technology (videoconferencing with Blackboard)” was significantly different: $t(88) = 4.55, P < 0.01$, Cohen’s $d = 0.93$. Finally, Item 15 “I would recommend this course using this technology (videoconferencing with Blackboard)” was significantly different: $t(88) = 3.58, P < 0.01$, Cohen’s $d = 0.73$.

The literature presented several studies that examined synchronous and asynchronous methods of distance learning. The synchronous environment in the videoconference method is less comfortable for female students, and they see the availability of asynchronous learning (Blackboard) as more convenient. This is consistent with the findings of McBrien, Cheng & Jones (2009), where they recorded that students who were shy about participating in a face-to-face setting were more comfortable and confident participating in an asynchronous technology setting. In addition, some students have good computer skills and are more motivated to participate in an asynchronous discussion. Due to the frequent use of technology by young students, they usually tend to prefer courses where instructors use computers and other technological tools. In contrast, when expressing their perception of the synchronous learning style, some students stated that technical problems prevented them from seeing each other in the video calls. They also faced difficulties dealing with time management (Ghazal et al., 2015).

Recommendation

According to the findings and in order to better understand the use of synchronous and asynchronous online distance learning in universities, this study recommends the following:

- The sample study is not large enough to generalize the results of the study. Therefore, more qualitative research is needed to explore the students' preferences and the quality of their performance.
- Future research is needed to examine different online tools and learning delivery methods in online distance learning.
- It is very important to examine the differences between the effects of the synchronous method, the asynchronous method, and a blend of synchronous and asynchronous methods on student interaction, engagement and performance.
- Rectors and policy makers at Saudi universities should fully activate the role of Deanship of E-learning to reap the benefits of the technology and encourage faculty members to improve their technology skills, specifically in terms of integrating technology in their teaching.
- More research is needed to examine the role of instructors in distance learning and how Blackboard can be used effectively in all colleges.
- Professional development is needed for instructors who lack technological skills.

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