

# Saudi Academic Perceptions of e-Learning Systems

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Manuscript submitted April 30, 2017; accepted May 21, 2017; published 6 March 2019.

DOI: 10.1504/IJLT.2019.105710

**Abstract:** The Kingdom of Saudi Arabia has seen growing interest in the uptake of cloud-based educational technologies in the university sector in recent years. The majority of delivery models are currently structured on a client-server-based provision and typically utilizing Blackboard or Moodle with some choosing a Learning Management System (LMS) designed for Arab countries (Al-Dali et al., 2013). Many universities are interested in leveraging the potential benefits offered by cloud computing and are exploring the potential to migrate their e-Learning service provision into the cloud. A cloud computing architecture for e-Learning would see a university move from maintaining the hardware and licensed software resources needed for e-Learning systems onsite to an outsourced set of IT services provided over the Internet on a shared and scalable infrastructure. In order to better understand the potential of cloud-based opportunities, it was considered important to first investigate the experiences of staff in their current use of e-Learning systems. This article aims to broadly contribute to a better understanding of the academic perceptions of learning and value in e-Learning systems in higher education, and in particular within the Saudi Arabian context. A survey was undertaken to explore whether current e-Learning systems were serving tertiary learning requirements as articulated by those academics teaching and providing the e-Learning services in Saudi Arabian universities. The online survey collected 55 full responses. Findings contrast earlier studies critical of the country's e-Learning provision (Al-Draiby 2010; Al-Harbi 2011) and suggest that Saudi Arabian universities now appear to have sound e-Learning infrastructure in place. Shifting e-Learning services into the cloud was identified as a new opportunity that may allow academics to leverage the benefits of cloud technologies and to address some of the challenges they face.

**Key words:** e-Learning, cloud computing, learning systems, Saudi Arabia, educational technologies

## 1. Introduction

Cloud computing presents a highly promising pathway to digital transformation for universities across the Kingdom of Saudi Arabia. The cost advantages of a pay-per-use, elastic, and scalable service provision may be easy to identify. However, how well it can meet the learning needs of students from the perspective of academics, campus technology and learning support specialists is yet to be discerned. Some of their current challenges may be resolved through a shift to cloud-based e-Learning provision, and yet new challenges may surface. Cloud computing has certainly changed the way in which many users can access, use and manage their Information Technology (IT) applications.

Cloud computing is designed for use via applications services on a flexible online infrastructure that combines many shared resources (Al-Zoube, El-Seoud & Wyne 2010). Typically, the use of cloud-based resources is based on a particular pattern offered by the provider of these technologies or services, such as an infrastructure, platform, or software (Vaquero, Rodero-Merino, Caceres & Lindner 2008). In addition, cloud computing has been described as a platform that can hide the layers of complexity in its function and services from users in a simple way. Furthermore, the technological complexity of this platform simultaneously helps save on labour, maintenance service and data costs, and the costs associated with software and system updates (Alshwaier, Youssef & Emam 2012). Sedayao (2008) commented that the revolution in multimedia, communication, and computing technology has helped to build an environment for learning that can be unit-shared. Recent advances in cloud computing have enabled the development of effective and scalable web applications which can be used as important resources to provide educational services to users over the Internet (El Mhouti, Erradi & Nasseh 2017).

A study was undertaken to investigate the opportunity for cloud-based e-Learning in the university environment in the Kingdom of Saudi Arabia by looking at e-Learning systems from the perspective of the academics themselves as experts within the provision of e-Learning, and with a focus on the learning needs of their students. The study explored the research question of *how well do cloud-based e-Learning systems serve tertiary learning requirements in the Kingdom of Saudi Arabia?* The study aimed to investigate whether the current client-server-based systems were seen to be effective, and to identify any service gaps for whether new cloud-based e-Learning opportunities might be identified and potentially exploited.

Numerous studies have been conducted to examine the claims for e-Learning in various contexts. Findings have generated mixed results but often lead to the conclusion that most e-Learning programs are far more effective than no training intervention and are as effective as traditional teaching methods, although positive comparative effects are heterogeneous and frequently small. In the case of nearby Egypt, university student perceptions of e-Learning implementation in 5 Egyptian universities showed that the majority of students preferred a traditional on-campus learning mode despite of all the advantages of e-Learning (Gamal & Aziz, 2011). Yee (2011), also concluded that there were few differences in perceptions of online learning between the international Asian students from Malaysia and Australian students in her study of student perceptions of online learning at an Australian university.

At the instructor level, a study at Kuwait University by Salah Al-Fadhli (2009) revealed that faculty members showed optimism for the potential impact of e-Learning on the learning process for students. The study, involving 118 academic staff, identified technical problems as a confronting factor, along with pedagogical difficulty, with a few identifying social challenges with implementation as an issue. Advantages were seen by academics in e-Learning's ability to provide the prompting for self-learning, to promote better learning quality, easing the process of teaching, and it's flexibility.

### **1.1. Challenges and Growth in Saudi Arabian University Education**

There are 70 universities and higher learning colleges within the Kingdom of Saudi Arabia, with the majority (54) located in the provinces of Riyadh, Makkah and Ash Sharqiyah (Eastern Province). Universities in Saudi Arabia offer four-year bachelor's degrees, two-year masters and four-year doctoral degrees. Facilities at the leading universities in Saudi Arabia are renowned for being highly advanced, thanks to the nation's ongoing and significant investment in higher education. The wealth invested comes primarily from the country's oil exports. Saudi Arabia holds approximately 20% of

the planet's oil reserves, which has powered the nation's rapid development over the last half-century, with a strong impact on trade, business, tourism, education, technology, transport, architecture and culture, particularly within the key cities. Given this, Saudi universities are especially well-renowned for oil and gas engineering degree programs. Saudi universities have also been highly willing to take advantage of e-Learning opportunities as part of recent reforms across the education system (Al-Nuaim 2012; Bates 2009; Mirza & Al-Abdulkareem 2011; Reuben 2008). Along with a massive expansion in the number of both private and state universities over recent years, there has been a rapid uptake of e-Learning across the university sector (Bates 2009).

The Kingdom of Saudi Arabia covers a large geographical domain with a land area of approximately 2,150,000 km<sup>2</sup> (830,000 mi<sup>2</sup>). Saudi Arabia is geographically the fifth-largest state in Asia and the second-largest state in the Arab world after Algeria. A large proportion of the population is living in remote areas, where the possibility of going to university is somewhat problematic (Al-Harbi 2011; Bates 2009). Also, the growth in the Saudi population in-line with a lack of qualified university staff presents a growing systemic challenge (Chatin 2016; Hassan 2008). This is particularly true for female academic staff (Al-Asmari & Rabb Khan 2014) and a lack of university facilities has been cited (see Bates 2009). In addition, student demand through applications and enrolments in foundational university courses well exceeds the current provision capacity (Al-Asmari & Rabb Khan 2014; Bates 2009).

Increasing costs in university administration (Lungu 2016), as well as higher costs of living for students who are often required to travel to cities for educational purposes, present a considerable issue facing those seeking to participate in the education system at university level (Al-Harbi 2011). Some parents are also unhappy to allow their children to travel to distant cities to study (Al-Harbi 2011), especially if they are female (Alaugab 2004). E-Learning has been seen as a welcome and helpful solution that can address these challenges, as well as addressing a significant rise in demand for university education right across Saudi Arabia.

Along with the needs of the native Arabic language, and a focus on an Islamic-based cultural perspective, these particular educational issues present a helpful and internationally important perspective on cloud computing opportunities in e-Learning.

## **1.2. Cloud Computing in e-Learning**

Along with a rapid educational uptake of e-Learning, a rapid technological growth has also seen the rise of cloud computing opportunities in many sectors of the economy in the Kingdom of Saudi Arabia, including in education. Although the majority of Saudi Arabian universities and colleges have a client-server-based architecture for deploying their e-Learning, there still is a fresh opportunity to investigate current e-Learning systems. Many are looking beyond just the benefits of cost savings to uncover new opportunities where cloud computing can provide enhanced services or to potentially provide an improved educational experience to staff and to students.

## **1.3. Academic Perspective**

Offerings of e-Learning in the Kingdom of Saudi Arabia are increasing, however, there is little research to show how these offerings are received by Saudi Arabian learners and how these offerings match the course delivery needs of the academics themselves, in terms of their student's learning needs. In other words, there is a need to put a focus on those delivering the learning with these systems. While student experiences are reasonably well investigated in e-Learning, it is less so for the academics using e-Learning systems, nor how well they see the various provisions of systems

meeting their students' learning objectives. It is essential to understand this area in greater depth if the e-Learning programmes are to be effective in meeting learning outcomes across a range of different courses in a university context. The study presented in this paper therefore sought to improve understanding of the nexus between e-Learning platforms and the actual learning needs and outcomes that need to be met from the perspective of the academic content providers.

## **2. Method**

Within a qualitative approach, an anonymous online survey was designed to explore the perspectives of academics and those in Saudi universities providing e-Learning systems. As experts in both education and the use of the systems in educational delivery, academics have unique insights into the effectiveness of e-Learning and could identify new opportunities that were currently unmet by their client-server-based architecture. The survey aimed to be explorative in nature rather than to define or prove a particular set of hypotheses. The intention was to broadly explore and identify practices, behaviours, and preferences of faculty and to identify opportunities for more in-depth study. The research was guided by the research question: *How well do cloud-based e-Learning systems serve tertiary learning requirements in Saudi Arabia?* It was anticipated that a snapshot of the current perceptions may identify future opportunities for investigating pertinent aspects for academics in the emerging growth in cloud-based e-learning systems in Saudi universities.

### **2.1. Qualitative Approach**

A key reason for taking a qualitative approach in the present study was to collect insights about the research topic from academics in their own words. The qualitative, open-ended questions aimed to gather rich and detailed opinions from the participants to delve deeper into the aspects related to the learning of students using e-Learning systems. It was hoped that this might be a useful approach to delve into the perspective of individuals at different levels of their academic careers.

### **2.2. The Survey**

An invitation to participate in an anonymous online survey was circulated by email and on staff electronic notice boards to staff at Saudi Arabian Universities. The self-administered survey was offered through the Qualtrics online survey platform. Language options for participants included either English or Arabic to suit each respondent's preference and language needs.

#### **2.2.1. Survey design**

The survey aimed to gather descriptive, rather than statistical, data and to identify the important issues and perspectives of academics, as well as identifying how well they thought their students' learning needs were being met by their current systems. There were 28 questions organized into three sections. The first section was demographics-related and asked questions about the participant's age, gender, job role, job title, and the number of years they had spent working in their current role. The second section focused on e-Learning experience (novice, intermediate or expert) and consisted of 10 open and closed-ended questions. These questions asked the participants about their experiences in e-Learning, including: the number of years of experience they had; the type of e-Learning user they were; the types of e-Learning systems and platforms that they may have used previously; the methods of teaching when using e-Learning; the key tasks, features, or functions they used most; the features or functions they had wished to use but were not currently supported by their e-Learning systems;

and any important difficulties faced with using their systems. The final section asked participants nine open-ended questions that related to the learning needs of their students. It included identifying the key benefits of using the e-Learning system, the disadvantages, and the aspects of learning that academics believed were currently well supported, or currently not supported by their system. They were also asked to rate their current system from 1 to 10, with 1 being very poor and 10 being excellent.

### **2.2.2. Pilot test**

A pilot of the survey was undertaken with five test subjects to increase the effectiveness of the results. The pilot participants were all male postgraduate students working part-time in Teaching Assistant roles at the Auckland University of Technology. Based on the feedback from the pilot testing, some minor changes were made to questions to improve their readability. The pilot subjects indicated that the timeframe given to complete the survey was appropriate, the questions were clear and easy to understand, and they found it easy to respond to the questions.

### **2.2.3. Snowball sampling**

The intended target population of the study was the academic teaching staff of Saudi Arabian universities. It was believed that the total population of academics in Saudi Arabia was approximately 50,000 (Times Higher Education, 2017, June 7). Some responses were also collected from those in e-Learning administrative or support roles. It was anticipated that the academics would most likely have the best perspectives on the effectiveness of the e-Learning systems in meeting the learning needs of their students, but there was also a desire to include any insights from any administrative or learning support staff who also wished to participate in the survey as well. It was thought that the administrative and learning support staff would likely have experiences involving staff and student issues with e-Learning systems and would likely have perspectives and expertise covering a wide range of disciplines and educational settings.

An advertisement with a survey link was circulated to teaching and administrative staff initially at the University of Dammam, where a second ethics application had been made and approved by the Institutional Review Board (IRB). IRB approval at one university in Saudi Arabia allowed for the survey to then be circulated and undertaken at others across Saudi Arabia. The survey was then forwarded on to academic staff at three of the 30 Saudi Arabian universities and to a multi-university e-list for learning and teaching. Recipients were asked to share the survey with their colleagues – giving rise to snowball sampling. Dillman, Smyth, and Christian (2009) explained that snowball sampling is helpful when it is difficult to reach all the desired participants. This study intended to collect data from many universities in Saudi Arabia and, due to the complexity of reaching individual participants in each university, a snowball sample was deemed appropriate in the study's design. As the survey was intended to be anonymous, data about which institution an academic was at was not collected. Therefore, it was unknown how many Saudi Universities were represented in total in the survey results.

### **2.2.4. Data preparation**

With a focus on descriptive analysis rather than statistical inference, of the 114 responses received, only 55 were included in the final analysis, as the other 59 responses were predominantly empty or incomplete. Participants had the option not to answer any of the questions, and the data removed offered little insight into why many left the survey predominantly incomplete.

Following data collection, the data were prepared for analysis by being exported from Qualtrics as

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tab delimited data into Excel. The researchers cleaned the data by eliminating incomplete responses and reviewed each response to ensure that they were related to the questions asked. Translations of Arabic into English for the Arabic responses were then completed to assist in a common analysis.

### 3. Results

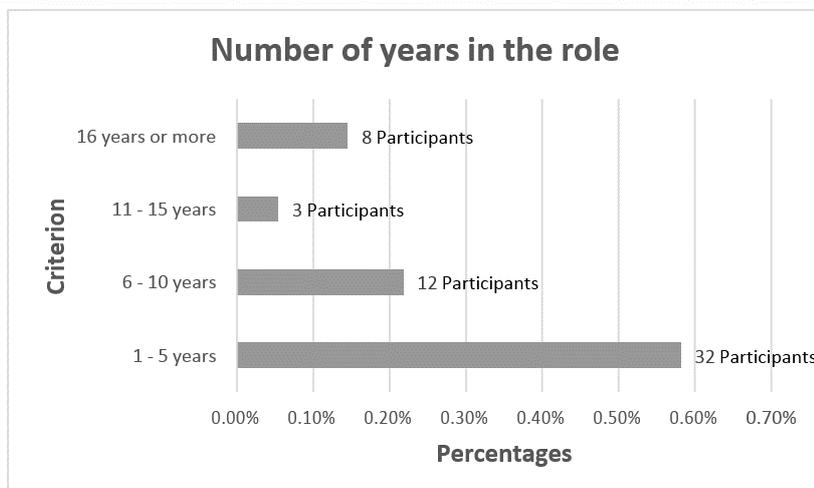
#### 3.1. Participants

The majority of respondents were between 30-39 years of age (40%) and then 40-49 years of age (32.73%). 14.55% of the respondents were 20-29 years old, and 50 years or older constituted 12.73% of the respondents. Thirty-three respondents were female (60%) and twenty-two were male (40%). The greater majority were in an academic role - 48 (87%) - with others in technical or administrative roles.

Forty percent of respondents were Lecturers, 25% were Assistant Professors, 11% were Associate Professors, 9% were Teaching Assistants, and 7% were Professors. There were also four 'Other' responses (7%) that included a secretary, a clerk, and two respondents who did not mention their job titles. The majority of participants, 58%, had not been in their roles for more than five years, while nearly one quarter had six to ten years of experience. Fifteen percent of the participants had been in their roles for 16 or more years, and the lowest percentage of respondents (around 5%) had spent 11-15 years in their roles.

**Figure 1**

*Number of years respondents were in their role*



#### 3.2. E-Learning

Seventy-five percent of participants indicated Blackboard as their university's e-Learning platform, and 19% used Moodle. Two respondents indicated that they used a combination of Blackboard or Moodle with WebCT or with Smartboard. This was not an unexpected spread of choices given the strong focus in the Kingdom of Saudi Arabia of private universities typically choosing the Moodle platform, and government universities choosing the Blackboard platform. Uppermost in the software tool decision choice in Saudi Arabia is the need for effective provision of technical support and learning support. Both Blackboard and Moodle having extensive support infrastructures. Moodle, however, being open source, also provides a wider non-proprietary user community of support and no licensing costs.

**Table 1**

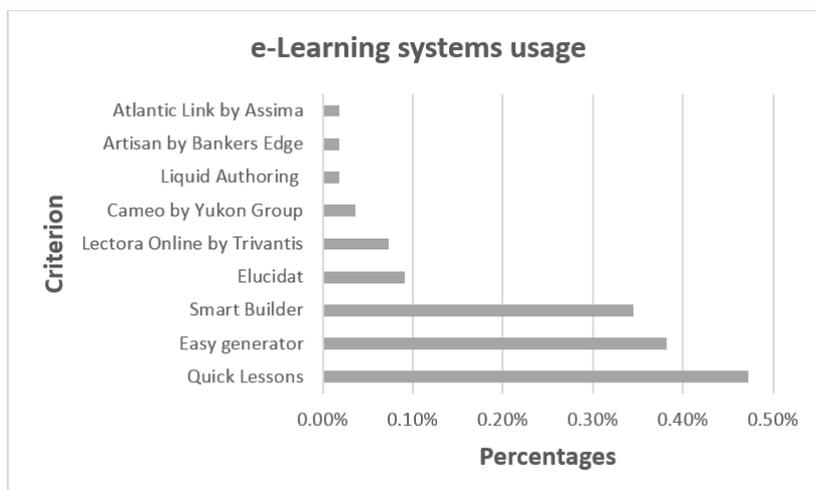
*e-Learning platforms participants had used*

Criterion	Number	Percentage
Blackboard	41	74.55%
Blackboard - Moodle	8	14.55%
Moodle	2	3.64%
Blackboard - Moodle - WebCT	1	1.82%
Blackboard - WebCT	1	1.82%
Smart board	1	1.82%
No answer	1	1.82%
Total	55	100%

When asked what other e-Learning platforms participants had used, the highest percentage of respondents identified QuickLessons at 47%, followed by Easy Generator at 38% and the Smart Builder systems at 35%.

**Figure 2**

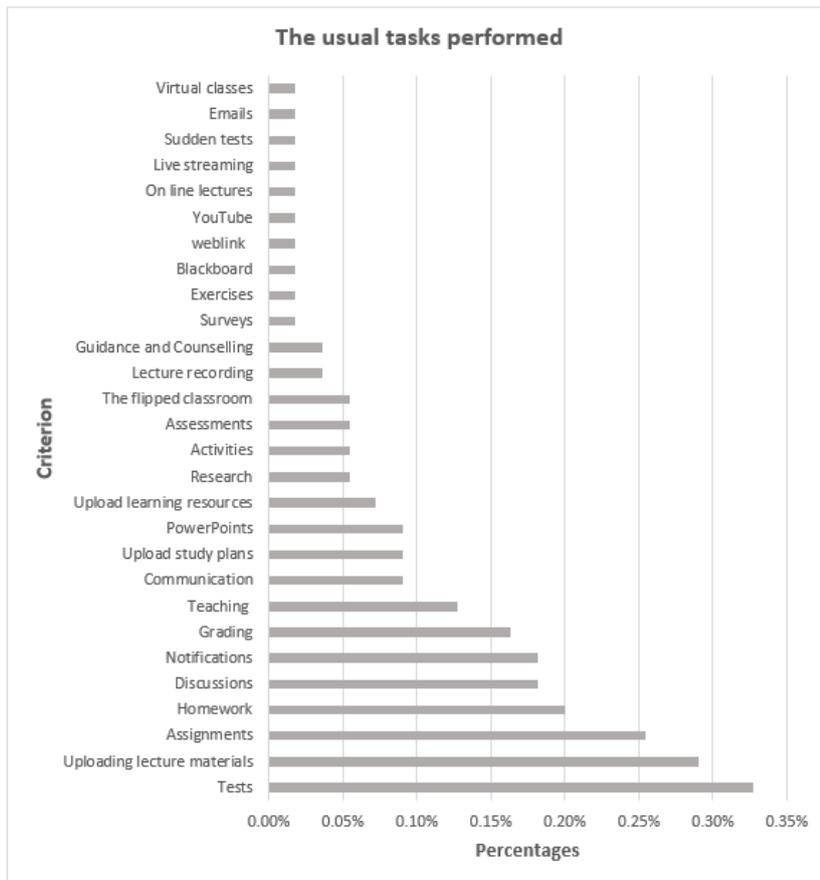
*e-Learning systems used by participants*



The most common tasks performed included: creating tests (33%), uploading lecture materials (29%), assignments (25%), homework (20%), discussions (18%), notifications (18%), grading (16%), and teaching (13%).

**Figure 3**

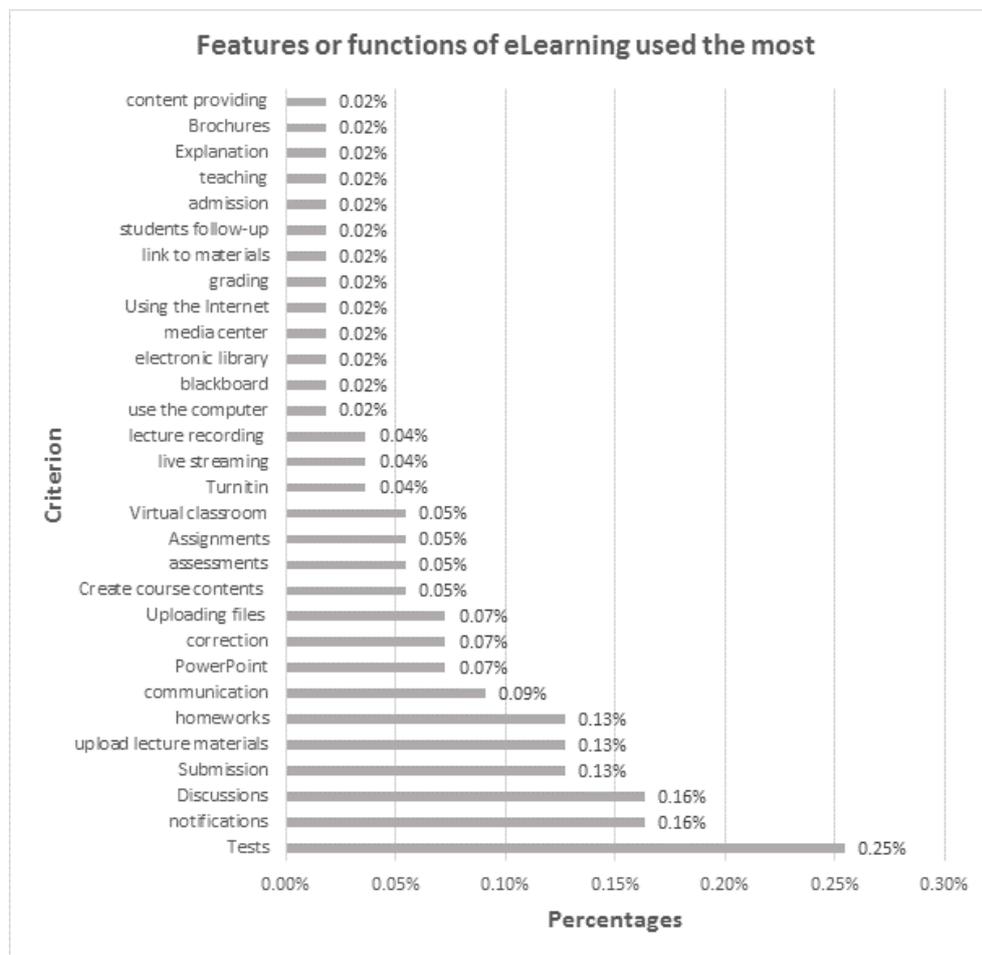
*Typical tasks performed with e-Learning*



The most-used features or functions identified included the creation of tests (25%), the uploading of lecture materials/PowerPoint (20%), notifications (16%), the use of the discussion forum (16%), assignment submission (13%), and the provision of homework (13%).

**Figure 4**

*Features or functions of e-Learning tools used the most*



When asked how the features or functions supported their learning outcomes or goals, several lecturers (17) agreed that e-Learning systems had always made communication between students and lecturers easier more “rapid and direct” (participant 50). E-Learning systems helped them to deliver and receive information, including their lecture materials, and better enabled these to be shared with their students.

E-Learning systems were associated with helping students keep up to date or timely with their learning materials, allowing them to receive timely feedback, and enabling them to look up their grades (8). One respondent mentioned that the systems were a good resource pool for students’ learning as they provided a relevant information database for their topic.

Many of the respondents (24) believed that the e-Learning systems supported the student learning process, with automatic grading of online tests a benefit for one participant. They also commented that the systems helped them to ensure that course material was kept up to date efficiently and quickly, as well as to create a centralized knowledge base in one organized place. One participant mentioned that the e-Learning system had assisted them as academics in a mentor-student environment.

One respondent commented that students these days preferred a modern and convenient method of obtaining information, spending significant time on their laptops and smart phones. This, along with e-Learning systems use, helps them to develop technological skills needed for university-level education (4). The systems were seen as providing academics with an opportunity to deliver learning in a way that their students enjoyed and found familiar. One participant believed that the e-Learning

system helped classes to be easy, interesting, active, enjoyable, and effective.

When asked *what was the key benefit of e-Learning systems?* several participants (28) identified the saving of effort and time, and the ease of access to learning.

When asked what additional features or functions respondents would have liked available in their E-Learning system, a large number of participants said nothing, or that they did not know (21). Desired features included full integration with smart phones and tablets; interaction with social media; support for functions for analysis [such as those available in the Statistical Package for the Social Sciences (SPSS) and in Excel]; a comprehensive question database; electronic attendance tracking; knowledge sharing tools; the ability to submit large files when posting videos; support for open badges; and a diagnostic detector.

Participants identified a number of aspects of their e-Learning system that they found cumbersome, such as: glitches, difficulties in training students to use the system, issues with system orientation, notifications were not in real-time. Presentation of courses through the Learning Management System (LMS) interface were considered difficult by one, and for another, maintaining discussions and themes for each course. Technical difficulties were also experienced when marking tests, the system was also not considered user-friendly by some (3). One participant disliked the length of time it took to navigate and learn all the various features, for example, the Control Panel provides so many options that puzzle the instructors sometimes. Updates to the system that introduced new features or added new technology functions created disorganization, and live streaming of virtual classes could glitch. Uploading lecturing videos became difficult if there was a technical fault. Other technical issues such as updating in general were identified, or when students submitted their work, or updated their information, but the system did not appear to update correctly.

### 3.2.1. Learning needs

Table 2 summarizes the key advantages and disadvantages identified by respondents of e-Learning systems in meeting the learning needs of their students.

**Table 2**

*Using E-Learning Systems to Meet Learning Needs*

<b>Advantages</b>	<b>Disadvantages</b>
Saving time and effort	Poor Internet connectivity
Useful communication channel	Technical problems
Learning availability anytime, anywhere	Lack of adequate training
Facilitates the learning process	Lack of human interaction
Ease of access	High cost of licenses
Keep abreast of technology	Limitations of tools
Attraction of students to the university	

Respondents identified various aspects of learning as being well-supported by their e-Learning systems. These included the availability of lecture materials, recording and uploading lecture videos, and attaching documents to any forum post; using a projector; submitting homework; using e-references; quizzes, tests, research and activities; communication methods; discussion forums and announcement notifications; evaluation, grading and feedback to students; theoretical aspects; easy access from anywhere; time saving; and facilitating the learning process.

One respondent stated that some features were well-supported, but some academics did not know how to use them.

Various aspects of learning were identified as not being well-supported. These included: interactive learning with Flash and animation support; online tutoring; voice-recorded lectures; a lack of discussion; technical aspects - including saving data; the Internet connection was always slow and would go down; visual education; application and practical aspects of courses; cognitive skills were not well supported; peer student interactions (such as group work, communication skills, and practical skills); direct encounters with students were sometimes unpleasant due to poor Internet connectivity issues; student statistics, feedback, online exams and teaching methods; and that the interface was not considered user-friendly.

On average, respondents assigned a rating of 7.5 out of 10 for the ability of e-Learning systems to serve the university's tertiary learning requirements. One commented that it provided an effective way to keep students on the right track.

Participants suggested improvements could be made to systems to better match their learning requirements, such as increasing the number of tools and equipment made available to academics. At the systems' design stage there is a need to consider academic improvements more to ensure it is better suited for the desired educational outputs and enable more virtual classes. One participant suggested the idea of moving the client-server architecture to a wider network, such as a cloud computing space, and better infrastructure were also proposed.

There was a suggestion that there should be intensive training for both lecturers and students, and that both groups should be encouraged to interact with the technology. Other suggestions were in improving usability and flexibility with the aid of computing and online tools support. Other ideas regarding technical improvements included developing improved Internet connectivity, making the network available offsite, and increasing the capacity and speed of downloading and uploading of content. One respondent stated that completely online distance-Learning courses should be recognized by the Ministry of Civil Services in the Kingdom of Saudi Arabia, as currently online courses were not considered a recognized qualification.

#### **4. Discussion**

The responses to the survey demonstrate the successful uptake and the use of e-Learning in Saudi Arabian universities. Good e-Learning infrastructure is available to support learning outcomes and is rated highly by the majority of respondents in the survey. This aligns with known work undertaken by Al-Asmari & Rabb Khan (2014), who claimed that many Saudi Arabian universities were well-equipped with supportive e-Learning tools and technologies that enhanced the learning process. As supported in the present study, the quality of e-Learning in Saudi Arabian universities reflects the significant impact of development in e-Learning in the country, and demonstrates its progress since Al-Draiby's 2010 study (2010) entitled *E-Learning and its effectiveness in Saudi Arabia*, and Al-Harbi (2011) in her study entitled *E-Learning in the Saudi tertiary education: Potential and challenges*, that stated in 2010 that e-Learning in Saudi Arabia was still in its infancy.

In response to the research question of how e-Learning systems were currently serving the learning requirements of students, the study identified many benefits, such as: saving time and effort; providing an effective communication channel; learning becoming available anytime, anywhere; facilitating the learning process; helping users keep abreast of technology; and attracting students to the university. The ease of access to class resources was an additional benefit.

Cloud-based computing is anticipated to be the next major trend in the development of e-Learning systems due to the extra features and capabilities of cloud-based computing, and the advantages that

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it offers over the traditional deployment of client-server based e-Learning systems, especially from the perspectives of technology and cost (Alghali, Najwa & Roesnita 2014). Therefore, shifting e-Learning in Saudi Arabian universities to the cloud may allow universities to retain these benefits and add more, such as:

- Providing personalized learning by offering boundless learning choices which expose students to a wide variety of software tools and resources in a rich and flexible environment.
- Economic benefits. Software and hardware require continual upgrades that drain universities' budgets. Cloud computing can reduce the cost by offering its services on a cheaper pay-per-use basis, which enables universities to accelerate the use of new technologies and focus on imparting quality education.
- Elasticity and scalability such that universities can scale up to more resources and storage when user load increases, or to scale down when need decreases. This can be considered a major advantage of cloud computing when consumers are not confined to a specific set of resources.
- Accessibility, because users can access resources anytime and anywhere. Hence, the quality of services provided through superior resources and skills make this possible.
- Standardization, since cloud computing provides standardized software for use of individual or networked universities. For example, universities can develop their own collections of applications or solutions and re-use them. This can potentially help reduce costs and implementation time, with a consequent increase in reliability (Anand & Kamayani 2015).

The time is right for universities in Saudi Arabia to consider a shift in their e-Learning systems to the cloud, particularly within its government universities. The Kingdom of Saudi Arabia has recently generated a new vision for the future called 'Saudi Vision 2030'. It is a collection of social and economic policies designed to free the kingdom of dependence on oil exports, and to build a prosperous and sustainable economic future by focusing on the country's strengths and policy within the region. Part of *Saudi Vision 2030* (2016) is to develop education in Saudi Arabia by reshaping and modernizing the academic and educational systems. Alongside this, the Saudi government is looking to advance the education sector in line with market needs. Therefore, adopting cloud-based e-Learning systems is a positive contribution to Saudi Vision 2030 as it advances education and reduces the costs of hardware maintenance, systems upgrades, renewal of software licenses, and adds features (Abu El-Ala, Awad & El-Bakry 2012; Anand & Kamayani 2015).

## 5. Conclusion

Reliance on the learning model of traditional in-person classes at universities has been evolving with the advent of e-Learning. However, the user still needs to be attached to, or have server access to a local network to effectively use e-Learning services. Online learners have learnt to become more freely engaged because of the IT infrastructure shift to cloud-based systems. Thus, as long as students have Internet access, they can access e-Learning services anywhere and at any time. The technology of cloud computing has been developed to work on a pay-per-use basis. Universities are seeking to benefit from this approach when providing technologies to its staff and students and to save money that they might otherwise spend on hardware maintenance and software licenses. Therefore, cloud computing can be seen as a useful tool which can enable universities to create an enhanced learning experience for students to enrol in various courses at an affordable cost.

With its investment in education, access to resources, and a unique profile within the region, the

Kingdom of Saudi Arabia is uniquely placed to pave the future direction for many countries facing similar challenges, such as the needs of a native language, a focus on an Islamic-based cultural perspective, a rapidly growing and dispersed population, the need to create better access to university education for women, and a lack of qualified university staff and campus infrastructure. Many countries will be looking to the educational leadership of Saudi Arabia for guidance on what works in order to adopt a similar approach to tackling their own national education deployment, especially at university level. E-Learning cloud providers will certainly need to better understand how to appropriately calibrate their offerings to meet the kinds of country-specific needs and context experienced in the Kingdom of Saudi Arabia. Similarly, universities also need to clarify the opportunities available to ensure that the intended benefits are realized for their unique educational perspective. This article aimed to broadly contribute to a better understanding of the academic perceptions of learning and value in e-Learning systems in higher education, and in particular within the Saudi Arabian context.

In summary, from the present study, we know that:

- (a) From the academics' perspective, e-Learning developments in Saudi universities appear to have had some successful implementation within the last five to six years.
- (b) The staff in Saudi Arabian universities are interested in using e-Learning, find it improves communication with students and saves time.
- (c) Improvements can be made to systems to better match their learning requirements by including academic staff in the design stage, providing tools and equipment, and in training staff in all the features and functions of the e-Learning systems.

This study involved the perspectives of academics and university staff on the question of how e-Learning systems are serving tertiary learning requirements within Saudi Arabia. The study had initially hoped to develop a new e-Learning framework based on an academic perspective of student learning needs; however, sufficient data was not available for this purpose. Subsequent work to establish a framework can be based on some of the findings of this study. The small sample size of 55 out of an estimated population of 50,000 is a limitation on the generalisation of the study. The authors also note that recent studies by country on academic perceptions, or comparisons between them, have been somewhat scant in our literature search and this offers an important opportunity for further research.

The study contributes a number of new aspects to the conversation on when or if a move to the emerging opportunity of cloud-based E-Learning systems will better serve Saudi universities. It is hoped that this study can provide a useful perspective for university decision makers for e-Learning systems deployment.

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### **Acknowledgments**

Special acknowledgment for support of the research process goes to the Saudi Cultural Mission in New Zealand and to academics at the University of Dammam, represented by Dr Saleh Al-Rashid, Preprint author submission version of Thorpe, S. J., & Alsawayed, H. M. (2019). Saudi academic perceptions of e-learning systems. *International Journal of Learning Technology*, 14(3), 251-268.

and other universities in the Kingdom of Saudi Arabia.

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