

University of Northern Colorado

Scholarship & Creative Works @ Digital UNC

Dissertations

Student Work

5-2018

Effectiveness of Student Engagement Using Learning Management System in the Blended Learning Environment at Saudi Electronic University

Yousef Almoslamani
University of Northern Colorado

Follow this and additional works at: <https://digscholarship.unco.edu/dissertations>

Recommended Citation

Almoslamani, Yousef, "Effectiveness of Student Engagement Using Learning Management System in the Blended Learning Environment at Saudi Electronic University" (2018). *Dissertations*. 484.
<https://digscholarship.unco.edu/dissertations/484>

This Dissertation is brought to you for free and open access by the Student Work at Scholarship & Creative Works @ Digital UNC. It has been accepted for inclusion in Dissertations by an authorized administrator of Scholarship & Creative Works @ Digital UNC. For more information, please contact Nicole.Webber@unco.edu.

UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

EFFECTIVENESS OF STUDENT ENGAGEMENT USING
LEARNING MANAGEMENT SYSTEM IN THE
BLENDED LEARNING ENVIRONMENT AT
SAUDI ELECTRONIC UNIVERSITY

A Dissertation Submitted in Partial Fulfillment
of the Requirements of the Degree of
Doctor of Philosophy

Yousef Almoslamani

College of Education and Behavioral Sciences
Department of Educational Technology

May 2018

This Dissertation by: Yousef Almoslamani

Entitled: *Effectiveness of Student Engagement Using Learning Management System in the Blended Learning Environment at Saudi Electronic University*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in College of Education and Behavioral Sciences in Department of Educational Technology,

Accepted by the Doctoral Committee

Mia Kim Williams, Ph.D., Research Advisor

Brian C. Rose, Ph.D., Committee Member

Hyun J. Kang, Ph.D., Committee Member

Cassandra M. Bergstrom, Ph.D., Faculty Representative

Date of Dissertation Defense _____

Accepted by the Graduate School

Linda L. Black, Ed.D.
Associate Provost and Dean
Graduate School and International Admissions

ABSTRACT

Almoslamani, Yousef. *Effectiveness of Student Engagement Using Learning Management System in the Blended Learning Environment at Saudi Electronic University*. Published Doctor of Philosophy dissertation, University of Northern Colorado, 2018.

The use of learning management systems (LMS) in higher education continues to grow, yet research into the impact of the amount of engagement on student outcomes is still developing. This dissertation investigated the relationships between student engagement and student outcomes in the blended learning environment of Saudi Electronic University. It used data from LMS activities self-reported by students with special attention to whether gender played a role in the level of engagement and quality of outcome. This dissertation used a quantitative method to analyze the correlational relationship between the perceived amount of time students spent hourly participating in LMS activities and student grade point average (GPA). Furthermore, this dissertation measured the perceptions of students' level of online engagement utilizing the Students' Engagement Questionnaire. The participants were 246 students from Saudi Electronic University. Results indicated no statistically significant difference between genders regarding their online engagement. In addition, no significant relationship was found regarding students' grade point average and online discussion, audio discussion, and virtual lecture. However, a statistically significant difference between genders was found in their perception of the number of hours spent per week on LMS activities. Therefore, Saudi Electronic University must encourage instructors to use more multimedia such as

video conferencing and audio discussion to enhance students' critical thinking and engagement in LMS activities, thus improving students' outcomes.

Keywords: Learning management system (LMS), Students' Engagement, blended learning, and LMS data activities.

TABLE OF CONTENTS

CHAPTER I. INTRODUCTION.....	1
Statement of the Problem.....	4
Purpose of the Study	5
Research Questions	6
Definitions of Terms	7
CHAPTER II. LITERATURE REVIEW	10
Student Engagement	10
Online Engagement Based on Gender	14
Outcomes and Student Engagement	18
Learning Management Systems	24
Higher Education in Saudi Arabia	31
Blended Learning.....	36
Summary	40
CHAPTER III. METHODOLOGY	43
Study Sample	44
Instrument	44
Data Collection and Procedures.....	47
Data Analysis	48
Limitations of the Study.....	48
CHAPTER IV. FINDINGS	50
Reliability of the Scores.....	51
Tests for Assumptions.....	52
Results of Multivariate Analysis.....	53
Demographics	61
Self-Report of Learning Management System Activity	66
CHAPTER V. DISCUSSION AND CONCLUSION	78
Research Question One.....	79
Research Question Two	81
Research Question Three	84

Recommendations/Implications..... 87

Future Research 88

Conclusion 89

REFERENCES 92

APPENDIX A. SURVEY 113

APPENDIX B. CONSENT FORM FOR HUMAN PARTICIPANTS IN
RESEARCH..... 119

APPENDIX C. INSTITUTIONAL REVIEW BOARD APPROVAL 122

APPENDIX D. PERMISSION TO CONDUCT RESEARCH AT SAUDI
ELECTRONIC UNIVERSITY..... 124

LIST OF TABLES

1.	Cronbach’s Alpha of Student Engagement Questionnaire from Prior Research	47
2.	Overall Internal Consistency for the Student Engagement Questionnaire	52
3.	Frequencies and Percentages of Participant Demographic Variables.....	62
4.	Educational Level for Gender and Type of College	64
5.	Educational Level for Gender and Grade Point Average	65
6.	Educational Level for Gender and Courses Taken	65
7.	Student Estimations of Online Engagement	67
8.	Multivariate Tests of Online Engagement	68
9.	Student Perceptions of Number of Hours Spent Per Week on Learning Management Systems Activities.....	72
10.	Multivariate Tests of Student Perceptions Regarding Number of Hours Spent Per Week on Learning Management Systems Activities.....	73
11.	Correlation Between Student Grade Point Average and Perceived Number of Hours Students Estimated They Spent on Learning Management Systems Activities.....	76

LIST OF FIGURES

1.	Multivariate outliers for online engagement between genders	54
2.	Multivariate outliers for active learning between genders.....	55
3.	Multivariate outliers for academic relevance between genders	56
4.	Multivariate outliers for online collaboration between genders	57
5.	Multivariate outliers for social interaction between genders	58
6.	Multivariate outliers for online discussion between genders.....	59
7.	Multivariate outliers for audio discussion between genders.....	60
8.	Multivariate outliers for virtual lecture between genders	61
9.	Perceived number of hours students estimated they spent on online discussion, audio discussion, and virtual lecture	66
10.	Perceived number of hours students estimated they spent in online discussion	69
11.	Perceived number of hours students estimated they spent in audio discussion	70
12.	Perceived number of hours students estimated they spent in virtual lecture ...	71
13.	Perceived number of hours students estimated they spent in online discussion according to grade point average	74
14.	Perceived number of hours students estimated they spent in audio discussion according to grade point average	74
15.	. Perceived number of hours students estimated they spent on virtual lecture according to grade point average	75

CHAPTER I

INTRODUCTION

Education equips students with problem-solving skills and prepares them for future social roles. Every institution strives to provide the kinds of quality services that best suit the needs of both learners and society. Service deliveries in learning institutions, however, depend upon the effectiveness of certain factors such as the form in which learning materials are presented to students and how the institution manages and stores records. One measure of a successful college is the system it adopts to run its activities. Bates and Poole (2003) affirmed the type of coordination implemented in a learning environment impacted the welfare of both students and teaching staff. Bersin, Howard, and O'Leonard (2008) identified learning management systems (LMS) as an effective and efficient way of running activities of learning institutions. An LMS is a complex, web-based application that provides tools and functions such as content delivery, learning assessment, communications services, and course management. It supports learners for online or blended-learning activities. These systems could be used by learning institutions and corporate training systems (Inversini, Botturi, & Triacca, 2006). An LMS is an e-learning system that incorporates a high level of strategic planning to manage educational events within an organization so it can provide online learning in a virtual classroom, allowing the institution to manage learners, the types of activities occurring, and necessary administrative functions (Fetaji & Fetaji, 2007). Such

applications have become a necessary component of both teaching and learning. Most U.S. universities have adopted some sort of LMS to assist student learning and instructor planning (Chung, Pasquini, Allen, & Koh, 2012).

Institutions of higher education with Internet capabilities have been able to provide online courses that allow students who are unable to physically attend classes on-site (Klassen & Vogel, 2003). According to Young (2006), online learning has changed the methods used to provide instruction as well as the role of instructors, specifically through distance learning. According to the ITT Technical Institute (2007), online learning has allowed students to learn anytime and anywhere; it has been defined as an online learning environment where students can self-determine the pace of their educational process and have the flexibility to access their programs at any time to work around issues such as other employment or family responsibilities. Thus, online learning has become an important component of the educational system.

The Chronicle of Higher Education (2003) reported that U.S. public four-year institutions of higher education provided at least some learning online to approximately 89% of students while two-year public institutions provided online learning to approximately 90% of students. Due to the growth in the use of online learning for at least some part of education delivery, higher education has become a major global market for LMS programs. Global revenues of LMS providers had increased from \$1.9 billion in 2013 to \$2.6 billion in 2014. Such projections for LMS implementation in higher education have been expected to further increase to \$7.8 billion by 2018. In fact, approximately 99% of higher education institutions (universities and colleges) in the

world use some form of LMS application to deliver their services (Dahlstrom, Brooks, & Bichsel, 2014).

Online learning has become an important tool for teaching and learning. E-learning systems have allowed for meaningful learning through student-centered, life-long, and self-directed learning; could create greater opportunities for a larger cross-section of students than typical site-specific learning environments (Jones, Morales, & Knezek, 2005); and could help students build knowledge through active, collaborative, problem-based, situated, and resource-based learning (Nichols, 2003). In the last decade, online learning has become one of the most common teaching and learning methods in the world (AlNajdi, 2014).

However, in Saudi Arabia, online learning has been slow in being integrated into higher education as the Saudi higher education system has relied mainly on traditional methodologies to support pedagogy. Therefore, online learning still has not been used as widely as it could be to support teaching and learning (AlNajdi, 2014). However, LMS has many benefits for pedagogy, which could combine face-to-face and hybrid learning. From the start, Saudi universities and colleges have also been implementing and adapting LMS programs to provide other opportunities for students to study via online learning such as reaching students located in remote or rural areas of the country or to allow students with certain disabilities access to education via the Internet (AlNajdi, 2014). The National Center for e-Learning and Distance Learning (NCeL; 2010b) was established to both monitor and assist colleges and universities in developing online learning based on meeting specific student needs. One example is an institution of higher education must be licensed by NCeL (2010b) to offer online learning. Another is an

initiative that established the LSM “Jusur,” a web-based application used to launch online courses. The country also established the Saudi Digital Library (SDL) to assist researchers in accessing resources more effectively (AlNajdi, 2014). The National Survey of Student Engagement (NSSE; Pascarella, Seifert, & Blaich, 2010) was also created to measure student participation, time, and effort on academic and institutional activities. Pascarella et al. (2010) found improvements in NSSE scores were indicators of improved student education outcomes.

Statement of the Problem

Traditional learning requires students to engage in different activities in schools and colleges. For example, discussions between students require students to interact and collaborate within the classroom (Alanazy, 2013). Whereas the online learning environment has many tools in which students can engage such as voice chat (Alanazy, 2013). As a result, online learning environment can be difficult due to students’ willingness and interaction within practice activities.

Baepler and Murdoch (2010) found higher education institutions implementing learning management systems have been developing the necessary technology tools that would allow them to invest in human resources and infrastructure. However, student engagement with LMS environments has not been studied empirically nor has student performance with content been explored in relation to student adaptation within such learning environments. According to Coates, James, and Baldwin (2005) and Trowler (2013), there has been a lack of research exploring student engagement in LMS environments. Coates et al. (2005), Dawson and McWilliam (2008), and Long and Siemens (2011) indicated LMS data may be used to measure student engagement for use

in institutional planning. However, research is lacking that investigates relationships between student engagement and LMS usage data.

In Saudi Arabia, education from K-12 and also higher education is a single-sex education. As a result, females and males are separated at all levels of education. For this reason, gender was an interesting research element for this study in exploring engagement. It is important to know any differences about online engagement and related outcomes based on gender differences. In Saudi Arabia, Saudi Electronic University is the only university that provides a blended learning environment, which is a new method of teaching and learning being applied in the country. Also, knowing about increased student engagement in a blended learning environment at Saudi Electronic University could lead to successful learning and help inform practice at the university. Only through assessing the engagement within the LMS activities and student outcomes will researchers be able to make informed decisions about instructional implementation.

Therefore, the present study specifically sought to address some research questions and add to the literature about LMS integration, student engagement, and student performance in LMS-assisted learning environments. In addition, it examined whether or not the gender of the Saudi Arabian student related to his/ her level of engagement and/or use of the LMS via Blackboard.

Purpose of the Study

The purpose of this research was to discover if there was a correlation between student engagement with LMS programs and student outcomes by analyzing LMS data (via Blackboard) in the blended-learning environment of Saudi Electronic University. The research also examined whether gender played a role in the level of student

engagement in this setting. Dixon (2010) identified two reasons to study student engagement in online courses. The first was the growth in the number of students taking higher education courses through online programs. For example, in the United States alone, this figure increased from 2.3 million to 3.2 million between 2004 and 2005 (Allen & Seaman, 2006). The second reason was achieving high student engagement was considered one of the most important components to effective teaching (Beer, Clark, & Jones, 2010). Due to the segregated nature of Saudi education, it was important to consider the issue of gender vis à vis engagement due to the dramatic increase in recent years in female applicants to Saudi institutions of higher education.

Dahlstrom and Bichsel (2014) found 72% of the students they studied preferred a blended-learning environment--a combination of face-to-face and online learning. Their study indicated that with the rise in LMS use, student usage of blended-learning environments has also increased over the last decade. Baepler and Murdoch (2010) found a need for research utilizing both actual data from LMS activities and questionnaire-type inquiries to fully determine how perceptions of student activity levels and actual activity levels compared.

Research Questions

The following research questions guided this study:

- Q1 Is there a significant mean difference related to student gender in their online engagement in the blended learning environment of Saudi Electronic University?
- Q2 Is there a significant mean difference due to student gender in terms of student perception of the number of hours spent per week on learning management systems activities in the blended learning environment of Saudi Electronic University?

- Q3 Is there a significant correlation between student grade point average and the perceived number of hours students estimated they spent on learning management systems activities in the blended learning environment of Saudi Electronic University?

Definitions of Terms

Academic analytics. A tool used by educational institutions through which they analyzed various student attributes obtained through learning management systems to design better tools for managing and administering academic programming (Dawson & McWilliam, 2008; Goldstein & Katz, 2005; Wolff, Zdrahal, Nikolov, & Pantucek, 2013).

Audio discussion. The Blackboard instant messaging (IM) service that enabled faculty and student online communication (Saudi Electronic University [SEU], 2017).

Blended learning. Educational programming that combines online and traditional instruction; rather than rigidly requiring students to either attend a physical classroom or to solely obtain learning via online programs, such environments merge both types to provide a more comprehensive experience (Kemper, 2015).

Learning management system. An electronic information system implemented by an institution to facilitate online learning or e-learning that supported teaching, learning activities, communications, and administration. Such applications included software tools that could be used to support online-learning environments and virtual-online education (Klobas & McGill, 2010).

Online engagement. Refers to the level of psychological investment and effort the student expended toward obtaining knowledge, skills, and learning through online methods (Fredricks, Blumenfeld, & Paris, 2004).

Saudi Electronic University. The Ministry of Saudi Higher Education established the Saudi Electronic University (SEU) in 2012 in the capital city of Riyadh to provide the higher learning and lifelong learning for Saudi students (Ministry of Education, 2016). The SEU (2012b) established the three branches in Jeddah, Dammam, and Medina; currently has 20 branches across the Kingdom of Saudi Arabia; and serves more than 10,000 students. The goals of the SEU are to provide the best education model integrated with sophisticated techniques for Saudi students and provide quality academic learning. It provides undergraduate degrees and master's degrees in different majors in the following colleges:

- The College of Administrative and Financial Sciences;
- The College of Computing and Informatics;
- The College of Health Sciences.
- The College of Science and Theoretical Studies (SEU, 2012a).

Saudi Electronic University has used a blended-learning environment, which has consisted of 25% face-to-face learning and 75% online learning in English language starting in the first year of studying--the preparatory year at SEU. The SEU provided the learning-management system, which was helping students to participate in virtual classroom, video tutorials, book contents, and interaction with educational forums. Also, the SEU (2012a) has many features of LMS for instructors to build the courses content.

Self-report data. Data acquired through such tools as questionnaires where study participants answer questions designed to supply the researcher with information

on the participants' perceptions of his or her activity or behavior rather than gathering data from objective, strictly factual sources other than the subjects.

Student engagement. Trowler (2013) defined student engagement as

the investment of time, effort and other relevant resources by both students and their institutions intended to optimize the student experience and enhance the learning outcomes and development of students, and the performance and reputation of the institution. (p. 3)

Virtual learning. A service that provides learning/education to students remotely

through which students can “attend” the physical classroom using an online connection and participate in the classroom discussion using audio and/or video technology (SEU, 2017).

CHAPTER II

LITERATURE REVIEW

Student Engagement

Higher education only began to recognize the importance of analyzing and encouraging student engagement as recently as the 1990s. In 1998, a number of education experts, researchers, and organizations came together to conduct the first National Survey of Student Engagement (NSSE; Pascarella et al., 2010). However, according to Coates (2006), researchers had been studying student engagement for the previous three decades. For example, studies were conducted by Pace (1979) for students' quality of effort, Chickering and Gamson (1987) for good practices, and Astin (1984) for students' participation based on psychosocial and physical factors. These studies examined the student effort and practices employed to enhance student participation in the campus environment as it related to student success. Also in 1984, Astin proposed a theory to explain how student involvement in the post-secondary experience might be related to student backgrounds and how such levels of involvement related to the opportunities students enjoyed after graduation.

Institutional behavior has been found to impact student success; therefore, it was important for colleges and universities to determine how to best structure their offerings to support students. Chickering and Gamson (1989) proposed seven principles for best practices in learning and teaching that could also be very helpful in course design: (a)

communication between students and instructors; (b) cooperation between students; (c) encouragement of students to utilize active learning; (d) provision of feedback to students; (e) emphasize the need for students to complete tasks/assignments on time; (f) hold high expectations for all students and instill students with high expectations for themselves; and, (g) respect for student diversity in such areas as learning style, ability, and achievement. These principles were guidelines for developing teaching and learning in any type of environment or setting--from face-to-face, to blended, to purely online.

There have been certain disadvantages to online learning: a lack of engagement in an asynchronous environment, a lack of connection between students and instructors, and the challenges of engaging in collaborative projects in the online environment (Clark, 2003). On the other hand, online education has possessed numerous positive traits such as the ability to maintain a higher level of communication with students, flexibility in the learning process, ability for instructors to act as a coach and mentor rather than simply a director, and an enhanced sense of community--all of which might help students be more successful in an online-learning environment rather than a physical one with inflexible programming hours (DeVine, 2013).

Certain research has suggested methods for addressing potentially negative factors sometimes noted with online-learning programs. In separate studies, Salmon (2002) and Huang (2002) suggested a model for facilitating such environments that identified several elements as critical to a successful program: access, motivation, knowledge construction, socialization, interactive learning, authentic learning, collaborative learning, student-centered learning, information exchange, and the facilitation of learning. Moreover, students need strategies to learn successfully in online

environments and could benefit from the inclusion of the following: strategies to enhance online learning environments that include emphasizing time management skills as well as strong encouragement and support for engaging in online discussion. These tools encourage students to ask questions, stay motivated, understand instructions (or request clarification when they do not), and keep open communication with students (Roper, 2007).

Gender has long been identified as an important factor for educators to consider in traditional classrooms. Until recently, it had not been addressed much in online or blended environments. Vogt (2016) examined actual student engagement in LMS activities compared to students' perceptions of their activity levels. The participants were 214 students (154 females, 60 males) at the urban Ontario College of Applied Arts and Technology in Canada. This study explored whether any differences existed between student engagement related to gender and investigated the correlation between actual engagement and student estimates of LMS activity. Vogt found no significant differences between the responses of the male and female participants in certain categories. However, the study did find certain variations related to gender. For example, female students scored higher than males on visits to content pages. In addition, males were found to have created more discussion posts and females were found to have replied to posts less often than their male counterparts. In general, the results indicated female students were more engaged than were male students. Regarding a relationship between online engagement SEQ scores and student estimates of their own LMS activity, the results indicated no significant correlation between the student

estimates of LMS activity and their online engagement SEQ total scores related to gender.

Lerma (2010) conducted a study to investigate students' engagement in online courses at the community college in Southern California. This study used the NSSE survey to measure online engagement for age and gender. Participants were 465 students who enrolled in online courses: 308 female students and 158 male students. Results indicated no significant interaction between gender and level of engagement such as collaborative/active learning.

Chang (2012) conducted a study to explore how the role of gender impacted the engagement of students in eight universities in Taiwan by using the National Survey of Student Engagement (NSSE). Participants were 886 students, representing 44.92% of male students and 55.08 % of female students. Results indicated gender was the only feature related to engagement of students. Also, it showed the female students were slightly higher engaged than were male students. Furthermore, results indicated a weak correlation between gender and students' engagements.

Studies have also explored the link between the level of student engagement and online students' achievement through LMS activities such as page visits and their frequency of discussion. A sample of 38 students was selected randomly from 70 students (Hamane, 2014). The Online Student Engagement Survey (OSES) was used to measure students' level of engagement in an online course. Results indicated a weak positive relationship between frequent login activity in LMS and the level of engagement. Results also found the higher the students' frequency of logins, the greater the level of total engagement (Hamane, 2014).

Online Engagement Based on Gender

Gender is an element necessary to consider in the level of engagement in online learning (Lerma, 2010). There was a change of the social attitudes concerning access to higher education for the general public. According to Brock (2010), the demographics of students have changed in higher education; in the 1970s, more male students were enrolled in colleges and universities. By 2005, the ratio of gender had reversed--more females than males were enrolled at higher education institutions. Also, the growth of online learning enhanced higher education institutions by adding online courses, thus changing diverse characteristics of the student population (Hamane, 2014).

According to Dahlstrom and Bichsel (2014) in their study to compare gender when using information technology, there was no difference between males and females utilizing technology in education. Diaz (2000) explored how gender played a role when choosing online or traditional learning in community college health courses. Results indicated women chose online learning more than men; one of the primary reasons women preferred to take online courses was due to convenience (Koroghlanian & Brinkerhoff, 2007). Also, women more than surpassed men when using technology related to learning and men chose to utilize LMS activity more than women (Beer et al., 2010; Heffner & Cohen, 2005).

Male and female students had similar significant means for five categories of a learning management system: online engagement, online active learning, online collaboration, online academic relevance, and online social interaction (Vogt, 2016). However, one research study mentioned that males were more engaged in using technology than females (Parker & Bianchi, 2008). Also, females had less experience in

using computers (Vogt, 2016). Yet another study found the level of engagement difference between males and females decreased when females had access to a smartphone and wireless internet in their homes (Junco & Cole-Avent, 2008). According to Berge (1998) and Diaz (2000), females were more engaged in online courses than male and also were more likely to succeed in completing their degrees. Females also preferred online courses to traditional courses (Daugherty & Funke, 1998; Koroghlanian & Brinkerhoff, 2007; Wyatt, 2005). In addition, Robinson (2006) indicated female students were more engaged than males in collaborative learning and online discussion. Moreover, female students were more active learners than males in terms of collaborative learning in online discussion (Hiltz & Shea, 2005). Therefore, students were more likely to use online discussion to support their learning because they could provide detailed responses, critical dialogue, and individual reflections (Garrison & Vaughan, 2008). Caspi et al. (2008) explored the mean difference between gender for online engagement, specifically online discussion. Of the 1,368 participants, 593 were male (43.3%) and 775 were female (56.7%). Results indicated no statistically significant difference between males and females in terms of online discussion.

Willekens (2009) explored students' engagement in hybrid courses and addressed the active, collaborative learning and interactions between students and instructors. The The Community College Survey of Student Engagement (CCSSE) was used at a community college in the Western United States. The aims of the research were to discover mean differences between students based on gender, ethnicity, and course discipline for engagement in a hybrid learning environment. A significant difference was found in means between males and females for collaborative learning and student-

instructor interactions. It showed females were more engaged than males in visiting their Blackboard pages and in online discussion with instructors. Parker (2015) examined the correlation between student engagement and student learning in online programs utilizing students' perceptions of their levels of engagement in their learning and demographic information. Participants were enrolled in online courses at a private online institution in the Northeast. Of the 110 student participants, 73 (67%) were female and 37 (33%) were male. Results from the National Survey of Student Engagement (NSSE) indicated no significant difference between males and females regarding active/collaborative learning, student-instructor interactions, level of academic challenge, and enriching educational experience.

Berger (2014) investigated the perceptions of students and instructors regarding student engagement in online courses environments at a private university according to gender. Of the 130 participants, 109 males represented 75% of the participants and 21 females represented 25% of the participants. Results indicated a slight difference between males and females for online engagement; more than 60% of both genders said "yes" engaging more with online courses. Lerma (2010) conducted a study to investigate students' engagement in online courses at a community college in Southern California. This study used the NSSE survey to measure online engagement for age and gender. Of the 465 students who enrolled in online courses, 308 were female and 158 were male. Results indicated no significant interaction between gender and level of in collaborative/active learning.

Chang (2012) conducted a study to explore how the role of gender impacted the engagement of students at eight universities in Taiwan by using the NSSE. Participants

were 886 students of which 44.92% were male and 55.08% were female. Results indicated gender was the only feature related to engagement of students. Also, it showed female students were slightly more engaged than were male students. Furthermore, results indicated a weak correlation between gender and student engagement. Studies also explored the link between the level of student engagement and online students' achievement through LMS activities such as page visits and frequency of discussion. A sample of 38 students was selected randomly from 70 students (Hamane, 2014). The Online Student Engagement Survey (OSSES) was used to measure students' level of engagement in an online course. Results indicated a weak positive relationship between frequent login activity in LMS and level of engagement. Results also found the higher the students' frequency of logins, the greater the level of total engagement (Hamane, 2014).

York (2012) examined students' engagement in an online class compared to a traditional class based on time spent studying. A one-way analysis of variance (ANOVA) was used to determine any gender difference for spending time engaged in online and traditional coursework. Results indicated no significant difference between males and females for time engaged in an online class and a traditional class. In addition, Vogt (2016) found female students spent more time hourly in visiting course content pages in LMS activity than did male students. A mean difference was also found between males and females for number of page visits and quiz attempts; males spent less time than females in LMS activities. In addition, female students had significantly higher frequencies in creating new forum posts and checking grades than male students. In addition, Anderson and Haddad (2005) explored the mean difference between genders in

online learning. Participants were 109 students from both genders. Results indicated a significant difference between males and females—females were less hesitant when engaging in online discussion.

Outcomes and Student Engagement

Institutions of higher education have been aware of the positive correlation between student engagement and learning outcomes. Such potential positive outcomes of high student engagement include improvements to: (a) academic performance of students, (b) performance of the university or college, (c) experiences of students, (d) learning outcomes, and (e) reputation of the institution (Trowler, 2010). In addition, engaged students tended to report feeling they “belonged” at their institutions which, in turn, would increase retention. It was also demonstrated that information gained from monitoring levels of student engagement could be used to better direct institutional resources and services that support student participation and retention. The importance of the connection between student engagement and student outcomes has also been dependent upon developing student self-esteem and cognitive and psychosocial development (Kuh, 2009; Wolf-Wendel, Ward, & Kinzie, 2009).

Cognitive engagement in students indicates an investment in learning, self-regulation, and an ability to use learning strategies (Fredricks et al., 2004). The concept includes being able to engage in flexible problem-solving, hard work, and the inner strength to face failure or setbacks with a positive attitude (Connell & Wellborn, 1991). Strategic learning has led to more cognitive engagement; this, in turn, has helped students create ideas and make connections between those ideas. Thus, strategic learning has led to more valuable aspects of engagement, self-regulated learning, and motivation

(Fredricks et al., 2004). Behavioral engagement has included positive conduct in academic tasks and activities. This is expressed when students respond to instructors, initiate activities, and engage in independent and autonomous academic behaviors (Buhs & Ladd, 2001; Fredricks et al., 2004).

Institutions have also gathered information on students' social engagement in order to develop an understanding of student perceptions of their educational institutions. Such feedback has aided institutions in decision-making and program creation that better serves students (Trowler, 2010; Zepke & Leach, 2010). The impact of social factors on student engagement has been based on examining student behavior and activity from a psychological perspective (Zepke & Leach, 2010). Psychological engagement has involved subjective concepts such as the feelings of students about their college and their sense of belonging (Kahu, 2013).

Some past research has utilized LMS data. For example, one study looked at an Ontario college's use of LMS data to collect login information of students to learn about the interactions students had with the institution (Macfadyen, Dawson, Pardo, & Gašević (2014). The LMS data included student and institutional activity and recorded such student activities as clicks on content pages and participation in discussion forums to assess the relationships between social engagement and student outcomes (Macfadyen et al., 2014). However, only limited research has been conducted on the correlation between LMS activities and learning outcomes.

Hamane's (2014) study was conducted to discover the correlation between students' actual level of engagement and perceived level of engagement with outcomes by using the learning management system activities in the university's online courses.

The total number of participants were 38 undergraduate students who enrolled in the online Natural Disasters course and the Race and Culture course. Participants included 29 female students and 9 males. The research used grade point average (GPA) of students to discover the students' engagement outcomes; ranges in GPAs were: (a) less than 2.0, (b) 2.0-2.4, (c) 2.5-2.9, (d) 3.0-3.4, (e) 3.5-3.9, and (f) 4.0. Fifteen students were between the range of 2.5-2.9, slightly less than the majority. One student was in the lower range of less than 2 and nine students were in the 3.0-3.4 GPA range. The study used the OSES (Dixson, 2010) to examine students' self-report of perceived levels of their engagement. The LMS record was used to discover students' actual levels of engagement by tracking their data for total logins and number of times. Results indicated the correlation between students' engagement and outcomes were partially positive in the discussion forum (Hamane, 2014). Also, the results indicated the students had a moderate positive correlation between online discussions (posts, replies with perceived level of engagement).

In addition, the findings indicated no relationships between students' perceived level of engagement and student outcomes (Hamane, 2014). Furthermore, results indicated strong relationships between students' actual level of engagement and perceived level of engagement with students' outcomes in the discussion forums (Hamane, 2014). Furthermore, self-report survey research is lacking that explores the correlation between LMS usage and student engagement. Another gap in the literature involved the need for more comprehensive research that examines online engagement through LMS activity in regard to blended learning environments.

Davis and Graff (2005) compare students' frequency of online learning and their grades specifically using the Blackboard discussion board; 122 students (52 females and 70 males) participated. Results indicated students who had higher grades had higher engagement with online activity environments. In addition, according to Shoepe (2013), no useful relationship was found between engagement and student performance in LMS activity as a measure of predicting student learning performance. Also, Fritz (2011) explored the relationship between online LMS activity and student outcomes by using students' grades. Results showed a strong relationship between students' online activity and students' outcomes. Hamane (2014) and Vogt (2016) also found no relationship between perceived level of engagement and student success. Therefore, students who spent time in LMS activity did not essentially achieve their outcomes.

Researchers found positive relationships between student outcomes and LMS activity. For example, students who actively participated in LMS activities tended to perform better academically in the form of achieving better grades (Dawson & McWilliam, 2008; Vogt, 2016). Similarly, Gašević, Dawson, and Siemens (2015) reported Australian students who regularly participated in discussion forums exhibited significant improvement in academic achievement. During the academic years 2006-2009, Alonso, Manrique, Martínez, and Viñes (2011) documented student performance in face-to-face learning environments for the first three years compared to student performance in a blended-learning environment during the 2009 academic year. The participants were 693 undergraduate engineering students for all four years. The results found student performance in the blended-learning environment was significantly higher statistically than student performance in the face-to-face setting. In addition, the use of

Moodle (an LMS) by 111 students was examined to compare their LMS activity with their grades. The results indicated a positive relationship between LMS activity and student GPA (Alonso et al., 2011).

Vaughan (2014) examined 273 students in a blended-learning environment used for seven courses to explore the correlation between LMS activity and final grades. A positive relationship was found between participating in LMS (Blackboard) activities--such as total page visits--and student outcomes as measured by their final grades. Beer et al. (2010) examined the data of students using two major LMS applications--Moodle and Blackboard. The university in question used Blackboard from 2004 to 2010 for online courses; it used Moodle in 2009 as a pilot system and then in 2010 as the single LMS in use at Central Queensland University. The database included student demographics, LMS usage, and grades of 2,714 undergraduate students who studied via online courses. Learning management systems activity was represented in terms of average number of pages visited and average amount of time spent logged in. The researchers found students who used the LMS programming more frequently were more engaged than students who used it less frequently. Students with more visits and/or more login time also had higher GPAs than students who had logged onto their LMS pages less often. These results also showed LMS usage could be utilized to improve student engagement and become a potential resource for decision-making.

Despite all this existing research, a gap exists in the literature that examines student engagement and student outcomes utilizing LMS activity in different learning environments. Therefore, there was a clear need to study how LMS activities could

support learner engagement and improve student outcomes in the blended learning environment.

Learning Analytics

The field of learning analytics is a relatively new one that has been defined as the “measurement, collection, analysis and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs” (Siemens & Gašević, 2012, p. 1). It has been considered a very useful tool that could be used by institutions to improve services and structures (Campbell & Oblinger, 2007). Long and Siemens (2011) described it as a new model for colleges and universities to implement changes that improve efficiency, curriculum, and institutional management, which could drive change throughout their programs.

Other studies have used LMS systems as sources for data collection to conduct learning analytics (Lonn, Aguilar, & Teasley, 2013; Wolff et al., 2013). Lonn et al. (2013) stated the LMS was used to build an “Early Warning System” that focuses on monitoring student engagement in their academic coursework. Information in an LMS has also been used to track student performance through assignment tools. Such data have also been used to create a prediction model to discover risk factors in student performance that might impact student outcomes (Wolff et al., 2013), whereas LMS data have used assignment and activity grades. In addition, an LMS could be used to predict student online behavior by using such data as frequency of access.

Learning analytics have been one of the greatest tools available to examine student engagement (Vogt, 2016). Analyzing LMS data that involve student engagement indicators could aid institutions in adjusting program offerings in order to improve

student success (Coates & McCormick, 2014). Gašević et al. (2015) examined how learning analytics could be used to investigate student performance and achieve meaningful learning.

Summary

Measuring student engagement has been key to helping institutions improve higher education offerings. It has helped administrators understand the data on activity, supports learning analytics, and has aided in the design of instructional systems. Creating engaging learning activities for online courses has motivated active learning such as problem-based and collaborative learning. According to Ross (2009), activities should be an essential component of the learning process and support students in their interactions with the campus environment as well as enrich their educational experiences. Other factors that have impacted student activities and engagement in the campus environment include (a) culture, (b) learner-learner and student-faculty interaction, (c) motivation of learners, and (d) expectations regarding student behavior. So, it has become clear that a learning management system would be helpful in collecting data for the measurement of the many aspects of student engagement.

Learning Management Systems

The LMS has been a very important tool in curriculum design development and in organizing factors that motivate student learning (Özdamli, 2007) by guiding institutions in how to create effective teaching and positive student learning practices (Santos & Boticario, 2007). The LMS is a software application designed to help in the administration of courses for both students and instructors. Such systems have been designed for use in learning and teaching activities (Chung et al., 2012). They have also

provided a variety of methods of interaction between instructors and learners in order to better facilitate the learning process. A well-designed LMS could also help improve student skills such as effective online learning and self-direction (Norouzi, 2014); students could use the system to enhance performance (perceived usefulness); and, students could use such systems with little effort (perceived ease of use; Venkatesh & Davis, 2000).

A majority of higher education institutions have incorporated LMS systems; they have been used in university systems by schools, faculties, and instructors (Klobas & McGill, 2010). Because so much of higher education has been focused on course delivery in a physical classroom, the implementation of an LMS has aided institutions in transitioning to the new online universe of curriculum delivery (Georgouli, Skalkidis, & Guerreiro, 2008). As noted by Dahlstrom et al. (2014), 99% of higher education institutions were using LMS programs in 2014, more than 70.0% of faculty were using LMS, and 83% of students were using LMS. An effective LMS centralizes and automates administration, sustains portability and quality standards, and uses a web-based platform to organize and deliver training programs. Depending on need, an LMS could be used to manage training, organize educational records, and/or distribute learning materials.

Learning managements systems (LMS) programs could also provide computer-based training and continuous professional education (CPE) and could support both classroom teaching and online coursework while serving a larger population of learners than conventional classrooms (Rice, 2008). For institutional development, the web-based features of an LMS could be used to access administration and management training

(Cole & Foster, 2007). By incorporating performance management systems, an LMS could improve management competency, employee appraisal methods, succession planning, and address skill gaps.

The population of Saudi Arabia could double over the next five years, at which point people under 30 could comprise 65% of the population. To meet the educational demands of this rising and youthful population, the Ministry of Education must utilize all available new technologies to improve the quality of education delivery and achieve optimum student performance (Male & Alshathri, 2015). Given the existing emphasis on traditional teaching techniques in Saudi, the blended learning structure--which combines face-to-face educational environments with an online element--might be ideal for the country as it would be a new method of instruction delivery that incorporates different learning tools to link and organizes learning activities to the learning process (Schreurs, Moreau, & Picart, 2003). Blended learning could link communications technology with learning activities to improve student outcomes.

Although there might be some challenges to designing a quality blended-learning program, the benefits to the creation of a successful learning environment are clear. Blended-learning environments have increased access and flexibility, improved the quality of course delivery, encouraged more productive participation through a well-designed learning management system, and integrated electronic media and other web resources within the structure of a traditional teaching environment (Newbury, 2013). The design concepts in a blended-learning environment have focused on activities and the use of resources within the instructional context to enhance learning (Huang, Ma, & Zhang, 2008). For successful blended learning, it would be important to have a platform

that allows instructors and students to engage in ways that support the instructional goals of the course.

Learning Management System Activity

Online discussion. Online discussion is one of the tools in LMS that plays a massive role in students' interaction in online learning. Dawson, Macfadyen, and Lockyer (2009) stated 80% of students' engagement in online class occurred in discussion board. Online discussion is required for all students to engage via discussion board at SEU (Alebaikan, & Troudi, 2010). Alanazy (2013) indicated Saudi female students preferred to use online discussion because they felt confident, were comfortable, and had reduced social anxiety. On the other hand, a lack of interaction between students and instructors through online discussion led to decreased engagement for students. According to Vogt (2016), when instructors had little engagement through discussion board, students had lower engagement in online learning-- 40% of faculty members used online discussion, which led to 38% of students being engaged in online discussion. However, students who were more engaged via online discussion acquired a higher grade result (Dixson, 2010; Hamane, 2014; Vogt, 2016).

Audio discussion. Speaking skills in online courses is a very important tool in preparing students for their future workplace. Speaking skills also help students develop their writing skills (Suttle, 2010). This skill is "internal and not directly observable, but their presence and power may be inferred from the competence with which the skilled activity is performed" (Romiszowski, 2009, p. 204). However, female Saudi students do not like to use speaking skills in an online learning environment (Suttle, 2010). Culture, background, and social anxiety have had a major impact in female Saudi students not

using audio discussion (Alanazy, 2013). Therefore, audio discussion is an essential tool in the online learning environment. Hence, speaking skills support students in being more engaged and they also promote critical thinking (Suttle, 2010).

Virtual lecture. Virtual lecture is a platform consisting of PowerPoint slides with live-recorded audio clips. Virtual lecture helps students review it any time for retention of course content. Cramer, Collins, Snider, and Fawcett (2006) surveyed 116 in-class and 29 online students for using virtual lecture. Results indicated students believed the virtual lecture enhanced students' learning and improved their grades. Also, 90% of students agreed virtual lecture must be used in all courses. In addition, virtual lecture is the only way to receive the lecture materials online. Moreover, students who used virtual lecture more times had significant improvements in their test scores (Cramer et al., 2006).

Engagement of Students in Online Learning Management Systems

Higher education institutions have been using e-learning technologies to access educational resources and improve the quality of learning. This has helped learners improve their information technology skills (Chang, 2008). E-learning technologies have allowed the role of the instructor to evolve--teachers now become not just deliverers of rote learning but course designers, student allies, guides, and evaluators who can take advantage of the flexibility of online environments to create an active learning educational experience for students (Cantoni, Cellario, & Porta, 2003).

To be most useful to the institution, an LMS must address teaching the social and cognitive aspects of learning. The social aspect involves how successfully students function in the non-traditional learning environment of an online or blended program; the

cognitive side relates to how student knowledge has grown “through reflection and communication processes” and the teaching aspect “that directly or indirectly facilitates social interaction and simulation in the cognitive process” (Vázquez-Cano & García, 2015, p. 63).

Online learning using an LMS has advantages such as access to content at any time and identical learning content so all students are exposed to a standardized educational system in keeping with learners’ educational levels (Seo, Hasegawa, & Ochimizu, 2007). In online learning, students are able to communicate through discussion boards and e-mail (Foothill Global Access, as cited in Al-Kassir, 2008). Online education programs would also allow students to be more actively involved in how their education progresses, to control how fast or slow they proceed, to access multiple types of learning, and to access academic advising in a safe and confidential environment. Online education programs must also be interactive and asynchronous, allowing students to respond anytime anywhere. Therefore, an online learning program must incorporate the LMS and integrate it with multiple software programs in order to achieve successful learning standards (Foothill Global Access, as cited in Al-Kassir, 2008).

McGill and Klobas (2009) investigated the influences of task technology performance on the LMS and the role of information system technology success. The focus of their study was on how task technology impacted student performance in the LMS. The researchers also used questionnaires to examine student attitudes toward using the LMS. Participants were students at an Australian university that used the LMS WebCT. There were two main sections to the questionnaires. First, participants were

asked about previous experience and/or training with computers. Second, participants were asked about their perceptions of the role of WebCT in their academic success. There were 267 student participants (more than 73% were female and more than 26% were male). Results indicated students adapted to WebCT and had a positive attitude toward their level of LMS utilization. Also, 44% of students using the LMS stated it impacted their learning and more than 60% of students stated it created positive attitudes toward the use of the LMS in learning. In addition, task technology had a strong positive influence on the impact of the LMS on learning.

Martin (2008) explored how an LMS could help students learn computing skills and the usefulness of an LMS in content delivery through the use of a survey to discover the value and usefulness of the features in the environment of the Blackboard LMS. Participants were 145 undergraduate college students at a large southwestern U.S. university who were solicited via an email invitation. The seven instructors involved with the survey explained the usefulness of Blackboard as an LMS for the students. Results indicated the features in the Blackboard LMS environment were very useful tools that allowed for access to materials including quizzes, assignments, grade books, and course documents at any time. Instructors and students had a positive response to using the LMS and reported being very comfortable with using the technology. Results indicated Blackboard as an LMS helped students develop computer skills and computer literacy.

Another important aspect of LMS tools was data storage as these applications were able to track vast amounts of data that reflected student behaviors and could aid in discovering their levels of engagement. Another example of how LMS data could be

used to assess student engagement (Vogt, 2016) includes determining any correlation between student activities and learning outcomes. Such data could be used to support institutions in developing the academic environment and programming in the blended-learning model.

Summary

A learning management system platform supports student and instructor interaction and communication. It contains tools and functions that could help students complete different activities in online, face-to-face, and blended-learning environments. Learning management systems activity tools such as discussion forums and course content could support learning and teaching to enhance student outcomes. An LMS would provide ways of engaging and interacting that enhance learning and aid instructors in utilizing effective, active learning styles. Changes in technology including the Internet means LMS tools to access course content and resources would be available at any time and from anyplace. In addition, an LMS could help students organize academic studies and collaborate with each other. Finally, data generated by an LMS could aid institutions in developing and improving offerings as well as supporting student learning and outcomes.

Higher Education in Saudi Arabia

In Saudi Arabia, the Ministry of Higher Education (2010) has administered and created the colleges and universities in the Kingdom, coordinated between universities and other ministries in terms of the needs of institutions of higher education, and represented the government abroad in all educational and cultural affairs. It has been responsible for directing university education in accordance with adopted policies,

supervising the development of university education in all sectors, and formulating rules and regulations in all institutions of higher learning. In the last decade, higher education in Saudi Arabia has undergone tremendous growth, going from just seven institutions in 1975 to 23 government universities, 12 technical colleges, and 33 private institutions of higher education in 2011 (Alamri, 2011). By 2013, the 25 public universities in Saudi Arabia had a total of 1,165,091 enrolled students (Clark, 2014). All subjects were taught in English with the exception of Islamic and Arabic studies for which Arabic was used (Ministry of Education, 2016).

Information Technology in the Saudi Academic Context

Colbran and Al-Ghreimil (2013) explored how technology could support quality teaching and learning in Saudi higher education institutions based on Saudi academic perceptions. They used a survey to investigate these perceptions using information communication technology with Saudi faculty members at seven universities. The survey aimed to discover the current levels of technology used in learning and teaching at Saudi universities and to better understand how to use technology in the future. A total of 338 academics participated: 193 males (58%) and 138 females (42%). The results indicated 95% of Saudi faculty were interested in incorporating information technology in their teaching and learning. In support of these findings, Saudi higher education institutions worked to increase awareness of educational technology among academic staff. According to Colbran and Al-Ghreimil, the strategy of higher education in Saudi Arabia was to use e-learning at different institutions in order to gradually shift away from traditional learning models. E-learning integrated various aspects of the educational

process online to expand offerings, stimulate information acquisition mechanisms, and promote active interaction.

Moreover, 70% of Saudi faculty members indicated they had received training in new technologies. However, although 58% of Saudi academics reported using learning management systems in their teaching, 42% of Saudi faculty members indicated they did not use a learning management system at all in their work. These results indicated a lack of adequate support for the use of learning management systems within Saudi institutions. In addition, Saudi academics have faced certain challenges when using technology in their teaching including inadequate technology infrastructure, poor management of information communication technology necessary to implementing LMS programming, a lack of time to prepare courses that use technology, many issues involving inadequate wireless network services and inconsistent access to the Internet, a lack of high-quality technical support staff, and a lack of training on how to use the technology available at their universities. Clearly, Saudi Arabia has needed to improve infrastructure and expand training in technology use.

Using a Learning Management System in Saudi Arabia

Universities have provided online learning degree programs to give students an alternative avenue to learning in order to serve those students who, for whatever reason--distance, disability, lack of access to transportation, etc.--could not attend a physical classroom (AlNajdi, 2014). Therefore, online learning or e-learning has been a very useful tool to those pursuing education who face these and other limitations (Nichols, 2003). Again, the Ministry of Higher Education (2010) has been responsible for

managing and developing such e-learning programs and for establishing the rules regarding how they will operate.

In Saudi Arabia, the NCeL (2012), a division of the Ministry of Higher Education, has facilitated the use of e-learning by organizing and supporting the development of the online programs at all universities and colleges. One NCeL initiative was the Saudi Digital Library--an electronic library to help students and instructors access databases for academic research.

In 2010, the Ministry of Higher Education created an LMS for improving traditional teaching styles in the country and incorporating new methods that use technology. As mentioned earlier, the system is called Jusur (NCeL, 2012). The Jusur LMS is

an integrated system capable of managing e-learning processes, including such administration tasks as registration, assessment, placement, course selection, course management, and tracking of student assignments, progress, and grades. The system can also manage both synchronous (e.g., chat rooms) and asynchronous communications (e.g. e-mail) tools. (NCeL, 2010a. p. 5)

In 2011, Jusur was used to establish a web-based hybrid online learning program in an effort to accommodate the growing number of Saudi students seeking higher education (NCeL, 2012). The NCeL has supported students and instructors in the use of Jusur with tutorials (NCeL, 2010c).

AlNajdi (2014) investigated student perceptions of Jusur at Saudi universities using NCeL survey questionnaires sent to students studying during AY2013-2014. This involved 132 male and female students--56.1% males ($n = 74$) and 43.9 % females ($n = 58$). The results showed Saudi students had positive views toward the hybrid learning programs adapted by Jusur. Participants in other studies also indicated that using Jusur

was a positive experience and they looked forward to having such hybrid courses in the future. Students stated that although it was initially a little complicated to understand how it would work, over time and with practice they found it easier to navigate (Zouhair, 2010).

When Hussein (2011) explored the perceptions of 90 faculty members at Saudi universities using Jusur, Saudi instructors reported positive attitudes toward utilizing Jusur as an LMS. Hussein found faculty members had a positive attitude toward e-learning as a result of using Jusur and found no significant difference in attitudes related to gender or type of college (health, scientific, or humanities). The research methodology used a 34-item questionnaire incorporating a 5-point Likert-type scale. The items were classified into three main categories: (a) personal view toward using the LMS in e-learning, (b) the need to utilize the LMS, and (c) the need for training to use the LMS effectively. The results indicated that although faculty had positive attitudes toward using the LMS and e-learning, they felt the need for more training in the use of the system.

Summary

This section explained the history of Saudi higher education and how technology was helping make a university education more accessible to an increasing number of students interested in obtaining one. Universities and colleges in Saudi Arabia have been encouraged to use information technology to achieve quality academic programs. The Ministry of Higher Education (2010) has been working to provide infrastructure, through NCeL, for information technology to be implemented at every university and college in the country. As the population in Saudi Arabia has increased, higher education must

grow along with the student population (Alebaikan & Troudi, 2010). To address this, the Ministry of Higher Education launched the Saudi Electronic University (SEU), which has been integrating online instruction with traditional instruction methods, also known as a blended learning style.

Blended Learning

A Brief History of Blended Learning

During the 1980s, colleges and universities began using computers and the Internet to enhance their learning programs (Burge, 2008). In the 1990s, accessing the Internet and the expansion of communication information technology led to easier access to information and the sharing of instructional materials (Brown, 2011). Furthermore, the development of educational technologies enabled higher education institutions to use online learning and communication activities such as e-mail, blogs, and discussion forums (Bates, 1995). New types of educational technology, such as social networking, enabled learners to communicate more efficiently and effectively. New kinds of curriculum management systems, such as learning management systems, helped to enhance student access to materials, helped to organize the curriculum, and improved collaboration through interactive learning activities (Brown, 2011).

According to Kemper (2015), the effectiveness of online learning has grown rapidly due to its many advantages such as lower cost, convenience, and the ability to access courses anytime and from anywhere. From 1994 to 1995, approximately 750,000 students in the United States enrolled in online courses (Lyons, 2004). Singh and Pan (2004) stated that from 2000-2002, student enrollment in online learning grew to more than 2.9 million in the United States. In 2000, there were more than 54,000 online

learning programs with more than 1.6 million students enrolled. Although higher education institutions offered many online courses, students shared feelings of isolation from their peers and expressed dissatisfaction with instruction in online learning environments (Bair & Bair, 2011). Blended learning has offered a best-design model for instructional online courses in order to address these student concerns and improve engagement. With the advent of blended learning, students now report greater satisfaction and achievement with learning (Precel, Eshet-Alkalai, & Alberton, 2009).

The Blended-Learning Model

Blended learning has engaged students in both face-to-face and online learning (Copp, 2007). By 2004 in the U.S., blended learning had become readily available at undergraduate institutions and represented 46% of course offerings (Allen & Seaman, 2004). Due to its rapid growth, blended learning has almost become the norm in higher education (Norberg, Dziuban, & Moskal, 2011). Kumar (2012) asserted that because blended learning combined the delivery of face-to-face and online learning, it engaged all three learning modalities and has become very popular with academics (Buzzetto-More & Sweat-Guy, 2006). Blended learning has created a learning hybrid that allows for optimal student achievement by applying technology to traditional face-to-face learning to better reach learning goals. It also encouraged the attitude that learning is a life-long process through its incorporation of student-directed processes (Graham, 2005).

Effective tools of e-learning have easily been used to implement various instructional approaches such as resource-based learning, constructivism, problem-based learning, active learning, situated learning, and collaborative learning (Nichols, 2003). Therefore, the success of blended-learning programs through e-learning in higher

education has depended on the specific learner's objectives. However, many variables need to be considered such as the culture and characteristics of the students and the nature of the course, which would drive how to change the components of the instructional approach in blended learning (Miliszewska, 2008).

Qi and Tian (2011) provided a framework on which to base a blended-learning environment that consisted of evaluating the learner, identifying teaching objectives, and selecting appropriate teaching strategies. In this framework, three groups were involved in the development of the blended learning: (a) learners who are able to obtain knowledge from multiple sources, (b) instructors who facilitate the learning process, and (c) institutions that provide the infrastructure through which the learning is delivered. According to Johnson (2005), the four properties of blended learning are (a) the number of learners and the combination of self-directed and group learning (students), (b) the mix of synchronous and asynchronous learning (time), (c) the mix of self-paced and group-paced learning (pace), and (d) the mix of formal and non-formal learning (lifelong learning). All these factors support the following three reasons to adopt blended learning in higher education:

1. Blended learning has been shown to enhance learning effectiveness (Johnson, 2005).
2. Blended learning is more accessible and convenient than traditional face-to-face learning (Ellis, 2001).
3. Blended learning is a more cost-effective approach (Spector, 2008).

Students have reported satisfaction with blended learning environments. Aycok, Garnham, and Kaleta (2002) conducted a survey of learners after they had completed a

course taught using hybrid learning at the University of Wisconsin-Milwaukee in the spring of 2001. Results indicated the majority of the students would recommend blended learning to another student. Another research study on blended learning conducted just five years later at the University of Maryland Eastern Shore found more than 90% of students said, “I was satisfied with the overall experience” (Buzzetto-More & Sweat-Guy, 2006, p. 158). By 2019, it has been predicted that blended learning will be used in up to 50% of U.S. high school courses (Horn & Staker, 2011) due to its integration of multiple learning methods such as collaborative learning, face-to-face lectures, online courses, and formal coursework (Cucciare, Weingardt, & Villafranca, 2008; Rossett & Frazee, 2006).

Kanthawongs and Kanthawongs (2013) investigated the effectiveness of using an LMS for individual and social reasons. They concentrated on blended-learning courses and hybrid learning as models for the LMS and used a survey questionnaire. The participants were 77 undergraduate students (about 55% female and about 44% male) at the University of Thailand in 2012 who were studying finance and business computing utilizing an LMS. The survey utilized a 5-point Likert scale (1 = *Strongly Disagree* to 5 = *Strongly Agree*). Results indicated a significant relationship between student perception of the LMS’s usefulness and student expressed intention of using the LMS-- meaning if students expressed the intention to use the LMS system, they were more likely to find it useful. The Thai students also adapted well to the hybrid instruction model created by implementing the LMS.

Blended Learning in the Saudi Context

Al-Mousa (2004) found that regardless of how advanced technology became, the perception was there would continue to be no substitute for direct contact when students and teachers have little experience with online learning. Al-Taheeh and Marzouk (2004) indicated Saudi students have seemed to perform poorly when direct contact was absent and lacked the requisite skills for successful online learning. Blended learning could address such problems by helping students create virtual learning environments and allowing them greater access to different resources using the Internet.

At many universities in Saudi Arabia, the numbers of students who want to pursue degrees have outstripped the number of available spaces in universities. For example, King Saud University has exceeded its maximum capacity for student enrollment and was then operating at 110% capacity. To respond to such over-crowding and demand, the Ministry of Higher Education established the Saudi Electronic University, which used a blended-learning environment, as an innovative solution to deal with enrollment and other challenges in the country (Male & Alshathri, 2015).

Alebaikan (2010) explored the future of blended learning in higher education with 12 female postgraduate students and seven female instructors in one course at King Saud University using a qualitative study method that included observation and interviews. Results indicated the blended-learning environment provided a successful learning experience for students. It also found both students and instructors had a positive perception of the blended-learning environment and believed blended learning was appropriate for Saudi culture, specifically regarding the education of women.

Saudi Arabian culture is an important factor to consider when developing blended-learning programs. For example, Saudi students have been used to traditional, lecture-based learning. They will need to develop more self-discipline and self-direction skills to be successful in a blended-learning environment. In addition, students and instructors believe they will need more time to complete online activities. Stafford (2005) examined student motivation by using Internet-enabled educational courses in Saudi Arabia. The results indicated social alienation was one of the biggest concerns with the online component of blended learning as the perception was it separated students from their instructors and colleagues. Students and instructors would need to be educated regarding the obvious benefits--access, accommodation, etc.--to fully implement blended-learning programs throughout the country. As proponents of this unique design noted, it would be necessary to carefully examine all aspects of learning--learning style, curriculum, instruction methods available, materials, and culture--to create a successful blended-learning program for a given environment (Gedik, Kiraz, & Ozden, 2013).

Summary

In the last decade, the development of educational technology has made blended learning possible and educational programming has possessed a flexibility that allows it to be appropriate for a wide cross-section of students and institutions. It has combined the best aspects of traditional, face-to-face instruction with constantly evolving technology to create a productive learning environment for students around the world. The blended-learning approach has helped learners by incorporating many effective instructional tools such as active and problem-based learning (Nichols, 2003).

As a country, Saudi Arabia has been motivated to use new technology in teaching and learning in order to provide quality higher education to its ever-expanding and youthful population. Saudi Electronic University (2012b), which has used the blended-learning approach, has been pivotal in starting to address the many issues and challenges facing Saudi higher education. These issues include a rapidly growing student population; an increase in the number of women pursuing degrees; the overall rise in those seeking degrees; and student lack of experience with independent, self-directed learning--a pivotal online component of blended learning.

CHAPTER III

METHODOLOGY

This study used a descriptive, quantitative correlation research design method to analyze the relationships between student outcomes and student engagement in a blended-learning environment using data from the institution's learning management system (LMS). It surveyed students studying at the Saudi Electronic University (SEU) during AY2017-2018 in all classes. This study followed Creswell's (2012) recommendation for quantitative research by utilizing a survey to obtain data on the subject. A cross-sectional survey design was used in this study, which has been the most popular for educational research because it involves a one-time collection of data. It also has many advantages such as providing information in a short amount of time and measuring the current attitudes of participants (Creswell, 2012).

Demographic information on students' perceptions of how much time they spent using LMS activities was gathered through a survey (see Appendix A). The survey included questions intended to ascertain how many hours students perceived they spent per week on LMS activities such as online discussions, audio discussions, and virtual learning.

The second measurement assessed student engagement utilizing the Student Engagement Questionnaire (SEQ), which gathered information on student perceptions of their level of engagement in online education (see Appendix A). The SEQ assessed five

areas of online learning (engagement, active learning, academic relevance, collaboration, and social interaction). This chapter explains the survey instrument, the analysis of the variables, and the external and internal validity of the research study.

Study Sample

For this research, the population was students studying at higher education institutions in Saudi Arabia in AY2017- 2018 for all classes. Approximately 1,527,769 students are enrolled in institutions of higher education in the country (Ministry of Education, 2016). The target population for the study consisted of all students studying at SEU for the 2017-2018 academic year. This research used convenience sampling-- choosing a pool of potential participants because the individuals were accessible to the researcher and were likely to be available and willing to participate.

A survey link was sent to all SEU students by email and such social networking sites as Facebook and Twitter. The sampling included approximately 11,620 students at SEU of which 7,294 were male and 4,326 were female (Ministry of Education, 2016). The study's sample represented the target population. Participants were invited to voluntarily participate in the surveys. In this study, 246 participants completed the survey; 91 students were male (37%) and 155 were female (63%). The first page of the survey provided the consent form where they confirmed they agreed to participate before proceeding to the questionnaire (see Appendix B).

Instrument

The researcher used a questionnaire as the survey instrument for this study. It was provided to participants to be completed and then returned to the researcher. The questionnaire consisted of three parts. The first part was adapted from *Students'*

Perceptions Toward Using Jusur: A Web-based Learning Management System for Higher Education in Saudi Arabia (AlNajdi, 2014) as well as from *Participation in Online and Face-to-Face Discussions: Perceptions of Female Saudi Students in the United States* (Alanazy, 2013). Demographic information requested consisted of gender, current GPA, total number of courses taken so far, and location of their campuses (see Appendix A). The second part covered the self-reporting of the student's LMS activity and was adapted from York (2012) and Parker (2015). The third section contained the SEQ questionnaire as described in Coates (2006) and used by Vogt (2016). The researcher translated the questionnaire from English to Arabic and then from Arabic to English.

Self-Report of Learning Management Systems Activity Questionnaire

This self-report questionnaire asked students their perceptions of how many hours each week they spent during three common online class activities: audio discussion (a part of Blackboard), virtual learning, and online discussion. The latter included posts to which students wrote, read, and replied. Student respondents were given five choices (0; between 1 and 3 hours; between 4 and 6 hours; between 7 and 9 hours; or 10 or more hours; see Appendix A). The three variables were combined into one dependent variable (Parker, 2015; York, 2012). "Seat time," time in the classroom, and the time the student spent studying outside of the classroom might average six to nine hours per week. Distance education created a sense of seat time to engage students and instructors in online courses through specified online activities (Nonis, Philhours, & Hudson, 2006; Shedd, 2003; Thorpe diary, as cited in York, 2012). The reliability and validity of time diaries might provide high accuracy based on findings when similar instruments were

used in previous research (Kolari, Savander-Ranne, & Viskari, 2006; Simons & Parkinson, 2009; Wijeratne, 2009). Cronbach's alpha, an index of internal consistency used to determine the reliability of a psychometric instrument, was used to measure the reliability. Cronbach's alpha was .80, which was near the "1" of Parker's (2015) work.

Student Engagement Questionnaire

The SEQ (Coates, 2006) was used to explore student engagement in online and campus-based learning and consisted of two parts that separately examined students' online engagement and students' general engagement. The measurement of the students' online engagement involved seven scales in the questionnaire and included 29 items. These seven scales for both instructors and students included the following online items: social interaction, academic relevance, teaching, active learning, contact with staff, engagement, and collaboration.

The second part of the instrument, which measured general engagement, consisted of nine scales including 43 items. These nine scales were also for both instructors and students and included active learning, supportive learning environment, constructive teaching, teacher approachability, collaborative work, student and staff interaction, beyond class collaboration, academic challenge, and complementary activities (Vogt, 2016).

This research study primarily examined students' online engagement as represented by five scales that included the following online items: (a) engagement, (b) active learning, (c) academic relevance, (d) collaboration, and (e) social interaction. Twenty items from the SEQ questionnaire were adapted from Vogt (2016; see Appendix

A). Cronbach’s alpha values in Vogt’s (2016) and Coates’s (2006) studies were near to 1, indicating highest reliability (see Table 1).

Table 1
Cronbach’s Alpha of Student Engagement Questionnaire from Prior Research

SEQ Scale	Vogt (2016)	Coates (2006)
Online Engagement	.71	.72
Online Active Learning	.81	.73
Online Academic Relevance	.87	.79
Online Social Interaction	.79	.69
Online Collaboration	.80	.75

Data Collection and Procedures

This study used a quantitative research method. The researcher used Qualtrics survey software to collect the survey data. The survey was sent to all potential student participants by email and social networking. Students who volunteered to participate were asked to read and agree to a digital consent form located at the front of the survey (see Appendix B).

The SEQ and the students’ self-report of LMS activity were used to survey participants. After the researcher determined the potential participants and obtained permission from the Institutional Review Board (see Appendix C), participation was solicited. Permission was also sought and obtained from Saudi Electronic University to conduct the research (see Appendix D).

Data Analysis

Statistical analyses were conducted using SPSS. The researcher used Cronbach's alpha (α) to determine reliability statistics for the survey's items and constructs or scales. The dependent variables were ordinal. The researcher utilized a measure of central tendencies to describe the sample and the variables. The researcher tested for normality via a Boxplot test for the dependent variables (self-report and SEQ). If the dependent variables passed the test of normality, several parametric methods such as a multivariate analysis of analysis (MANOVA) were used to examine the questions. A MANOVA was used to determine whether any statistically significant differences would be found among the means of three or more independent (unrelated) groups. Specifically, testing occurred to determine whether significant mean differences existed in online engagement and self-report of LMS activity related to student gender.

The researcher used a correlation statistical method to answer Research Questions 4 and 5. A Pearson's correlation coefficient was used to investigate the relationship among student engagement, actual hours spent per week, and student GPA in the blended learning environment of Saudi Electronic University. The researcher also investigated the relationship between student GPA and the number of hours students spend per week on LMS activities. According to Creswell (2012), a correlation statistical design method examines two or more variables to determine whether changes in one create change in the other(s).

Limitations of the Study

According to Creswell (2012), limitations are weaknesses or issues that could impact study results. The following limitations were identified by this researcher.

1. The biggest limitation in this research was the lack of a data record by LMS software, which would have compared students' estimation with the actual hours they spent hourly in LMS activity.
2. Translation of the survey from English to Arabic and then from Arabic to English.
3. Student respondents were given five choices (0, between 1 and 3 hours, between 4 and 6 hours, between 7 and 9 hours, or 10 or more hours. These scales were combined into one dependent variable (Parker, 2015; York, 2012). These scales are a categorical scale. Also, these scales not include a choice of 3-5 hours.

CHAPTER IV

FINDINGS

This chapter provides results for this research. The results furnished descriptive information and statistical analysis (Creswell, 2012) about online engagement in the Saudi Electronic University. Data collected for this study were used to answer the following research questions:

- Q1 Is there a significant mean difference due to student gender in terms of online engagement in the blended-learning environment of Saudi Electronic University?
- Q2 Is there a significant mean difference due to student gender in terms of student perception of the number of hours spent per week on learning management systems activities in the blended-learning environment of Saudi Electronic University?
- Q3 Is there a significant correlation between student grade point average and the perceived number of hours students estimate they spend on learning management systems activities in the blended learning environment of Saudi Electronic University?

Data were collected utilizing a three-part survey. This chapter presents the results and analyses of six outcomes from that survey:

1. Demographic information about students' gender, type of college, educational level, campus located, grade point average, and how many courses currently taken.

2. Self-reported LMS activity defined by how many hours students perceived they spent per week on LMS activities including online discussions, audio discussions, and virtual lecture.
3. Students' online engagement in online LMS activities. It also showed the differences between students' gender in terms of online engagement in the blended-learning environment of Saudi Electronic University
4. Students' perceptions of the number of hours spent per week on LMS activities. Also shown were the differences between students' gender in terms of student perception of the number of hours spent per week on LMS activities in the blended-learning environment of Saudi Electronic University.
5. Students' perceptions of the number of hours spent per week on LMS activities. It also showed the differences between students' GPA in terms of students' perceptions of the number of hours spent per week on LMS activities in the blended-learning environment of Saudi Electronic University.
6. The correlation between student GPA and the perceived number of hours students estimated they spent on LMS activities in the blended learning environment of Saudi Electronic University.

Reliability of the Scores

In this study, the researcher used the Statistical Package for Social Science (SPSS) version 20.0 to analysis the data. Table 2 provides the levels of internal

consistency for scores on the survey scales. Overall consistency for the 20 items on the SEQ was .920.

Table 2
Overall Internal Consistency for the Student Engagement Questionnaire

Questionnaire Items	Cronbach's Alpha	Items
Online Engagement	.850	4
Online Active Learning	.851	5
Online Academic Relevance	.879	3
Online Collaboration	.916	4
Online Social Interaction	.773	4

Tests for Assumptions

This researcher used a multivariate analysis of variance (MANOVA) to answer the research questions. The MANOVA tested several assumptions,

The first assumption was whether there would interval or ratio levels on dependent variables (Tabachnick & Fidell, 2007). This research had interval and ratio levels on the dependent variables of number of hours estimated in LMS activity per a week and online engagement. Therefore, this assumption was met.

The second assumption was whether the independent variables consisted of two or more categorical, independent groups (Tabachnick & Fidell, 2007). This research had two independent variables and each of them had two or more categorical groups: gender

(male, female) and grade point average (A, B, C, D). Therefore, this assumption was met.

The third assumption was there would be no relationship between groups (Tabachnick & Fidell, 2007). This research used an electronic survey; it was assumed each participant answered the survey independently. Therefore, this assumption was met.

The fourth assumptions concerned multivariate outliers, i.e., each value is extremely small or large compared to other scores. Boxplots in the SPSS program were used to test normality for multivariate outliers (Tabachnick & Fidell, 2007). It showed each score was different from the others. Mean scores for the scales of online engagement, active learning, online collaboration, and online social interaction were represented in the boxplots by the following values: Never (1-4), Rarely (5-8), Sometime (9-12), and Often (13-16; see Figures 1, 2, 4, and 5). The mean score for the online academic relevance scale was represented in the boxplots by the following values: Never (1-3), Rarely (4-6), Sometime (7-9), and Often (10-12; see Figure 3). In addition, mean scores for the scales of online discussion, audio discussion, and virtual lecture were represented in the boxplots by the following values: Rarely (1-2), Sometime (2-3) and Often (4-5; see Figures 6, 7, and 8). Therefore, this assumption was met.

Results of Multivariate Analysis

Online Engagement

The median value for females (represented by number 1) had a little lower value than males (represented by number 2). Disruptions were also similar. However, males had some low values for outliers (see Figure 1).



Figure 1. Multivariate outliers for online engagement between genders.

Active Learning

The median value for females (represented by number 1) was a little lower than for males (represented by number 2). Disruptions were different between males and females but females had some lower values on outliers (see Figure 2).

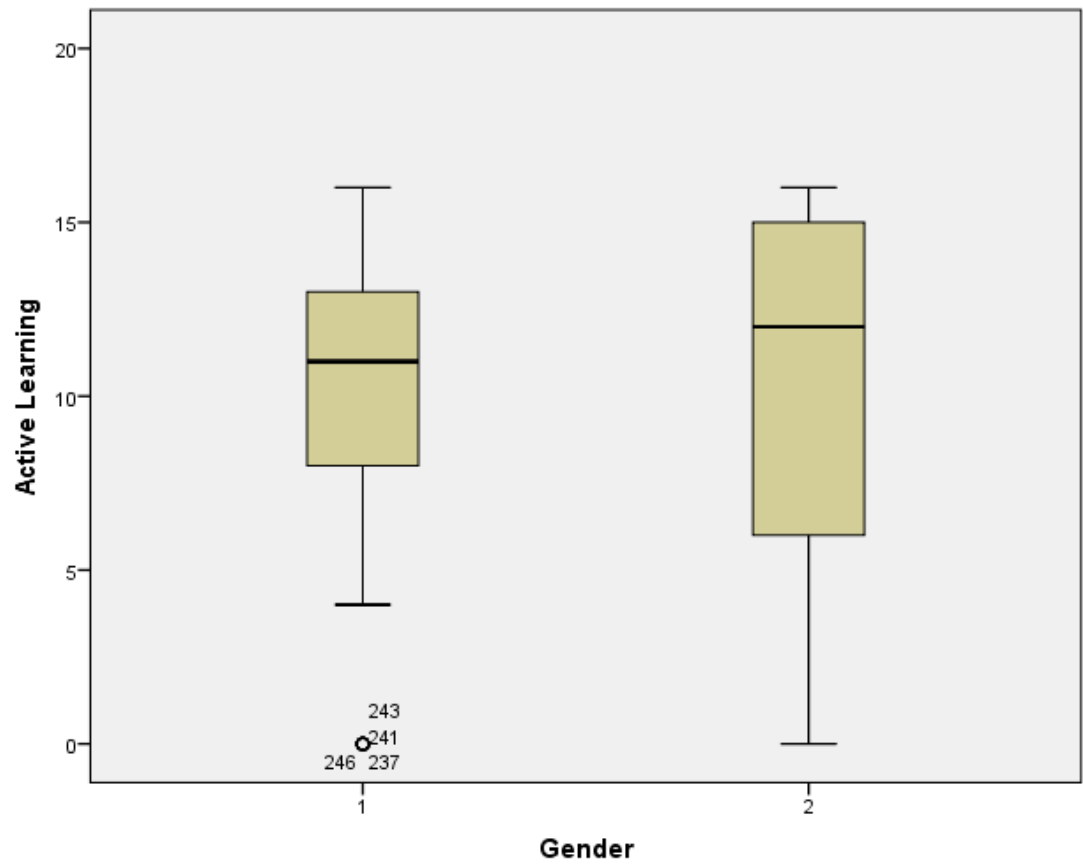


Figure 2. Multivariate outliers for active learning between genders.

Academic Relevance

The median value for females (represented by number 1) was a little lower than for males (represented by number 2). Disruptions were similar between males and females. Also, no values were found for outliers in each gender (see Figure 3).

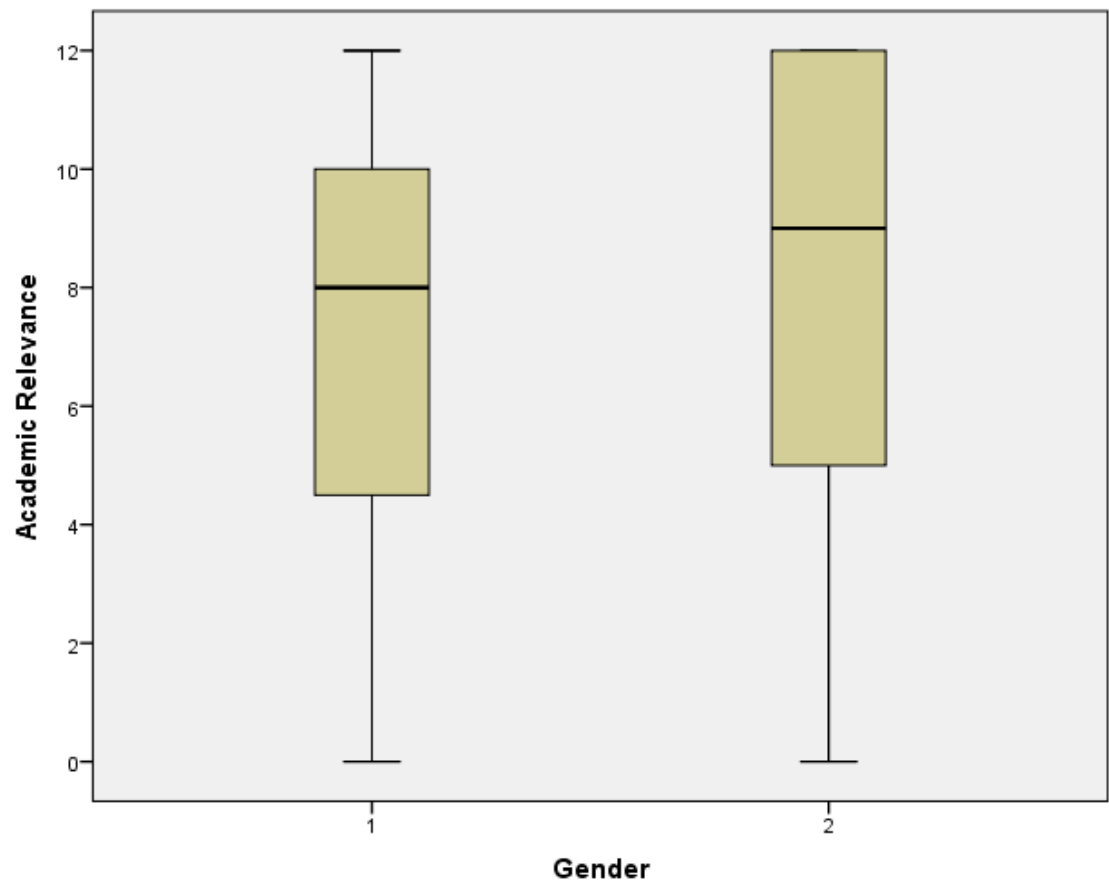


Figure 3. Multivariate outliers for academic relevance between genders.

Online Collaboration

The median value for females (represented by number 1) was a little lower than for males (represented by number 2). Disruptions were similar between males and females. Also, no values were found for outliers in each gender (see Figure 4).

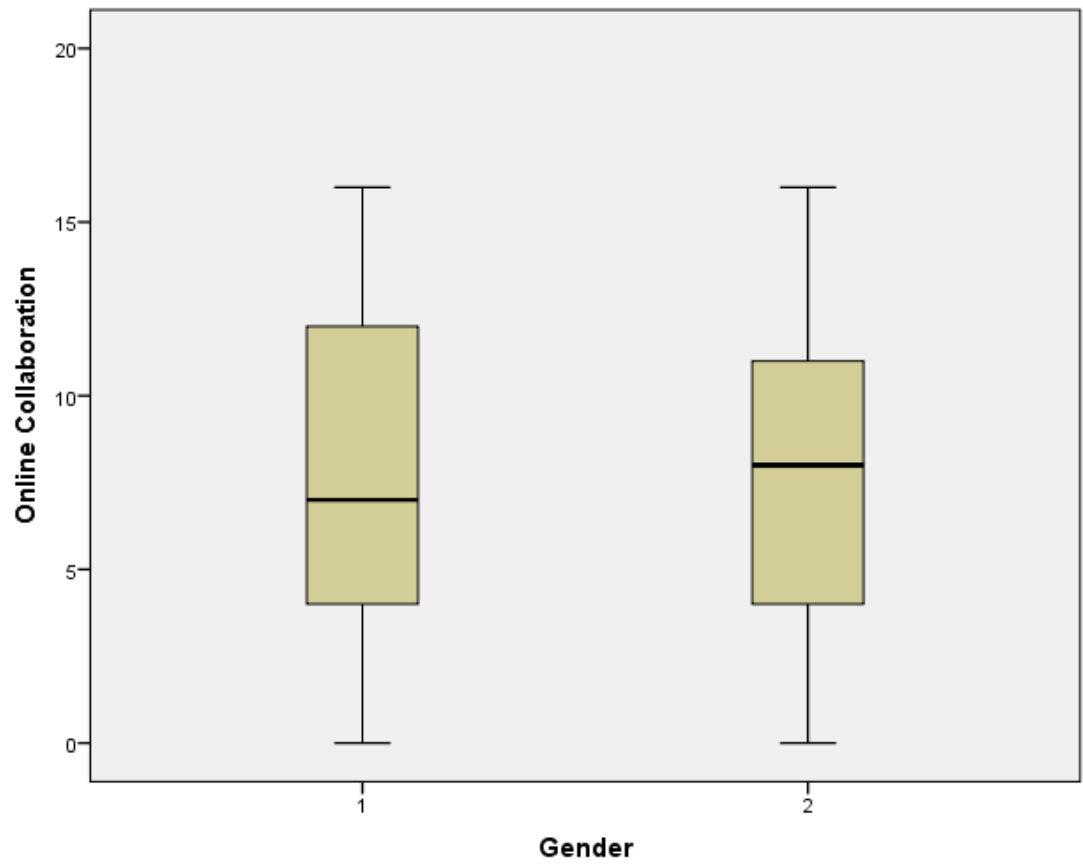


Figure 4. Multivariate outliers for online collaboration between genders.

Social Interaction

The median value was very similar between females (represented by number 1) and males (represented by number 2). Disruptions were also similar between males and females. In addition, no values were found for outliers in each gender (see Figure 5).

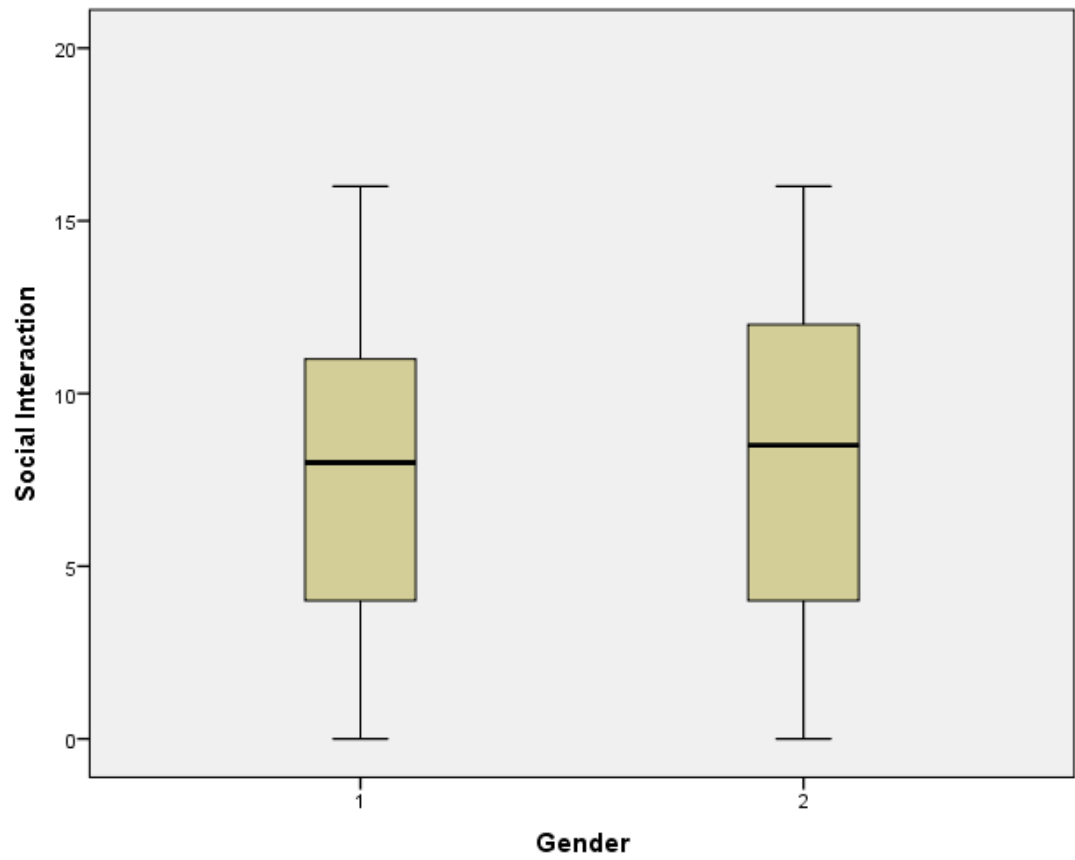


Figure 5. Multivariate outliers for social interaction between genders.

Online Discussion

The median value was very similar between females (represented by number 1) and males (represented number 2). Disruptions were also similar between males and females. In addition, no values were found for outliers in each gender (see Figure 6).

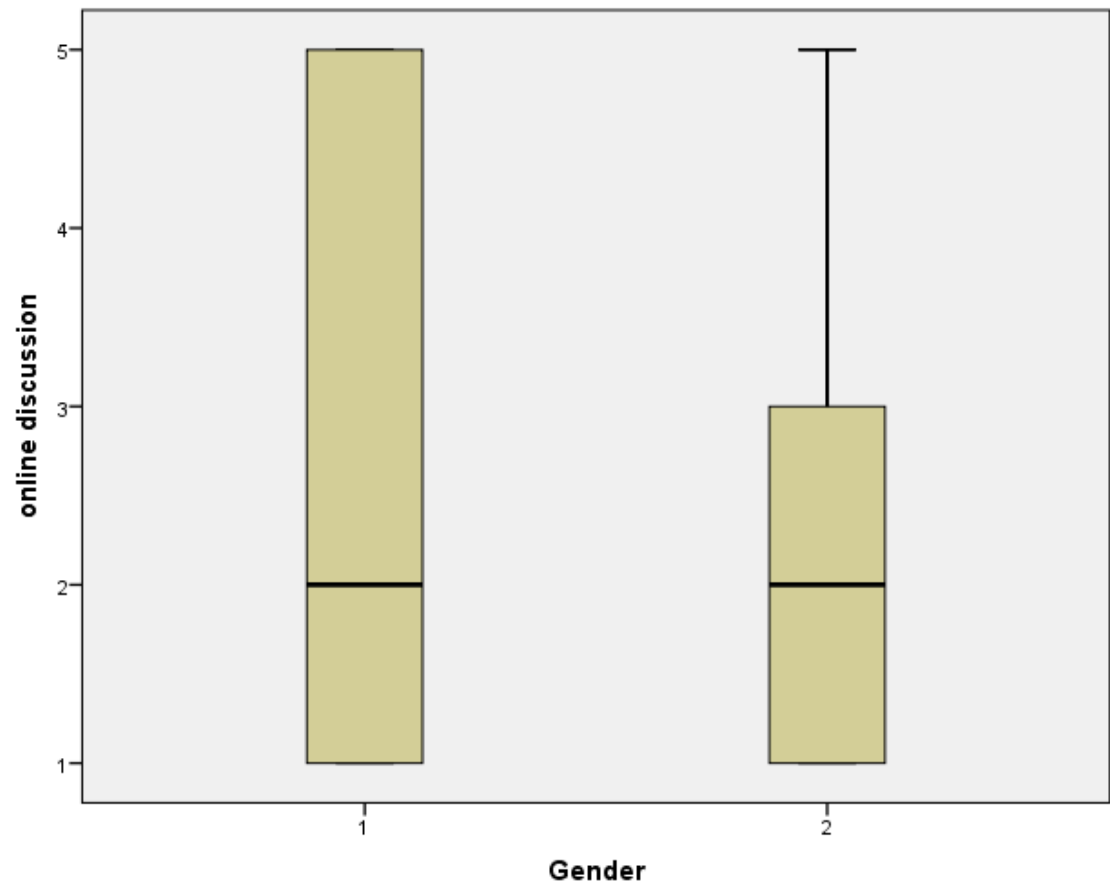


Figure 6. Multivariate outliers for online discussion between genders.

Audio Discussion

The median value was different between females (represented by number 1) and males (represented number 2) but the disruptions were similar between males and females. In addition, no values were found for outliers in each gender (see Figure 7).

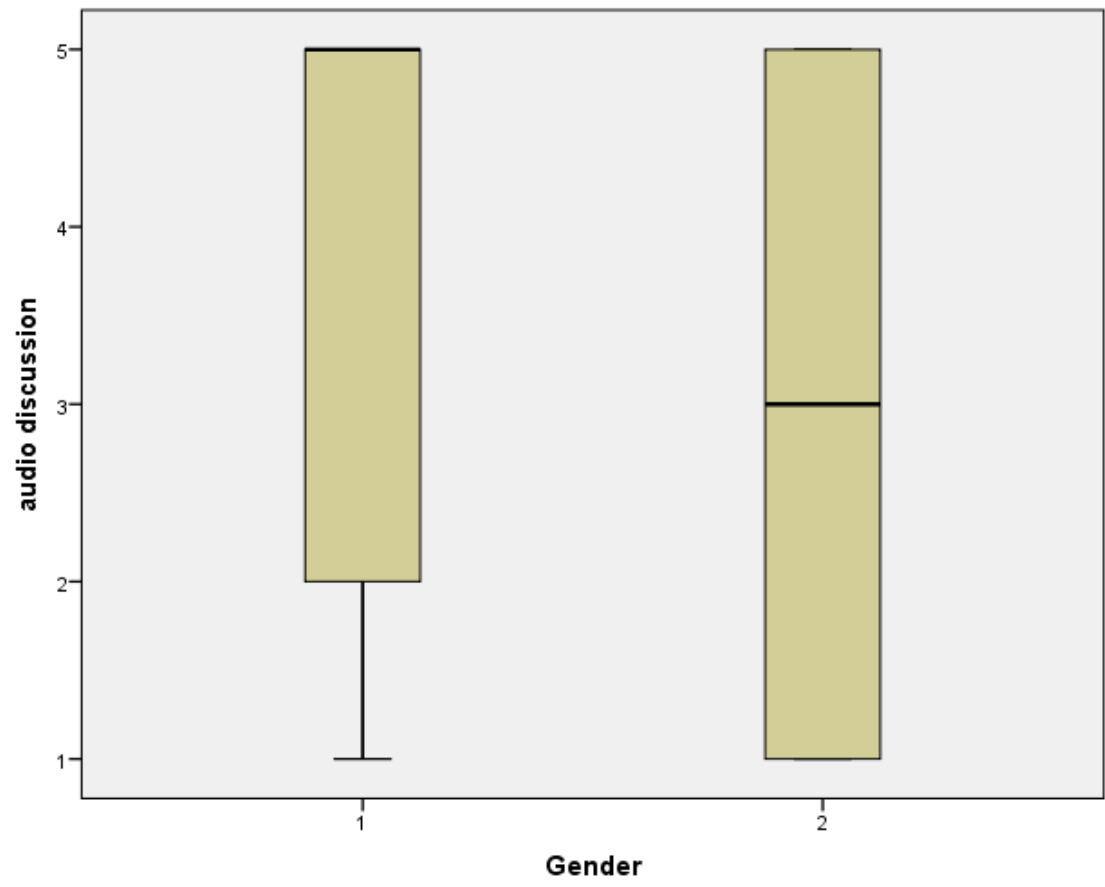


Figure 7. Multivariate outliers for audio discussion between genders,

Virtual Lecture

The median value was very similar between females (represented number 1) and males (represented by number 2). Disruptions were also similar between males and females. However, males and females had some high values for outliers (see Figure 8).

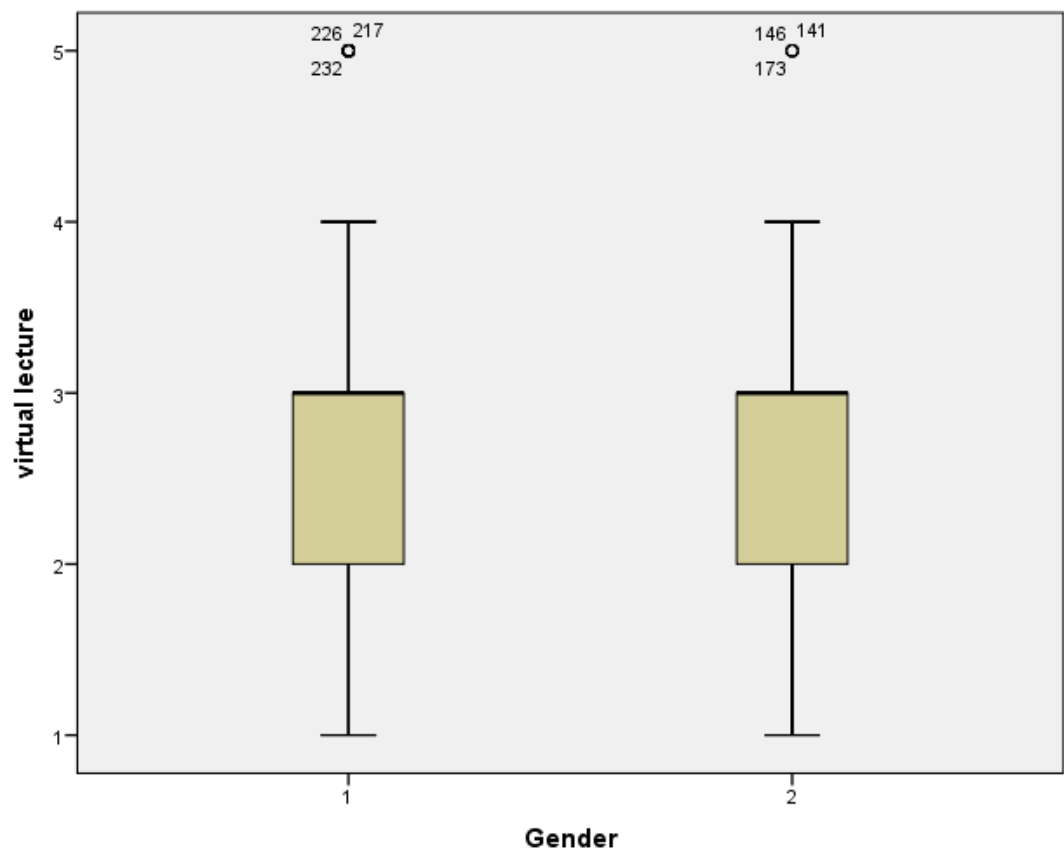


Figure 8. Multivariate outliers for virtual lecture between genders.

Demographics

In this study, 246 participants completed the survey; 91 students were male (37%) and 155 were female (63%; see Table 3). When participants were asked about the type of college, the largest number of participants indicated they studied in the College of Computation and Informatics (88, 35.8 %) from both genders. The smallest number of participants studied in the College of Science and Theoretical Studies (48 male and female students), representing 19.5 % of the participants. The College of Administration and Finance had 59 students enrolled, representing 24% of participants. Finally, the College of Health Sciences had 51 students enrolled--20.7 % of the participants.

Table 3
Frequencies and Percentages of Participant Demographic Variables

Variables	<i>F</i>	%
Gender		
Male	91	37.0
Female	155	63.0
Type of College		
Administration and Finance	59	24.0
Computation and Informatics	88	35.8
Health Sciences	51	20.7
Science and Theoretical Studies	48	19.5
Educational Level		
Undergraduate	236	95.9
Graduate	10	4.1
Campus Location		
Central Region	146	59.3
Northern Region	0	0
Eastern Region	27	11.0
Southern Region	23	9.3
Western Region	50	20.3
Grade Point Average		
(A) from 3.5 to 4	99	41.2
(B) from 3 to less than 3.5	82	33.4
(C) from 2.5 to less than 3	45	18.3
D) from 1 to less than 2.5	20	8.1
Number of Courses Taken		
One course	16	6.5
Two courses	7	2.8
Three courses	21	8.5
More than three courses	202	82.1

The educational level analysis showed the majority of the participants were undergraduate students (236 students, 95.9%; male and female). Graduate students (10 male and female students represented 4.10% of participants (see Table 3).

The highest percentage of participants ($n = 146$ male and female students, 59.3%) studied in the Central region at campuses located in Riyadh and Alqassim. No participants in this research study were enrolled at campuses in the Northern region located in Tabuk and Aljouf. Fifty (20.3%) participants from both genders studied at the Jeddah and Almadinah campuses in the Western region. Twenty-seven participants (11%; male and female students) were enrolled at campuses located at Dammam and Alahsa in the Eastern region. Finally, 23 students from both genders (9.3%) were enrolled at campuses located at Abha and Jazan in the Southern region.

The GPA analysis indicated the majority of participants had a grade of A ($n = 99$ from both genders; 41.2%), 82 (33.4%) male and female participants had a grade of B, 45 (18.3%) participants of both genders had a grade of C, and 20 (8.1%) participants from both genders had a grade of D.

The majority of participants had taken more than three courses ($n = 202$ from both genders; 82.1%) while the lowest number of participants had taken two courses ($n =$ seven female and male students; 2.8%). Sixteen participants from both genders (6.5%) had taken one course. Finally, 21 participants from both genders (8.5%) had taken three courses (see Table 3).

Table 4 provides a frequency analysis of educational level and type of college by gender. For female undergraduate students, the highest percentage of participants ($n = 54$; 22%) was from the College of Computation and Informatics and the lowest percentage (10.2%; $n = 25$) was from the College of Science and Theoretical Studies. In contrast, the highest percentage for male students (13.9%; $n = 34$) was from the College of Computation and Informatics while the lowest percentage (5.3%; $n = 13$) was from the

College of Health Sciences. Three male students and six female students participated in this survey from the College of Administration and Finance. Only one female graduate student participated from the College of Science and Theoretical Studies (see Table 4).

Table 4
Educational Level for Gender and Type of College

Educational Level	Gender	A&F		Type of College C&I		HS		S&TS	
		Freq	%	Freq	%	Freq	%	Freq	%
Undergraduate	Female	31	12.7	54	22.0	38	15.4	25	10.2
	Male	19	7.7	34	13.9	13	5.3	22	8.9
Graduate	Female	6	2.4	0	0	0	0	1	0.4
	Male	3	1.2	0	0	0	0	0	0

Note. A& F = Administration and Finance, C&I = Computation and Informatics, HS = Health Sciences, S&TS = Science and Theoretical Studies

Table 5 represents a frequency analysis of education level and grade point average by gender. Of 246 participants, 71 (28.9%) undergraduate female students had the highest percentage with a grade of A and seven (2.5%) had a grade of D; 34 (13.9%) undergraduate male students had the highest percentage grade of B and the lowest percentage was for graduate male students with a grade A (1.2%; $n = 3$).

Table 5

Educational Level for Gender and Grade Point Average

Educational Level	Gender	Grade Point Average							
		A		B		C		D	
		Freq	%	Freq	%	Freq	%	Freq	%
Undergraduate	Female	71	28.9	47	19.1	23	9.3	7	2.8
	Male	19	7.7	34	13.9	22	8.9	13	5.3
Graduate	Female	6	2.4	1	0.4	0	0	0	0
	Male	3	1.2	0	0	0	0	0	0

Table 6 provides a frequency analysis of educational level and number of courses taken by gender. The majority of students who had a taken more than three courses were undergraduate female students ($n = 120$; 48.8%) and male undergraduate students ($n = 79$; 32.1%). The lowest number of students who had taken just one courses was one graduate female student (0.4%). The highest number of students who had taken more than three courses was one male graduate students (0.4%).

Table 6

Educational Level for Gender and Courses Taken

Educational Level	Gender	Courses Taken							
		1		2		3		3+	
		Freq	%	Freq	%	Freq	%	Freq	%
Undergraduate	Female	13	5.3	4	1.6	11	4.5	120	48.8
	Male	3	1.2	2	0.8	4	1.6	79	32.1
Graduate	Female	0	0	1	0.4	4	1.6	2	0.8
	Male	0	0	0	0	2	0.8	1	0.4

Self-Report of Learning Management System Activity

The highest percentage of students ($n = 84$; 34.2%) estimated they spent one to three hours in online discussion and the lowest percentage was 10 hours or more ($n = 18$; 7.3%). Fifty-three (21.5%) students of both genders indicated they did not use online discussion at all. The majority of participants ($n = 131$; 53.3%) did not use audio discussion for their learning, 23.6% of students used the audio discussion one to three hours, and the lowest number of students used audio discussion 10 hours or more. Most participants (both genders) used virtual lecture seven and nine hours ($n = 94$; 38.3%), 73 (29.7%) participants (both genders) used virtual lecture four to six hours, and about 7.3% of students (both of genders) did not use the virtual lecture (see Figure 9).

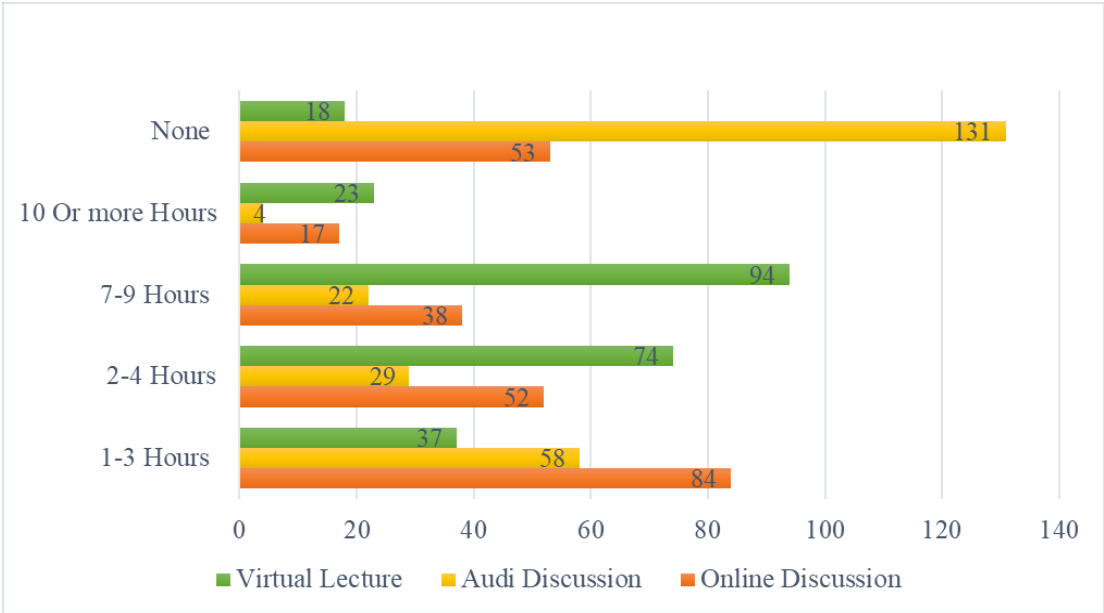


Figure 9. Perceived number of hours students estimated they spent on online discussion, audio discussion, and virtual lecture.

Student Gender in Terms of Online Engagement

Q1 Is there a significant mean difference due to student gender in terms of online engagement in the blended-learning environment of Saudi Electronic University?

To answer the first question, a MANOVA was conducted to describe the mean differences between genders for multiple dependent variables: online engagement, online active learning, online academic relevance, online collaboration, and online social interaction. Mean scores and standard deviations of female and male participants for multiple dependent variables are reported in Table 7.

Table 7
Student Estimations of Online Engagement

	Gender	M	SD	N
Online Engagement	F	11.39	4.367	155
	M	11.92	4.798	90
	Total	11.58	4.527	245
Active Learning	F	9.87	4.745	155
	M	10.22	5.580	90
	Total	10.00	5.059	245
Academic Relevance	F	7.13	3.774	155
	M	7.72	4.251	90
	Total	7.35	3.958	245
Online Collaboration	F	7.45	4.949	155
	M	7.40	4.931	90
	Total	7.43	4.932	245
Social Interaction	F	7.14	4.617	155
	M	7.94	5.163	90
	Total	7.43	4.830	245

No statistically significant difference was found in online engagement based on gender, $F(5, 239) = 1.267, p = 0.279 (> \alpha = .05)$; Wilk's $\Lambda = 0.974$, partial $\eta^2 = .026$. A MANOVA using the Wilk's Lambda test with an alpha level of .05 was conducted; no significance was found, Wilk's $\Lambda = .974, F(5, 239) = 1.267, p = 0.279 (> \alpha = .05)$, Wilk's $\Lambda = 0.974$, partial $\eta^2 = .026$. The F statistic indicated no significant differences between the genders on a linear combination of the five dependent variables: online engagement, online active learning, online academic relevance, online collaboration, and online social interaction (see Table 8).

Table 8
Multivariate Tests of Online Engagement

Multivariate Tests						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.863	302.004 ^b	5.000	239.000	.000
	Wilks' Lambda	.137	302.004 ^b	5.000	239.000	.000
	Hotelling's Trace	6.318	302.004 ^b	5.000	239.000	.000
	Roy's Largest Root	6.318	302.004 ^b	5.000	239.000	.000
Gender	Pillai's Trace	.026	1.267 ^b	5.000	239.000	.279
	Wilks' Lambda	.974	1.267 ^b	5.000	239.000	.279
	Hotelling's Trace	.027	1.267 ^b	5.000	239.000	.279
	Roy's Largest Root	.027	1.267 ^b	5.000	239.000	.279

The partial η^2 can be defined as the ratio of variance accounted for by an effect and that effect plus its associated error variance within a MANOVA. This statistic ranges from 0 to 1; a 0 indicates no relationship between the factor and the dependent variable while a 1 indicates the strongest possible relationship. It is unclear what should be considered a small, medium, and large effect size for partial η^2 since the interpretation is relative to the field of study for which the MANOVA is being used. Cohen (1988) and

Miles and Shevlin (2001) suggested a partial η^2 value of 0.01 is small, 0.06 is medium, and 0.14 is large. Therefore, the effect size of 0.026 is small to medium size as it relates to the relationship between genders on a linear combination of the five dependent variables: online engagement, online active learning, online academic relevance, online collaboration, and online social interaction.

Student Gender in Terms of Number of Hours Spent Per Week

Most participants of both genders spent one to three hours in online discussion: female students ($n = 50$; 20.5%) and male students ($n = 34$; 14%). The lowest percentage of participants from both genders used online discussion 10 or more hours: female students ($n = 11$; 4.5%) and male students ($n = 6$; 2.4%). Therefore, it was obvious that female students were more likely to use online discussion in their learning than their male counterparts.

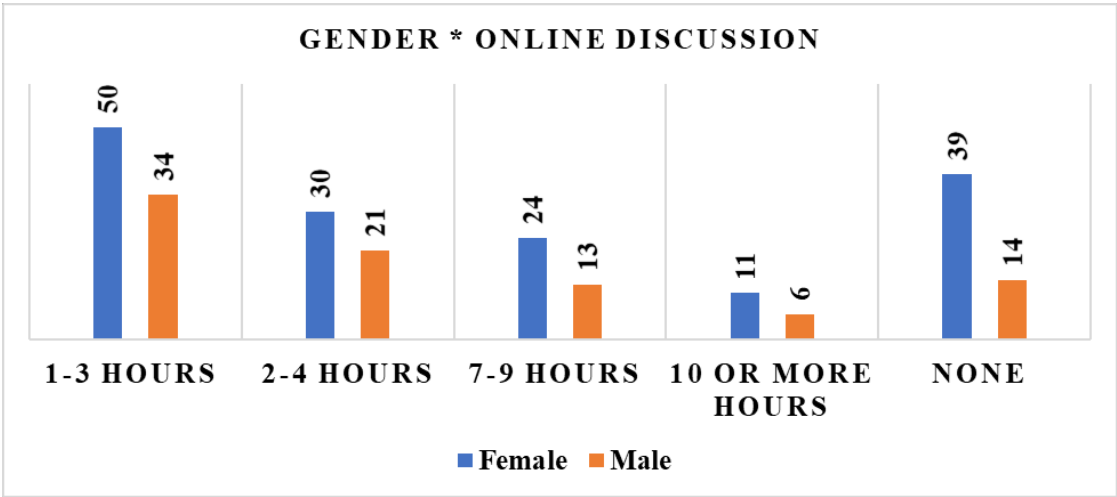


Figure 10. Perceived number of hours students estimated they spent in online discussion.

Most participants did not use audio discussion in their learning: female students ($n = 95$; 39.2%), and male students ($n = 36$; 14.9%); however, 23.6% of participants used audio discussion one to three hours for learning: female students ($N = 30$; 12.3%) and male students ($N=27$; 11.15%), The lowest number of participants from both genders used audio discussion 10 or more hours (see Figure 11). Therefore, it was clear female students did not like to use audio discussion in their learning in contrast to male students who liked to use audio discussion.

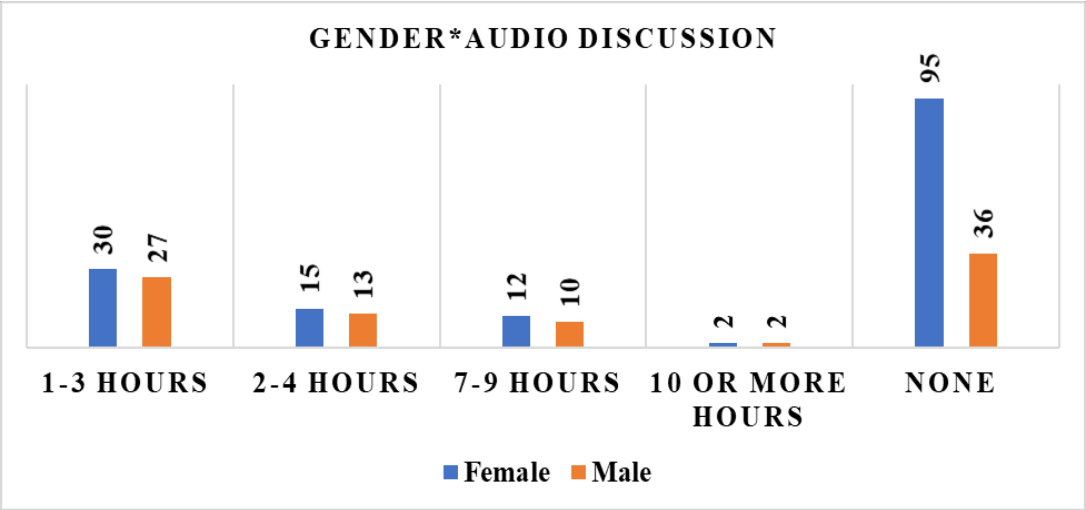


Figure 11. Perceived number of hours students estimated they spent in audio discussion.

The highest percentage of students estimated they spent seven to nine hours in virtual lecture: female participants ($n =59$; 24.18%), and male participants ($n =35$; 14.3%). The second highest percentage of participants used virtual lecture two to four hours: male students ($n =31$; 12.7%) and female students ($n =42$; 17.2%). The lowest percentage of participants spent 10 or more hours of virtual lecture in their learning: male

students ($n = 14$; 5.7%), and female students ($n = 9$, 4; 3.7%, 1.6%). Obviously, male and female students liked to use virtual lecture in their learning (see Figure 12).

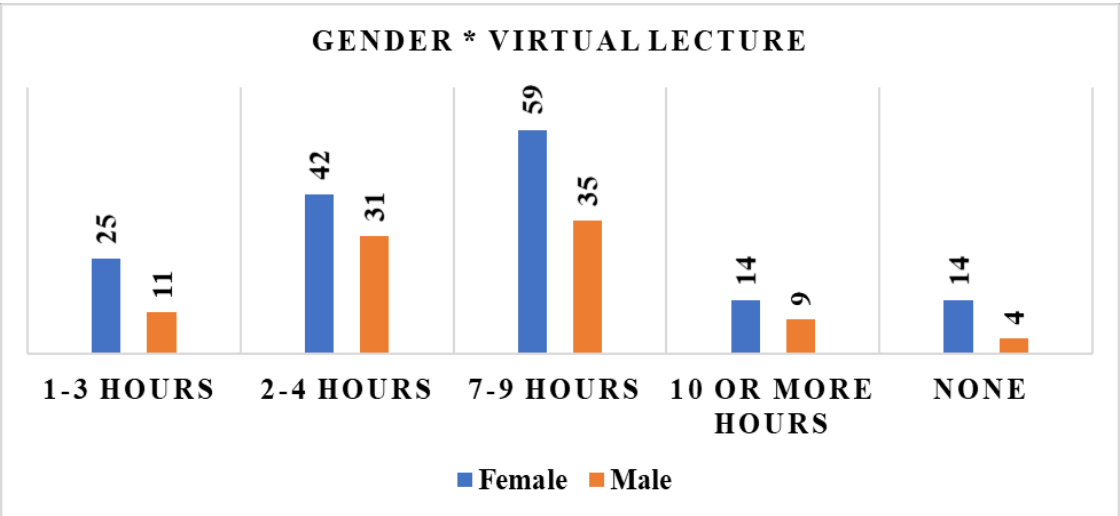


Figure 12. Perceived number of hours students estimated they spent in virtual lecture.

Q2 Is there a significant mean difference due to student gender in terms of student perception of the number of hours spent per week on learning management systems activities in the blended-learning environment of Saudi Electronic University?

To answer the second question, a MANOVA was used to was conducted to describe the mean differences between genders due to multiple dependent variables (online discussion, audio discussion, and virtual lecture) and an independent variable-- gender. Table 9 provides descriptive statistics for student perceptions of the number of hours spent per week on learning management systems activities. There was a statistically significant difference in student perception of number of hours spent per

week on learning management systems activities based on gender, $F(3, 238) = 3.33, p = 0.02 (< \alpha = .05)$; Wilk's $\Lambda = 0.960$, partial $\eta^2 = .040$.

Table 9

Student Perceptions of Number of Hours Spent Per Week on Learning Management Systems Activities

Descriptive Statistics				
	Gender	<i>M</i>	<i>SD</i>	<i>N</i>
Online Discussion	F	2.73	1.589	154
	M	2.38	1.457	88
	Total	2.60	1.549	242
Audio Discussion	F	3.76	1.673	154
	M	3.08	1.750	88
	Total	3.51	1.729	242
Virtual Lecture	F	2.68	1.131	154
	M	2.61	.988	88
	Total	2.65	1.080	242

Using an alpha level of .05, the MANOVA results using the Wilk’s Lambda test were significant, Wilk’s $\Lambda = .960, F(3, 238) = 3.33, p = 0.02 (< \alpha = .05)$; Wilk's $\Lambda = 0.960$, partial $\eta^2 = .040$ (see Table 10). The significant F indicated a significant difference among the genders on a linear combination of the three dependent variables regarding student perception of the number of hours spent per week on learning management systems activities.

Table 10

Multivariate Tests of Student Perceptions Regarding Number of Hours Spent Per Week on Learning Management Systems Activities

Multivariate Tests ^a						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.907	771.553 ^b	3.000	238.000	.000
	Wilks' Lambda	.093	771.553 ^b	3.000	238.000	.000
	Hotelling's Trace	9.725	771.553 ^b	3.000	238.000	.000
	Roy's Largest Root	9.725	771.553 ^b	3.000	238.000	.000
Gender	Pillai's Trace	.040	3.329 ^b	3.000	238.000	.020
	Wilks' Lambda	.960	3.329 ^b	3.000	238.000	.020
	Hotelling's Trace	.042	3.329 ^b	3.000	238.000	.020
	Roy's Largest Root	.042	3.329 ^b	3.000	238.000	.020

According to Cohen (1988) and Miles and Shevlin (2001), a partial η^2 value of 0.01 is small, 0.06 is medium, and 0.14 is large. Therefore, an effect size of 0.04 is medium to large as it relates to the relationship between genders on a linear combination of the three dependent variables regarding student perception of the number of hours spent per week on learning management system activities.

Student Grade Point Average and Hours Spent on Learning Management Systems Activities

The majority of participants who currently had high grades (A, B) spent between one to three hours and two to four hours in online discussion. In addition, some participants (16%) who currently had high grades (A, B) did not use online discussion, represented 16.0 % of the whole participants. Meanwhile, most students who had a grade of C estimated they spent one to three hours in online discussion. In addition, students who had a grade of D estimated they spent one to three hours and two to four hours in online discussion (see Figure 13).

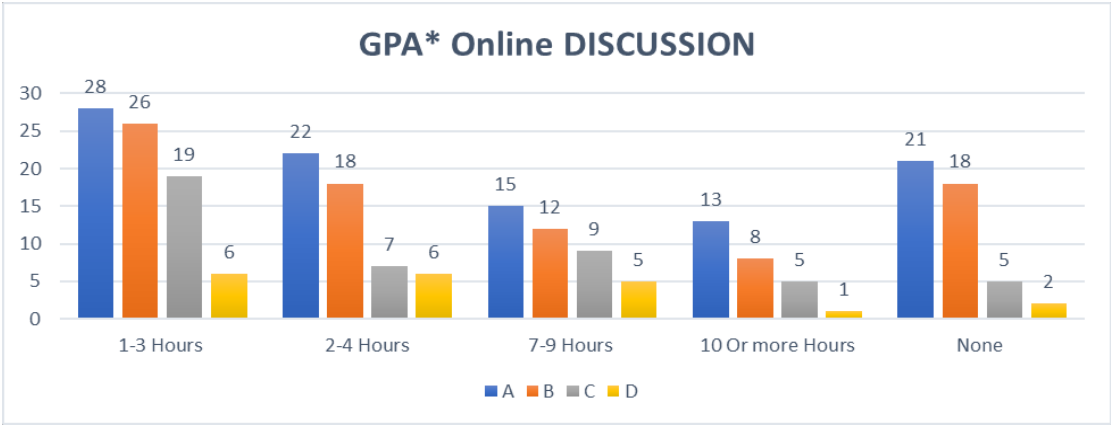


Figure 13. Perceived number of hours students estimated they spent in online discussion according to grade point average.

Most participants who currently had grades of A ($n = 38$), B ($n = 49$), C ($n = 29$), and D ($n = 14$) did not use audio discussion. However, some students who currently had a grade of A used audio discussion the following number of hours: 25—one to three hours, 13—two to four hours, 14—seven to nine hours, and nine--10 hours or more (see Figure 14).

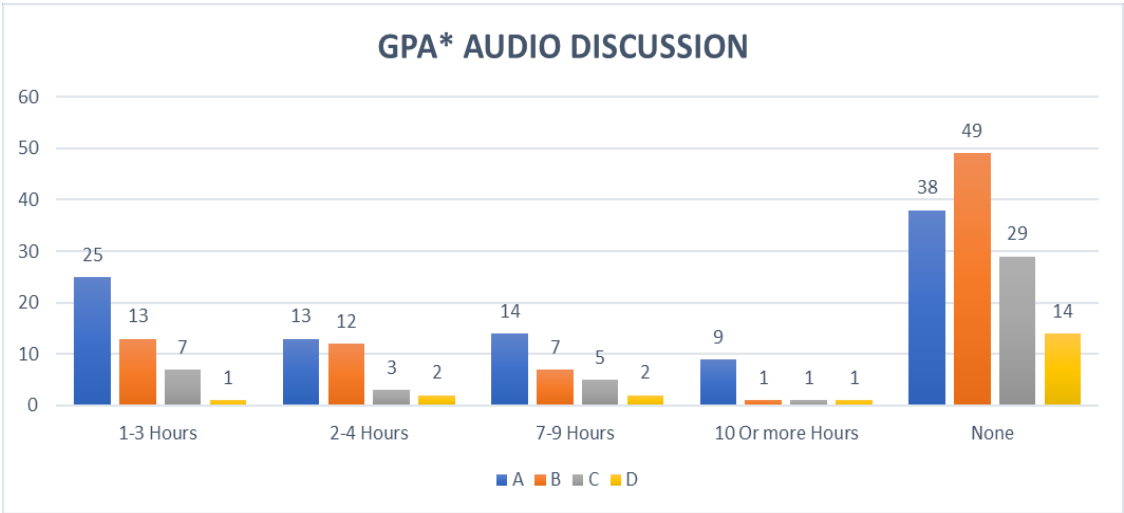


Figure 14. Perceived number of hours students estimated they spent in audio discussion according to grade point average.

The highest percentage of participants ($n = 34$; 14%) who estimated spending the most time on virtual lecture currently had a grade B. Students with a grade of A spent the following number of hours on virtual lecture: 27 (11%) spent between two and four hours and 25 (10.24%) spent seven to nine hours. Twenty-two (8%) participants who currently had a grade of D estimated they spent seven to nine hours and nine (4%) students who currently had a grade of C estimated they spent seven to nine hours (see Figure 15).

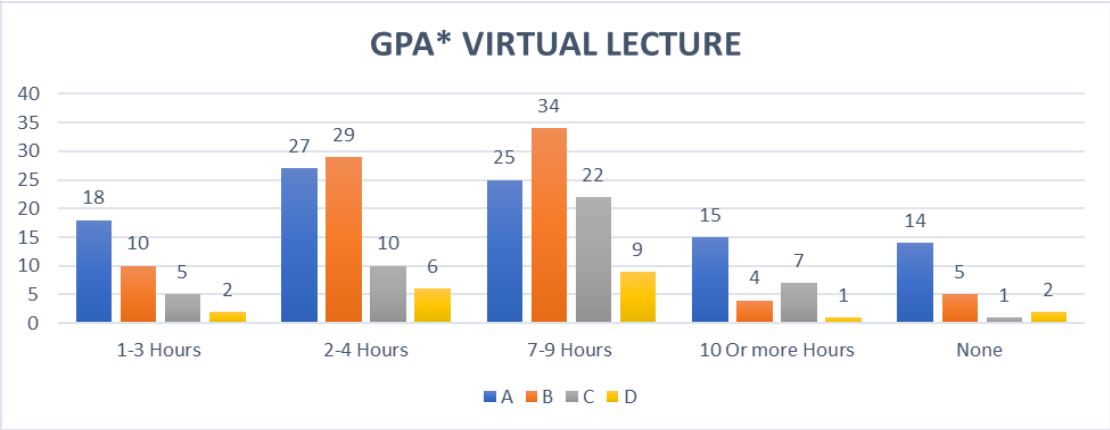


Figure 15. Perceived number of hours students estimated they spent on virtual lecture according to grade point average.

Q3 Is there a significant correlation between student grade point average and the perceived number of hours students estimate they spend on learning management systems activities in the blended learning environment of Saudi Electronic University?

A Pearson correlation statistical method was used to analyze the relationships between the student grade point average and the perceived number of hours students estimated they spent on learning management systems activities in a blended learning environment at Saudi Electronic University. A 2-tailed Pearson correlation statistical method was used to analyze the relationship between student grade point average and the

perceived number of hours students estimated they spent on learning management systems activities (see Table 11).

Table 11

Correlation Between Student Grade Point Average and Perceived Number of Hours Students Estimated They Spent on Learning Management Systems Activities

		Correlations			
		GPA	Online Discussion	Audio Discussion	Virtual Lecture
Grade Point Average	Pearson Correlation	1	-.097	-.052	.031
	Sig. (2-tailed)		.133	.417	.629
	N	246	243	243	245
Online Discussion	Pearson Correlation	-.097	1	.253**	.069
	Sig. (2-tailed)	.133		.000	.282
	N	243	243	243	243
Audio Discussion	Pearson Correlation	-.052	.253**	1	.102
	Sig. (2-tailed)	.417	.000		.114
	N	243	243	243	243
Virtual Lecture	Pearson Correlation	.031	.069	.102	1
	Sig. (2-tailed)	.629	.282	.114	
	N	245	243	243	245

According to Table 11, the correlation between students’ grade point average and the online discussion was not statistically significant ($r = -0.097$, $p = 0.133 > 0.05$), indicating no significant relationship was found between grade point average and online discussion. Also, the correlation between students’ grade point average and audio discussion was not statistically significant ($r = -0.052$, $p = 0.417 > 0.05$), indicating no significant relationship was found between grade point average and audio discussion. In addition, no significant relationship was found between students’ grade point average and the virtual lecture ($r = -0.031$, $p = 0.629 > 0.05$). Hence, the results showed no

significant relationship between grade point average and the perceived number of hours students estimated they spent on any learning management systems activities.

CHAPTER V

DISCUSSION AND CONCLUSION

This chapter provides the purpose of this research, research questions, summary of the results, limitation of the study, recommendations for future research, discussion, and conclusion.

The purposes of the research were to (a) examine if gender played a role in the level of student engagement and grade point average for LMS activity at Saudi Electronic University and (b) discover if there was a correlation between student engagement with LMS programs and student outcomes by estimating students' engagement in LMS activities in a blended-learning environment at Saudi Electronic University.

This descriptive research study answered the following three research questions to determine how gender and GPA impacted online engagement in LMS activities. The questions also aimed to find correlations between engagement and outcomes at Saudi Electronic University by using perceived number of hours students estimated they spent on LMS activities per week.

- Q1 Is there a significant mean difference due to student gender in terms of online engagement in the blended-learning environment of Saudi Electronic University?
- Q2 Is there a significant mean difference due to student gender in terms of student perception of the number of hours spent per week on learning management systems activities in the blended-learning environment of Saudi Electronic University?

- Q3 Is there a significant correlation between student grade point average and the perceived number of hours students estimate they spend on learning management systems activities in the blended learning environment of Saudi Electronic University?

An electronic survey completed by 246 students from Saudi Electronic University consisted of three sections related to the research questions. The first section asked for demographic information data about gender, type of college, educational level, campus located, GPA, and how many courses currently taken. Findings showed females represented 63% of participants and males represented 37% of participants. Also, the majority of participants (95.9%) were undergraduate students and graduate students were represented by 4.1% of participants. Furthermore, the majority of participants (41.2%) had a grade of A while 8.1% of participants had a grade of D. An analysis of students' perceptions regarding the number of hours spent per week on LMS activities indicated students preferred one to three hours in online discussion. Moreover, the results indicated students did not like to use audio discussion in their learning. In addition, the findings indicated students were more likely to use virtual lecture at about seven to nine hours per week.

Research Question One

Results of the first research question revealed 245 participants (155 females and 90 males) answered the Student Engagement Questionnaire (SEQ). The 20-item SEQ examined students' online engagement utilizing five scales: (a) online engagement, (b) active learning, (c) academic relevance, (d) collaboration, and (e) social interaction. A MANOVA was used to discover mean differences between males and females regarding online engagement in LMS activities. The results indicated no differences between males and females regarding their online engagement in LMS activities at Saudi Electronic

University. Hence, the results were similar to prior studies conducted by Lerma (2010), Vogt (2016), Berger (2014), Caspi, Chajut, and Saporta (2008), and Parker (2015) wherein no significant differences were found between responses for male and female participants regarding online engagement. Suttle (2010) also found no statistically significant predictive correlation between genders in online engagement. According to Dahlstrom and Bichsel (2014), no mean difference was found between males and females when using technology in education. Many reasons exist for no mean differences between genders. First, a few researchers found the level of engagement between genders decreased because women who had a smartphone and access to the Internet became more engaged with technology (Junco & Cole-Avent, 2008). Second, students have access to many resources outside the LMS website's activity. For example, students could be using their smartphones to capture slides of course content and sharing with others. They could also use phone applications instead of using LMS activity websites to solve problems (Vogt, 2016). Third, females surpassed males when utilizing information technology for academic purposes and men have many more choices than females to link with LMS activity (Beer et al., 2010; Heffner & Cohen, 2005).

The results of this research contrasted with prior studies conducted by Chang (2012), and Willekens (2009) who found female students had slightly higher engagement than male students. Jaffe, Lee, Huang, and Oshagan (1999) indicated female students had higher levels of social interaction than did male students. This fact was also asserted by Bostock and Lizhi (2005) and Leung (2001) who found female students were more engaged and preferred online interaction in term of online learning rather than male students. However, a few researchers indicated men were more engaged than women in

terms of online engagement (Parker & Bianchi, 2008). Also, the female students had less experience using computers in terms of learning (Vogt, 2016). Certainly, Saudi female students have positive attitudes regarding online instruction and also believe online learning helps overcome many social and cultural barriers (Alarfaj, 2001).

Saudi Electronic University provides many tools and activities in LMS for helping both genders effectively engage in online learning. Also, SEU has access to multiple institutions such as Ohio University, Colorado State University Global Campus, Franklin University, and Education First. The relationship between these institutions and SEU helps SEU to update new information regarding a blended learning environment that reflects students' engagement. Furthermore, it supports SEU in filling the gap in students' engagement through accessing new research about blended learning environments as well as the differences between males and females when studying in different courses. In contrast in the Public Saudi University, some majors are for males only. However, SEU provides access to both genders in terms of majors and acceptance.

Research Question Two

The results of the second research question revealed 242 participants (88 males and 154 females) answered the survey about the perception of the number of hours spent per week on LMS activities. The SEQ examined students' perceptions of the number of hours spent per week on LMS activities as represented by three scales and 15 items including the following online items: online discussion, audio discussion, and virtual lecture. The results of a MANOVA indicated a statistically significant difference between males and females in their perception of the number of hours spent per week on LMS activities at Saudi Electronic University. This finding was similar to a prior study

conducted by Vogt (2016) who found a statistically significant difference between genders; female students spent more time logged in and attempting quizzes than did male students. Also, Anderson and Haddad (2005) stated there was a difference between males and females for online discussion; female students were less hesitant to engage in online discussion than male students. On the other hand, Hamane (2014) and York (2012) found no statistical differences between genders regarding time spent online in LMS activities. Also, Caspi et al. (2008) found no statistical significance between males and females in their online discussion.

In this research study, results showed more than 75% of female participants and 80% of male participants were engaged in online discussion. Dawson, Macfadyen, and Lockyer (2009) indicated online discussion forums in LMS are very important in students' interaction as 80% of students' engagement occurred in discussion boards. Certainly, Saudi female students would feel comfort, exhibit confidence, and reduce their social anxiety when using online learning discussion, which would help them participate effectively (Alanazy, 2013). Although speaking skills are very important for students in their future workplace and in online discussion (Suttle, 2010), 40% of male participants and more than 60% of female participants did not use audio discussion in this research. Obviously, culture, background, and social anxiety might have had a major impact in students participating in the audio discussion, especially female Saudi students. Therefore, speaking and writing skills had a minor role in online engagement learning. Also, it is necessary to help students enhance their critical thinking (Suttle, 2010). More than 90% of female and male participants estimated they spent time in virtual lecture activities.

In the researcher's opinion, female Saudi students were more engaged in online discussion and less engaged in audio discussion. According to Alanazy (2013), the culture and background of Saudi Arabia have had an impact on females not using audio discussion and preferring to post many messages in online discussion in terms of learning. Also, the lack of teaching the typing on a computer in primary and middle school has had an impact on both genders regarding online discussion. Moreover, it was clear from the results of this research that approximately 60% of male participants used audio discussion in their learning. Saudi Electronic University uses English in all but Islamic and Arabic courses, which might have had an impact on students who preferred not to use audio discussion in English due to it being their second language.

On the other hand, virtual learning has helped students of both genders be more engaged. Results of this research indicated the majority of students (both genders) preferred to use virtual lecture in their online learning. According to Cramer et al. (2006), 90% of students believed virtual lecture must be in class, online, or face to face to help students promote their learning by being able to review the lecture any time and the flexibility to transfer from slide to slide. Also, Saudi females did not like to use their voice to create messages for the instructor or their classmates using audio discussion. However, SEU provides many other activities through LMS to meet students' needs for online learning other than audio discussion. This is not say audio discussion is not a useful activity but might be a very important activity to consider in the future for both genders.

Research Question Three

Results of the third research question revealed 242 participants (88 males and 154 females) answered the SEQ about their perceptions of the number of hours spent per week on LMS activities in the blended learning environment at SEU in relation to their GPA (A--from 3.5 to 4, B--from 3 to less than 3.5, C--from 2.5 to less than 3, and D--from 1 to less than 2.5). The SEQ consisted of three scales containing 15 items including the following online items: online discussion, audio discussion, and virtual lecture. A Pearson correlation statistical method analysis was used to discover relationships between students' GPA and the perceived number of hours students estimated they spent on LMS activities in the blended learning environment at SEU. The results found no significant relationship among students' grade point average and online discussion, audio discussion, and virtual lecture. Hence, the results were similar to prior studies conducted by Hamane (2014), Vogt (2016), and Shoepe (2013) who found no correlation between students' engagement and overall outcomes. The reason this research found no difference between students' estimated LMS activity and their outcomes could be the instructors did not encourage students to use LMS activities. Hence, students might not have utilized online engagement via online discussion since few faculty used online discussion in their online classes. Vogt stated 44% of faculty used online discussion but only 38% of students were engaged on online discussion. Also, students who did not access and engage in online discussion in LMS activity courses had a lower score on the online interaction scale. On the other hand, students who engaged more in online discussion had a higher mean score on the Online Social Interaction scale (Dixson, 2010; Hamane, 2014; Vogt, 2016). Online discussion via LMS activity had a significant role in supporting a sense of

belonging in institutions for students and faculty (Baepler & Murdoch, 2010; Dixon, 2010; Macfadyen & Dawson, 2010). Thus, faculty members could have caused a weak correlation between students and online engagement as a result of limited LMS activity in their online classes (Vogt, 2016).

However, some research studies contrasted with this researcher's results and found a strong relationship between students' online activity and students' outcomes (Fritz, 2011; Mogus, Djurdjevic, & Suvak, 2012). Also, Davis and Graff (2005) demonstrated a relationship between students' online activity and their grades. For example, the online discussion board (post and reply) had a strong correlation between students' perceived level of engagement and successful learning. Students who had more participation in online discussion had a higher perceived level of engagement (Hamane, 2014). In addition, Beer et al. (2010) indicated discussion forums enhanced students' ability for online engagement, thus leading to students' success in achieving outcomes. According to Vogt (2016), a moderate positive correlation was found between GPA and online discussion. Moreover, virtual lecture played a massive role in the blended learning environment. According to Cramer et al. (2006), more than 90% of participants asserted the virtual lecture helped them enhance their grades. Also, speaking skills helped students in achieving success and engagement in their online courses (Suttle, 2010).

In the other words, students who were more engaged in LMS course activity frequently logged in, leading to an increase in their learning success (Carini, Kuh, & Klein, 2006; Junco, 2012; Kuh, 2008). Hence, students who logged into LMS activity more frequently perceived themselves as more engaged in their learning (Morris,

Finnegan, & Wu, 2005). Beer et al. (2010) also found a positive relationship between perceived level of engagement and students' outcomes.

Another reason for this research finding no difference between students' estimated LMS activity and their outcomes was an instructor's ability to utilize many technological resources for promoting students' performance. Al-Kassir (2008) analyzed students' perceptions of instructors' competencies, leadership skills, and student academic success in online learning. Results indicated more than 98% of participants agreed an instructor's technical skills were able to increase students' performance, leading to students' academic successes. Instructors play a vital role in adopting many technological resources to increase the effectiveness of their teaching skills, which is reflected in raising students' grades.

The finding of no significant relationship between students' estimated LMS activity and their grade point average (GPA) might be due to Saudi students preferring to use multiple Internet websites and social networks such as Facebook, Twitter, and Telegram outside of the LMS to communicate with other students when solving problems and achieving positive results in their online courses. The Saudi Electronic Library could support students in accessing many resources, which could help them solve problems and increase their grades. The Saudi Electronic Library and social networking could help students be more engaged in their online class (as opposed to LMS activity), which could also lead to an increase in their grades.

The results indicated gender did not play a big role in online engagement when using LMS activity at SEU--a blended learning environment only. Also, no relationship was found between students' spending hours engaged in LMS activity and their grade

point average. However, a difference was found between genders in terms of spending time hourly in LMS activities such as online discussion, audio discussion, and virtual lecture. Saudi Electronic University provides the same opportunities for male and female Saudi students to engage in many different resources and activities in LMS. Also, males and females could use many resources outside of LMS activity such as access to the Saudi Electronic Library to research for solving problems. Both genders preferred to use online discussion as they did not like to use audio discussion. Males and females preferred to use virtual lecture as they could replay the lecture anytime and they liked the flexibility of switching from slide to slide to review the course.

Recommendations/Implications

Gender did not play a big role in the blended learning environment at Saudi Electronic University in terms of online engagement. Saudi Electronic University gives students (both males and females) the same opportunities for using LMS activities and also for studying in different majors. However, a statistically significant difference was found between genders in terms of using online discussion, audio discussion, and virtual lecture. The female students preferred online discussion rather than audio discussion due to social anxiety and culture of Saudi students not preferring to speak online. The results also indicated the virtual lecture was very important for both genders in reviewing the courses. Therefore, the Ministry of Education must encourage SEU to open more majors to both genders. Also, SEU must provide additional activities in LMS such as video conferencing to encourage more interaction between students or between students and faculty.

In the researcher's opinion, instructors should use audio discussion one hour weekly to engage students in exchanging ideas through LMS activity as well as online discussion one hour weekly to answer all questions. These activities would be required of all students. Online discussion could be saved and sent to all students by email. Thus, students would be encouraged to participate by speaking, and leading to enhanced critical thinking and online engagement learning. In addition, instructors must encourage students to incorporate multimedia into their assignments and submit them in the LMS activities. Students could share their ideas and receive constructive comments from students or from instructors. This would help students become more engaged in LMS activities and have an impact on their outcomes.

Future Research

The researcher provides the following recommendations for future research:

1. Comparison between blended learning and face-to-face learning for online engagement in LMS activity related to students' GPA.
2. Measure difference in online engagement between blended learning and pure online learning for LMS activity related to students' GPA.
3. Measure online engagement in the blended learning environment at SEU using actual data via Blackboard and students' estimation of hours spent in LMS activities per week.
4. Measure online engagement in pure online learning environment using LMS activities in an Arabic context.
5. Measure online engagement in face-to-face learning environment using the LMS activities at Saudi universities.

6. Critical and analytical thinking are useful variables to research in the future --not only for online engagement but also in the blended learning environment.
7. Future research should focus on other variables such as age and majors, which would be very important to consider when studying online engagement.
8. Future research could focus on perspectives of instructors and learners regarding some factors in online engagement using a blended learning environment: perspectives of learners in identifying their own interpersonal needs and perspectives of instructors in understanding their roles as facilitator and designer in customizing and transforming education paradigms (Suttle, 2010).
9. Future research must focus on online learning styles in a blended learning environment related to learners' performance. Learning styles are "cognitive, affective, and psychological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (Fahy & Ally, 2005, p. 5).

Conclusion

In the last decade, online learning has played a vital role in teaching and learning as it focuses on meaningful, self-directed, life-long, student-centered learning (Jones et al., 2005). Also, it helps students construct their knowledge through problem-based, active, and collaborative learning (Nichols, 2003). In addition, Vygotsky (1978) indicated social interaction helps learners increase their socialization, higher thinking

functions, and engagement in the learning process. Moreover, Dewey (1938) and Vygotsky stated collaboration learning and social interaction lead to meaningful learning. Students who build and construct their knowledge not only get a higher grade but they positively engage in their courses (Asfaranjan, Shizad, Baradari, Salimi, & Salehi, 2013; Li & Guo, 2015). In addition, Dahlstrom and Bichsel (2014) indicated more than 70% of students liked and preferred to study in a blended learning environment, which combines face-to-face and online courses.

The aim of this study was to discover if there was a correlation between student engagement with LMS programs and student outcomes by estimating perceptions of students' engagement in LMS activity in a blended learning environment at SEU. The research also examined whether gender played a role in the level of student engagement in this setting. In general, the results showed no relationship between students' GPA and LMS activity utilizing three variables: online discussion, audio discussion, and virtual lecture. The results did mention a statistical difference between males and females regarding online discussion, audio discussion, and virtual lecture. In addition, no statistically significant difference was found between males and females regarding online engagement, active learning, academic relevance, collaboration, and social interaction.

Based on the results of this study, higher education institutions must use LMS data for quality assurance purposes to quantify how well a particular university was serving students. Therefore, there should be no reason not to use such data to measure the quality of pedagogy and learning outcomes (Coates et al., 2005). Baepler and Murdoch (2010) noted data in an LMS have provided indicators of the quality of learning, which has helped connect the relationship between teaching and student efforts.

In addition, Coates et al. (2005) indicated the LMS as used by students could help educators, educational leaders, and designers build better educational programs and design more successful curricula in order to improve learning outcomes. Macfadyen et al. (2014) argued for research in which LMS data were used to measure the quality of learning and teaching and to assess individual student outcomes. The data could also assess institutional success relating to the enhancement of student learning outcomes.

REFERENCES

- Al-Kassir, S. A. (2008). *The effects of the instructor's skills on online learning at community colleges in Southern California* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3346631).
- Al-Mousa, A. (2004). *E-learning conception...its benefits...its advantages...its deterrents*. Working paper presented to the Future School Symposium, King Saud University, College of Education. Available at <http://www.ksu.edu.sa/seminars/future-school/index2/htm>
- Al-Taheeh, H., & Marzouk, S. (2004). *DL and e-learning: Concepts and experiences*. Kuwait: Al-Kitab Company.
- Alamri, M. (2011). Higher education in Saudi Arabia. *Journal of Higher Education Theory and Practice*, 11(4), 88-91.
- Alanazy, M. M. (2013). *Participation in online and face-to-face discussions: Perceptions of female Saudi students in the United States* (Doctoral dissertation). University of Northern Colorado, Greeley.
- Alarfaj, A. (2001). *The perception of college students in Saudi Arabia towards distance web-based instruction*. (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (Accession Order No. AAT 3032949)
- Alebaikan, R. (2010). *Perceptions of BL in Saudi universities* (Unpublished doctoral dissertation). University of Exeter, United Kingdom.

- Alebaikan, R., & Troudi, S. (2010). Blended learning in Saudi universities: Challenges and perspectives. *Research in Learning Technology*, 18(1), 49-59.
- Allen, I. E., & Seaman, J. (2004). *Entering the mainstream: The quality and extent of online education in the United States, 2003 and 2004*. Newburyport, MA: Sloan Consortium.
- Allen, I. E., & Seaman, J. (2006). *Making the grade: Online education in the United States*. Needham, MA: Sloan-C. Retrieved from <http://www.sloan-c.org/publications/survey/survey06.asp>
- AlNajdi, S. M. (2014). *Students' perceptions toward using Jusur: A web-based learning management system for higher education in Saudi Arabia* (Doctoral dissertation). Indiana State University, Terra Haute.
- Alonso, F., Manrique, D., Martínez, L., & Viñes, J. M. (2011). How blended learning reduces underachievement in higher education: An experience in teaching computer sciences. *IEEE Transactions on Education*, 54(3), 471-478.
- Anderson, D. M., & Haddad, C. J. (2005). Gender, voice, and learning in online course environments. *Journal of Asynchronous Learning Networks*, 9(1), 3-14.
- Asfaranjan, Y. S., Shizad, F., Baradari, F., Salimi, M., & Salehi, M. (2013). Alleviating the senses of isolation and alienation in the virtual world: Socialization in distance education. *Procedia--Social and Behavioral Sciences*, 93, 332-337.
- Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25(4), 297-308.

- Aycock, A., Garnham, C., & Kaleta, R. (2002). Lessons learned from the hybrid course project. *Teaching with Technology Today*, 8(6), 9-21. Retrieved from <http://www.uwsa.edu/ttt/>
- Baepler, P., & Murdoch, C. (2010). Academic analytics and data mining in higher education. *International Journal for the Scholarship of Teaching and Learning*, 4(2), 1-9.
- Bair, D. E., & Bair, M. A. (2011). Paradoxes of online teaching. *International Journal for the Scholarship of Teaching and Learning*, 5(2).
- Bates, A. (1995). *Technology, open learning and distance education*. New York, NY: Routledge.
- Bates, A., & Poole, G. (2003). *Effective teaching with technology in higher education of San Francisco*. Indianapolis, IN: Jossey-Bass/John Wiley.
- Beer, C., Clark, K., & Jones, D. (2010). *Indicators of engagement. Curriculum, technology & transformation for an unknown future*. Retrieved from <http://ascilite.org.au/conferences/sydney10/procs/Beer-full.pdf>
- Berge, Z. L. (1998). *Changing roles of teachers and learners are transforming the online classroom*. Retrieved from https://www.researchgate.net/profile/Zane_Berge/publication/265525982_Barriers_To_Online_Teaching_In_Post-Secondary_Institutions_Can_Policy_Changes_Fix_It/links/54a6d5520cf257a6360aa187/Barriers-To-Online-Teaching-In-Post-Secondary-Institutions-Can-Policy-Changes-Fix-It.pdf.
- Berger, A. E. (2014). *Views of student engagement among students and faculty in online courses* (Doctoral dissertation). Pepperdine University, California.

- Bersin, J., Howard, C., & O'Leonard, K. (2008). *Learning management systems 2008: Facts*. Oakland, CA: Bersin & Associates Research.
- Bostock, S. J., & Lizhi, W. (2005). Gender in student online discussions. *Innovations in Education and Teaching International*, 42(1), 73-85.
- Brock, T. (2010). Young adults and higher education: Barriers and breakthroughs to success. *The Future of Children*, 20(1), 109-132. doi:10.1353/foc.0.0040
- Brown, V. (2011). Changing demographics of online courses. *US-China Education Review*, 8(4), 460-467.
- Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as an antecedent of young children's school adjustment: An examination of mediating process. *Developmental Psychology*, 37(4), 550.
- Burge, L. (2008). Crafting the future: Pioneer lessons and concerns for today. *Distance Education*, 29(1), 5-17.
- Buzzetto-More, N. A., & Sweat-Guy, R. (2006). Incorporating the hybrid learning model into minority education at a historically Black university. *Journal of Information Technology Education*, 5, 153-164. Retrieved from <http://jite.org/documents/Vol5/v5p153-164Buzzetto130.pdf>
- Campbell, J. P., & Oblinger, D. G. (2007). Academic analytics. *EDUCAUSE Review*, 42(4), 40-57.
- Cantoni, V., Cellario, M., & Porta, M. (2003, October). Perspectives and challenges in e- learning: Towards natural interaction paradigms. *Journal of Visual Languages and Computing*, 15(2004), 333-345.

- Carini, R. M., Kuh, G. D., & Klein, S. P. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education*, 47(1), 1-32.
- Caspi, A., Chajut, E., & Saporta, K. (2008). Participation in class and in online discussions: Gender differences. *Computers & Education*, 50, 718–724.
- Chang, C. L. (2008). *Faculty perceptions and utilization of a learning management system in higher education* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI NO. 3319031)
- Chang, H. (2012). *Student engagement and the quality of higher education: A contextual and analytical study of current Taiwanese undergraduates* (Doctoral dissertation). University of California, Davis.
- Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39(7), 3-7.
- Chickering, A. W., & Gamson, Z. F. (1989). Seven principles for good practice in undergraduate education. *Biochemical Education*, 17(3), 140-141.
- Chung, C. H., Pasquini, L. A., Allen, J. M., & Koh, C. E. (2012). A review of web-based learning management system design on higher education. In T. Bastiaens & G. Marks (Eds.), *Proceedings of world conference on e-learning in corporate, government, healthcare, and higher education 2012* (pp. 1428-1436). Chesapeake, VA: Association for the Advancement of Computing in Education.

- Clark, T. (2003). *Disadvantages of collaborative online discussion and the advantages of sociability, fun and cliques for online learning*. Retrieved from http://delivery.acm.org.pallas2.tcl.sc.edu/10.1145/860000/857104/p23-clark.pdf?ip=129.252.86.83&acc=PUBLIC&CFID=46283172&CFTOKEN=35395452&__acm__=1317788445_930b859aea8d2589ca1eb14a373c6e94
- Clark, N. (2014). *Higher education in Saudi Arabia*. New York, NY: World Education Services.
- Coates, H. (2006). *Student engagement in campus-based and online education*. New York, NY: Routledge.
- Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary Education and Management*, 11(1), 19-36. Retrieved from <http://doi.org/10.1080/13583883.2005.9967137>
- Coates, H., & McCormick, A. C. (Eds.). (2014). *Engaging university students: International insights from system-wide studies*. London, UK: Springer.
- Cohen, J (1988) *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cole, J., & Foster, H. (2007). *Using Moodle: Teaching with the popular open source course management system* (2nd ed.). Boston, MA: O'Reilly Media and Press.
- Colbran, S., & Al-Ghreimil, N. (2013). The role of information technology in supporting quality teaching and learning. In *Higher education in Saudi Arabia* (pp. 73-82). New York, NY: Springer Science and Business Media Dordrecht.

- Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. Gunnar & L. A. Sroufe (Eds.), *Minnesota symposium on child psychology* (pp. 43-77). Chicago, IL: University of Chicago Press.
- Copp, C. D. (2007). *Students, faculty, and administrators: Perceptions of hybrid instruction in higher education* (Doctoral dissertation). Retrieved from <http://www.lib.uci.edu>
- Cramer, K. M., Collins, K. R., Snider, D., & Fawcett, G. (2006). virtual lecture hall for in-class and online sections: A comparison of utilization, perceptions, and benefits. *Journal of Research on Technology in Education*, 38(4), 371-381.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Upper Saddle River, NJ: Pearson Education.
- Cucciare, M., Weingardt, K. R., & Villafranca, S. (2008). Using blended learning to implement evidence-based psychotherapies. *Clinical Psychology: Science and Practice*, 15(4), 299-307.
- Dahlstrom, E., & Bichsel, J. (2014). *ECAR study of undergraduate students and information technology, 2014* [Research report]. Available from <https://library.educause.edu/~media/files/library/2014/10/ers1406.pdf>
- Dahlstrom, E., Brooks, D. C., & Bichsel, J. (2014). *The current ecosystem of learning management systems in higher education: Student, faculty, and it perspectives* (Research report). Retrieved from <http://www.educause.edu/ecar>

- Daugherty, M., & Funke, M. (1998). University faculty and student perceptions of Web-based instruction. *Journal of Distance Education*, 13(10), 21-39.
- Davis, J., & Graff, M. (2005). Performance in e-learning: Online participation and student grades. *British Journal of Educational Technology*, 36(4), 657–663.
- Dawson, S., Macfadyen, L. P., & Lockyer, L. (2009). *Learning or performance: Predicting drivers of student motivation*. Paper presented at Ascilite University, Auckland, NZ. Retrieved from <http://www.ascilite.org.au/conferences/auckland09/procs/dawson.pdf>
- Dawson, S., & McWilliam, E. (2008). *Investigating the application of IT generated data as an indicator of learning and teaching performance*. Retrieved from http://altf.org/wp-content/uploads/2016/08/McWilliam_E_Associate-Fellowship_Resource_2009.pdf
- DeVine, C. (2013). *The skills both online students and teachers must have*. Retrieved from <http://www.edudemic.com/2013/03/the-skills-both-online-students-and-teachers-must-have>
- Dewey, J. (1938). *Logic: The theory of inquiry*. New York, NY: Holt, Rinehart and Winston.
- Diaz, D. P. (2000). *Comparison of student characteristics and evaluation of students in an online health education course* (Ed.D. dissertation). Nova Southeastern University, Davie, Florida.
- Dixson, M. D. (2010). Creating effective student engagement in online courses: What do students find engaging? *Journal of the Scholarship of Teaching and Learning*, 10(2), 1-13.

- Ellis, A. K. (2001, March). *Teaching, learning, and assessment together: The reflective classroom*. London, England: Eye on Education.
- Fahy, P., & Ally, M. (2005). Student learning style and asynchronous computer-mediated conferencing (CMC) interaction. *American Journal of Distance Education, 19*(1), 5-22.
- Fetaji, B., & Fetaji, M. (2007). Learning management systems evaluation and comparative analyses. *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, 20*(1), 285-292.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59-109.
- Fritz, J. (2011). Classroom walls that talk: Using online course activity data of successful students to raise self-awareness of underperforming peers. *The Internet and Higher Education, 14*(2), 89-97. doi:10.1016/j.iheduc.2010.07.007
- Garrison, R. D., & Vaughan, N. D. (2008). *Blended learning in higher education: framework, principles, and guidelines*. San Francisco: Jossey-Bass.
- Gašević, D., Dawson, S., & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. *TechTrends, 59*(1), 64-71.
- Gedik, N., Kiraz, E., & Ozden, M. Y. (2013). Design of a blended learning environment: Considerations and implementation issues. *Australasian Journal of Educational Technology, 29*(1), 1-19.

- Georgouli, K., Skalkidis, I., & Guerreiro, P. (2008). A framework for adopting LMS to introduce e-learning in a traditional course. *Educational Technology & Society*, 11(2), 227-240.
- Goldstein, P. J., & Katz, R. N. (2005). Academic analytics: The uses of management information and technology in higher education. *Educause*, 8, 1-12
- Graham, C. R. (2005). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.). *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). San Francisco, CA: Pfeiffer Publishing.
- Hamane, A. C. (2014). *Student engagement in an online course and its impact on student success* (Doctoral dissertation. Pepperdine University, Malibu, California.
- Heffner, M., & Cohen, S. H. (2005). Evaluating student use of web-based course material. *Journal of Instructional Psychology*, 32(1), 74–81.
- Hiltz, S. R., & Shea, P. (2005). The student in the online classroom. In S. R. Hiltz & R. Goldmann (Eds.), *Learning together online: Research on asynchronous learning networks* (pp. 145-168). Mahwah, NJ: Erlbaum.
- Horn, M. B., & Staker, H. (2011). *The rise of K-12 blended learning*. Mountain View, CA: Innosight Institute.
- Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27-37.
- Huang, R., Ma, D., & Zhang, H. (2008). *Towards a design theory of blended learning curriculum*. Presentation at International Conference on Hybrid Learning (ICHL), Beijing, China.

- Hussein, H. B. (2011). Attitudes of Saudi universities faculty members towards using learning management system (JUSUR). *Turkish Online Journal of Educational Technology-TOJET*, 10(2), 43-53.
- ITT Technical Institute. (2007). *Education services*. Retrieved from <http://www.itt-tech.edu/>
- Inversini, A., Botturi, L., & Triacca, L. (2006). Evaluating LMS usability for enhanced elearning experience. *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, 6(1), 595-601.
- Jaffe, J. M., Lee, Y., Huang, L., & Oshagan, H. (1999). Gender identification, interdependence, and pseudonyms in CMC: Language patterns in an electronic conference. *The Information Society*, 15(4), 221–234.
- Johnson, G. M. (2005). Synchronous and asynchronous text-based CMC in educational contexts: A review of recent research. *TechTrends*, 50(4), 46-53.
- Jones, J. G., Morales, C., & Knezek, G. A. (2005). Three-dimensional online learning environments: Examining attitudes toward information technology between students in internet-based three-dimensional and face-to- face classroom instruction. *Educational Media International*, 42(3), 219-236.
- Junco, R. (2012). The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement. *Computers & Education*, 58(1), 162-171.
- Junco, R., & Cole-Avent, G. A. (2008). An introduction to technologies commonly used by college students. *New Directions for Student Services*, 124, 3–18.

- Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, 38(5), 758-773. Retrieved from <http://doi.org/10.1080/03075079.2011.598505>
- Kanthawongs, P., & Kanthawongs, P. (2013). Individual and social factors affecting student's usage intention in using learning management system. *Procedia-Social and Behavioral Sciences*, 88, 89-95.
- Kemper, K. L. (2015). *Effects of pedagogy on higher education blended instructional design and delivery* (Doctoral dissertation). Widener University, West Chester, PA.
- Klassen, J., & Vogel, D. (2003). *Web-based education: Learning from experience*. Hershey, PA: Idea Group.
- Klobas, J. E., & McGill, T. J. (2010). The role of involvement in learning management system success. *Journal of Computing in Higher Education*, 22(2), 114-134.
- Kolari, S., Savander-Ranne, C., & Viskari, E. L. (2006). Do our engineering students spend enough time studying? *European Journal of Engineering Education*, 31(5), 499-508.
- Koroghlanian, C. M., & Brinkerhoff, J. (2007). Online students' technology skills and attitudes toward online instruction. *Journal of Educational Technology Systems*, 36(2), 219-244.
- Kuh, G. (2008, Fall). Why integration and engagement are essential to effective educational practice in the twenty-first century. *Peer Review*, 3, 27-28.
- Kuh, G. D. (2009). What student affairs professionals need to know about student engagement. *Journal of College Student Development*, 50(6), 683-706.

- Kumar, A. (2012). Blended learning in higher education: A comprehensive study. *Proceedings of International Conference on Business Management & IS*, 0(1), 345-352. Retrieved from <http://journal.ijacp.org/index.php/ICBMIS/article/view/82/127>
- Lerma, M. D. P. (2010). *Wired and engaged? Student engagement in online learning at the community college level* (Doctoral dissertation). California State University, Long Beach.
- Li, L., & Guo, R. (2015). A student-centered guest lecturing: A constructivism approach to promote student engagement. *Journal of Instructional Pedagogies*, 15, 1-7.
- Long, P., & Siemens, G. (2011). Analytics in learning and education. *EDUCAUSE Review*, 46(5), 30. Retrieved from <https://net.educause.edu/ir/library/pdf/ERM1151.pdf>
- Lonn, S., Aguilar, S., & Teasley, S. D. (2013). Issues, challenges, and lessons learned when scaling up a learning analytics intervention. In *Proceedings of the third international conference on learning analytics and knowledge--LAK '13* (p. 235). New York, NY: ACM Press. Retrieved from <http://doi.org/10.1145/2460296.2460343>
- Lyons, J. (2004). Teaching U.S. history online: Problems and prospects. *The History Teacher*, 37, 447-456.
- Macfadyen, L. P., & Dawson, S. (2010). Mining LMS data to develop an “early warning system” for educators: A proof of concept. *Computers & Education*, 54(2), 588-599. doi:10.1016 /j.compedu.2009.09.008

- Macfadyen, L. P., Dawson, S., Pardo, A., & Gašević, D. (2014). Embracing big data in complex educational systems: The learning analytics imperative and the policy challenge. *Research & Practice in Assessment*, 9, 16-28.
- Male, T., & Alshathri, A. (2015, June). *Students and instructors' perceptions of blended learning in the first electronic university in the Arab world (Saudi Electronic University)*. Proceedings of the British Education Studies Association (BESA) Annual Conference, Cardiff Metropolitan University, New South Wales, 1-23.
- Martin, F. (2008). Blackboard as the learning management system of a computer literacy course. *Journal of Online Learning and Teaching*, 4(2), 138-145.
- McGill, T. J., & Klobas, J. E. (2009). A task-technology fit view of learning management system impact. *Computers & Education*, 52(2), 496-508.
- Miles, J., & Shevlin, M. (2001). *Applying regression and correlation: A guide for students and researchers*. London: Sage.
- Miliszewska, I. (2008). Transnational education programs: Student reflections on a fully-online versus a hybrid model. *Hybrid Learning and Education*, 5169, 79-90.
- Ministry of Higher Education. (2010). *About the ministry*. Reviewed from <http://mohe.sa/en/aboutus/Pages/default.aspx>
- Ministry of Education. (2016, January). *Statistical reports* [Data file]. Retrieved from <http://hesc.moe.gov.sa/pages/default.aspx>
- Mogus, A. M., Djurdjevic, I. , & Suvak, N. (2012). The impact of student activity in a virtual learning environment on their final mark. *Active Learning in Higher Education*, 13(3), 177-189. doi:10.1177/1469787412452985

- Morris, L. V., Finnegan, C., & Wu, S. (2005). Tracking student behavior, persistence, and achievement in online courses. *The Internet and Higher Education*, 8(3), 221-231.
- National Center for E-Learning and Distance Learning. (2010a). *Jusur manual: Lecturer's manual*. Retrieved from http://www.elc.edu.sa/jusur/pdf/JUSUR_Lect_1.pdf
- National Center for E-Learning and Distance Learning. (2010b). *List of rules of distance learning and e-learning*. Retrieved from: http://www.elc.edu.sa/portal/templates/lms_mohe2/download/DL_bylaws.pdf
- National Center for E-Learning and Distance Learning. (2010c). *Home page*. Retrieved from: <http://www.elc.edu.sa/portal/>
- National Center for E-Learning and Distance Learning. (2012). *Jusur LSM*. Retrieved from <http://jusur.elc.edu.sa/jusur/English>
- Newbury, R. (2013). *Student outcomes and design elements in blended learning courses*. Ann Arbor, MI: ProQuest LLC.
- Nichols, M. (2003). A theory for eLearning. *Educational Technology & Society*, 6(2), 1-10. Retrieved from <http://www.ifets.info>
- Nonis, S. A., Philhours, M. J., & Hudson, G. I. (2006). Where does the time go? A diary approach to business and marketing students' time use. *Journal of Marketing Education*, 28, 121-135. doi:10.1177/0273475306288400
- Norberg, A., Dziuban, C., & Moskal, P. (2011). A time-based BL model. *On the Horizon*, 19(3), 207-216.

- Norouzi, M. (2014). Model of learning management system for self-directed learning. *International Journal of Information Dissemination and Technology*, 4(4), 332-337.
- Özdamli, F. (2007, May). *An evaluation of open source learning management systems according to administration tools and curriculum design*. Paper presented at the International Educational Technology (IETC) Conference, Nicosia, Turkish Republic of Northern Cyprus.
- Pace, C. R. (1979). *Measuring outcomes of college: Fifty years of findings and recommendations for the future*. San Francisco, CA: Jossey Bass.
- Parker, C. L. (2015). *Online student engagement: Perceptions of the impact on student learning and effective practices* (Doctoral dissertation, Northeastern University). Retrieved from <https://search.proquest.com/openview/4e675034119ebd3637a7ea261dfae739/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Parker, R. E., & Bianchi, A. (2008). Perceptions of instructional technology: Factors of influence and anticipated consequences. *Educational Technology & Society*, 11(2), 274–293.
- Pascarella, E. T., Seifert, T. A., & Blaich, C. (2010). How effective are the NSSE benchmarks in predicting important educational outcomes? *Change: The Magazine of Higher Learning*, 42(1), 16-22. Retrieved from <http://doi.org/10.1080/00091380903449060>
- Precel, K., Eshet-Alkalai, Y., & Alberton, Y. (2009). Pedagogical and design aspects of a blended learning course. *International Review of Research in Open and Distance Learning*, 10(2), 1-16.

- Qi, L. S., & Tian, A. K. (2011). Design and application of hybrid learning platform based on Joomla. In M. Zhou & H. Tan (Eds.), *Advances in computer science and education applications* (pp. 549-556). Berlin, Germany: Springer-Verlag.
- Rice, W. (2008) *Moodle 1.9 e-learning course development: A complete guide to successful learning using Moodle*. Olton, TX: Packt Publishing Ltd.
- Robinson, C. C. (2006). *New benchmarks in higher education: Student engagement in online learning* (Ed.D. dissertation, Oral Roberts University). Retrieved from Dissertations & Theses: The Humanities and Social Sciences Collection. (Publication No. AAT 3211944).
- Romiszowski, A. (2009). Fostering skill development outcomes. In C. M. Reigeluth & A. A. Carr-Chellman (Eds.), *Instructional design theories and models: Building a common knowledge base* (Vol. III, pp. 199-224). New York, NY: Routledge.
- Roper, A. R. (2007). How students develop online learning skills. *Educause Quarterly*, 1, 62-65.
- Rossett, A., & Frazee, R. V. (2006). *Blended learning opportunities* [White paper]. Retrieved from https://www.researchgate.net/profile/Rebecca_Frazee/publication/228669485_Blended_Learning_Opportunities/links/55c1564508aed621de154484.pdf
- Ross, C. (2009). *Engagement for learning: What matters to students, what motivates them and how can institutional support services foster student engagement?* Presented at Australian and New Zealand Student Services Association Biennial Conference, Brisbane, Australia. Retrieved from <http://www.adcet.edu.au/Anzssa/View.aspx?id=7034>

- Salmon, G. (2002). *E-tivities: The key to active online learning*. New York, NY: Routledge Falmer.
- Santos, O. C., & Boticario, J. G. (2007). *Developing adaptive learning management systems--An open IMS-based user modelling approach*. Retrieved from <http://jime.open.ac.uk/2007/02>
- Saudi Electronic University. (2012a). *Saudi Electronic University: FAQ*. Retrieved from <http://seu.edu.sa/pages/view/35/>
- Saudi Electronic University. (2012b). *Saudi Electronic University: Vision and mission*. Retrieved from <http://seu.edu.sa/pages/view/24/>
- Saudi Electronic University. (2017). *Student services*. Retrieved from <https://www.seu.edu.sa/sites/ar/ElectronicServices/Pages/StudentsServices.aspx>
- Schreurs, J., Moreau, R., & Picart, I. (2003). *E-blended learning management system*. Presentation at Seventh International Association of Science and Technology for Development International Conference on Internet and Multimedia Systems and Applications (pp. 99-103), Diepenbeek, Belgium.
- Seo, A., Hasegawa, S., & Ochimizu, K. (2007, June). A situation adaptable learning management system. In *World Conference on Educational Multimedia, Hypermedia and Telecommunications*, 2007(1), 1550-1555.
- Shedd, J. M. (2003). The history of the student credit hour. *New Directions for Higher Education*, 122, 5-12.

- Shoepe, T. C. (2013). *Engaging undergraduate students in an online science course: The relationship between instructor prompt and student engagement in synchronous class sessions*. Retrieved from <https://unco.idm.oclc.org/login?url=https://search-proquest-com.unco.idm.oclc.org/docview/1328405178?accountid=12832>
- Siemens, G., & Gašević, D. (2012). Learning and knowledge analytics. *Educational Technology and Society*, 15(3), 1-2.
- Simons, G., & Parkinson, B. (2009). Time-dependent observational and diary methodologies and their use in studies of social referencing and interpersonal emotion regulation. *21st Century Society: Journal of the Academy of Social Sciences*, 4(2), 175-186.
- Singh, P., & Pan, W. (2004). Online education: Lessons for administrators and instructors. *College Student Journal*, 38, 302-308.
- Spector, J. M. (2008). *Handbook of research on educational communications and technology*. London, England: Taylor & Francis.
- Stafford R. (2005). Understanding motivations for internet use in distance education. *IEEE Transactions on Education*, 49, 301-306.
- Suttle, C. M. (2010). *Engagement in online courses*. Retrieved from <https://search.proquest.com/docview/741706670?accountid=142908>
- Tabachnick, B., & Fidell, L. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson/Allyn & Bacon.
- The Chronicle of Higher Education. (2003). *Distance learning*. Retrieved from <http://chronicle.com/cgi2>

- Trowler, V. (2010). *Student engagement literature review*. Retrieved from www.heacademy.ac.uk
- Trowler, V. (2013). Leadership practices for student engagement in challenging conditions. *Perspectives: Policy and Practice in Higher Education*, 17(3), 91-95.
- Vaughan, N. (2014). Student engagement and blended learning: Making the assessment connection. *Education Sciences*, 4(4), 247-264.
- Vázquez-Cano, E., & García, M. L. S. (2015). Analysis of risks in a learning management system: A case study in the Spanish National University of Distance Education (UNED). *Journal of New Approaches in Educational Research*, 4(1), 62.
- Venkatesh, V. & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Vogt, K. L. (2016). *Measuring student engagement using learning management systems* (Doctoral dissertation). University of Toronto. Ontario, Canada.
- Vygotsky, L. (1978). *Mind and society*. Cambridge, MA: Harvard University Press.
- Wijeratne, W. (2009). Some observations on study time of a sample of open/distance learners in Sri Lanka. *OUSL Journal*, 3(9), 111.
- Willekens, R. G. (2009). *Maintaining student engagement in community college hybrid courses*. Retrieved from <https://search.proquest.com/docview/305066485?accountid=142908>

- Wolf-Wendel, L., Ward, K., & Kinzie, J. (2009). A tangled web of terms: The overlap and unique contribution of involvement, engagement, and integration to understanding college student success. *Journal of College Student Development*, 50(4), 407-428.
- Wolff, A., Zdrahal, Z., Nikolov, A., & Pantucek, M. (2013). Improving retention: Predicting at-risk students by analytics clicking behavior in a virtual learning environment. In *Proceedings of the third international conference on learning analytics and knowledge--LAK '13* (pp. 145-149). New York, NY: ACM Press. Retrieved from <http://doi.org/10.1145/2460296.2460324>
- Wyatt, G. (2005). Satisfaction, academic rigor, and interaction: Perceptions of online instruction. *Education*, 125(3), 460-468.
- York, R. M. (2012). *The relationship between student engagement in online courses and credit hour Value* (Doctoral dissertation, Walden University). Retrieved from <https://search.proquest.com/openview/7df104c47b1623e1959edad1d4f7160b/1?pq-origsite=gscholar&cbl=18750&diss=y>
- Young, S. (2006). Student views of effective online teaching in higher education. *American Journal of Distance Education*, 20(2), 65-77.
- Zepke, N., & Leach, L. (2010). *Improving student engagement in post-compulsory education: A synthesis of research literature*. A report prepared for the Teaching and Learning Research Initiative, Wellington, New Zealand.
- Zouhair, J. (2010). Utilizing JUSUR in an information systems course. *International Journal of Education and Development using Information and Communication Technology*, 6(4), 114-121. Retrieved from <http://ijedict.dec.uwi.edu/index.php>

APPENDIX A
SURVEY

Part 1: Demographic Information

Instruction I: This section is seeking information about your background. Please choose the answer that applies.

1. What is your gender?

☐ Male

☐ Female
2. What is your Identification Number of the Saudi Electronic University?

3. What is your type of college?

☐ College of Administration and Finance

☐ College of Computation and Informatics

☐ College of Health Sciences

☐ College of Science and Theoretical Studies
4. What is your current educational level?

☐ Undergraduate Student

☐ Graduate Student
5. Where is your campus located?

☐ Central Region (Riyadh, Alqassim)

☐ Northern Region (Tabuk, Aljouf)

☐ Eastern Region (Dammam, Alahsa)

☐ Southern Region (Abha, Jazan)

☐Western Region (Jeddah, Almadinah)

6. What is your current GPA?
- ☐ (A) From 3.5 to 4
 - ☐ (B) From 3 to less than 3.5
 - ☐ (C) From 2.5 to less than 3
 - ☐ (D) From 1 to less than 2.5
7. How many courses are you taken currently?
- ☐ One course
 - ☐ Two courses
 - ☐ Three courses
 - ☐ More than 3 courses

Part 2: Self-report of LMS activity

Instruction I: This section is seeking information about your self-report of LMS activity. Please choose the answer that applies.

1, How many times did you spend in a week doing online discussion?

- ☐ None
- ☐ Between 1 and 3
- ☐ Between 4 and 6
- ☐ Between 7 and 9
- ☐ 10 or More

2. How many times did you spend in a week doing audio discussion?

- ☐ None
- ☐ Between 1 and 3
- ☐ Between 4 and 6
- ☐ Between 7 and 9
- ☐ 10 or More

3. How many times did you spend in a week doing virtual lecture?

- ☐ None
- ☐ Between 1 and 3
- ☐ Between 4 and 6
- ☐ Between 7 and 9
- ☐ 10 or More

Part 3: Student Engagement Questionnaire (SEQ)

Instruction I: This section is seeking information about your Student Engagement. Please choose the answer that applies.

Online Engagement					
	Items	Never	Rarely	Sometimes	Often
1	Online learning systems are a major part of my university education.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	I used online systems to improve how I learn at university.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Online systems helped me to interact better with the university.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	I used online systems to manage my university study.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Online Active Learning					
	Items	Never	Rarely	Sometimes	Often
5	I used online materials to improve my learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	I used online materials to make lectures more meaningful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I identified expected work standards using online systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I found that online materials challenged me to learn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Online Academic Relevance					
	Items	Never	Rarely	Sometimes	Often
10	Using online systems made my study seem more relevant.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Using online learning systems made me feel part of the university.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Using online materials helped me put my study in real-world contexts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Online Collaboration					
	Items	Never	Rarely	Sometimes	Often
13	I used online systems with other students around campus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	I used online systems to do academic work with other students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	I used online systems to work with other students outside of class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	I used university online systems to communicate with other students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Online Social Interaction					
	Items	Never	Rarely	Sometimes	Often
17	Teaching staff participated in online discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	I found it easy to explain my ideas in online discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	I had helpful online discussions with other students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	I met new people when using the online learning system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX B
CONSENT FORM FOR HUMAN PARTICIPANTS
IN RESEARCH



CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

Project Title: Effectiveness of student engagement using learning management system in the Blended learning environment at Saudi Electronic University

Researchers:

Yousef Almoslamani, MSN, RN; Doctoral Student

Research Advisor: Dr. Mia Kim Williams

Email: Mia.Williams@unco.edu

Phone: (970) 351-2414

Purpose and Description: The purpose of the quantitative method is to investigate the relationships between students' outcomes and students' engagement in LMS at the blended learning environment by using the log data for various LMS activities. This research also will explore the relationship between LMS use and students' engagement in the Saudi Electronic University. In addition, this research will investigate how students' engagement with LMS activities in the Blended learning environment at Saudi higher education context. In addition, this study will discover the differences between students (male and female) for engagement in LMS activities and their outcomes. Therefore, this research helps to understand the effectiveness of using learning management system activity in the blended learning environment. In addition, the results of the study could help students, instructors, academic administrators and instructional designer in the academic field for effectiveness of using the online courses by LMS tools. It will help to understand the students' engagement within LMS activities in the Blended learning environment at Saudi higher education context. Our research questions will focus on the relationships between students' outcomes and students' engagement in LMS at the blended learning environment in terms of gender by using the log data for various LMS activities.

Survey about opinions or estimating and data record from Blackboard that may pose very minimal potential risk by causing mild embarrassment or concern. These risks are no greater than other participants may already be experiencing on a daily basis in college. However, there is a good potential benefit of allowing participants to have experience about online engagement in LMS activity from many aspects. Also, Ministry of education in Saudi Arabia may use this information as needed and benefit from it.

The first part was about demographic information such as: gender, types of colleges, and current GPA. Second part is three questions about self-report of LMS activity. Third part is 20 questions about the Online Student Engagement. The data will be stored and

secured electronically with a password. Only the primary researcher will have login credentials to access this data. The identity of the participants will be anonymous. no names. However, it need the Identification numbers of students at the Saudi Electronic University that helping the researcher to get their data from learning management system, which is the Blackboard. They will not have to supply any identifying information on the survey. The surveys will, however, bear some identifying information, no names, but these will be stored in a locked file cabinet and destroyed as soon as they are no longer needed.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Also, your identification numbers is very important to give the researcher for permission to obtain their data from Blackboard. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Sponsored Programs, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-2161.

Please feel free to contact us if you have any questions or concern about this research.

Thank you for assisting with this research.

Participant’s Signature	Date
Researcher’s Signature	Date

APPENDIX C
INSTITUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board

DATE: November 9, 2017

TO: YOUSEF ALMOSLAMANI

FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [1143790-2] Effectiveness of student engagement using learning management system in the Blended learning environment at Saudi Electronic University

SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS

DECISION DATE: November 9, 2017

EXPIRATION DATE: November 9, 2021

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Be sure to remove signature lines for the survey. Best, Maria

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX D

**PERMISSION TO CONDUCT RESEARCH AT
SAUDI ELECTRONIC UNIVERSITY**



المملكة العربية السعودية
وزارة التعليم العالي
الجامعة السعودية الإلكترونية
Saudi Electronic University
(٥٥)
عمادة البحث العلمي

سعادة الأستاذ/يوسف عبدالرزاق المسلماني

حفظه الله

السلام عليكم ورحمة الله وبركاته.

إشارة إلى موافقة سعادة مدير الجامعة على ضوابط تعبئة أدوات جمع البيانات للباحثين المرفوعين بالخطاب رقم ٤٢٣٩ وتاريخ ١٥/٣/١٤٣٦هـ، وبناء على توصية لجنة فحص أدوات جمع البيانات للطلبات المقدمة إليها ومنها طلبكم المقدم بعنوان:

"Effectiveness of Student Engagement Using Learning Management System in the Blended Learning Environment at Saudi Electronic University"

أفيدكم بصدور الموافقة على توصية اللجنة، وبإمكانكم البدء بالعمل.

نأمل منكم تزويد الجامعة لاحقاً بنسخة من البحث وأي بحوث منشورة بناء على هذه الدراسة.

ولكم خالص الشكر والتقدير،،،

عميد البحث العلمي

د. أديب بن محمد الحمود