E-learning policy in Saudi Arabia: Challenges and successes

Abdullah Aljaber
School of Education, University of Glasgow, UK

Abstract

E-learning is a sector of Saudi Arabian education that is witnessing significant growth, particularly in higher education. This article aims to provide a historical overview of the development and evolution of e-learning in Saudi Arabia. With the Ministry of Higher Education at the core of education and e-learning, the article will explore recent e-learning-related developments in King Saud University, King Faisal University, King Abdulaziz University and the Saudi Electronic University. As part of this analysis, the article will explore the challenges that are being encountered and the strategies that each of these institutions is implementing to support and develop e-learning. It is equally important to evaluate the role played by international partners, particularly the UK and the US, in supporting e-learning financially, socially and technologically. The Kingdom of Saudi Arabia has obtained significant support from the US and UK, with both countries contributing to the establishment of an integrated model for e-learning curriculums and information management systems in Saudi Arabia. Finally, this analysis explores the growth potential of e-learning and the efforts being made to support Saudi Arabia's growing university student population. The article includes an exploration of the methods of evaluating, securing and modifying the current systems.

Keywords

Education, e-learning, pedagogies, higher education

Recent history of higher education in Saudi Arabia

During the last 20 years, the demand for higher education in the Kingdom of Saudi Arabia (KSA) has grown rapidly. A national report published by the Saudi Arabian Ministry of Higher Education showed that demand for higher education rose by over 479% between the academic years 2005 and 2009. This situation is attributed to the rapid growth in the number of high school graduates (Observatory on Higher Education, 2010). The rise in population in institutions of higher education has created capacity pressure here. Consequently, the ministry has been encouraging the adoption and use of information and communication technologies (ICTs) in education. This has led to the development of e-learning as a complementary and alternative system of learning. According to the *Saudi Gazette*, the value of the e-learning industry reached US$125 million in 2007, with a 33% growth rate projected in the next decade (Saudi Gazette, 2008).

Corresponding author:
Abdullah Aljaber, College of Social Sciences, School of Education, St Andrew's Building, University of Glasgow, Glasgow, UK.
Email: a.aljaber.1@research.gla.ac.uk or aaljaber388@gmail.com

E-learning was first widely adopted in Saudi Arabia in the early 1990s and was further supported in the following decades with the expansion of computer technology and the World Wide Web (Al-Masaud and Gawad, 2014). An interesting evolution in e-learning in the kingdom relates to the early use of closed-circuit television as a mode of e-learning, allowing the creation of a one-way video network and a two-way audio network to address the problem of insufficient instructors in higher education institutions.

The National Communication and Information Technology Plan was set up in 2007 and has since driven the inclusion and integration of ICTs at all levels of learning, with a focus on higher education (Unnisa, 2014). At around the same time, the National Centre for E-learning and Distance Learning was established in collaboration with the Open University of Malaysia to support the realisation of the same goal. Somewhat earlier, at the turn of the 21st century, most Saudi Arabian universities had already started setting up centres of distance learning in support of this goal. One of the earliest universities to implement this was King Fahd University for Petroleum and Minerals, in 2003 (Bendania, 2011; Unnisa, 2014). Others include King Khalid University in 2006, King Saud University (KSU) in 2007 and King Faisal University (KFU) in 2008.

Accordingly, a combination of distance learning, e-learning and blended learning strategies has been adopted across institutions of higher education in the kingdom. Presently, King Abdulaziz University (KAU) uses blended learning, which combines a virtual learning environment, the Internet and e-learning management systems (Alebaikan and Troudi, 2010; Unnisa, 2014). On the other hand, KFU operates through a special system of enhanced distance programmes in specific subjects - this is an expansion from the few subject areas that had previously adopted this method (Alsadoon, 2009).

According to a study covering the period 2007-2009 conducted by the Saudi Communication and Information Technology Commission on the subject of computers, technology and ICTs in learning, e-learning growth relies on ease of use (Alkhalaf et al., 2010). Projections on the development of these technologies have suggested that e-learning in Saudi Arabian universities continues to be hindered by lack of technology awareness and understanding of the potential it offers. Despite these challenges, rapid enhancements have occurred in terms of Internet penetration across Saudi Arabian universities. As Jones and Madden (2002) point out, Internet use among university students has been a major phenomenon since the early 2000s, with around 74% of students spending an average of four hours online per week from as far back as 2002. For the most part, this trend reflects the students' adoption of Western (mostly US and UK) practices regarding e-learning, whereby they spend significant time accessing educational materials and undertaking research online in cyber cafes, Wi-Fi hotspots and libraries.

Nevertheless, institutional accounts across Saudi Arabia outline persistent challenges and limitations with regard to e-learning. For instance, between 30-40% of the student and faculty population demonstrate levels of dissatisfaction with e-learning, either in terms of content or method (Alkhalaf et al., 2010). Of all these limitations, computer literacy is a dominant theme that has consistently plagued e-learning in Saudi Arabia (Al-Asmari and Khan, 2014). Once these challenges have been resolved, the kingdom's university education sub-sector may be in a more favourable position to maximise effective use of and optimise outcomes from its investment in e-learning.

Development of e-learning

The KSA has not been left behind in the global integration of informational and instructional technologies in education. It is important to note that as an active method of redesigning the education system, the KSA has adopted the National Plan for Information Technology to direct the

effective assimilation of e-learning in public and private education institutions (Al-Asmari and Khan, 2014). Since this was implemented in the 1990s, the campaign has seen tremendous growth. The year 1996 marked a huge milestone with the establishment of the Computer and Information Center by the Ministry of Higher Education (Akkari, 2004: 147; Alamri, 2011: 90). The main purpose of this unit was to provide an array of ICT services to schools and learning institutions, and to train both teachers and students in the role of technology in learning. This was followed by an extensive campaign in 1999 to cover all schools, leading to the Watani Project (Akkari, 2004: 149). The continued expansion of the project in 2001 aimed to connect and link schools to education directories through a wide area network (WAN) that would include all the schools in the country. In collaboration with Intel and government stakeholders, a local software company created a software platform displaying all national curriculums, and established an e-library platform that allowed teachers to design and tailor their e-lessons. This platform was built with accessibility and affordability in mind to ensure not only that teachers were able to tailor their classes but students could access them easily and conveniently. By 2002, the country had a fully functioning e-resource and e-learning platform that carried over 50,000 books and 2500 training courses (Al-Shehri, 2010: 147).

The most notable recent landmark achievement was the launch of the Google Education Programme in 2008 (Al-Hariri, 1987: 54; Al-Shehri, 2010: 147). Through collaboration between the Ministry of Higher Education, Intel and Microsoft, the KSA established both short- and long-term plans to focus on training and e-learning programmes for all levels of education. As one of the top ICT markets in the Middle East, the KSA's projected e-learning growth raised the prospects of educational diversification at the same time as simultaneously attracting more international students into the kingdom. This move has widely boosted the government's efforts towards eliminating barriers to education, most of which are established along gender and religious lines.

The UK and the US were among the first countries to adopt e-learning, and the e-learning sectors in these countries have experienced rapid and exponential growth. Although both countries established their e-learning systems at around the same time, the UK has shown slower growth compared to the US. This is because the UK government has had to pay more attention to its own needs and, consequently, has not been so keen to partner with other countries. Notably, this relatively slower growth in applying technology to learning has been a common characteristic throughout Europe. On the other hand, the UK market has invested more time and resources in online corporate training. This shows that although the UK possesses the potential and technological capability to advance e-learning, most of it appears to be directed towards corporate and business online training.

Among the most active e-learning university partners in the KSA are KSU, Taibah University, King Khalid University, Qassim University, Madinah Islamic University, Al-Baha University and KAU. These institutions offer different methods of e-learning support depending on the course and subject. Similarly, both private and public schools have adopted e-learning as a means of synchronising access to resources and encouraging participation between teachers, students, parents, international actors and schools. Vocational training institutes have also been at the forefront of efforts to join forces with e-providers and universities to create holistic approaches towards practical and virtual learning. In fact, such initiatives acted as a catalyst for distance learning and were the initial driving force in transforming the KSA into a burgeoning higher education hub in the region.

In terms of international actors, the focus has shifted further towards the involvement of the UK and the US. For the most part, the involvement of these two countries has consisted of the design of e-learning curriculums, provision of technology and design of learning systems. For this reason, much of the kingdom's education system is modelled around the US and UK education systems. This contribution is justified considering that these partners have extensive knowledge, research

and statistical frameworks for supporting the educational approaches that best match the Saudi Arabian population's needs.

One of the most significant challenges facing Saudi Arabia remains the government's inability to match quality educational needs to the growing population. This gap has prompted the government to seek an alternative method that could coincide with national planning and industry diversification. A pervasive challenge in this regard is the insufficient number of faculty staff, especially at the higher education level. During the last 20 years, the kingdom's population has almost doubled. Consequently, learning institutions in urban areas have become overcrowded, and the teaching staff overworked to a point of incapacitation. For this reason, many parents in traditional and rural areas are increasingly sceptical about sending their children to study in large cities. Even though the KSA has set aside a substantial budget to fund the education system, there is still a large gap in terms of human resources and availability of faculty members. One solution entails the sourcing of faculty members from other countries such as the US, UK, Egypt, India and Pakistan. Following these challenges, local stakeholders, regional partners and global partners are joining together to support e-learning as a way to promote globalisation, access to education and economic wellbeing in Saudi Arabia in particular, and within the Middle Eastern region in general.

In integrating e-learning into their societies, US and UK stakeholders have created awareness in terms of the need to take religious alignment, social structure and political organisation into consideration. The Middle East has traditionally adopted a fairly reserved approach to the integration of the Internet into their countries and operations. This was a major problem in many conservative societies, with most countries only embracing the technological change wave in the 1990s and the early 2000s. Even so, Internet use in Saudi Arabia remained regulated and restricted. Only recently have Middle Eastern countries become aware of the disadvantages of remaining isolated from the global cyber network. Efforts by the UK and US in advocating for global Internet expansion to streamline connectivity, free trade and the growth of emerging economies have greatly contributed to Saudi Arabia's increasing embracement of the Internet.

At the heart of the current growth in e-learning in Saudi Arabian universities is the kingdom's status as a highly conservative society. This poses a difficult challenge in that the education system effectively sidelines women. The male population also faces a difficult time adapting to and engaging with online learning environments because the education system in Saudi Arabia contains elements of the US system, raising awareness of the differences between US educational culture and local belief systems. This has been a huge challenge.

These challenges in e-learning are being addressed by students using their own ad-hoc solutions, especially in higher education contexts. Reserved and shy students who are uncomfortable during class participation or group interaction can engage in learning activities in a manner that enables them to evade these stressors. Highly motivated and directed students can coordinate their learning, classes and assignments with minimal interaction or exposure to the high-pressure environments imposed on them in the wider society. Although it is recognised as important for students to acquire skills in communication, leadership and participation, e-learning environments can be constructed to gradually build confidence in these areas. The US has provided psychological and sociological support to guide e-learning and educational developments so that students are exposed to a balanced demand to meet both cultural and academic responsibilities in their studies. In this way, even students in rural and extremely conservative areas of the kingdom are able to access the curriculum, faculty staff and growth opportunities. Furthermore, students from neighbouring countries can sign up for distance learning programmes being offered in Saudi Arabian universities. In the next section, the article highlights case studies of e-learning in four leading Saudi Arabian universities: KAU, KSU, KFU, and the Saudi Electronic University (SEU).

KAU

Founded in 1967, this national university is a pioneer in supporting female students through e-learning and was the first university to register female and male students at the same time. Starting with only 68 male and 30 female students, the university now has a combined population of more than 82,000 students, with almost equal representation in terms of gender (Amani, 2005: 43). In the past, the university has housed colleges that have gone on to become independent universities, including Teebah University, Tabuk University and Jazan University. Through the Deanship of E-learning and Distance Education, the institution takes pride in its extensive regular and external programmes. Some of the widely varied areas of specialisation for this university include ocean and sea sciences, aviation, nuclear engineering, medical engineering and minerals and oil resources. The programmes are available at the bachelor, master and doctorate level, with most having two options: distance learning and a combination of regular and distance learning.

Unfortunately, of the university's five campuses, only two have reliable Internet connections. Some students and teaching staff, therefore, have limited access to affordable and reliable Internet connectivity almost all the time (Amani, 2005: 47; Bassam, 2012: 4). This has continued to be the biggest limitation to the implementation of fully online courses. Between 2008 and 2012, female enrolment in distance learning rose by 55%, while female enrolment in traditional learning contexts rose at an average rate of 56% (Amani, 2005: 44). The steady growth in female enrolment has been attributed to the flexibility offered by distance learning. Traditional classrooms are characterised by gender separation and subject specifications along gender lines. The distinctive growth in distance learning is expected to reduce these issues and provide a free learning environment that is supportive of the potential of female students. This demonstrates that e-learning has the potential to provide quality and equal opportunities for all demographic groups.

Based on the institution's projections, the trend of enrolment should lead into a downward trend for traditional enrolment of women, this being replaced by a steady positive growth in distance learning. It is against this backdrop that KAU is fully committed to establishing a fully certified e-university as a means of reaching marginalised groups who face extensive limitations within the traditional learning model. The goal is to implement a functional e-infrastructure that supports interactions between information synthesis, design and dissemination. Often ignored is the component of information design and verification. Yet, this is extremely important, especially as e-learning is characterised by continuous efforts to seek self-validation and independence. It is important that e-learning content is carefully designed in accordance with the curriculum and then aligned with the new e-curriculum architecture. The university is currently making efforts to create a system of analysing and interpreting the information and structure that has dominated traditional curriculums and accurately transferring these to e-platforms. This requires constant upgrading and editing of content to fit the values and standards of the institution's education system. The university has joined forces with students, faculty members, non-governmental organisations (NGOs) and international partners to facilitate a smooth transition to the e-university, with a particular focus on content development and the incorporation of integrity and transparency into the model (Eickelman, 1992: 647; Miric and Chapman, 2009: 323).

To bridge geographical gaps, the electronic management education system (EMES) was formulated at KAU. It supports remote communication between teaching staff and students in a manner that replicates the dominant conditions of traditional learning environments (Grant, 2013: 20; Miric and Chapman, 2009: 340). Furthermore, the EMES allows for interaction among individuals and groups alike, widening the potential reach of this model. The model simulates an actual classroom, whereby quizzes and assignments can be administered and research projects and assignments submitted for evaluation. A major strength of this tool is the ability to accurately track

academic progress and level throughout the semester and year. This is enabled by tools that automatically gauge the position and performance of each student and students are able to personally monitor trends in their own performance. Through these records and under the supervision of their instructors, they can choose how to proceed, which subjects they should drop and how to target effort into particular units. At the same time, students and teachers are able to identify significant strengths in core subjects and recommendations can be made on career or specialisation prospects. This is extremely beneficial, particularly for female students, most of whom may not have previously been made aware of their strengths and talents in such an explicit manner.

The electronic self-service system that is in place at the university enables students and instructors to access their accounts through both home and school networks. Similarly, the on-demand university services (ODUS) provide access to all the system's services through the Internet (Miric and Chapman, 2009: 337; Rugh, 2002: 42). To enhance security, enquiries and university records are transmitted in an encrypted and secure, fast, automated pathway. Finally, the university has also invested in satellite communications technology to boost connectivity and synchronisation between the main branch in Jeddah and other campuses in Jizzan and Tabuk. This bold move has ensured that the EMES and ODUS systems installed in all the branches are operational and have the same level of effectiveness. The next projected move will be to create a 24-hour television network that will broadcast all KAU activities and programmes while coordinating the e-learning and traditional learning frameworks across all the branches. In due course, KAU hopes to expand this channel for public and regional viewing. Budgetary plans to purchase broadcast hours from public television networks in the country are underway.

Meanwhile, one of the biggest debates in e-learning in the Middle East has been that of learning management systems (LMS). Some institutions use a system designed for Arab countries, others use Blackboard and yet others prefer Moodle (Al-Dali et al., 2013: 142). KAU is one of the few universities in the Middle East that has opted to design its own LMS for best suiting its requirements and needs. It is also one of the top performers with regard to female integration. During seminars, participants from international partners have reported having a particularly easy experience here. Whereas seminars in other institutions will typically not have male and female faculty members in the same room, KAU has formulated a T-structure in which male and female counterparts can study in the same rooms but on different sides.

KAU has been extremely willing to integrate government and international partnerships within its structure since its foundation and very active in doing so, and it is for these reasons that it has established excellent research ties with leading universities in Canada and the US. In addition, it was quick to align itself with the KSA government in a manner that enabled it to acquire funding and other forms of institutional support. Female faculty members here are extremely vocal and professional, a sign that they are at the new frontiers of education in Saudi Arabia. Through distance learning, women have been able to actively participate in traditionally male-dominated subjects such as engineering, and petroleum management.

One of KAU's pioneering moves, which acted as a precursor to e-learning, was to establish correspondence studies in 1972. It re-established a department for distance learning in 2002, following the closure of the correspondence centre four years earlier. As one of the most experience-oriented and experiment-driven universities in this learning approach, KAU now boasts exemplary e-resources and e-learning support in the faculties of social sciences, economics and management and public administration. It operates highly effective management systems that promote communication and correspondence between the school, faculty and students. Communications between these groups are strongly supported by these systems, which are a platform for the implementation of further reforms to ensure gradual and continuous growth of the university.

KSU

In 1953, King Saud took the throne after succeeding his father King Abdulaziz. In wishing to develop an immediate focus for education in the KSA, a rapidly modernising country, he commissioned the Council of Ministers and established a Ministry of Education. With a concentrated mission of education growth, KSU was established as the first institution of higher education in 1957 in Riyadh (Higgins and Awadh, 2013: 220). In its first academic year, students joined the College of Arts. In the two years that followed, the university was able to establish colleges of sciences, business and pharmacy.

The royal decree of 1961 recognised the university as a legal and independent entity with the Minister of Education serving as the president. The statute also required that the university appoint a vice-president, a secretary-general and a dean to represent each college. The royal decree of 1967 required the formation of the University council that would bear administrative responsibilities (Higgins and Awadh, 2013: 221). This council would be made up of four people: two active or inactive presidents and two native intellectuals (or two faculty members who had taken up such positions in other countries). This University council continues to be in charge in most aspects of policy development, budgeting, financial planning, implementation of policy and strategy, and administration. By 1990, the university had colleges of agriculture, veterinary medicine, economics, computer and information sciences, architecture and language and translation.

In recent years, KSU has fully adopted e-learning and made efforts to incorporate it into all the colleges. One of the university's initiatives has been to create learning and information technology units across all the colleges. These units create a direct link and network between the Deanship of E-learning and Distance Education in the institution. The main role of these units is to establish a suitable e-environment that allows for inter-faculty and inter-college sharing. These units also focus on training staff in the electronic and learning products offered by the deanship. In addition, they combine training models with e-curriculums, e-designs, smart and informational technologies, and content development (Onsman, 2010; Prokop, 2003). The training packages are designed to be independent and informative both with or without an instructor.

Finally, these units help faculty members to remain up to date with developments and changing patterns in e-learning. This is achieved by providing technological support for some of the complex and ever-changing smart technologies that are used within the institution. The units have provided flexibility and freedom to the faculty member or student to enable them to choose their own preferred learning method. In addition, students are also free to dictate their timeframes and location preferences during learning. Without a doubt, these units have facilitated improved quality and standards in e-learning with increasingly positive results.

Collaborations and partnerships are some of the most powerful methods of growth and technology development. For example, Samsung's interest in KSU's e-learning resulted in a group of delegates visiting the university who were introduced to the university's smart campus and LMS. With more people possessing mobile and smartphones, Samsung's collaboration has led to an investigation into the possibilities for mobile applications and software to run the e-learning platforms and resources in a more accessible mode (Al-Hamzi, 2003; Bassam, 2012). The university is seeking to eventually make its e-learning systems available on mobile platforms as the primary mode of operation.

The university has successfully automated its e-learning systems to a level of sustainable independence. The Deanship of E-learning and Distance Education has also assumed responsibility for contributing towards the social wellbeing of the university community. Activities here include blood donor sessions, and fundraising events to support other students who may be unable to cover their education costs. This has validated the position of e-learning and encouraged community

participation in learning and the local environment. These social initiatives have raised awareness of e-learning among the public, most of whom may remain unaware of the options available through distance learning.

KSU's e-learning platforms have mostly targeted women and students in the traditional areas near the university locality. This form of learning has promoted and developed a form of privacy in education. It has allowed women to undertake non-traditional courses and achieve results that fully demonstrate their capabilities (Amani, 2005; Eickelman, 1992). Although the university's main aim is not to underestimate the role of religion and gender in the kingdom, its approach has allowed for more women to obtain tertiary level qualifications and gain the opportunities to progress significantly further in their careers.

In this respect, KSU has been identified as a key player in promoting the empowerment and emergence of women in education, both as students and as faculty members. During seminars, women and men are separated, as is the case in most universities and administrative forums in the KSA. Even so, women are given platforms from which to voice their opinions in these seminars, and they have equal opportunities. As e-learning and regular learning continue to evolve, women and international students are being provided with better feedback, and opportunities to inspire change in the re-modelling of the system (Baki, 2004; Onsman, 2010). In this way, these groups are increasingly creators of and active participants in the development process.

KSU is also faced with the ongoing challenge of creating fully online courses that are examinable through online platforms. This move has been met with opposition from senior management and some populations of faculty members and students (Saha, 2015; Shamsur and Mohammed, 2014). The main reason for opposition is the lack of trust in the capability of full online courses. According to the senior management in this institution, it still has a long way to go in its technological and informational design work before fully online courses can be introduced and certified.

The Deanship of E-learning and Distance Education has prioritised the goal of strengthening the position and credibility of e-learning and certification. However, there is still a wide gap between management and the Deanship of E-learning and Distance Education even though this has been narrowed through social campaigns. Recent workshops have focused on promoting communication and agreement between the departments of e-learning and regular learning within each college. As the two departments operate in a complementary way, the deans, in collaboration with the University council, have developed multidisciplinary strategies to promote efficiency and productive co-dependence between the two while strengthening each department to eventually operate independently.

The university has also made technological improvements that have achieved global acclaim, such as the 'smart paper tray' invented by Dr Sulliman (Shamsur and Mohammed, 2014). This device has received a US patent for its contribution to e-learning, and printing technology.

KFU

Founded in 1975, KFU initially had four campuses, two located in Dammam and the other two in Al-Ahsa, with the main campus in Hofuf. Over time, the campuses located in Dammam were merged into the University of Dammam which later became the Imam Abdulrahman Bin Faisal University (IAU). The university has since established itself as a leading Saudi Arabian higher education institution constituting of four colleges: the College of Agricultural and Food Sciences; the College of Veterinary Medicine and Animal Husbandry; the College of Architecture and Planning; and the College of Medicine and Medical Sciences. The two campuses housing the latter two colleges are located in Dammam (Dijkstra and Seel, 2004).

KFU continues to operate in the pursuit of the goal of using scientific research to solve problems in society, which was the basis for its founding. By strengthening research and scientific analysis, the university has participated in and coordinated numerous national research projects. In this way, the university has been able achieve institutional success and widen its reach to international arenas, where it has made scholarly contributions to international platforms and organisations. Consequently, it has emerged as an institution that is committed to the adoption of modern technology and methods of operation in all aspects of academic endeavour.

Academic and management decisions at the university are centred on computer applications and technology and, as a result, have enabled it to participate in multicultural conferences that are not limited by region (Allen, 2010; Altintas and Gunes, 2012). The university is a pioneer with regard to international participation in scientific dialogue and research by students and faculty through e-conferencing and e-learning. KFU has demonstrated its ability to operate an evolving system with regard to e-learning. In this context, distance learning at the university can be divided into two phases: traditional distance education covering the first two decades following its formation, and modern or enhanced distance learning, which covers the early 2000s (Apple, 1990; Benjamin, 2003).

As previously observed, the KSA has traditionally promoted a system of grading based on academic performance that is used to determine entry into institutions of higher education. Primarily, top-performing students were guaranteed entry and financial support to join universities with more options in their preferred areas of specialisation. At the same time, many students who had below average to low grade point averages (GPAs) were often locked out of tertiary education. Furthermore, students in this situation, who were further limited by gender, finances, distance and cultural factors, found themselves almost completely unable to pursue any form of education past this level. KFU's concentration on research in local social issues has enabled the institution to identify this gap. These efforts have opened up a multitude of opportunities for restricted and disadvantaged students, who now can take up subjects and courses without having to physically relocate to the university. Despite the numerous challenges that traditional distance learning faced, the concept was widely appreciated and assimilated by Saudi Arabian schools and the Ministry of Education (Boyd and Hipkins, 2011; Chang, 2004; Rugh, 2002). Amidst the rising focus on educating and intellectually diversifying the Saudi Arabian population, distance learning received huge praise and support, especially from the marginalised and minority groups that were bound by the limitations described.

Even so, the distance learning system was faced with challenges and had shortcomings that required the eventual enforcement of a new e-learning system, one that was more adaptive and self-regulating. First, over-reliance on direct communication between instructors and students was reduced with the adoption of the Internet and e-communication. Initially, there was reluctance to adopt this form of learning due to a combination of factors, including suspicion surrounding its use, and this was further heightened by cultural and social factors. The suspicion came from both faculty members and students who perceived this form of communication as unsafe and having the potential to expose them in a negative way. Consequently, e-learning development remained stagnant for a long period, despite that fact that more people were becoming aware of its possibilities.

Another key challenge was the physical remoteness that distance learning students experienced. Even though more people across the kingdom were taking up their courses in distance learning modes, most universities, including KFU, had to integrate e-learning into the regular curriculum (Corbett, 2001; Ljungholm and Popescu, 2015). Without doubt, this was the most realistic way to develop distance learning and it had considerable success. However, this approach posed challenges to many students who were located in remote areas and still faced extreme difficulties because they had to travel to the main campuses for examinations and other activities.

The third challenge that distance learning faced was the lack of equal supervision and instruction compared to students on the regular programmes. This had two immediate effects: the deterioration of education quality and the underperformance of students. As predicted, the different forms of instruction created tension. There was a clear demarcation of academic achievement between distance learning and regular students. Although the basic results and performance were similar, there were obvious limitations in the distance mode of instruction that were directly attributable to the system. This created a period of uncertainty as to whether it was indeed an efficient method of learning.

Finally, this form of education resulted in a form of separation and a reduced sense of belonging or ownership on the part of e-learning students. Interestingly, as the regular learning students demonstrated belonging, the distance learning students became more isolated. In situations where they had the opportunity and ability to actively participate in campus activities, many would decline. Although this was not an unexpected result, lack of engagement in university life is known to have negative effects on the academic and social success of students across the world. It is for this reason that universities should allocate time, resources and human capital to the integration and accessible entry of distance students. Furthermore, as more universities accept more international students on to regular and distance learning programmes, it is imperative that enough consideration is given to the cultural and ethnic diversity being created. In the same way, as the KSA developed its education system, it began to attract more international students from neighbouring countries. The need to create ownership and a sense of belonging for its students became a top priority, but KFU remained unable to meet this challenge.

As the government and Ministry of Education became more concerned and involved in education with a particular focus on e-learning, KFU set a goal of carrying out a full-scale review of its internal operations. As a result, the administration decided on a complete overhaul of the entire education and e-learning systems and they were, therefore, redesigned. This required international benchmarking and partnerships with international stakeholders in the US and European markets.

The goals of the new systems, which were designed in consultation with faculty members and students through all the stages of development, revolve around modern new technology, dynamic curriculums, new trends in education, modern education expectations and preservation of the methods of instruction and education standards. This move significantly raises the quality of instruction and education while providing ownership to those participating in the learning experience. According to internal audits and studies, inclusion in the redesign process reduced the feeling of exclusion and boosted a sense of belonging among students. Under the new systems, which now demonstrate interactive and virtual learning processes, lectures are available for viewing at any time because live lectures are recorded and can be used continuously by students at their own convenience. This method of automation saves time in instruction and in dissemination of lecture material, in addition to creating uniformity of content between regular and distance learning curriculums.

KFU still maintains a remarkably well-organised distance learning system that requires minimal physical movement to the institution, except during pre-determined examinations which are held at a pre-planned locations at the end of every semester. One of the biggest achievements is the LMS available at the university; the Blackboard system has promoted access to lectures and additional e-resource learning materials. In terms of accessibility, the system has enabled a variety of communication methods, such as slides, videos and e-files, to be made available. Lectures are broadcast live and then stored for subsequent download. Students can communicate directly with their lecturers using the LMS via forums and other interaction platforms. To some extent, students can also communicate directly on a personal level with their instructors in addition to accessing assistance from their lecturers and further support from the university administration. In this way, there is a continuous and fair feedback communication pattern that has served efficiently to give equal

importance to the students whatever their gender or culture. As examination centres are identified and announced early, more students have continued to sign up for these e-learning programmes.

The final examinations are organised and announced by the KFU administration to ease the pressure of the test experience and period. Accredited test centres have designed and implemented their own campaigns to attract more students into the distance learning process, focusing especially on the remote areas. KFU's concentration on and specialisation in scientific subjects has pushed more women into science courses from which they had been previously been excluded. They are now able to take up these courses while simultaneously meeting social expectations and without being judged negatively by society. The university's view of this development is that these female students are performing well due to the privacy offered and the absence of the discrimination that is sometimes directed towards women in scientific areas within the kingdom.

Presently, the main areas of e-learning specialisation that the university has focused on are arts, education, business, sociology, English, and Arabic and Islamic studies. However, efforts are being made towards the establishment of independent e-learning curriculums in other disciplines through a combination of e-learning and regular programmes. KFU continues to be the leading university in distance learning and education for women. The university has adopted a community approach that emphasises the importance of education for all. Older women, who may be married, are also furthering their education to masters and PhD level while still performing their professional responsibilities as part of career development. Stakeholders at KFU appear to understand the need to preserve traditions and cultural values while simultaneously embracing evolving trends in education. To maintain cultural values, the university has even been promoting specialisation in Arabic and Islamic studies within the e-learning context.

At the same time, KFU supports participation by women in academic opportunities at conferences and in decision making. Even though their participation may not be as extensive, faculty members have made efforts to voice the concerns of and suggestions made by women within faculties. Whereas women would previously have been completely excluded from board meetings and international conferences, they are now encouraged and required to participate through a quota system. Notably, the female leadership within the university has also demonstrated integrity and professionalism, enabling women to carry out extensive research, demonstrate confidence and attend e-learning forums despite their limited access to resources and poor time allocation. It is hoped that women will have an even greater role to play in the strengthening of academic standards and quality in this era of digitisation. In this respect, the university has already made significant progress and has established its mark as a pioneer in female education and e-learning in accordance with national educational goals and objectives.

SEU

The SEU was established on 8 October 2011. It is centred on blended learning, which is a combination of online and regular education. Blended learning combines traditional systems of face-to-face classes with online, digital computer-aided activities. This institution provides undergraduate and graduate qualifications through a very personalised learning process that allows instructors and students to design and tailor their curriculums and schedules. It was established under royal decree by King Abdullah Bin Abdulaziz through continuous collaboration with international universities, mainly Walden University, the University of Phoenix and Franklin University. It is made up of four colleges: the College of Financial Sciences; the College of Computing and Informatics; the College of Health Sciences; and the College of Sciences. Its establishment occurred against the backdrop of positive results demonstrated through e-learning in other Saudi Arabian universities. The aims of founding the SEU included making education more flexible, promoting communication and

cooperation between faculty members, and enabling students limited by their location and jobs to pursue further education and specialise in postgraduate studies.

With much of its influence and design coming from its partner US and European universities, the university combines blended learning with synchronous and asynchronous learning, with the former acting as its primary strategy. Synchronous learning, as defined by the SEU, involves merging the instructor and student environments using educational tools such as virtual classrooms, video conferencing and video chats. In contrast, asynchronous learning does not merge the teacher and learner environments at the same time, and the tools used in this respect include social networks, e-courses, email and e-forums.

To succeed in these objectives, the university has also invested significant funding and resources in adopting mobile learning devices. This state-of-the-art institution has installed sufficient personal digital assistants and small personal computers supported by a high-speed Internet connectivity to provide a modern learning experience. Notably, the systems are linked to mobile phones that provide enhanced accessibility in terms of transfer of data or learning materials, thereby simplifying all functions in the classroom process hierarchy, starting with the actual learning process, moving on to the actual submission of assignments and ending, ultimately, with the examination results.

Furthermore, the university's record system allows for students and lecturers to observe performance trends and identify strategies to promote positive performance. In essence, the SEU's distance learning system has one of the most comprehensive and dynamic performance support systems. The virtual classroom system uses the Blackboard, Moodle, Sakai and Jusur platforms to deliver lectures while enabling the students to meet their instructors directly through the Internet to access all learning materials. Secure systems allow logging in and monitoring of attendance and participation. This has been made possible because the sessions mostly require the presence of both the teacher and the student.

The system allows for class recording of lectures, which are then made available for further reference. The Tigrity and Echo360 video recording platforms are both used to achieve this goal (Allen, 2010; McDaniel et al., 2005). Due to the complexity of the e-learning software, lecturers and curriculum designers are provided with tools and materials to help them in publishing and modifying learning programmes without having to learn to program or use computer coding. The e-learning software programs, common examples of which are Lectora and ToolBook, have inbuilt templates and features that improve the aesthetic appearance of lessons or learning materials for interactive learning.

A creative feature of e-learning in the institution is the test design and question bank system that allows for the contribution and formulation of tests and the maintenance of a question bank. Different types of questions can, therefore, be accumulated, and this results in a diversity of testing approaches. The test design and question bank system is then linked with the management systems and integrated into the learning system. This allows for easy access to revision materials while providing more resources for the lecturers. The overall system that combines all these various systems enables each to function independently and also integrates them into one combined and efficient system.

The most common methods of e-learning used by the SEU include e-libraries with e-books, interactive whiteboards, video conferencing or chatting, and learning simulators (Benjamin, 2003; Corbett, 2001). Over time, the e-library has expanded its capacity and now holds books in many areas. Coupled with advantages such as affordability and portability, e-books have become a popular form of storing and accessing reading material in the university. Because the university was founded as a predominantly digital institution, most students are signed up to the e-library. Some of the books available are compiled collectively by instructors and continuing students at postgraduate level as a way of promoting interaction. Women were previously not able to contribute to

the process of content creation; they have now been able to offer their expertise and learning experience in the creation and expansion of the e-library (Hale and Fisher, 2013). The virtual nature of the library makes its capacity infinite and it is supportive of writers and content creators.

Similarly, efforts have been made to develop learning simulators in the institutional e-learning structure. This technology simplifies otherwise complex processes or concepts through computer-aided demonstrations and allows the user or student to participate in a space similar to reality (Corbett, 2001; Flagg, 1990; Lester and Van Fleet, 2008). Although there are common and well-known simulators for training pilots and for medical studies, there are other smaller and practical simulators for business and legal studies. An example is a law simulator that simplifies the voting experience. Law students often have to study international legal systems in their courses. An example of a well-developed simulator in this field is one that demonstrates the process of voting for constitution amendments in the US. The US legal system is very complex and this simulator gives the user practical experience in understanding and applying it, and actively takes the student through all the levels of the amendment process. It has been widely noted that content or lessons that use simulators are effective for student learning. This, in turn, promotes the quality of education and encourages active learning geared towards knowledge application, as distinct from exam-based education. In this way, students and alumni have been involved in the design and development of these simulators. In addition, the process of design involves other methods of e-learning, such as video conferencing, and incorporates the referencing of e-materials (Flagg, 1990).

Overall, the entire learning system at the SEU has become self-supporting, and this confirms the university as a pioneer in the KSA with regard to the success and growth of e-learning during the short period it has been in operation. At the same time, the university faces challenges with regard to e-learning, expansion and development of the quality of education. Even though it has received a great deal of financial support from the government and international partners, funding and updating the technology remains a constant hurdle that the university has to overcome. Even so, it has remained affordable and accessible to a large portion of the local population as well as the international population.

Pedagogies for e-learning

Amador et al. (2016) refer to the term ‘e-learning’ as the adoption of a learning design that enhances education effectiveness and quality by incorporating technology which improves teaching and assessment and the learning process as a whole. It is also referred to as a digital or technology-enhanced teaching and learning experience. The education system needs to continue to integrate e-learning pedagogy to cater for a wide range of particular needs.

According to an argument put forward by Marc Prensky, the new generation of learners are finding it hard to incorporate technology into traditional learning (Prensky, 2015). At times, the use of technology causes tension, especially in the way teaching is conducted, and with regard to what is being taught, as well as in the way the student perceives the learning experience. This calls for a continually developing digital curriculum.

Technology-enhanced learning (TEL) could require a complete change in the curriculum because its traditional content may require very significant adaptation. Thus, there is a need to consider factors that drive the choice of a given pedagogical approach. The identification of these factors is directly associated with answering questions such as ‘what are we teaching, how can content be delivered to students, and in what ways are students ready to learn?’ (Mitra et al., 2015). They observe that, so far, e-learning and TEL are only parts of the main curriculum. TEL has only been applied to the current curriculum using traditional pedagogical approaches. Therefore,

questions have emerged about whether a hybrid approach, in which new pedagogies for e-learning are introduced to enhance learning, teaching and assessment, is as effective as a pure approach.

Discussion and summary

Even though the concept of e-learning was fully actualised in the late 1990s, the thinking behind it may be said to have been in existence since the mid-19th century. As early as the 1840s, some teachers practised a form of contemporary e-learning through letter correspondence. Students would receive their assignments, write them out in shorthand and send them back to their instructors. It was this popular learning technique that gave rise to the first testing machine created in 1924, paving the way for the rise of other learning systems in the following decades (Graff, 2011). By the end of the 20th century, more homes and learning institutions had adopted computer technology and the Internet had spread across the world. In the first 10 years of the 21st century, Internet use began to expand exponentially and made its way into domestic, business and learning environments (Graff, 2001; Gupta, 2010). At the same time, e-learning received a major boost following international recognition, and the parallel growing access to computers and the Internet. It is in this context that e-learning in Saudi Arabia should be discussed.

Most Saudi Arabian universities have adopted the blended e-learning model, and the stakeholders involved have continued to appreciate its importance in the way it has boosted social and interactive learning. As is the case in many countries, Saudi Arabia faces a range of challenges with regard to distance learning (Graff, 2011). Other than the infrastructural factors that limit e-learning, there are other common and often underestimated challenges, including the technology gap, course design, student motivation and supervision.

The problem of the technology gap tends to take on a different meaning in different regions and countries. In developed countries, this gap is manifested by limited knowledge of the technologies, whereas in developing countries it is demonstrated through both a lack of the technologies and the know-how with regard to how to operate them. In Saudi Arabia, some regions have all the required technological installations to support e-learning, whereas others, mainly in remote locations, lack both the technology and the know-how. In an attempt to bridge this gap, the government has rolled out procedures to redirect its focus to remote areas that remain left out of ongoing e-learning initiatives.

In terms of student motivation and supervision, instructors often leave it to students to navigate the platform and the learning system. Yet, it could be argued that it is the faculty's responsibility to guide the students through the system and encourage productive participation. This situation has reduced student motivation to use e-learning systems and their 'ownership' of them, resulting in perceptions that e-learning systems are elusive, evasive and complex, whereas, in fact, they are not (Bridie, 2001; Hafez, 2011; Humphrey, 1998; Pitler et al., 2012). Stakeholders, including the Saudi Arabian Ministry of Education, continue to deal with this shortcoming by providing avenues for feedback and through which modifications can be made.

Finally, the challenge of course design, verification and modification has also proved quite difficult. This challenge has the potential to create huge negative effects that may require a complete redesign of the system and curriculum. As previously noted, Saudi Arabian universities, KFU, for example, have had to completely redesign their e-learning systems from the basic foundations (Hafez, 2011; Marsh, 2004). The Ministry of Higher Education in the KSA thus regulates the course design process at a supervisory level but gives the institutions control over the systematic processes. In this way, faculties can creatively design their own systems based on their environment, goals and requirements.

By and large, distance learning in Saudi Arabia may be said to have achieved much success. More female students have enrolled in higher education with remote areas being opened up to education and economic activity (Hafez, 2011). Consequently, there has been a rapid growth in the number of graduates from and local instructors at these universities and colleges. With an increasingly skilled population, the KSA is achieving its goal of diversifying and expanding beyond the status of an oil-dependent kingdom. It has set an example in the Middle East and promoted a regional focus on education without severely discriminating against the female student population. The KSA has successfully spearheaded the adoption of a modern education system that maintains the kingdom's cultural and social values.

The analysis of the four Saudi Arabian universities provides insights into the development of e-learning as well as the successes and challenges of distance learning in the country. With the approval of the US$21 billion plan to develop Saudi Arabia's education sector, the e-learning sector is bound to benefit immensely, with ripple effects acting as a boost to other realms of society, including e-government, e-commerce and e-services (Olivares and Morgan, 2012; Salem et al., 2012).

As observed in this study, many universities in the country have formed partnerships with global stakeholders that have already demonstrated expertise in e-learning and the continuous improvement of the associated systems. As one goal of higher education in the KSA is to provide it for all people, especially those in marginalised areas, distance learning has helped that goal to be accomplished (Wade, 2000). The education system also has the task of balancing the needs of students with those of teachers. Although many decisions have been made that favour the students' needs, growing issues with teaching staff have been identified. Administrative boards have, therefore, redirected their attention to teachers and faculty staff (Unruh, 1975). One of the challenges that teachers face is their need for continuing professional development to adjust to or learn new technologies and pedagogies. It is popularly said that technology now evolves at a higher rate than that at which we are able to learn about it.

Although the challenge of ensuring educators possess the right skills to operate technology remains a significant issue, it is important to note that the same challenge does not exist in the KSA's corporate sector (Repko, 2007). The difference in performance between the two areas is caused by the fact that corporate structures do tend to allocate resources for training. A significant gap in the education system is the lack of teacher training at most institutions of higher education. Teachers are, therefore, unable to demonstrate learning materials to their students or otherwise adjust to the rapidly changing nature of learning technology (Pflaum, 2004; Saban, 1995). Teachers have, therefore, remained widely unenthusiastic about distance learning and have ended up transferring this attitude to the students in the form of reduced motivation. An example of an effort towards teacher training is the Tatweer Company for Educational Services (T4EDU), which continues to develop its teacher training programmes (Kozma, 2003). This organisation has partnered with government regulators to train educators who will then train teachers and instructors. The training involves practical skills and the flexibility and basic tools to adjust to and self-develop with new technology (Kozma, 2003; Laurillard, 2002; Moursund, 2002). Furthermore, more education institutions are developing their own systems and programmes using their own trainers, which makes it easier to introduce them to their populations.

Nevertheless, amidst this national move and campaign in support of e-learning, a sizeable section of the Saudi Arabian population has remained suspicious of modern learning systems. Many people in conservative and remote areas remain locked out of education because they continue to refuse to accept and adopt blended forms of learning. This means that educators still have a long way to go in creating more awareness of educational alternatives. The education system is promoting ownership of students' learning and encouraging students to take responsibility for their own

studies by working with them to further demonstrate the benefits of e-learning to those who are still sceptical about this method of education.

Conclusion

Researchers and technology providers see great potential in Saudi Arabia's education and distance learning sectors. Major industries in the kingdom have identified and acknowledged the impact that education has and will continue to have on economic prosperity for this nation (Rayed et al., 2015; Rupp, 2009). Through partnerships, ICT education and the use of technology in instruction have both been made a reality. Through regional and international collaborations, the country has succeeded in lowering the cost of outsourcing for teachers and instructors across the higher education system (Marsh, 2004; Repko, 2007). At the same time, Saudi Arabia has a great deal to learn from neighbouring countries that have equally (if not more) well-established education sectors. Through adequate benchmarking, Saudi Arabian universities will eventually be able to fully automate their e-learning systems and position themselves as key education players in the region and globally. Finally, the Saudi Arabian education sector has achieved considerable success in educating the female population and allowing women to take up more responsibilities in the country's economy and industries. Considering the country's rapidly growing population, e-learning probably provides the most comprehensive and realistic learning approach for ensuring that the Saudi Arabian population expands in educational terms in the same way that it continues to expand demographically.

Saudi Arabia is to be commended for taking systematic steps towards strengthening e-learning. Mobile e-learning is the most recent approach that has demonstrated the greatest potential in this sector. The SEU has been a key player in advancing mobile e-learning systems and this university has one of the best integrated learning systems, offering quick and convenient access to learning materials and lessons. As a result, it has addressed some of the common shortcomings of distance learning, such as poor communication and weak links between the students and instructors. Designed with flexibility and adaptability in mind, this university continually improves its systems and allows for complete ownership in operation by all the parties concerned. Its willingness to encourage instructors' and students' contributions in developing content is exceptional.

KAU, KSU and KFU have also performed well with regard to combining their regular programmes with distance learning. This approach has paved the way for ongoing development of e-learning, and progress towards the development of a comprehensive system. Even though particular institutions have made direct efforts, it is no doubt that the Saudi Arabian government has been the most significant driver with regard to e-learning. With a heavy investment portfolio in this sector and a keen focus on the expansion of education and distance learning, most universities and colleges in the kingdom agree that the government has been very influential.

Private partnerships with global providers and national governments have furthered the cause of distance learning in Saudi Arabia. US and Canadian e-resource providers have established direct links with most universities in the kingdom that use e-learning. The US has directly contributed to the research process since the 1990s when the KSA embraced e-learning. Throughout the last 20 years, during which time the KSA's education and e-learning systems have been catapulted to international standards, the US has encouraged innovation in this sector through technical and managerial intervention. The UK continues to contribute towards corporate and e-governance in Saudi Arabia (Bassam, 2012). Eventually, the adoption of e-resources in the areas of education, governance, business and health in Saudi Arabia will serve to create a combined system in the country that is self-supporting and of vital importance to the education sector.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

Akkari A (2004) Education in the Middle East and North Africa: The current situation and future challenges. *International Journal Education* 5(2): 144-153.

Alamri M (2011) Higher education in Saudi Arabia. *Journal of Higher Education Theory and Practice* 11(4): 88-91.

Al-Asmar A and Khan M (2014) E-learning in Saudi Arabia: Past, present and future. *Near and Middle Eastern Journal of Research in Education* 1(2): 82-95.

Al-Dali W, Fnais M and Newbould I (2013) Private higher education in the Kingdom of Saudi Arabia: Reality, challenges and aspirations. *Higher Education in Saudi Arabia* 40(1) 137-146.

Alebaikan R and Troudi S (2010) Blended learning in Saudi universities: Challenges and perspectives. *Research in Learning Technology* 18(1): 1-17.

Al-Hamzi S (2003) EFL teacher preparation programs in Saudi Arabia: Trends and challenges. *Tesol Quarterly* 37(2): 341-344.

Al-Hariri R (1987) Islam's point of view on women's education in Saudi Arabia. *Comparative Education* 23(1): 51-57.

Alkhalaf S, Nguyen A and Drew S (2010) Assessing e-learning systems in the Kingdom of Saudi Arabia's higher education sector: An exploratory analysis. In: *Proceedings of the 2010 international conference on intelligent network and computing* (ed H Kettani), IEEE, Kuala Lumpur, Malaysia, 26-28 November 2010. NJ, USA: Piscataway.

Allen J (2010) *Hybrid Learning: The Perils and Promise of Blending Online and Face-to-Face Instruction in Higher Education*. Santa Barbara, CA: Praeger.

Al-Masaud K and Gawad A (2014) Impediments of activating e-learning in higher education institutions in Saudi Arabia. *International Journal of Advanced Computer Science and Applications* 5(4): 12-18.

Alsadoon E (2009) *The potential of implementing online professional training development for faculty in the College of Education at King Saud University*. MEd Thesis, Ohio University, USA.

Al-Shehri Ali (2010) E-learning in Saudi Arabia: 'To E or not to E, that is the question'. *Journal of Family and Community Medicine* 17(3): 147-150.

Altintas T and Gunes A (2012) Evaluation of distance education components: A case study of associate degree programs. *Academy of Educational Leadership Journal* 16(3): 23-34.

Amador F, Nobre A and Barros D (2016) Towards a model of a didactics of e-learning: An application to education for sustainable development. In: Pinheiro M and Simões D (eds) *Handbook of Research on Engaging Digital Natives in Higher Education Settings*. Hershey, PA: IGI Global, pp.396-415.

Amani H (2005) Women and education in Saudi Arabia: Challenges and achievements. *International Education Journal* 6(1): 42-64.

Apple M (1990) *Ideology and Curriculum*. London: Routledge.

Baki R (2004) Gender-segregated education in Saudi Arabia: Its impact on social norms and the Saudi labor market. *Education Policy Analysis Archives* 12(28): 1-12.

Bassam A (2012) Students acceptance of mobile learning for higher education in Saudi Arabia. *American Academic & Scholarly Research Journal* 4(2): 1-6.

Bendania A (2011) Teaching and learning online: King Fahd University of Petroleum and Minerals (KFUPM) Saudi Arabia. Case study. *International Journal of Arts & Sciences* 4(8): 223-241.

Benjamin S (2003) Moments of inclusion and exclusion: Pupils negotiating classroom contexts. *British Journal of Sociology of Education* 24(5): 547-558.

Boyd S and Hipkins R (2011) The recursive elaboration of key competencies as agents of curriculum change. *Curriculum Matters* 7: 70-86.

Bridie R (2001) Learning, progression and development principles for pedagogy and curriculum design. *Australian Journal of Early Childhood* 26(2): 31-33.

Chang S (2004) Online learning communities with online mentors. *Quarterly Review of Distance Education* 5(2): 75-88.

Corbett J (2001) *Supporting Inclusive Education: A Connective Pedagogy*. London: Routledge.

Dijkstra S and Seel NM (2004) *Curriculum, Plans and Processes in Instructional Design: International Perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.

Eickelman D (1992) Mass higher education and the religious imagination in contemporary Arab societies. *Journal of the American Ethnological Society* 19(4): 643-655.

Flagg B (1990) *Formative Evaluation for Educational Technologies*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Graff N (2011) An effective and agonizing way to learn: Backwards design and new teachers' preparation for planning curriculum. *Teacher Education Quarterly* 38(3): 151-168.

Grant M (2013) Challenges of introducing liberal arts education for women in the Middle East. *The Fletcher Forum of World Affairs* 37(2): 15-24.

Gupta M (2010) The enabling role of e-business technologies in strategic operations management. *Journal of International Technology and Information Management* 19(2): 107-109.

Hafez S (2011) *An Islam of Her Own: Reconsidering Religion and Secularism in Women's Islamic Movements*. New York: New York University Press.

Hale JA and Fisher M (2013) *Upgrade Your Curriculum: Practical Ways to Transform Units and Engage Students*. Alexandria, VA: ASCD.

Higgins S and Awadh A (2013) Effects of traditional, blended and e-learning on students' achievement in higher education. *Journal of Computer Assisted Learning* 29(3): 220-234.

Humphrey C (1998) Techniques. Teaching curriculum and program planning in Israel: Another use of the nominal groups technique. *Journal of Adult Education* 26(1): 16-20.

Jones S and Madden M (2002) *The Internet Goes to College: How Students are Living in the Future with Today's Technology*. Washington, DC: The Pew Internet & American Life Project.

Kozma R (2003) *Technology, Innovation and Education Change: A Global Perspective: A Report of the Second Information Technology in Education Study, Module 2*. Eugene, OR: International Society for Technology in Education.

Laurillard D (2002) *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology*. New York: Routledge.

Lester J and Van Fleet C (2008) Use of professional competencies and standards documents for curriculum planning in schools of library and information studies education. *Journal of Education for Library and Information Sciences* 49(1): 43-69.

Ljungholm DP (2015): E-governance and public sector reform. *Geopolitics, History and International Relations* 7(2): 7-12.

McDaniel E, Roth B and Miller M (2005) Concept mapping as a tool for curriculum design. *Issues in Informing Science and Information Technology* 2: 505-513.

Marsh C (2004) *Key Concepts for Understanding Curriculum*. London: Routledge.

Miric S and Chapman D (2009) Education quality in the Middle East. *International Review of Education* 55(4): 311-344.

Mitra B, Kode S and Cheruvu A (2015) Mobile learning: A pedagogical framework to facilitate distributed learning through collaborative approach for enhancing English Language communication skills. In: *Proceedings of the seventh international conference on technology for education* (eds V Choppella and SI Kinshuk), Warangal, India 10-12 December 2015, pp.91-94, Los Alamitos, CA; Washington, DC; Tokyo: CPS/IEEE Computer Society.

Moursund D (2002) *Project-Based Learning Using Information Technology*. Eugene, OR: International Society for Technology in Education.

Observatory on Higher Education (2010) *Higher Education in the Kingdom of Saudi Arabia, Indicators and International Comparisons*. Ministry of Higher Education. Available at: https://pingpdf.com/pdf-higher-education-in-the-kingdom-of-saudi-arabia.html (accessed 22 February 2018).

Olivares K and Morgan R (2012) *Quick Hits for Teaching with Technology: Successful Strategies by Award-Winning Teachers*. Bloomington, IN: Indiana University Press.

Onsman A (2010) Dismantling the perceived barriers to the implementation of national higher education accreditation guidelines in the Kingdom of Saudi Arabia. *Journal of Higher Education Policy and Management* 32(5): 511-519.

Pflaum W (2004) *The Technology Fix: The Promise and Reality of Computers in Our Schools*. Alexandria, VA: Association for Supervision and Curriculum Development.

Pitler H, Hubbel E and Kuhn M (2012) *Using Technology with Classroom Instruction that Works*. Alexandria, VA: ASCD

Prensky M (2015) The world needs a new curriculum. Keynote conversation presented at E-Learn: World Conference on E-Learning. Available at: www.learntechlib.org/p/180551/ (accessed 22 February 2018).

Prokop M (2003) Saudi Arabia: The politics of education. *International Affairs* 79(1): 77-89.

Rayed A, Nguyen J and Drew S (2012) Factors influencing e-commerce adoption by retailers in Saudi Arabia: A quantitative analysis. *International Journal of Electronic Commerce Studies* 3(1): 1-15.

Repko A (2007) Integrating interdisciplinarity: How the theories of common ground and cognitive interdisciplinarity are informing the debate on interdisciplinary integration. *Issues in Integrative Studies* 25(1): 1-31.

Rugh W (2002) Education in Saudi Arabia: Choices and constraints. *Middle East Policy* 9(2): 40-55.

Rupp R (2009) Higher education in the Middle East: Opportunities and challenges for US universities and Middle East partners. *Global Media Journal* 8(14): 3-8.

Saban A (1995) Outcomes of teacher participation in the curriculum development process. *Education* 115(4): 571+.

Saha N (2015) Higher education in Saudi Arabia. *Journal of International Students* 5(3): 317-319.

Salem A, Drew S and Alhussain T (2012) Assessing the impact of e-learning systems on learners: A survey study in the KSA. *Social and Behavioral Sciences* 47: 98-104.

Saudi Gazette (2008) Business: Kingdom's e-learning industry to reach $125 million this year. Saudi Gazette, 26 April. Available at: www.sauress.com/en/saudigazette/4097 (accessed 22 February 2018).

Shamsur K and Mohammed A (2014) E-learning in Saudi Arabia: Past, present and future. *Near and Middle Eastern Journal of Research in Education* 10(2): 2-11.

Unnisa S (2014) E-Learning in Saudi Arabia's higher education. *Kuwait Chapter of Arabian Journal of Business and Management Review* 4(2): 152-157.

Unruh G (1975) *Responsive Curriculum Development: Theory and Action*. Berkeley, CA: McCutchan.

Wade S (2000) *Preparing Teachers for Inclusive Education: Case Pedagogies and Curricula for Teacher Educators*. Mahwah, NJ: Lawrence Erlbaum Associates.

Author biography

Abdullah Aljaber holds a Masters Degree in Education in Educational Technology from King Abdulaziz University, Educational supervisor in planning and development in Ministry of Education in the Kingdom of Saudi Arabia, Ph.D. candidate studying the reality of using smartphone applications for learning in higher education of Saudi Arabia in Glasgow University.