Alan S. Weber · Sihem Hamlaoui *Editors*

E-Learning in the Middle East and North Africa (MENA) Region

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Preface

This volume is the first comprehensive handbook covering the history, development, and current and future practices of e-learning in the Middle East and North Africa (MENA) region. *E-learning* (electronic learning) is defined herein as learning facilitated by computers and online networks such as the Internet and intranets and includes mobile technologies, or m-learning, as well. Earlier definitions of e-learning also involved the concepts of computer-assisted learning, computer-based instruction, Web-based training, and computer-based training, generally meaning any form of study using a computer and educational software, not necessarily involving the Internet or intranets. The term "educational technology" is gaining currency as an umbrella term; however, it should be noted that pens, paper, and blackboards are in fact forms of technology (artificial assistance) used in the classroom. Educational technology remains a useful conceptual term, since computers in the classroom have been fetishized as a panacea for all educational problems, and all technology use by educators from simple to complex should first and foremost serve the interests of learning.

Some of the current e-learning teaching models – including blended and purely autonomous virtual learning (formerly known as "self-study") – grew out of distance education, still employed in universities throughout the world. Common modalities for distance education, which continue in some areas of MENA, included mailing paper-based study materials and later video cassettes, CD-ROMS, and DVDs to students, in addition to radio and television broadcasts sponsored by national governments. Assignments and exercises could be mailed back to instructors for correction, and individual tutorial could take place over the telephone (now videoconferencing, online text chat, or email is commonly used), constituting an early form of blended learning. During the transition to modern modalities of online learning – which now represent an actual paradigm shift in pedagogical practice – the Internet or an intranet was often only used as a substitute for snail mail, i.e., for the distribution of learning materials and as a way of organizing classroom activities through a learning management system, also called a virtual learning environment.

Interestingly, a common earlier term for LMS was CMS or course management system, demonstrating the evolution of the LMS from a set of tools designed primarily for instructors to manage a course more efficiently (such as attendance rolls, recording exam scores, distributing announcements, etc.) to a system that is integral to the way students learn and retain information. Both functionalities are critical, since a poorly organized and managed course obviously greatly detracts from efficient learning for students. Technology in the classroom, however, must be integrated into learning goals and learning outcomes according to a pedagogical plan for learning, i.e. using the proper virtual tool to achieve the desired educational objective. Learning in most modern electronic pedagogies is designed to be student-centered. Student-centered learning relies on individual ownership of knowledge and peer learning, two areas in which e-learning has made a strong impact due to the array of synchronous and asynchronous communication and collaborative tools now available.

The regional designation Middle East and North Africa (MENA) used for this volume is not entirely satisfactory for a variety of reasons, since originally the terms "Middle East" and "Far East" invoked Europe as the reference point for "the center." Also, not all organizations use the term MENA consistently, and the member countries of MENA vary according to different definitions. In this handbook, a World Bank definition of the MENA countries was adopted with Djibouti added as an illustrative end point in ICT and e-learning development. Similar definitions of the region include the Arab States' United Nations Development Programme (covering the Arabic-speaking-majority nations), the Arab League's 22 member states, and the Organization of Islamic Cooperation (OIC), with 57 members including both the Muslim-majority nations and nations with significant Muslim populations, including Southeast Asian nations such as Indonesia and Malaysia which are culturally distinct from the MENA countries. The IMF has adopted the term MENAP (MENA + Afghanistan + Pakistan) in its reports, adding two other Muslim-majority but non-Arab countries.

Possibly the most significant defining feature of MENA is historical and political: except for the southern Arabian Peninsula, Djibouti, and Iran, all MENA countries formed part of the Roman Empire at one point in time, and during the decline of Rome beginning in the fifth century, the Islamic Rashidun, Umayyad, Abbasid, and Fatimid caliphates replaced Roman rule in the countries we now designate as MENA. Arab culture and Islamic religion left a lasting impact on the region, even among non-Arab peoples.

In the modern period, regional political power was divided between the Ottoman Empire and various European colonial powers, most notably France and England. Also, a large percentage of the MENA region consists of desert or drylands due to the massive Sahara Desert, Arabian Desert, and Iranian deserts which have led to the development of similar patterns of culture and economic and agricultural development. For example, although Tuareg and Imazighen peoples of North Africa are linguistically and culturally distinct from Arab Bedouins, these peoples share many cultural similarities due to their similar responses to dry conditions, such as nomadic lifestyle and the use of camels.

Due to postcolonial politics, internal civil conflicts, and the redrawing of national boundaries by European powers during the post-1918 period, some geographical boundaries and even entire nation states are the subject of serious disputes within the modern MENA region. For example, Western Sahara or the Sahrawi Arab Democratic Republic is a disputed territory administered by Morocco, with 37 nations endorsing an indigenous government in exile. Palestine, whose borders are coterminous with the State of Israel, is recognized by some nations as a sovereign state, but not by others. Similar regional disputes arise in the use of the term Arabian Gulf (al-khaleej al-arabi) by some of the Arab-speaking nations to describe what has been known historically before the 1960s as the Persian Gulf (originally *sinus persica* in Latin translations of Ptolemy and Strabo). Many of the borders of the uninhabited desert regions of MENA were not resolved until the twentieth century; the potential for the discovery of oil or water resources, however, led to more precise fixed boundaries after the first petroleum deposits were discovered in Iraq, Iran, Bahrain, and Saudi Arabia.

Except for Israel (a mixture of Jewish sects and Palestinian Muslim and Christian Arabs) and Lebanon (with a substantial Christian population), all MENA countries are Muslim-majority nations, and this fact adds another unifying characteristic to the region. According to the Pew Research Center, 93% of the 341 million inhabitants of MENA profess Islam. However, regional variations of Islamic practice create diversity in MENA, with Sunnis, Salafists, Deobandis, Shias, Ibadhis, Sufis, Ismailis, Alawites, etc. all adhering to slightly varying beliefs and customs.

Despite its flaws, MENA, therefore, remains a useful concept due to the historical, cultural, and geographical similarities of these nations, and the designation is used widely in academia, media, and government.

Plan of the Book

Individual e-learning experts from each MENA country were asked to assess e-learning activity in their country with respect to education, business, and government. In each country study, e-learning is contextualized within the nation's general history, educational system, ICT ecosystem, e-readiness, and national development plans. Each country study discusses the historical development of e-learning, the scope and aims of e-learning within the country, current practices including programs, regulation, and accreditation, and future prospects for online learning in the country. The chapters are followed by a comprehensive bibliography of major research studies on the topic from the last 15 years – very little literature on e-learning in the region exists before the year 2000.

Common patterns that readers will note concerning e-learning development in MENA are that many member states have centralized governments with little regional governance, along with centralized ministries or councils of education which dictate policy and curricula for national e-learning implementation plans. Most MENA nations have developed nationwide plans of varying degrees of effectiveness for incorporating ICT into all facets of life, including electronic banking, public e-services (e-government) through comprehensive government portals, education, and the promotion of the use of the Internet in business.

E-learning has witnessed explosive growth in the last two decades in MENA. The World Economic Forum in 2017 argued that further investments in ICT training will spur economic development in the region, diversify the economies, and provide critical services for other industries: “to harness the sector’s full potential, and ensure the market’s future skills needs are met, governments across the MENA region should encourage vocational training within the ICT sector itself, and provide support and recognition to specialized capacity-building and certification programmes, such as micro-credentials, addressing the needs of individuals, institutions and industry.” E-learning is particularly well suited for delivering ICT courses online – with occasional blended learning meetings with mentors via videoconferencing. E-learning can aid in the training of national workforces without the necessity of building new universities and technical colleges and hiring expatriate educators or the costly option of sending students abroad for their education (a currently common solution at the PhD level). Sending students abroad can contribute to brain drain since PhD candidates develop professional and social networks in their host countries while obtaining their degrees and often accept job offers via these networks outside their home country. E-learning, in the form of informal and lifelong learning, can also keep the unemployed “youth bulge” common in many MENA countries engaged in useful activities.

One barrier to e-learning development region-wide is the widespread shortage of trained ICT professionals who can set up, customize, and maintain platforms and learning management systems. Education systems will need to adapt to provide more of the basic digital literacy skills which are now required to function in a modern, globalized world. Internet banking, communication through social media apps, contactless payment, and the use of government e-portals for services are now ubiquitous in the developed world and require at least a minimal knowledge of computers and the Internet. Although countries like Egypt, Israel, and Turkey are now exporters of ICT services and products, few other MENA countries are able to meet full capacity in this sector with locally trained technicians.

Additionally, teacher training programs need to include an online learning component since e-learning methods will undoubtedly eventually merge with normative teaching praxis and become an expected mode of best-practices learning. Even if institutions cannot afford ICT support for in-house e-learning systems and hardware for students, low-cost Internet-enabled phones or tablets can access the wealth of free and low-cost educational materials now on the Internet which only require an Internet browser and connection. Thus cloud computing (remote server) solutions should become increasingly attractive as an educational option for developing countries. Sites such as Wikipedia, Khan Academy, iTunes U, and MOOCs on platforms such as Coursera, edX, and Udemy should not be ignored by educators in both developed and developing nations.

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Contents

Chapter 1
Algeria

Mahieddine Djoudi

Abstract This chapter surveys the development and current state of e-learning in the People's Democratic Republic of Algeria. The author surveys the general social, economic, historical, and demographic background of Algeria and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Algeria. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Algeria • E-learning • Web-based learning • ICT • Internet • Education • Distance learning

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Country Profile

Algeria (the People's Democratic Republic of Algeria) is located in North Africa. It is bordered by Tunisia and Libya in the east, Niger in the southeast, Mali and Mauritania in the southwest, Morocco and Western Sahara in the west, and by the Mediterranean Sea to the north with a coastline stretching close to 998 kilometers between Morocco and Tunisia. Algeria has an area of 2.4 thousand square kilometers; it is therefore the tenth largest country in the world and the biggest on the African continent and in the Arab world. The country consists of 48 wilaya (provinces), and its capital and most populous city is Algiers (Djoudi 2010).

In July 2015, Algeria's population was estimated at 39.5 million. About 70% of the country's population is urban. Algeria is one of the most populous countries of the Maghreb, but it has an unbalanced geographical occupation since 90% of the population lives in the northern region, along the Mediterranean coast, which constitutes only 12% of the land area. In Algeria, population distribution by age in 2015 was as

Table 1.1 Socioeconomic indicators

Indicator	Algeria
Religions	Sunni Muslim (state religion) 99%; other 1%
Languages	Arabic and Berber (official since 2016), French
Population	40.26 million (2016 est.) (IWS 2016)
Population growth rate	1.84% (2015 est.)
Life expectancy	Male: 75.29 years Female: 77.96 years Total population: 76.59 years (2015 est.)
Literacy	Male: 87.2% Female: 73.1% Total population: 80.2% (2015 est.)
GDP (gross domestic product)	$570.6 billion (2015 est.)
GDP per capita	$4.400 (2015 est.)
Unemployment rate	11% (2015 est.)

follows: 0–14 years, 28.75%; 15–24 years, 16.64%; 25–54 years, 42.84%; 55–64 years, 6.42%; and 65 years and older, 5.35%. The total fertility rate is around 2.3 children per woman. As this data indicate, the country has a young population, which poses a challenge for the education system and the labor market (CIA 2016; Table 1.1).

Internet and ICT in Algeria

The connection of Algeria to the Internet began with email in 1993. There were two groups working on this task. The first group called DZNET was based abroad and started in 1989. Committed Internet enthusiasts, too numerous to name, worked hard by contacting the various network organizations such as EARN and NFS-NET in the hope of some help from these organizations. DZNET members also approached Algerian officials to make them aware and convince them of the need for and the advantages of having Algerian scientific institutions connected to the outside world via email. The second group which worked inside the country was composed of two independent entities, namely, the Algerian Unix Users Group (ALUUG) and Centre for Information Science and Research (CERIST), a governmental academic organization. CERIST was established in 1985 to promote the exchange of scientific and technical information, communication technologies, and networking at the national level and to form a link with outside researchers. Several projects were initiated in order to connect this organization to some European sites. Many of these failed. The ALUUG association finally bore fruit when it was connected to the main European EUnet backbone located in Amsterdam through dial-up lines and when it registered and administered the Algerian Internet top-level domain .dz in 1991.

As for the CERIST, they succeeded in connecting using a 9600-baud leased line to CNUCE, a research institute in Pisa (Italy), under a project subsidized by the UNESCO, called RINAF (Regional Informatics Network for Africa). In 1995, CERIST became the manager of the domain name .dz and remained the only Internet service provider (ISP) before market liberalization in 1998 (Kavanaugh 1998). Two years later, in 2000, the Ministry of Post and Information and Communication Technologies (MPTIC) was created, mandated for the implementation and management of the national ICT policy. The first two decisions were the division of the public company Post and Telecommunications into two companies, Algeria Post and Algeria Telecom, and the creation of the Regulatory Authority for Post and Telecommunications (ARPT).

During the same year, the first six licenses were issued to providers GECOS, EEPAD, SERVNET, TDA, SOLINET, and ICOSNET. In 2001, Algeria Telecom launched the provider Djaweb to extend service beyond universities and research centers. In 2003, two ISPs launched ADSL (asymmetric digital subscriber line) deals with 128 Kbps, 256 Kbps, and 512 Kbps speeds, and CERIST was placed under the Ministry of Higher Education and Scientific Research (ClusMED 2014). The year 2005 (Koubaa 2009) witnessed the launch of ADSL offers of Algeria Telecom called "Fawri," the official launch of the Ousratic initiative that aims to provide each family with a personal computer and training through the provision of individual microcomputers and broadband lines, and the VoIP license allocation for the emergence of the Internet and voice over IP alternative operators. The licensing of 3G was granted to the three mobile network operators (Mobilis, Ooredoo, and Djezzy) in late 2013, and the provision of LTE (Long-Term Evolution) since 2014 has done much to ensure the availability of mobile Internet access across the large country (BuddeCom 2016; Chaabna and Wang 2015).

To facilitate the entry of Algeria into the knowledge economy, the following national ICT initiatives have been designed (Guemide and Benachaiba 2012; Hamdy 2007):

- The project of the Ministry of Education to equip all schools with computers
- The technology-enhanced learning projects
- The Academic and Research Network (ARN)

In December 2011, CERIST became the manager of the الجزائر (Arabic, Algeria) country code top-level domain. The number of Internet subscribers increased from 10.1 million in 2014 to 21.4 million at the end of March 2016, including 19 million registered subscribers for mobile Internet, 1.89 million ADSL subscribers, and 554,903 subscribers to 4G LTE (APS 2016; Table 1.2).

Table 1.2 Telecommunications infrastructure in Algeria

Indicator	Algeria
Telephone – main lines in use	3.1 million (2014)
Subscriptions per 100 inhabitants	11 (est. 2015) (IWS 2016)
Telephone – mobile cellular	37.3 million (2014)
Subscriptions per 100 inhabitants	93 (est. 2015)
Internet users	21.4 million (2016) (APS 2016)

Education System in Algeria

During the period of French colonization of Algeria, the education system was "designed primarily to meet the needs of the European population and to perpetuate the European cultural pattern. A large majority of the students were children of the colonists. French was the language of instruction, and Arabic was offered as an optional foreign language" (Metz 1994). Currently, the Algerian education system and training is administered by three ministries, those of National Education, Education and Vocational Training, and Higher Education and Scientific Research.

Primary and Secondary Education

At the independence of Algeria in 1962, the education system was in complete disarray, and enrollments in schools at all levels totaled only 850,000 (StateUniversity.com 2016). Immediately after independence, the new government of independent Algeria underwent a major reform, several schools were built, and many reforms occurred. "The first educational reform passed in 1971 introduced the nine-year basic education program. Further reforms in 1976 extended the period of compulsory education from 6 years to 10 years. In addition, education at every level is provided free to all and is considered being the exclusive domain of the state. In 2004 the government explicitly allowed for the establishment of private institutions of education under well-defined regulations" (Khaled and Boulenaour 2014, p. 286). The education system is structured so that the primary school cycle lasts 5 years, lower secondary lasts 4 years, and upper secondary lasts 3 years. Algeria has a total of 8,024,000 pupils enrolled in primary and secondary education. Of these pupils, about 3,452,000 (43%) are enrolled in primary education. Primary and secondary education is compulsory and free from 6 to 15 years old, and the literacy rate is around 78.7%. The academic year begins in September and ends in June.

French is the only foreign language taught at the primary school. Students start learning French as a first foreign language from the third year of primary education, whereas English is not taught at all until the first year of secondary education. New syllabi have been designed, and new textbooks have also been published recently. The competency-based approach was introduced in 2002 as a result of the educational reform in the primary, middle, and secondary schools (OBG 2016; Soreda 2013).

Vocational Training

Students leave school after 10 years of compulsory education. Some of them choose to enroll in a vocational training program (initial or continuous) which is overseen by the Ministry of Training and Professional Education (MFEP). The training sector and vocational education receive about 500,000 trainees and students at more than 1400 vocational training centers, offering more than 400 courses. Over 90% of students are trained within the network of the MFEP which also provides control of all aspects of the programs including continuing education. The objectives of the MFEP are:

- To foster particular categories of the population in regard to their socio-professional inclusion
- To provide economic partners with qualified, adequate human resources with the demanded competence
- To offer to workers a complementary education which allows them to extend or to deepen professional skills to adapt to the evolving labor market
- To assure professional qualification which allows students to find the right profession or to create their own enterprise

In addition to the classic face-to-face and apprenticeship training, the system offers four other specific modes: evening classes, distance learning, training for housewives, and rural women training. With these programs the government hopes to reduce illiteracy by 50% among women in the current decade. Women in the courses will be awarded Certificates of Achievement to encourage further study and to acknowledge their educational achievement. At these public institutions, private schools approved by the government are added which are specialized primarily in information technology, accounting, marketing, hairdressing, embroidery, sewing, and beauty (OBG 2016).

Higher Education

At the independence of Algeria in 1962, there were only the University of Algiers and two annexes in Oran and Constantine and some schools concentrated in the capital: total enrollment barely reached 3000 students. Access to higher education is guaranteed to all baccalaureate holders (or equivalent foreign title recognized). The Algerian state has established a wide and diverse university network, where the number of higher education institutions in 2016 has reached to over 110 institutions (50 universities, 10 university centers, 20 national schools, 11 higher colleges, 12 preparatory schools, 4 preparatory classes, and 4 university annexes). To this number must be added six institutes and schools under other ministries (MESRS 2016).

This enables nearly 1,500,000 students to be registered in Algeria, representing a ratio of 4000 students for 100,000 inhabitants from a total population estimated at 39.5 million inhabitants. The number of university teachers is about 60,000; thus, the student-teacher ratio is roughly 25. Today the budget for education and scientific research represents approximately 8% of the operating budget of the state and 2.4% of GDP.

The LMD system (License-Master-Doctorate) was introduced to provide better translation of qualifications into the labor market in accordance with international standards. With the LMD system, studies are organized around three basic levels of qualification, each of which corresponds to a certain number of credits: license, a total of 3 years of study (180 credits, 6 semesters); master's, a total of 5 years of study (an additional 2 years or 120 credits (4 semesters)) after completing the license; and doctorate (PhD), a total of 3 years (6 semesters) of study and research after the master's degree. Officially, the LMD system had to achieve a number of objectives including:

- Improving the quality of education programs
- Responding as well to the country's new socioeconomic needs
- Training for lifelong learning
- Protecting the autonomy of higher education institutions
- Opening the university to the outside world
- Harmonizing the higher education system to an international standard.

The gradual introduction of the LMD system began in 2004, and its coexistence with the former "classical system" – a situation specific to Algeria – has created some well-known serious obstacles and difficulties.

The higher education system in Algeria is closely linked to the scientific research which mobilizes more than 1300 research laboratories, 12 research units, and 6 thematic research agencies in different sectors. Each agency is a public administrative institution, responsible for contributing to the implementation and achievement of the national research program. Other programs of research depend on other official institutions. Today, Algeria's research regime must now provide a scientific production quality that meets international standards. The purpose of the national scientific research development plan project is to place Algeria at a high level of international competitiveness.

Algeria's Ministry of Higher Education and Scientific Research has focused its efforts on enhancing the quality of learning and scientific research. This is done by working on the establishment of an integrated quality assurance system in accordance with the international standards and by establishing good governance for academic institutions so as to improve the ranking of Algerian universities at the regional and international level (MESRS 2016; OBG 2016; Tempus 2012; Esau and Khelfaoui 2009).

Quality in Higher Education and World Rankings

Quality is at the heart of the concerns of both governments and universities that award degrees and allow students to be successful and competitive in the labor market and meet the needs of human, social, economic, and cultural development. This awareness is spreading and resulting in the publication of regulations for universities that aim to provide a common framework to manage quality. Competitiveness between institutions becomes strong in the face of the challenges of international rankings (Djoudi 2011). The first thing to do is to take an interest in the positions of the Algerian universities in various world rankings, like Academic Ranking of World Universities (ARWU), often known as the Shanghai Ranking, Times Higher Education (THE) World University Rankings, QS (Quacquarelli Symonds) World University Rankings, or Webometrics Ranking of World Universities. The Webometrics Ranking was initiated by the Scientific Research Superior Council (CSIC), the largest public research body in Spain. This ranking is based on the quantitative analysis of the Internet and Web content specifically related to the process of generating and communicating scientific knowledge. The purpose of the Webometrics Ranking is to promote global access to academic knowledge produced by universities and institutions worldwide (Webometrics 2016).

Since 2007, ALQIES, the Algerian quality system in higher education, has been interested in Algerian university rankings in the world mainly through the Webometrics Ranking. The conclusion we can make is that the number of Algerian universities ranked in the Arab world or in Africa is increasing and their rank improves from one year to another, although they are low in world rankings. Thus, the latest ranking of July 2016 Webometrics places 20 Algerian universities in the top 100 Arab universities and 27 universities in the top 100 African universities. University of Sidi Bel Abbes comes out as the best nationally at no. 4116 in the world, with University of Tlemcen second nationally, being no. 4143 in the world (ALQIES 2016).

E-Learning in Algeria

Organizations Responsible and Historical Evolution

The National Centre for Public Learning (CNEG) was the first center in Algeria in charge of all distance education. This permanent educational structure focuses on universal learning and adopts teaching by correspondence, radio, and television in the delivery of instruction to many persons deprived of education opportunities during the French colonial period. A large percentage of Algeria's adult education is carried out using remote education programs. Since 1969, CNEG has been teaching adults at a distance, including teacher training and secondary-level correspondence courses for adults, published in newspapers and with radio support. Grammar, vocabulary, and arithmetic lessons were distributed in factories to interested workers. Lessons were simply written, some to fit the specific requirements of each workplace. Tutorial help was available in the factories. Courses of varying difficulty in the same subject were also available to suit the needs of different individuals. The center has contributed significantly to the revitalization of learning and helped learners reach the secondary level by providing lessons by correspondence for those unable to follow lessons in a school or academic institution. In 1997, 3.1 million televisions and 7000 fax machines were utilized in connection with some type of distance course or program (Young et al. 2010).

In 2001, the CNEG became the National Office of Education and Distance Learning (ONEFD), a public company under the Ministry of Education. The ONEFD offers students the opportunities to prepare their homework for the final examination and to ensure additional or special training as part of social and professional promotion. The National Centre of Distance Vocational Education (CNEPD) is in charge of the various distance training courses which prepare students for the examinations organized by public institutions of vocational training in Algeria. The CNEPD is also responsible for the complementary training and reorientation of public servants and enterprise employees.

The first class graduates in e-learning solutions or International Computer Driving License (ICDL) received diplomas in 2007. A graduation ceremony was organized by the CNEPD, which monitored and evaluated the training, and with international certification. Over a period of a year, this training was launched in the academic year 2006–2007, via the Internet network CNEPD. The program was, meanwhile, developed by qualified teachers in this area. ICDL is a standard training that enables everyone to take training courses in its field. The advantage of this training system is that it is developed by competent international expertise. The CNEPD, covering 45,000 trainees, also offers 40 training programs in several areas, including finance, administration, tourism, construction, management, foreign languages, and transport (CNEPD 2016).

The University of Continuing Education (UFC), which was created in 1990, enables those who did not obtain the baccalaureate at school to enter higher education through 50 continuing-education centers distributed throughout the national territory (Tempus 2012). Courses destined for the classes with year-end examinations are broadcast (3 h of lessons every week) by public Algerian TV since January 2015, in accordance with an agreement signed by Algerian TV, the University of Continuing Education, and the CNEPD. The integration of e-learning at the level of the university is relatively recent (StateUniversity.com 2016).

Avicenna Virtual Campus

Avicenna Virtual Campus was a 4-year project coordinated by UNESCO and launched in November 2002 with funding from the European Commission through its Euro-Mediterranean Information Society (EUMEDIS) program to alleviate the digital divide in higher education along the Mediterranean basin (EUMEDIS 2006). The project aims to equip the centers and connect them through the Internet, to train the center staff, to train also the production managers in creating e-learning multimedia courses which are used on the Internet, to develop e-learning courses, to select the norms and quality evaluation procedures, to set up an open virtual library of e-learning courses in several languages including Arabic, and to provide e-learning sessions for students. The project engages a consortium of 15 Avicenna Knowledge Centers (1 for each participating country) also known as the nodes of the project. The University of Continuing Education (UFC) is the Knowledge Centre for Avicenna Virtual Campus in Algeria (Mitchell 2006).

Algerian Virtual University

Algerian Virtual University (AVUNET) is web-based multilingual e-learning environment developed in PHP/MySQL for distance education that can be used both for distance and blended learning where the data is stored in a centralized database at the platform server. The AVUNET environment includes three modules:

- An authoring system containing the necessary tools for ongoing course production. It contains a content design system and learner self-assessment tool to improve a student's knowledge and skills.
- A management and collaboration server consists of several tools. An information tool contains the various files and the data necessary for teaching or user training activities (teacher, student, administrator). A collaboration tool allows users to interact with each other to accomplish the work of the team or take part in discussions. To promote collaborative learning, the tools are designed to provide information on other users, providing an indication of their availability and access to their evaluations of educational materials.
- A learner interface makes it possible for the learner to obtain assistance. Various tools are available that favor personalized expression and to indicate who is and has been online by providing indices of their availability and access to their previously posted comments on specific information (Douidi et al. 2007).

Agent-Based Learning Platform

This approach aims to develop an agent-based platform able to take into account the problems encountered by the different forms of e-learning, namely, the learner's sociological isolation, the loss of motivation, and the autonomy of the learner. This platform has to (1) provide the necessary tools to make learners, working from a distance, feel the same way as if they were working face to face, while allowing more flexibility with respect to time and space constraints, and (2) propose tools to follow up, help the learners, and evaluate their work. So, the assistant can play the role of learner companion (Harbouche and Djoudi 2007a). An agent-based approach allows dividing the problem into intelligent communicating entities and distributed in space. These entities can substitute for teachers and thus reduce their tasks. The artificial agents can, also, assist learners in an asynchronous way during an exercise, problem-solving session, or a lecture session. The application was designed using MaSE methodology. MaSE is an easy and complete methodology that "covers the various steps of the analysis and design of the software engineering process" which helps in the identification of the agents. The agent-based platform was tested in 2006 with 112 students and 20 teachers from the University of Setif (Algeria). The authors found "a relation between the level of the learner and his/her choices" (Harbouche and Djoudi 2007a).

Listening Comprehension of English with Mobile Devices

A proposed approach for e-learning in Algeria examines mobile devices such as MP3 players, tablets, or smartphones in a mobile learning environment for learning English as a foreign language. One focus is on pedagogy; therefore, a major part of research is on developing, evaluating, and analyzing listening comprehension activities and then organizing activities into a curriculum. This approach proposes to the learners a new learning modality for languages as one of its main objectives. Also, it helps learners to become speakers who are able to make their ideas comprehensible to native speakers and to progress quickly in learning a foreign language. It also claims to give coherence to language learning through a multiple exposure to the target language. Thus, the portable MP3 player, for example, is presented as a tool adapted to the achievement of these objectives.

Diffusion of sound text files in the learning environment allows users rapid access to the sound documents. The environment also provides instructions on the work to be done and the exercises for learners. Listening to the sound files is then done starting from the computer itself and then by loading of these files onto mobile devices for listening independently on the computer. The platform is a web-based application with server-side processing of intensive requests. It can support a wide range of mobile devices. A key element of research will be testing the new mobile tools in several different device contexts to demonstrate support for heterogeneous mobile device environments. In addition, there is the potential to integrate mobile phone technologies such as SMS with platform tools as an alternative mobile platform for learner responses (e.g., question/answer, polling, etc.) (Djoudi 2008).

Adaptation of Learning Resources Based on MBTI Model

Research on e-learning is being carried out in Algeria to provide system capabilities to conduct reasoning on descriptions obtained in order to automatically adapt the resources to the learner according to his preferences. This research uses the MBTI model (Myers-Briggs Type Indicator) and uses artificial intelligence in the adaptation of learning resources but also more relevantly through the use of the ontology developed (learner, domain) and the semantic links between concepts and learning resources.

A learning object is an educational, atomic unity representing a physical entity (text, picture, sound, or video) belonging to a given category (definition, example, illustration exercise, etc.) corresponding to a particular notion represented in XML and carefully arranged together. In addition, to increase the expressiveness of this research, a set of SWRL rules are incorporated by exploiting the semantic relationships (between concepts and resources) to develop mechanisms that allow inference reasoning. A first prototype was developed embodying these principles, and the course “database” in a “master’s degree” program was used as the application domain (Behaz and Djoudi 2012).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

At present, e-learning is becoming an important global business not only in the commercial sector but also in the support that the national government is giving to educational institutions to increase their export income. Most Algerian universities have an e-learning platform, but these platforms have very few courses at present and are underutilized. Most institutions choose the open-source Moodle platform. Several institutions and commercial companies in Algeria are utilizing various technologies to develop solutions to solve the problems of teaching and learning. Some are offering online courses that are accessible for all; others are providing schools with educational kits. Many of these services have as their overall aim the improvement of education in Algeria (Mayard 2015).

Dirassatti

Dirassatti (means "my studies" in Arabic) is a web-based learning system launched in 2014 by two young students for private lessons as part of a start-up competition organized by the mobile operator Ooredoo in Qatar. This new platform allows students to participate in online review. The website includes video courses, exercises, quizzes, and evaluation sheets, developed by teachers in accordance with the official education programs set by the Ministry of National Education. In the beginning of the project, the material for courses was provided for mathematics, physics, and life sciences, but only for the last school year, both in written and video form. Thus, Dirassati plans to be the first distance-tutoring website by way of video chat. It will be gradually enriched and will affect all subjects from the primary to university level. By 2017, Dirassati hopes to offer content for all Algerian academic degrees (OBG 2016).

iMadrassa.com

iMadrassa.com ("Madrassa" means school in Arabic) is a primary and secondary education school management system. This environment complies with the official curriculum of the Algerian national education. The educational content is produced by teachers with over 20 years of experience and is validated by inspectors of education rigorously selected by a teaching team. To accompany the student success, interactive exercises, videos, and fun quizzes are provided to test their knowledge. Thus, iMadrassa represents an educational library with over 23,000 courses, 107,000 exercises, 600 controls, and 290,000 quizzes (iMadrassa 2016; OBG 2016).

Dirassatic

Dirassatic (Arabic for "your education") is an online management tool. Students and parents are granted access to education-related information, from class schedules to absences, notices, and grades. Dirassatic was created and funded by Dynamic Web Solutions, an Algerian Web agency. The service was launched in September 2014, after 2 years of preparation, and has a five-member team. For the time being, the service will be operating in around 15 private establishments (at the primary, middle, and high school levels). Whenever schools don't have the necessary budget to acquire this solution, Dirassatic will offer parents the option of paying for the service themselves. However, the school will still have to play its part and enter the required information (Dirassatic 2016).

DZCampus.com Platform

Actech (Technological Actions) specializing in multimedia communication, particularly in the design, implementation, and animation of websites and developing interactive Web applications, and "Conform Communications," an Algerian company specializing in studies, research, training, expertise, and communication consulting in all fields, have launched the first e-learning open platform DZCampus.com in Algeria in partnership with the National Library. The platform is aimed at companies, institutions, and training organizations in Algeria. DZCampus.com offers more than 40 online tutoring courses with training modules and assessment quizzes in the following areas: management, project management, languages, computer office automation, graphics, management secretariat, and general education. It offers various spaces dedicated to the company, the trainer, the trainee, a common space, and an "Agora"; it allows for capitalizing on the knowledge and expertise of users and thus helps to develop individual skills to improve business performance. DZCampus.com has a videoconferencing system and uses the Dokeos platform (DZCampus.com 2016).

Tarbiatic Project

Another project called Tarbiatic was initiated by EEPAD, an Algerian private telecom and Internet service provider, which introduced a new "pedagogical concept" in ten schools across the country that have joined in this innovative approach. According to officials of EEPAD, this digital school project is a complete and scalable solution that allows the school to better integrate and develop the use of ICT in partnership with French telecom provider Wanadoo, which networks the various stakeholders in the school including the school administration, teachers, students, and their parents. The platform is structured into five "virtual offices," namely, an office of the academy, an administration office of the school, one for the teacher, an office of the student, and, finally, another office reserved for parents of students who will follow the education of their children online. A hundred schools have been selected as part of this experimental project, and the platform now contains nearly 600 courses and 4000 exercises with answers along with the class averages for fourth year exams and third year secondary exams (Tarbiatic 2016).

eduDZ

eduDZ is an e-learning platform for Algerian students. It is organized, clear, and minimalist with a course and exercise section and contains no dead links because everything is hosted on the platform. eduDZ includes video courses, a forum, a blog, and an access to social networking such as Facebook and Twitter. The challenge for eduDZ designers is to generate widespread use, develop a professional interface, and continue to innovate (eduDZ 2016).

Djaweb Solution

Djaweb (Algeria Telecom) launched an "e- learning" service prepaid card, developed in partnership with Microsoft and Thomson. This service offers via the Internet the content of 4000 training courses in the field of information technology and communication and professional skills development. This solution provides computer literacy in the best-known certification programs of the major IT vendors (Microsoft, Oracle, Cisco, IBM, Novell, SAP, etc.). A training program is offered by Djaweb for customers for obtaining Microsoft certification. The program includes 16 modules for a period of 1 year with a complete course content of 200 h (Guemide and Benachaiba 2012).

CNEPD Computer Skills Certification

The National Distance Vocational Education Centre (CNEPD) has launched vocational training in the year 2006–2007 with new offerings including "Computer Skills Certification" or "International Computer Driving License," known worldwide under the acronym ICDL. The ICDL is an international standard that allows everyone to train while validating and improving their computer skills. This course is taught by CNEPD via the Internet through e-learning and supported by interested educational institutions and qualified teachers. Note that as part of the management training needs in Algeria, the CNEPD retained in its program in the short and medium term the launch of other training activities that will be offered under different formulas or solutions involving e-learning and blended learning. To do so, the

CNEPD provides its trainees a training program online, with course materials, exercises, forums, synchronous chat tools, calendar, wiki, etc. (CNEPD 2016).

Algerian Learning Centers

Created in 1995, Algerian Learning Centers (ALC) is an Algerian education organization that offers online English language courses to learners and uses e-learning technology to teach students. ALC has many international partners. Among them, ETS Global (Educational Testing Services) is the world leader in academic and professional tests. With over 20 years of experience, the ALC is the most important language school in Algeria. ALC presents a complete learning solution with a blended learning mode (ALC 2016).

Future Development

A great number of research projects in technology-enhanced learning are ongoing in several Algerian universities. At present, the most important and most innovative projects are CVL@b, a collaborative virtual laboratory, and a learner recommendation system and web-based groupware for teaching information literacy.

Virtual Laboratory for E-Learning

A virtual laboratory is a digital environment that aims to teach (using simulated experiments) the practical dimensions of an experimental discipline such as physics, chemistry, mechanical engineering, etc. The aim of CVL@b (Collaborative Virtual Laboratory) is to propose a multidisciplinary architecture for virtual experimentation on the Web. This architecture allows learners to perform remote practical work (Tele-PW) and experiments using virtual devices in the experimental sciences in a collaborative way. The trainers could lead interactive sessions providing instructions for Tele-PW using appropriate scenarios, thus using the metaphor of the distant practical work sheet (Tele-PW sheet). Its design was based on the analysis of classical laboratories (Mechta et al. 2013).

Learner Recommendation System for Collaborative Learning

Computer-supported collaborative learning (CSCL) fosters collaboration among users to exchange and share knowledge or skills to participate in a common learning project. Therefore, when users interact among themselves and within a learning environment, they provide a lot of information to each other (peer learning). This information is recorded and classified in a model of traces and thus made usable for various purposes such as updating a learner model. Taking account of the learner activities within a CSCL to guide students in their learning is complex. The learner model considers knowledge of all kinds (preferences, motivations, goals, plans, actions, acquired knowledge or not, mistakes, etc.).

The proposed method for the CSCL is (1) to refine the collaborative model of traces by a number of measures to build indicators on the state of the learner's knowledge and the progression of his knowledge within a group in a learning session and among these indicator parameters and (2) to retain the degree of mastery degree of knowledge represented by a concept. To achieve these goals, the following method is adopted: (i) propose a semantic model to measure indicators of the contribution of each student in the group, (ii) estimate the contribution of indicators using Bayesian formulas (taking into account the knowledge of the learner and his activities), and (iii) propose a set of recommendations to assist the learner in his learning (Mediani et al. 2015).

Web-Based Groupware for Teaching Information Literacy

An application was designed in Algeria to meet the needs of information literacy education and facilitate the management of research projects in both face-to-face and remote teaching situations. It promotes off-campus study and collaboration as well as communication among students, their instructors, and specialists in the concerned scientific field. The system is an aid for both teachers and students in managing and conducting research projects. It was designed for use in face-to-face classroom situations, in addition to cases of remote teaching. It can be regarded as a computer-supported collaborative learning platform. It is thus both a learning system and a groupware. It is based on a model of users and their interactions with others, in a given environment and situation or with a given goal in mind. In the model, all groups of users have a common objective, which is the management and completion of a research project.

The system is a web-based groupware, in that it assists groups of users in jointly carrying out a project. Group members may collaborate remotely or in each other's presence, at the same or different times. In accordance with preestablished rules, it permits communication between users, the production and sharing of documents, and simplified coordination and planning of user activities. Several services are offered to different users: shared services, which are mainly aimed at outside readers since they can be accessed freely via the Internet, and reserved services, which are specific to each user category defined in the application. Again, the functionalities of platform were developed in accordance with the teaching methods useful in information literacy education (FormaTIC 2016).

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Chapter 2
Bahrain

Nina Abdul Razzak

Abstract This chapter surveys the development and current state of e-learning in the Kingdom of Bahrain. The author surveys the general social, economic, historical, and demographic background of Bahrain and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Bahrain. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Bahrain · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

The Kingdom of Bahrain is an archipelago of islands in the Arab (Persian) Gulf region. It consists of three main types of communities: the generally poorer tribal and rural communities and the richer urban centers (Khuri 1980). The official religion in Bahrain is Islam, which is practiced by the majority of the citizens, and the official language is Arabic. In comparison to its neighboring Gulf countries, Bahrain has limited oil and gas reserves. It has therefore diligently attempted since the late twentieth century to diversify its economy by moving away from these limited natural resources as sources of wealth and has expanded economic activity into financial and banking services, tourism, and retail services – all of which require a high level of skill for workers in these sectors.

Partly due to this need for a high skill set and partly due to pressures from a competitive global market, Bahrain has been witnessing lately major economic, social, and cultural developments. These developments are primarily the result of reform initiatives that initially started in 2005 as an integral part of the country's national economic strategy underpinning Vision 2030 – the comprehensive economic vision developed for Bahrain (Abdul Razzak 2014a). Vision 2030 aims at providing a better life for Bahraini citizens, by improving their skills and making more and better job opportunities available to them, as well as by encouraging innovation, developing new economic sectors, and exploiting unprecedented growth opportunities, in order to compete in an increasingly global marketplace.

Policymakers in the Kingdom recognize that for Bahrain to realize its 2030 Vision, its economy has to develop into a knowledge-based one and its society has to become information based (Abdul Razzak 2014a, p. 62). "What is meant by a knowledge-based economy is an advanced economy in which there is greater reliance on information and high skill levels (OECD 2005); while, what is meant by an information-based society is a society which relies on gaining competitive advantage internationally through major dependence on and use of data, information, knowledge, and ICT in creative and productive ways (Abd.Mukti and Abd.Malik 2004)" (Abdul Razzak 2014a, p. 62). This indicates that as elsewhere in the world, Bahrain's economy nowadays is strongly and substantially correlated with ICT integration in every aspect of life (Abdul Razzak 2013), especially in the field of education and training, which probably has the greatest impact on the development of human skills and competencies needed for preparing citizens for tomorrow's employment challenges.

Education System in Bahrain

Before 1919, public schools did not exist in Bahrain; instead, education was mainly provided in local mosques through the religious imams (leaders) who focused mainly on the teaching of the holy Quran. These Quranic schools were known as "al-kuttab." World War I, however, with the political and social changes it brought along with it, led to greater openness of Bahrain toward modern Western influences. This gave birth to the need for a different kind of education in the Kingdom, the result of which was the establishment of the first public school for boys in 1919, while 1928 marked the opening of the first school for girls. Both of these schools were funded through financial contributions from a number of Bahraini families and were endorsed by the Royal family until 1930 when their administration was taken over by the government.

Currently, the entire education system is officially supervised and monitored by the Ministry of Education (MoE) (*National Report of the Kingdom of Bahrain* 2008, p. 14). Formal education is spread over 12 years and encompasses three stages: primary school (6 years), intermediate (3 years), and secondary (3 years) (Shaker 2000). The majority of the schools are public (207 in total), but there are also a considerable number of private schools (74 in total). According to the statistical reports on the MoE official website, the 207 public schools are divided into 112 primary schools, 21 primary-intermediate, 36 intermediate, 35 secondary, and 3 religious institutes. The 35 secondary schools provide mainly general education offered in a variety of tracks (literary, scientific, commercial, and unified), but there are some which are also technical and vocational in the programs they offer. The technical and vocational education (TVE) system in Bahrain "…produces graduates in different engineering specializations such as electronic and telecommunication engineering, building services, mechanical engineering, and computer technology" and in this system, "…the learning methodology consists of school-based learning (SBL) followed by work-based learning (WBL)" (Alseddiqi et al. 2010a, p. 11). The Sheikh Khalifa Bin Salman Institute is the leading TVE institution in Bahrain at the present time, and most of the research studies in the literature which have been done on the TVE system in the Kingdom are about this institution's practices and programs.

In addition to providing a variety of programs and tracks, schools in Bahrain at all levels also focus to a great extent on catering to students with special needs. According to the MoE, one of its main development projects pertains to the care of special needs students in government schools. The main aim of this project is to integrate such students into the regular classroom; however, in the case of more severe needs, the students are provided with special classes in some of the schools. According to the Ministry's 2012–2013 statistical reports, 54 (29 male and 25 female) government schools integrate special needs students, catering mainly to cases of autism, mental retardation, and Down syndrome. In addition to these programs, Bahrain has a number of specialized institutes for special needs such as the Bahrain Institute for Special Education (BISE), the Saudi-Bahraini Institute for the Blind, Al-Amal Institute, and a number of social rehabilitation centers for the handicapped, deaf, and mute under the administration of the Ministry of Labor and Social Development.

Alongside its special needs projects, the MoE has a number of school improvement programs that were initially launched in 2008 as a part of the Kingdom's national educational reform initiative. The aim of such projects is a nationwide increase in school effectiveness through tackling the school system from different angles, in order to develop student, teacher, and leadership competencies and performance (*National Report of the Kingdom of Bahrain* 2008, pp. 18, 19). The most notable of these projects are "…the introduction of a new performance management system (PMS) for the evaluation of teachers and staff and… projects that focus on: engaged student-centered learning; the integration of ICT; cooperative learning; differentiated instruction; higher-order thinking skills and other 21st Century skills; assessment for learning; action research; discipline for learning; and instructional leadership for learning" (Abdul Razzak 2016a, n.p.). These projects were therefore launched by the MoE to embed improvement into the educational system and also to make sure that the recommendations made by the nation's quality assurance body, which was initially established in 2008 and was formerly known as the Quality Assurance Authority for Education and Training (QAA), were being addressed internally (Abdul Razzak and Al-Baker 2015). The QAA – which is now called Bahrain Education and Training Quality Authority (BQA) – was originally established by the Bahraini government to ensure rigorous academic standards that meet international good practices in the Kingdom, by executing institutional and academic reviews at all education levels including schools, training/vocational, and higher education providers (Albalooshi 2013).

The BQA therefore plays a major role in ensuring quality education not only in the schools of the Kingdom but also in institutes of higher education, to which students are admitted after successfully completing the general secondary education with a certain score. These institutes are a mix of public, semipublic, and private bodies, and they are all supervised and monitored by the Higher Education Council (HEC), which was formed in 2006 under the chairmanship of the Minister of Education. The HEC is responsible for monitoring and evaluating programs and provision at these institutes; supporting the administrative, scientific research, and student services they offer; creating and issuing regulations in relation to their student admission and the organization of their academic, financial, and administrative affairs; and ensuring the quality of their performance and outputs. The HEC is also in charge of setting terms and criteria for the licensing of different types of higher education providers, especially the private ones (Higher Education Council official webpage).

The two main higher education institutions (HEI) in the Kingdom are the University of Bahrain (UoB) and the Arabian Gulf University (AGU) (Shaker 2000). The UoB, which was established in 1986, is the only public university, and it is the largest in the country in terms of facilities, range of programs, and number of students and staff members (Al-Alawi et al. 2009). UoB comprises ten main faculties: arts, business, sciences, information technology, law, engineering, applied studies, Bahrain Teachers College, health sciences, and physical education and physiotherapy (University of Bahrain website). The UoB also hosts the Bahrain Polytechnic (BPT), which is government owned, and delivers applied learning, technical education, and skills-based and occupational training. BPT was originally created to help with the reform of vocational education and for the purpose of better meeting the market needs through skilled graduates (Abdul Razzak and Al-Baker 2015). The AGU, on the other hand, was established in 1979 by the Gulf Cooperation Council (GCC) and is a private regional institution with three main faculties: Medicine and Medical Science College; College of Graduate Studies offering three programs in technical studies, educational studies, and gifted education; and the French Arabian Business School (Arabian Gulf University website). Other private institutions in the Kingdom are the Royal University for Women (RUW), Ahlia University (AU), the Kingdom University (KU), the Royal College of Surgeons in Ireland (RCSI), Applied Sciences University (ASU), the University College of Bahrain (UCB), AMA International University (AMAIUB), Bahrain Institute of Business and Finance (BIBF), Bahrain Institute of Hospitality and Retail (BIHR), and the Arab Open University (AOU).

In comparison to other institutions in Bahrain, the AOU is unique in the type of education access it provides; AOU is actually the leading dedicated distance education system in the Arab world (Alsunbul 2002). It was originally launched in 2002 in Kuwait after the chairperson of the Arab Gulf Program for United Nations Development Organizations (AGFUND) Prince Talal Bin Abdel Aziz had promoted the idea of AOU as a developmental pan-Arab project for several years (Zakari and Alkhezzi 2010). The Bahrain branch is only one of several AOU branches in the Arab region, and its uniqueness lies in the fact that it aims “at offering a large and diverse population of students an efficient access to higher education and lifelong learning, despite the place and time boundaries and social economic backgrounds” (Essam and Al-Ammary 2013, p. 22).

E-Learning in Bahrain

Educational Technology and E-Learning in the Middle East and GCC Countries

E-learning is one of those terms that has generated many different definitions (Carry and Willis 2001). It is synonymous with technology-based learning, which is “the learning of content via all electronic technology, including the Internet, intranets, satellite broadcasts, audio and video tape, video and audio conferencing, internet conferencing, chat rooms, e-bulletin boards, webcasts, computer-based instruction, and CD-ROM” (Koller et al. 2009, p. iii). As Akour (2012) explains, e-learning is currently the new paradigm of modern education (p. 60), and its potential for servicing more and more users increases naturally with an increase in Internet access (Mirza and Al-Abdulkareem 2011). Along the same lines, any delay in the adoption of the Internet by the governments of countries in a certain region logically leads to a delay in the adoption of e-learning in that region. The Middle East (ME) is a good example of late adoption, and this delay has led to a scarcity of published research “…with regard to the benefits, limitations, barriers, and acceptability of e-learning in the ME” (Mirza and Al-Abdulkareem 2011, p. 86). Still, from the little research that exists, it is clear that ME countries, which see a need to prepare their citizens for tomorrow’s employment challenges, recognize that e-learning and educational technology can serve as catalysts that can help them develop and progress (Dini et al. 2015, p. 39). For this reason, as explained by Mirza and Al-Abdulkareem (2011), “the 21st Century has witnessed a growing interest in most countries of the ME with regard to the adaptation and appreciation of e-learning. Different governments have rushed to establish e-learning projects and programs. This includes e-learning for K-12 and college students” (p. 88). The GCC countries are no exception. These countries have long relied in their economic development on an abundance of natural resources, in particular oil and gas. With time, however, they have come to realize that natural resources are not sufficient for sustainable economic development, which requires that such resources be accompanied by investments in knowledge that can facilitate technological innovation (Tseng 2014). This explains why the GCC countries in the past decade – and among them Bahrain – “have attempted to diversify their competencies away from oil and have been investing in education, research, and innovation” (Schwab 2011, as cited by Tseng 2014, p. 213).

The main focus in GCC education has been primarily on science education and ICT-based instruction; since, in the GCC context, these are perceived as “tools for legitimating countries’ inclusion in an international political, economic, and social community, and a key component in the establishment of national innovation systems” (Wiseman and Anderson 2012, p. 608). This is reflected clearly in the latest education reforms in the GCC countries that have accepted ICT integration in educational institutions as a legitimate method of instruction (Oyaid 2009 as cited by Wiseman and Anderson 2012). Such institutionalization of ICT in instruction is “in part due to the growing pressure on national education systems to prepare students to develop specialized ICT competencies that are dynamic and easily transferable” (Wiseman and Anderson 2012, p. 610).

History of E-Learning in Bahrain

Similar to the situation in the ME and the GCC described above, the government of Bahrain started to show increasing interest in the 1990s in providing education for all its citizens, and it recognized that the use of ICT in general education, special education, adult, and lifelong education is a primary way to create educational opportunities for all. As a result, computer literacy courses were introduced in high school classes and covered topics like the history of computers, computer components, and keyboarding skills. In the decade that followed, however, the computer education curricula evolved to include computer operations, applications, and technology. A network that connects all the public schools’ computer labs together was also established, and in-service training workshops for teachers were provided, to teach them computer applications for personal and instructional purposes (Jamlan 2004). In the mid-1990s, there were also several efforts to integrate the Internet into the educational system; however, up until 2003, there were only ad hoc, haphazard, and exploratory attempts to deliver online courses to targeted groups of students. No real coherent e-learning strategy in the Bahraini school system existed as of 2003 (Jamlan 2004).

In 2003, the wheels of change started turning when the Bahraini government launched a major initiative known as King Hamad’s Schools of the Future Project (KHSFP). This project’s vision entailed first the introduction of ICT in the educational system and then the provision of access, as well as the application of e-learning in all stages and schools in the Kingdom of Bahrain. This initiative was a turning point for Bahrain, and more will be explained about it in the subsequent section dedicated entirely to its description. The important point is that this project was the result of a national strategy aimed at developing a new environment for e-learning, with the view that such action will ultimately produce future generations empowered with the basic skills needed to establish a strong information society and to transfer Bahrain into a knowledge-based economy (Al-Ammary 2011). Along the same lines, the government of Bahrain decided in 2005 to establish and fund a UNESCO prize known as the King Hamad Bin Isa Al-Khalifa Prize for the use of information and communication technologies (ICTs) in education. The main purpose of the prize, as explained on the official UNESCO website, is to reward any excellent ICT initiative (whether model, best practice, or creative use) intended to enhance teaching, learning, and overall educational performance and outcomes. This prize has played a significant role over the years in engaging numbers of high-level educators, researchers, and practitioners in the fields of education and ICT and in encouraging innovation in educational technology and e-learning (Al-Ammary 2011). Like KHSFP, therefore, this prize was from the beginning consonant with Bahrain's Vision 2030 in its emphasis on the development and employment of highly developed skills, encouragement of innovation, and integration of ICT for the development of education, research, and culture and the construction of a knowledge-based society.

The launching of KHSFP in 2003 and the UNESCO King Hamad Prize in 2005 acted as a springboard for the creation of a new type of culture in Bahrain different from the pre-ICT culture that was then dominating the schools and colleges. This should not be taken to mean, however, that there necessarily was with this launching a general or wide acceptance of ICT in education; on the contrary, the expectation was that – similar to any context where change is being introduced – there would be a considerable degree of reluctance toward abandoning old practices, in general, and resistance toward adopting ICT implementation and new pedagogies, in specific. This expectation was reinforced by what the results of several international research studies have discovered with respect to users'– and in particular teachers'– reactions toward the adoption of ICT in teaching and learning (Papaioannou and Charalambous 2011; Totolo 2011; Bingimlas 2009). Nevertheless, the launching of the two initiatives at least helped in preparing the ground for future ICT implementations in education in Bahrain, and this was achieved by (1) basically raising awareness about the importance of using technology and its usefulness in instruction and (2) providing those who were already technology savvy with opportunities to try out new applications and ideas in a more aware and accepting educational culture.

The government of Bahrain did not stop there, and instead in 2007, and on a wider scale, it proposed to UNESCO the establishment of a regional ICT center in the capital Manama, to act as a knowledge hub and a research focal point for the whole Arab region. The end result was the launching in 2008 of the Regional Center for Information and Communication Technology. The main function of the Center was the creation of capacity in knowledge sharing and acquisition among the GCC states and Yemen, mainly through researching, strategically planning for, coordinating, and applying a variety of technology solutions, for the purpose of promoting sustainable development in all sectors (Official Center's webpage on the UNESCO website). In 2007, the government of Bahrain also launched its eGovernment program under the Information and eGov Authority. This program has succeeded in electronically integrating together all government efforts, organizations, and channels through a streamlined communication network. This has ultimately led to the provision of better and faster services to the Kingdom's citizens, residents, visitors, businesses, and government entities. It has also turned Bahrain into a world leader in the field of eGovernment, by receiving various awards and achieving advanced ranks on a number of surveys both regionally and internationally (e.g., ranking 1st in the Gulf, Arab world, and the Middle East, 3rd in Asia, and 13th worldwide on the 2010 United Nations Global eGovernment Survey). To be able to achieve such leading ranks, the Bahraini government had to introduce and implement through its eGovernment program various ICT initiatives, like developing advanced technological infrastructure and capabilities, securing the latest tools and technologies, employing effective technology solutions, launching new communication channels, and creating open data platforms that promote innovation. These initiatives have created countless opportunities for efficient and vigorous work, innovation, and cost-effective supply of public services (Kingdom of Bahrain eGov official website). They, as well as other eGovernment program initiatives, have had a positive impact on all public and private sectors in Bahrain, including the field of education, especially since the eGovernment program entailed steps like supplying eligible people with low-cost PCs and Internet connections as well as partnering with private entities to deliver PCs to students, as a part of fulfilling what is known as their corporate social responsibility (CSR). The eGovernment also teamed up with Microsoft Corporation in providing basic computer training to all needy individuals in the Kingdom, in part to fulfill the government's inclusive education initiative of providing every adult and child with quality education that helps them cope with the information age.

Linked to the eGovernment program is an initiative known as the Open Data Platform. It was launched to make available for public consumption data published by various ministries and government agencies. The data on the open portal includes studies, reports, and statistics related to Bahrain's governmental services and policies, in addition to data related to demographics, environment, trade, and the economy. This Open Data Platform initiative resulted from the government's strategy to promote transparency and encourage e-participation in the country (Bahrain Open Data Portal official website). Free and unrestricted access to this data has constituted a useful database of electronic resources for educational research purposes. Access to resources has also been made simpler in Bahrain through the MoE's online database of public library resources, which allows one to search the public libraries in the Kingdom for both Arabic and English resources, reserve copies, and renew borrowed items. E-libraries in all institutions of higher education in Bahrain have also facilitated information access.

As for simplifying and facilitating communication between educationalists and students, the MoE launched an electronic communication project in 2011 called Live@edu. This project relies on the use of the latest communication services provided by Microsoft, to raise the level of technology use in education and to create a high-quality communicative environment between students and teachers. The communication services made available through this project are mainly email, instant messaging, file sharing, and video calling (Live@edu webpage on the MoE website).

All of these initiatives and others like them have contributed greatly to facilitating and promoting the use of ICT in education in Bahrain. Without them, the journey to where Bahrain is now in terms of technology integration and application of e-learning would have been much longer and rougher. And despite the delay in the adoption of the Internet by the Bahraini government in comparison to other parts of the world, Bahrain has proven through these initiatives that it is more than willing to confront the challenges of changing the educational system and culture from a pre-ICT teacher-centered environment to a more flexible and student-centered learning experience that appreciates and implements e-learning and other ICT-based pedagogies. Bahrain has proven this by taking the essential steps needed for laying the foundation for e-learning to take root and grow, namely: comprehensive strategic planning; a robust technical infrastructure that supports all the technical aspects necessary for the production of course materials, delivery of e-learning courses, and teacher and student support; and quality assurance procedures and regular measurements to assess e-learning effectiveness (Jamlan 2004).

Still, even with these major steps taken by Bahrain, there remain – like elsewhere in the Middle East region – educational practitioners and students who are not totally familiar with the technical advancements and concepts of e-learning (Mirza and Al-Abdulkareem 2011). Similarly, there are those who are still reluctant to try technology-based pedagogies and, for different reasons, primarily challenging conditions existing in schools (Abdul Razzak 2014a). There is still much more to be done, therefore, in Bahrain before ICT-based education and e-learning reach the maturity level that can contribute to the desired economic sustainable development targeted by the government. To fully understand exactly what is needed, however, and what can be recommended, an explanation and analysis of ICT incorporation in schools and higher education are necessary in the next few sections.

King Hamad's Schools of the Future

It is impossible to mention ICT incorporation in Bahraini schools without referring to the government's King Hamad's Schools of the Future Project (KHSFP). This project is strongly linked to Bahrain's 2030 Economic Vision and was first proposed in 2003. It was introduced as a large-scale step toward initiating an educational revolution in the Kingdom through the utilization of a nationwide e-learning platform; since the common conception was that through e-learning, economic development and social elevation can be achieved in the long term, and students can be integrated quicker into the workplace where they will use technology in some form or the other (Slaise 2005). Since the e-learning platform was intended to be used by all (i.e., primarily students, teachers, administrators, and parents), the MoE took on the responsibility to conduct ICDL training of all teachers and school leaders across Bahrain, in preparation for redesigning lessons around technology-enhanced resources and achieving effective use of education technology.

The target of KHSFP was to generalize e-learning in all the public schools of Bahrain ideally by 2008, and its primary purpose was to provide opportunities for interactive student-centered learning through ICT integration in almost every curricular area. KHSFP, therefore, aimed at bringing about a fundamental change in the ways teaching and learning take place in Bahrain, by transforming the traditional classroom into an open and interactive environment that relies significantly on a wide-ranging use of technology (Al-Ammary 2011). The plan was to implement the project in phases. Phase 1 entailed that, in the year 2005, implementation would take place only in eleven secondary schools from the five different provinces of the Kingdom. "Those schools were to be provided with the latest hardware and software; the necessary infrastructure, equipment, and networks; a centralized educational portal to provide e-learning services; textbooks and materials that are transformed into e-learning contents; and training for all staff to learn how to use the e-learning systems" (Abdul Razzak 2013, n.p.). The expectation was that 11,000 students and 1,000 administrative and academic staff members would benefit from the initial phase of this project, with the intent of the project expanding in its later four phases to include all primary, intermediate, and secondary public schools in Bahrain. Yet, as Abdul Razzak (2013) explains, "although the strategy for carrying out the project was clear and direct from the beginning, the objective of expansion to include all public schools was only met in the academic year 2010–2011, as has been mentioned in Bahrain's local papers and news bulletins as well as on the official web-pages of the project" (n.p.). The 2008 target, therefore, was never met. In addition, despite the fact that the news regarding the complete implementation of KHSFP was encouraging at the time, two significant and recent research studies by Abdul Razzak (2013) and (2014a) have indicated that the situation with respect to ICT incorporation and e-learning in Bahraini public schools is bleaker than what was actually portrayed in the news. This is because the findings of these studies revealed an image considerably falling short of the aspired one for results of the project, to the extent that even schools that were originally included among the 11 schools of Phase 1 and which, therefore, were supposedly the most advanced in terms of ICT implementation, seemed to be encountering serious challenges in the process. Among the interesting findings of these two important and rare studies in Bahrain are the following:

- Teachers and school leaders in the public schools of Bahrain seem to have an incomplete understanding and application of the concept and process of technology integration. Their understanding and application are incomplete because they tend to focus mainly on only two of the three essential components of effective integration, which are (1) teachers and students learning how to use ICT and (2) teaching using ICT. The third component, students learning through ICT, remains to be left somewhat ignored. Certainly, this is a serious shortcoming, since this component is a form of active and engaged learning – the highly recommended and stressed on approach in circles of international best practices – and which is one of the central aims of the introduction of ICT integration and e-learning in education.
- Public schools in Bahrain, which happen to be heavily guided and mandated by the MoE, are limited in the authority they have to plan and budget for relevant ICT resources and training. They, therefore, more or less follow a one-size-fits-all plan tailored for them by the MoE, which does not always turn out to be best for them.

- Not many public schools are well equipped in terms of technology resources, neither in terms of availability nor in terms of currency and age. In more precise terms, in most schools, technology resources are available only in a limited number of classrooms instead of being available in all classrooms. In addition, there happen to be only a small number of computer labs in each school in which ICT-integrated lessons could be held.
- Many schools experience frequent technical problems with their computer networks, and there is an insufficiency of technical support specialists available to fix them.
- There is an absence of high-quality teaching software in Arabic. Most of what is available is in English, which constitutes a challenge to most teachers in Bahrain.
- There remain in the Bahraini public school system traditional teachers who are resistant to work with technology.
- Several conditions in Bahraini public schools exist that act as barriers for trying out ICT integration – or any other attempt that would count as an educational best practice for that matter – such as high student-to-teacher ratios (40 students per teacher in some cases) and lack of time to plan for ICT, lack of proper technological and pedagogical training, and multiplicity of tasks and responsibilities assigned to most teachers because of the introduction of several new reform projects into the schools at one time.

The findings above certainly make the successful implementation of an ambitious project such as KHSFP more difficult. Still, however, this does not mean that progress has not been made since Phase 1 of implementation. The least that can be said is that currently in Bahraini schools, there is more of an accepting – and in some cases an even welcoming – attitude of ICT incorporation into teaching and learning. This is because with reform projects such as KHSFP, “Bahraini teachers have come to realize that change is inevitable and that there is no point in resisting it anymore; since, moving against the current is not going to get them anywhere. On the contrary, it will just leave them behind, which is not something anyone would desire or aspire for” (Abdul Razzak 2014a, p. 70). In addition, there are many success stories of ICT integration to be found in the schools of Bahrain; the problem is that there isn’t enough research being done to document them. One documented success story is found in a study by Abdulrasool and Mishra (2009). That study focused on using computer technology tools to improve the teaching-learning process in technical and vocational education in Bahrain and in particular at Sheikh Khalifa Bin Salman Institute of Technology. The study’s results revealed that mechanical engineering students who were exposed to simulations had a higher level of understanding of content and performed much better than those exposed to traditional teaching, which proved that teaching with the help of ICT enhances students’ learning. Success stories such as this are not unusual in Bahrain. What are rare, however, are stories of ICT implementations that promote what Wiseman and Anderson (2012) call the “knowledge production capacity” of students – meaning, implementations that result in students’ development of three main skills: knowledge acquisition, creation, and implementation, which are needed for the development of (1) subject-area expertise and also of (2) the ability to transfer what is learnt in school to support research development and innovation in real-world situations beyond the classroom (pp. 611 & 616). It is precisely such skills that reform projects like KHSFP in Bahrain were created to develop and enhance, since these are the type of skills that can contribute to the sustainable development of innovation at the national level and, consequently, help with the realization of Vision 2030.

E-Learning in Higher Education in Bahrain

One can find in different parts of the Middle East region three main models of e-learning institutions of higher education, as explained by Mirza and Abdulkareem (2011). The three include a virtual e-learning model, a hybrid model, and a traditional university e-learning model (p. 88). The first refers to a setting where everything from registration to teaching and learning, discussions, correspondence, and assessment is done totally online in a virtual world; there are usually no physical buildings or campus to go to. The second "…involves the creation of actual physical buildings that students can visit for purposes of registration, taking exams, and meeting with faculty members once every two weeks. The greater responsibility falls upon the student for using the course management system for obtaining course material, contacting the course instructor, and submitting assignments" (Mirza and Al-Abdulkareem 2011, p. 89). The third model, on the other hand, consists of traditional courses being offered and attended in the institution with some learning management system (LMS) (e.g., Moodle, Blackboard, WebCT, etc.) being utilized to support the learning process. There are currently no virtual e-learning institutions in Bahrain, but there is one hybrid institution, which is the Arab Open University (AOU). All the other colleges and universities basically follow a traditional e-learning model in which online and traditional learning run parallel to each other (Al-Musawi 2014).

With respect to the LMS being used in Bahraini Universities, we find different types, with Blackboard having the greatest number of academic staff users. In some cases even, more than one LMS is adopted by the same institution, as is obvious from a recent study by Al-Ammary et al. (2016) on e-learning maturity level of the universities of Bahrain. "Adopting more than one system for e-learning indicates that universities are placing high priorities for e-learning and try to encourage both students and instructors to use e-learning by offering them different systems to satisfy their experience and knowledge" (Al-Ammary et al., p. 54).

Regardless of the model adopted or the LMS used, the fact remains that e-learning has spread extensively in educational institutions in Bahrain (Jabli and Qahmash 2013), and in some cases, as a study by Mohammed (2010) on four universities has shown, it has been having a vital impact on "enhancing students' learning and skills, increasing the level of communication between peers and instructors, and imposing a positive attitude toward the learning process" (Al-Ammary et al. 2016, p. 48). Still, however, and despite the fact that 70% of users from different universities in

Bahrain seem to be satisfied with their e-learning systems, these universities seem to have reached only an average level of achievement and performance in e-learning processes (Al-Ammary et al. 2016). This is because, as suggested by the results of Al-Ammary et al. (2016), e-learning is being used in most universities mainly for uploading and downloading resources and assignments, which are considered as the basic services provided by most e-learning platforms. Other uses, such as communication with instructors or students, are employed much less, partly because users prefer other channels of communication, mainly mobile applications and social media (e.g., WhatsApp, Instagram, Facebook, etc.). Online assessment is also not common, on the grounds that it is insecure and monitoring students' performance online is difficult. Students in most universities are therefore still being assessed in the classrooms by traditional techniques. Some faculty members, in addition, are not yet comfortable with designing basic online activities, and so it is farfetched that they would be utilizing online teaching methods that capitalize on higher-order thinking skills of students, such as critical and creative thinking, problem-solving, and innovation (Abdul Razzak 2014b). It seems therefore that the situation in most of the Kingdom's universities is quite similar to what Al-Sulaimani (2010) discovered with respect to education systems in the GCC; basically that even though they have increased access to ICT tools and resources, they often still mirror pre-ICT educational cultures and settings. For this reason, they still do not possess the ability to build knowledge production capacity and to create opportunities for innovation; since, as Luckin (2008) as cited by Wiseman and Anderson (2012, p. 610) maintains, "… building knowledge production capacity requires active, student-focused, inquiry-based education to be available via ICT." This, therefore, remains to be an area for improvement in the universities of Bahrain; although, their institutional strategies, goals, and policies, in general, do in fact emphasize the utilization of instructional methods that can develop and promote skills needed for knowledge acquisition, creation, and implementation, which eventually contribute to sustainable development of innovation at the national level. The main problem seems to be therefore that when it comes to e-learning, there happens to be a lack of alignment between it and the overall institutional strategies and objectives of most universities, as was discovered by Al-Ammary et al. (2016).

To understand better the status of e-learning in higher education in Bahrain, three cases will be briefly described below, namely, those of UoB, AGU, and AOU. The first two institutions were selected specifically for being the leading universities in the Kingdom; whereas AOU was selected for its uniqueness in the education access it provides. The only reason why other institutions were not touched upon has to do with space limitation.

The Case of the University of Bahrain (UOB)

The Internet was first introduced at the UoB in the early 1990s, but e-learning did not materialize as an actual educational alternative for those interested in teaching online until the mid- to late 1990s (Jamlan 2004). Up until 2004, however, there was no systematic use of e-learning throughout the university that led students to a certificate or degree, and "there was no comprehensive system or compelling strategy in place to guide the expansion of e-learning activities in a holistic, comprehensive manner" (Jamlan 2004, n.p.). For this reason, and because of the university's increasing interest in e-learning, Zain E-Learning Center was established at the University, in order to take on the responsibility of guiding e-learning deployment across all its colleges.

The Center provides a variety of academic, technical, training, and consultation services to faculty and students. It also organizes international e-learning conferences on a regular basis, to raise awareness about the latest educational technology developments and practices worldwide and to encourage ICT integration among the UoB academic community. The Center also provides this community continuous and easy access to two main e-learning systems: Moodle and Blackboard. These systems are currently being used by most instructors and students at UoB in parallel with classroom instruction. The main drivers for utilizing these systems and for adopting e-learning at UoB seem to be location and time independence of learning and ubiquity of end-user computing (Al-Ammary et al. 2016).

As for the e-learning challenges faced at UoB, the most reported by instructors are network access problems; system error and bugs; rapid change in technology; inconsistency of platforms, tools, and software; lack of confidence to use technology in teaching and learning; and insufficient knowledge of electronic course design (Al-Ammary et al. 2016). These challenges are significant because they seem to contribute to a high dissatisfaction rate with e-learning on the part of the instructors at UoB (50% dissatisfied users) (Al-Ammary et al. 2016). What such a high dissatisfaction rate indicates is that greater effort is needed on the part of Zain E-Learning Center, in particular, and the UoB policymakers, in general, with respect to e-learning, especially since till now there remains to be no systematic use of e-learning throughout the university that leads students to a certificate or degree. There also happens to be a lack of alignment between e-learning and the overall institutional strategies and objectives of the university, as was discovered by Al-Ammary et al. (2016). Greater alignment, therefore, and more effective e-learning initiatives and performance are needed at UoB, in order for the university to exceed ad hoc implementations and advance to well-defined processes and practices that efficiently support, develop, and sustain e-learning across all its colleges.

The Case of the Arabian Gulf University (AGU)

AGU possesses an Information Technology Unit which was established in 2001 and which has as its main responsibility the provision of support to the university's educational processes, research, and management. The unit is highly correlated with various university activities and works hard on keeping up to date with the latest advances in information technology. With respect to e-learning, this unit provides support for the LMSs adopted at the university, which are WebCT, Blackboard, and Moodle (AGU official website). Based on the study by Al-Ammary et al. (2016), around only 21% of faculty use these learning platforms, and the main drivers behind using them seem to be similar to those of UoB, with improved interactivity and collaboration and higher retention of content also scoring high in the case of AGU. The challenges encountered while using these systems at AGU are also similar to those of UOB, where most of them are technical in nature.

According to Dr. Rima Abdul Razzak, Associate Professor of Physiology and e-learning leader and trainer at AGU, these three LMSs are used by most of the faculties at the university with the exception of the College of Medicine and Medical Sciences (CMMS), which adopts a different and more advanced system called UNIO (Abdul Razzak, personal communication, October 1 2016a). Abdul Razzak explains that UNIO is a cloud-based electronic learning operating system for Blended Learning developed by the award-winning company Harness Handitouch UK Private Limited (London, UK). It is device and browser agnostic and was originally adopted by CMMS in 2014, in order to fulfill the university's accreditation requirements for embracing e-learning. The main objective behind implementing UNIO is to change the currency of teaching and learning inside a classroom and off campus. This is done by securely storing in the cloud all course materials, electronic assignments, live and offline quizzes, and group work and making them accessible to students and tutors from anywhere and at any time through the use of multiple electronic devices (e.g., iPads or other tablets). There is no need at all therefore for the use of hard copies of materials since everything gets published online. This capability of publishing everything online has made possible at CMMS the replacement of unclear paper copies of X-rays and images of pathological or microbiological slides/stains and which were being earlier circulated in classes, with online, continuously available, bigger, and higher-quality images that all students appreciate.

UNIO is also used for recording or conducting difficult-to-teach sessions such as "live surgery" and broadcasting them live in classrooms onto the screens of students, who do not have access to the operation theaters. During the classroom broadcasts, tutors can annotate on top of the broadcasted content, and students can also jot down their individual notes. All of the content, annotations, and notes get stored for the student infinitely. This continuous, easy, and clear access to course content and lecturer's annotations has allowed for increased student interaction and engagement.

Since its adoption, UNIO has been well integrated with the nontraditional and highly interactive problem-based learning (PBL) method used by CMMS for teaching medicine. During the PBL tutorials, UNIO is used in the first session for introducing the problem, from which small groups of students identify their learning needs, and then in the second session, it is used by students for embedding and explaining their presentations. After this, UNIO is used for working out/solving the problems (e.g., renal clearance, respiration equations, etc.) with all students within a medical year cohort in a big lecture hall. The solution is broadcasted live on a large screen as the teacher annotates (solves the exercises), so that the students can have a clear and live display of it, which is easily visible by all of them regardless of where they are seated in the hall.

UNIO has, therefore, managed to eradicate at CMMS a lot of the inconveniences that existed before its adoption, such as student distraction and lack of engagement; accumulation of printed handouts and hard copies of course materials; lack of access to course content in cases when students lost their printouts; unclear images, X-rays, and copies of supplementary materials; and lack of a productive use of electronic devices such as iPads inside the classrooms where they were mainly being used for entertainment purposes. Despite the eradication of such inconveniences and despite the great potential of UNIO as an advanced learning platform, it continues to be used by only a small number of instructors at CMMS, with many other faculty members still refusing to abandon their traditional practices and replace them with UNIO, even with several attempts at providing them with the needed training.

The Case of the Arab Open University (AOU)

The AOU, as mentioned before, is unique in the type of educational access it provides; for, although all higher education institutions in Bahrain have e-learning units or centers as well as e-services, training, and software which support e-learning in several of their offered courses, none of them except for AOU has a dedicated e-learning system that leads to a degree.

AOU adopts a hybrid e-learning model, through which it makes higher education available for anyone with potential and interest, regardless of their age, location, or background. For this reason, those who enroll in AOU are mainly adult learners and employees, who usually find it difficult to attend a traditional and physical university because of their life or work conditions. Women, in particular, are attracted to the e-learning model provided by AOU (where there is only a 25% physical attendance requirement), since many of them are either married or working or both (Essam and Al-Ammary 2013). They find the AOU learning system "…a good opportunity to save their time, providing them with the required learning resources, and allowing them to attend online sessions. Thus, they can have enough space to finish their desired degree while taking care of their homes, children, and work duties" (Essam and Al-Ammary 2013, p. 26).

AOU uses mainly Moodle as its e-learning platform (Arab Open University – Bahrain official website), and the main drivers behind students using e-learning at AOU seem to be motivation and student-student interaction (Essam and Al-Ammary 2013). As for e-learning challenges, the main one is the need for instructors to keep up with the latest technologies and techniques of electronic course design (Al-Ammary et al. 2016). Despite this challenge, AOU seems to have the highest e-learning capability maturity level among all universities in the Kingdom, as evidence from the study of Al-Ammary et al. (2016) has indicated. The results of this study have shown that the AOU capability at the lower dimensions of planning and delivery of learning well support its capability at the higher dimensions of evaluation and optimization. AOU, in addition, has managed to reach a level at which it is continually improving and developing in all aspects of the e-learning process.

E-Learning and National Innovation

As explained earlier, the purpose behind introducing e-learning not only in Bahrain but in the whole GCC region is to impact employment and labor markets in ways that would lead to national sustainable development and innovation. Unfortunately, the current status and conditions of ICT integration and e-learning in the public schools and universities of Bahrain suggest that there currently is no evidence of ICT being used for building knowledge production capacity that would support national sustainable development. Indications of this, as has been discussed in the earlier sections, are reflected in several conditions existing in most educational institutions at all levels, such as:

- Scarcity of research
- Lack of sufficient teacher training and support in ICT-based pedagogies
- Reliance on traditional teacher-centered practices which lead to e-learning environments that mirror pre-ICT educational cultures
- Heavy usage of e-learning systems to upload and download course materials and rare usage of e-learning platforms that use questions, case problems, simulations, and interactive activities that can, as Broadbent (2002) explains, improve the quality of student learning
- Limited investment in e-learning to address and develop students' higher-order thinking skills (such as critical and creative thinking, analysis and synthesis, evaluation, and innovation), which ultimately impacts negatively the accuracy, quantity, and quality of the knowledge they acquire, create, and implement
- Poor transfer of knowledge to new situations outside of the classroom.

It is safe to argue, then, that even though Bahrain with its many and ambitious e-learning initiatives has set the foundation for innovation development, it has not yet reached the point of fostering and transferring innovation from K-12 education to higher education and eventually to the labor market, in order to support research development and innovation (RDI) systems and national innovation systems. This confirms what has been discovered by research, that basically "…technology tools do not alone create innovation; it is the ways technology is integrated into learning that creates the opportunity for both tacit and explicit innovation" (Wiseman and Anderson 2012, p. 611).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

As explained earlier, apart from AOU, there is no systematic use of e-learning in Bahrain throughout any university that leads students to a certificate or degree. In addition, the AOU Bahrain branch still does not offer any e-learning education program; however, other AOU branches (e.g., Oman and Jordan) do offer a Master's of Education degree in Educational Technology.

Bahrain Teachers' College (BTC) – the official and only teacher training institution in Bahrain – similarly does not offer any e-learning or educational technology degree. The only teacher training programs provided by it are Bachelors of Education (B.Ed.) in English, B.Ed. in Arabic and Islamic Studies, and B.Ed. in Mathematics and Sciences. It also offers a number of postgraduate diplomas in education (PGDE) but none in e-learning or educational technology.

AGU is the only institution in Bahrain that offers a Diploma and a Master's program in Distance Teaching and Training. What this indicates therefore is that e-learning education programs that train and graduate professional e-learning instructors are extremely scarce in Bahrain. This has adverse consequences on students' knowledge production and innovation since, as Wiseman and Anderson (2012) suggest, the more teachers are trained and supported in ICT-based pedagogies, the more they are capable of linking "their own education and expertise in knowledge development to the learning experiences and knowledge outcomes of their students" (p. 617).

Future Development

The Kingdom of Bahrain as a country has institutional capacity in ICT. Due to a multiplicity of factors in the educational system, however, this capacity is not being used for knowledge development. Even though this is a serious situation which has negative repercussions on labor market gains as well as on RDI systems and national innovation systems, it can still be improved. Its improvement, however, calls for several measures from policymakers, such as mandating that all universities and colleges granting education degrees offer new e-learning and educational technology programs as well as suggesting to them to consider providing e-learning opportunities that systematically lead students to a certificate or degree of some sort.

Another necessary measure is requiring universities to have in their strategic plans clear and specific research agendas, which (1) identify themes to be focused on by researchers, among them ICT and e-learning themes; (2) include strategic objectives related to provision of research training and funding, dissemination of research findings, and informed decision-making and interventions based on research outcomes; and (3) encourage the implementation of action research that is related to e-learning implementations at the classroom level, in order that university faculty make a difference in their daily practices of teaching. Similarly, policymakers should develop strategies for introducing and promoting action research in K-12 education and for supplying teachers, head teachers, and school leaders with proper research training and greater autonomy, without which the implementation of action research is almost impossible.

There is also a need for policymakers to develop for all educational institutions in Bahrain technology plans that incorporate ICT-related professional development opportunities that include both ICT literacy and ICT pedagogy training. This training should concentrate mainly on the design of electronic activities that engage students and develop their higher-order thinking skills and knowledge acquisition, creation, and implementation capacity. These plans should also focus on sufficiently equipping institutions with the latest technology tools and resources and with supplying them with the necessary technical support. The MoE, in particular, "needs to find a mechanism through which to "Arabicize" existing high-quality teaching software or, even better, to start providing Bahraini technology-savvy youths with the necessary programming and pedagogical training, through which they can develop teaching software that measures up in quality, if not competes with, what is already existing in the market" (Abdul Razzak 2013, p. 315). It also needs to plan for ways that improve some of the conditions existing in schools and which have been acting as barriers to effective implementation of best practices, in general, and successful e-learning and ICT integration, in particular.

Successfully implementing such measures and others like them can in the long run improve the quality of the whole education system in Bahrain. This will generate better education outcomes in terms of more prepared and qualified graduates who enter the labor force. The resulting impact of this will ultimately be, therefore, a positive one on RDI systems and national innovation systems, which will consequently help pave the way toward the creation of the information society targeted by Bahrain's 2030 Economic Vision. All of these goals can certainly become more possible when such educational measures are supplemented with actions outside the education arena, like future economic investments and developments, which Bahrain has in fact already started planning for. As an example, Bahrain has started targeting, through the fourth National Telecommunications Plan (NTP), improved connectivity and data transfer speeds across the Kingdom, through expanding its fiber-optic network to offer full coverage nationwide within the coming 3 years (Oxford Business Group 2016). The NTP also includes the plan to deploy 5G technology and services by 2018 at the latest. With such a strong IT infrastructure, improved connectivity, and speedy data transfer, businesses in Bahrain become more prepared to scale up quickly and expand, leading thus to an enhancement of the whole economy.

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Chapter 3
Djibouti

Adem Salhi and Hamlaoui Sihem

Abstract This chapter surveys the development and current state of e-learning in the Republic of Djibouti. The authors survey the general social, economic, historical, and demographic background of Djibouti and provide a review of its educational system. Analysis and statistics on the information and communication technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the authors speculate on the future development of e-learning in Djibouti. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Djibouti · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Introduction

Djibouti is strategically located on the Horn of Africa. Many neighboring countries only have access to the sea or Internet cables by transiting through Djibouti. Djibouti wants to exploit this strategic location and the concentration of the population in the capital in order to become a telecommunication hub in East Africa. This can be realized only on the condition that the country develops an ICT policy for education to train pupils and students in schools and at universities so they can acquire the necessary know-how to run the required infrastructure and platforms.

This chapter discusses the situation of ICT and e-learning in Djibouti in general and especially in education. Firstly, the general situation of the infrastructure and the various state actors in the area of ICT will be presented; then the efforts and projects in the field of education will be listed. It is important to mention that information about Djibouti is scarce and opening up lines of communication with ministries or universities is difficult, which makes obtaining new and up-to-date data very problematic.

Country Profile

Independent since June 27, 1977, the Republic of Djibouti is located to the south of the Red Sea and the Gulf of Aden. It is bounded to the northwest by Eritrea, to the west and south by Ethiopia, and to the southeast by Somalia (see map above). Its position on the Horn of Africa, at the outlet of the Red Sea and the Gulf of Aden (between Suez and the Far East), makes it an important crossroads for communication between Europe, Africa, and Asia. Communication networks are a significant source of income for the country. Since 2005, the country has been divided into six regions subdivided into administrative districts.

The country has a volcanic terrain with enormous faults, in the midst of which collapsed plains and basaltic chains are found. The region is a semidesert, and the climate is arid. Temperatures are very high, with the exception of the mountainous and coastal regions. The year is distinguished by two seasons: a relatively cool season from October to April and a warm season from May to September. Precipitation is low (annual average rainfall less than 180 mm) and irregular. However, areas of high altitude have higher rainfall, with annual rainfall averaging 3000 mm.

The population of Djibouti is estimated to be between 800,000 and 900,000 inhabitants (CIA 2017). The capital, Djibouti City, and its suburbs are home to about 65% of Djibouti's population. The inhabitants of the chief towns and secondary agglomerations of the region make up about 20% of the population. The rural population is estimated at 15% of the total. French and Arabic are the two official languages due to Djibouti's former status as the French colony of Somaliland. Afar and Issa are also spoken by Somali ethnic groups.

Education System in Djibouti

The education system in Djibouti is essentially based on a school and university framework consisting of five levels of education: preschool education, basic education, secondary education, technical and vocational education and training, and higher education and research. Enrollment is compulsory for young people aged 6–16 years. Education can include 2 years of preschool, 9 years of basic education (6 years primary and 3 years middle school), 3 years of secondary education, 2–3 years of technical and vocational education and training (TVET), and 4–5 years of higher education and research.

Preschool education is optional and has not evolved much structurally; it remains a private institution concentrated in Djibouti City. Notwithstanding the embryonic nature of the sector and the concentration of supply on current demands, there is a steady increase in the preschool workforce. Between 1989 and 2008, enrollment in preschool education increased at an average annual rate of growth of 6.6% for the period considered, but the enrollment still did not exceed 4.7% in 2015 (World Bank 2017). Basic education is divided in two cycles, primary and middle education.

Primary education welcomes children ages 6–10 years, and the curriculum lasts 5 years. The end of the cycle is marked by a pedagogical evaluation at the end of the primary cycle (Objective Terminals of Integration, OTI), which is more a qualitative grading and an assessment of knowledge than a modality of selection for further programs. As a first priority in education policy, the network of schools has been significantly expanded, and measures to renovate dilapidated schools and their sanitary facilities, canteens, and electricity have greatly facilitated accessibility and retention of students in both urban and rural areas.

The effort has doubled the number of children enrolled in primary school from 31.1% in 2000 to 66.3% in 2015 (World Bank 2017). Access to the middle cycle has also grown remarkably between 1999 and 2010. Enrollment rose from 12,732 in 1999–2000 to 35,010 in 2009–2010. This growth is the result of the combined effects expanding the network of medium-sized educational institutions and reorganizing the architecture of the system. Over the same period, the number of secondary school pupils increased from 4000 to 12,404. A total of 1080 of these pupils attended public secondary schools. The construction of two new high schools in the capital and a few multipurpose high schools in regional hubs has allowed for an increase in the transition rate between middle and secondary school. The enrollment in secondary school increased from 14.1% in 2000 to 47.1% in 2015 (World Bank 2017). The government is also trying to develop technical and professional training for the demands of the labor market. A reform of this sector was a part of the education plan for 2000–2010. However, since the reform process only started in 2008 due to lack of additional resources, the subsector is still underdeveloped. It enrolled only 1860 students in 2009–2010 (Republic of Djibouti 2010, 2013).

Following the recommendations of the Estates General of Education in 1999, the Government of Djibouti created a center of higher education during the 2000–2001 academic year in close partnership with French universities. This cluster evolved into a fully functioning university by Decree No. 2006–0009/PR/MENESUP of 7 January 2006 (Republic of France 2014). As a full-fledged university, the University of Djibouti (UD) consists of four teaching units: a Faculty of Law, Economics, and Management; a Faculty of Letters, Languages, and Human Sciences; an Institute of Technology; and a Research Unit.

In 2011, a Ministry of Higher Education and Research was established. The Ministry manages the academic institutions of the country: the University of Djibouti, the Center for Studies and Research Djibouti (CERD), the Faculty of Medicine, and the Higher Institute of Health Sciences (ISSS). Access to higher education is conditional upon obtaining the Baccalauréat. It should be noted that the Baccalauréat issued in Djibouti was organized by the Académie de Bordeaux until 2013. It is now nationally issued.

In 2000–2001, the total number of Djibouti students in higher education was 1315, and 838 among them attended French universities. In 2006, when the UD was founded, it enrolled 2260 students, including 912 female students. Along with the Faculty of Medicine, created in partnership with the University of Tunis, the University of Djibouti remains the only place available in the country for obtaining a bachelor degree. At the start of the 2013–2014 academic year, the University of Djibouti had more than 7000 students (Republic of France 2014).

ICT in Djibouti

The Government of the Republic of Djibouti recognizes the importance of ICT as the engine of economic and social development in the country. A document entitled "National ICT Strategy for Development in the Republic of Djibouti" was prepared in 2003. It still serves as a frame of reference for the country's sectoral policy (Republic of Djibouti 2003).

The restructuring of the ICT sector is the subject of Act No. 80/AN/04/5 Reforming the Information and Communication Technologies Sector, which was issued on October 24, 2004 (Presidency of the Republic of Djibouti 2004). This Act establishes a regulatory authority called ADRT (Agence Djiboutienne de Régulation des TIC), the Djibouti ICT Regulatory Agency, and assigns to this body the tasks and powers to regulate the ICT sector. It establishes the principles of opening up the market to competition in the context of technological developments and the convergence of services. It defines the principles of regulation and the modalities to be implemented with the licensing and authorization regimes and with the interconnection procedures.

According to this strategy, the deployment of ICT will help the product markets, and especially the Djiboutian services, develop and become more efficient and open. The spread of the Internet will make Djibouti more attractive to foreign investors and, at the same time, will offer Djibouti's economic operators more opportunities. Other development actors like civil servants, farmers, herders and fishermen, teachers and students, NGOs, various associations and grassroots groups, researchers, and the general public will all have more opportunities to display their skills and exploit the resources and opportunities available not only in the Republic of Djibouti but also globally via the Internet.

The objectives of ADRT are based on what is most essential to the economic, social, and cultural development of the country. These objectives can be summarized as the following:

- Promote universal access to ICT services according to the needs of different categories of users, including disadvantaged neighborhoods and rural communes.
- Strengthen the competitiveness of Djibouti companies by improving their productivity, particularly in the services sector, whose share of GDP is increasing.
- Improve the efficiency of administrations by modernizing their operations using Internet services, local and intranet networks, and collaborative tools.
- Promote and enhance the activities of the ministries on their websites.
- Facilitate the establishment of administrative formalities on the Internet sites of the ministries concerned to assist users unfamiliar with the Internet in community telecentres.
- Strengthen the education system through distance learning and computer-based learning.
- Strengthen the health system by disseminating telemedicine applications.

- Assist civil society and international organizations in their efforts to combat poverty and improve the living conditions of the population.
- Develop content in local languages and sites that value the country's culture (Carrier 2008, p. 24).

Mobile and Fixed Line Telephone

The number of fixed lines is still very weak in Djibouti with a 2.4% teledensity and 22,902 subscribers in 2015 (Ministry of Communication and Culture responsible for Posts and Telecommunications 2017). The number of fixed lines has decreased because mobile telephony is replacing fixed. The percentage of fixed telephone lines installed covers 93.7% of Djibouti City and its suburbs, but fixed line connections remain relatively expensive (relative to the average Djiboutian salary), and infrastructure is still concentrated in Djibouti City (95% of the urban environs are connected to the network), while remote regions still deal with low levels of connectivity. The number of fixed lines in the districts outside Djibouti City increased significantly in early 2007 following the reduction of the connection tariff for these districts. Nevertheless, outer district accessibility is still weak.

Djibouti Telecom (DT) got the license for the GSM network in July 2001 and developed a commercial plan with the help of Alcatel-Lucent, under the name Evatis, in October 2001. The network had the capacity to manage 25,000 users and was then expanded to cover more than 40,000 users. Concurrently, the number of mobile networks increased enormously compared to the fixed networks leading to saturation. An attempt to resolve saturation issues was to extend the network with the help from Huawei, but this extension had many technical problems and led to a reduction in quality (e.g., removal of voice mail services) (Bezzina 2009, p. 2).

New systems installed to operate mobile networks still do not provide an adequate volume of outgoing and incoming mobile traffic. The lack of technical and financial data on mobiles is due to the weaknesses in operating systems and management systems. In 2015, DT had more than 314,350 subscribers in mobile service with a total penetration of 33.46% of the total population (Ministry of Communication and Culture responsible for Posts and Telecommunications 2017).

Internet

The deployment of ADSL technology currently only covers the city of Djibouti and its interior districts: Ali Sabieh, Tadjourah, Obock, Dikhil, and Arta. Cybercafés are currently enjoying phenomenal success. They are full at peak hours and open late into the night. For a middle-income country, the level of Internet development in Djibouti is very poor, worse than the average development in some low-income countries south of the Sahara. During presentation of the National Action Plan for the Exploitation of Information and Communication in an International Telecommunication Union's round table in Beirut (Beirut, 29 May 2003), the Minister of Telecommunications and Postal Services clearly stated that there is a long way to go before mass dissemination of technology becomes fully realized in Djibouti (Labelle 2003).

The main obstacles to the spread of the Internet in Djibouti are the high subscription rates and the price of computers. Although personal computers have become much more affordable and the subscription fees are down, subscription to home Internet remains out of reach even for senior Djibouti managers (heads of institutes and heads of departments). These executives simply use the Internet in the office, even for personal use in a limited way. This situation explains the very poor Internet penetration of 2.57% of the total population in 2015 (Ministry of Communication and Culture responsible for Posts and Telecommunications 2017).

There are lots of international gateway connections in East Africa with Djibouti. These have provided data for countries like Ethiopia and Somalia, which lack good data connectivity. Djibouti's submarine cable connections include the East African Submarine Cable System (EASSY) data cable, which currently has an operating capacity of 3.84 Tbps and was assembled in 2009. There is another cable connecting India to the Middle East, North Africa, Western Europe, and the UK. It has an operating capacity of 1.28 Tbps and has been in use since 2010. Out of all countries in East Africa, Djibouti is the only one with unlimited access to this submarine cable. Unfortunately, for the past 10 years, due to high tariffs and unnecessary delays in the introduction of new innovations, both the country and the telecommunication company have not benefited from the cable.

ICT and Education in Djibouti

Although there is no specific ICT strategy for education in Djibouti, the government is trying to improve the ICT situation in schools and universities. Through foreign aid from the West or the African Bank for Development, projects have been implemented to reduce the telecommunication gap and provide pupils and students with the necessary ICT know-how they need to enter the labor market. Some of these projects are presented below.

Education Major Plan 2010–2019

The main goal of the Education Major Plan is the development of access to information and communication technologies (Ministry of Education and High Education of the Republic Djibouti 2010, p. 28). Its objectives are (1) to define and implement a framework for the integration of ICT into school practices, (2) to train teachers in the use of technologies information and communication, and (3) to develop access to ICT as knowledge to be acquired and as learning materials.

To meet this challenge, the department's 10-year strategy includes familiarizing teachers with the use of digital technologies. The Educational Resource Centers located in the regions and the Hub, installed at the regional CFPEN (Le Centre de formation des personnels de l'éducation nationale), will be used ad hoc to set up a plan for developing the use of ICT in schools. The plan's aims are to (1) increase availability in computer facilities and transform the interactive digital databases developed by CFPEN into pedagogical Web spaces for teachers and students, (2) familiarize pupils with the basics of digital tools in primary and in the secondary school, and (3) gradually develop the use of ICT as a source for learning materials.

E-Campus of the University of Djibouti

The E-Campus is a platform that the University of Djibouti and the American company Oracle launched in June 2014. Oracle installed the servers and the storage systems (Oracle Sun X3–2), as well as the software (PeopleSoft Campus, Oracle Database, Oracle WebLogic, and Oracle WebCenter). This platform will give the country's students and the students in countries on the Horn of Africa access to high quality academic education without the need to travel abroad.

The E-Campus constituted a comprehensive university system delivering teaching, research, and administrative management in line with modern international practices. The university would not have had the capacity to implement quality education for all students in the country without an e-learning system. Bachelor degrees and training for the students of Horn of Africa countries will be offered using this system in the future.

Djibouti Assistance to Education Project (AIDE) USAID

The educational project known as the Djibouti Assistance to Education Project (Project AIDE – Assistance Internationale pour le Développement de l'Éducation in French) is aimed at improving education in Djibouti. The project was operational from June 2003 to February 2007. It had three main objectives aimed at improving the quality of teaching and learning, providing more opportunities for girls' education, and emphasizing the need for basic education:

- The first objective was to increase the capacity of the Ministry of Education to achieve the government goals.
- The second objective was to involve the host communities in the management of schools in their area.
- The third objective was to upgrade and improve school infrastructure in chosen communities (Project AIDE-Djibouti 2007).

These three objectives were thoroughly addressed. The government chose communities for development based on whether they conducted themselves in the right manner and whether they helped maintain and manage school facilities.

The Ministry of Education, in conjunction with the central government, closely supervised these communities to make sure that reforms were carried out.

One major area of focus was to encourage education for girls. In view of this, teachers were trained in the area of girls' participation and involvement in class. Also, there was a visible increase in the number of girls admitted to schools. Special recognition was given to high achievers, and they acted as role models for other girls. Furthermore, special centers were formed for girls' education, and curriculum was improved and upgraded. Over the years, due to poor hygiene in schools, Djiboutian families have decided against sending their daughters to school, and the urgent need to upgrade school infrastructure has never been more vital (Project AIDE-Djibouti 2007).

AVU/AfDB Teacher Training

The AVU/African Development Bank (AfDB)/NEPAD project, founded in 2006, is a teacher education program established for the East and Southern Africa Region, and Djibouti is a part of this region. Countries were chosen based on the following criteria:

1. Their commitment to AVU's network expansion and consolidation plan, as described in its principal plan from 2003 to 2009
2. The presence of ICT infrastructure in the country, based on ICT profiles relating to the Project Implementation Document
3. The potential a country offers for being conducive to AVU
4. The estimated gains and values of the bank in the chosen countries (Dzvimbo et al. 2006).

Nine countries (Djibouti, Ethiopia, Kenya, Madagascar, Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe) were chosen based on these criteria. Depending on security conditions and peace, Somalia might be considered the tenth country. Beneficiaries of this scheme were:

1. Public tertiary institutions that were granted functional and modern AVU learning centers with Internet facilities
2. Basic and secondary school teachers who received training
3. Qualified students, male and female, who were unable to pursue their tertiary education without the scholarships they were awarded
4. Various teacher training institutes that were upgraded to enhance learning.

The AVU plan enabled regional integration of the countries selected, thereby making possible the massive upgrade to the educational systems. The technological advancement AVU provided will continue to bring various institutions together through ICT-assisted education and training. The program is anchored on the usage of ICT in curriculum, focusing especially on mathematics and science. It is proven that ICT can be used as a flexible and dynamic approach to learning. Open, distance, and e-learning methods implemented at the tertiary and postgraduate level at an affordable price can allow future generations of youth wider access to high-quality teaching and learning (Dzvimbo et al. 2006).

Radio Programs

These programs are aimed at increasing access to quality education. Organized by the National Education Production Information and Research Centre (in French the Centre de recherche d'information et de production de l'éducation nationale), these programs have helped to broadcast quality educational content through Djibouti Radio once per week. Mainly aired in French, and covering core secondary school subjects like mathematics and science, these programs have given drop outs a second chance (Hare 2007, p. 6).

E-Learning Center Balbala

The digital library project called "E-Learning Center Balbala" opened in October 2014 and is located in the heart of the Wahlé Daba district. It is administered by a neighborhood management committee. It was initiated with funding from the German Shipowners' Association (VDR) through "SOS Children's Village International" and responded to a plea made by the Ministry for the Advancement of Women in Djibouti.

The library, which is multifunctional, is a place of learning and collaboration. It includes three classrooms and a digital library. It targets 10- to 21-year-olds in school and out of school and offers timely services such as information and communication technology (ICT) education, connection to the Internet, the use of search engines, etc. The center seeks to address the training needs of young people by providing access to information and communication technology (ICT). It is the fruit of cooperation between the Republic of Djibouti, the German Shipowners' Association (VDR), and the NGO Village of International Children. It is aimed at empowering young people from disadvantaged backgrounds in the municipality of Balbala. Thus, the digital library will provide young people with educational material in digital format, contents of English language training, or any other material needed to improve their opportunities. The training will enable future beneficiaries to acquire the skills they need for their personal enrichment.

Conclusion

Despite the relatively good telecommunication infrastructure in Djibouti and the fact that most of the inhabitants live in the capital, which theoretically should facilitate their connection with the telecommunication infrastructure (Internet, telephone, etc.), the costs for the Internet, computer, and phone are still very high for the ordinary citizen. The government should reform the telecommunication's sector and open it to competition, which will reduce the costs and improve the quality of the service and spread the access especially in the Internet and the mobile sectors. The privatization of the telecommunications sector will not only improve e-learning and distance education but will have significant spillover effects to all sectors of the economy.

In addition, the government still has no ICT policy for education except for the national ICT program, which is not specifically designed for education. Furthermore, the government is concerned about obtaining the necessary basic infrastructure for schools (construction of new schools, renovation of old schools, etc.) and with increasing the teacher workforce. Therefore, there is hardly any funding for an ICT program for education. The government should invest more in ICT in education as it is becoming an essential part of the schools of the future.

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Chapter 4
Egypt

Mahmoud M. El-Khouly

Abstract This chapter surveys the development and current state of e-learning in the Arab Republic of Egypt. The author surveys the general social, economic, historical, and demographic background of Egypt and provides a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Egypt. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Egypt · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Egypt, sometimes referred to as the "Motherland of the World," is famous throughout the world for its ancient civilization and 7000-year history along the Nile River. It is an important political and cultural center of the Middle East. Egypt's governmental system is separated into three branches. The executive branch is led by the President, who serves as the head of state. Parliament is made up of the Shura Council (upper house) and the directly elected House of Representatives (lower house). The judiciary operates as an independent branch of government, subject only to the law and no other authority. The acceleration of a long reform program and continued economic recovery, particularly in the retail and energy sectors, made 2016 a transitional year for Egypt. Table 4.1 provides some selected socioeconomic indicators for Egypt.

Table 4.1 Socioeconomic indicators

Indicator	
Ethnic groups	Egyptian 98%; Berber, Nubian, Bedouin, and Beja 1%; Greek, Armenian, other Europeans (primarily Italian and French) 1%
Religions	Muslim (mostly Sunni) 90%, Coptic 9%, other Christians 1%
Languages	Arabic (official). English and French widely understood by educated classes
Population	91.1 million (January 2016)
Age structure	• 30.1 million young people under 15 years old (15.4 million males/14.7 million females) • 58 million persons between 15 and 64 years old (29 million males/29 million females) • 4 million persons above 64 years old (1.8 million males/2.2 million females)
Internet users	30.3 million (2016)

Source: http://countrymeters.info/en/Egypt

Education System in Egypt

Pre-university Education System

The schools in the secular system are organized as follows: primary school (6 years), preparatory school (3 years), secondary school (3 years) (university track), and 3- or 5-year vocational schools. Figure 4.1 represents the education system in Egypt.

In Egypt, two types of public secondary schools are available. The first type of school is government run and uses the Arabic language as a first language, and students at these schools study all subjects in Arabic. However, the English language is the second language. These schools account for more than 90% of secondary schools in Egypt. The other type of school, which may be government run or private, uses the English language as a first language; therefore, these schools are called “language schools.” Students at these schools study in English. These schools are estimated to constitute less than 10% of secondary schools in Egypt (Alaa 2006). The formal education stage in schools ends with a general exam that is similar to that of the High School Graduation Exam in many countries known as the *Emtehan Thanaweyya Al-Amma*. This exam is national and allows students to move from secondary to higher education or to continue in technical and vocational education (Elshayeb 2012).

The Ministry of Education holds jurisdiction over all levels of education through secondary school. Each of the 27 governorates has its own governance system. The state Ministry of Education is responsible for the planning, policy formulation, quality control, coordination, and follow-up for all levels of public education, including the universities. The state government is responsible for most of education financing for both educational systems.

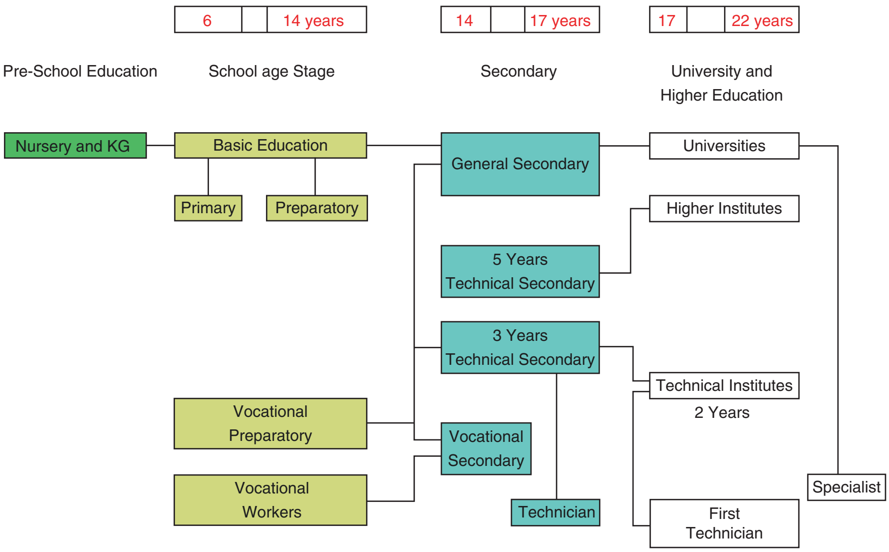

Fig. 4.1 Educational system in Egypt

Higher Education in Egypt

Higher education in Egypt is considered one of the world's oldest educational systems which dates back to 988 AD since the creation of Al-Azhar University by the Fatimids. Higher education is classified into two main sectors: the public (governmental) sector and the private (nongovernmental) sector. The governmental university sector is more dominant and larger than the private one with fewer students enrolled (El Sebai 2006). Governmental higher education in Egypt is also classified into two parallel educational systems (Loveluck 2012): the *secular system* which includes 22 public universities with 335 faculties and 100 higher education public nonuniversity technical institutes and colleges and the *religious system* represented by Al-Azhar University, which encompasses 64 faculties and 420,000 students (NAQAA 2012), specialized in offering academic degrees in Islamic Theology, Islamic Law and Jurisprudence, Arabic Grammar, Islamic Astronomy, and Early Islamic Philosophy.

On the other hand, nongovernmental higher education started with the establishment of the American University in Cairo (AUC) in 1919 (AUC Egypt 2012). However, Egypt only legalized Egyptian private universities in 1992 allowing the establishment of more private universities. The first four private universities were open to students by 1996 (Johnstone and Marcucci 2007). Private universities can be divided into two main categories. The first consists of highly prestigious and extremely expensive private universities, which are commonly developed under particular agreements between the Egyptian government and the government of another country or a partnership between Egyptian investors and a prestigious non-Egyptian university. The second group consists of less expensive and lower-quality universities. As a result, less than 3% of the total number of university students in Egypt enroll in private universities. Besides, private higher education institutes are seen by many institutions as *sellers* of higher education certificates to only those who can afford it, which contradicts the principle of equal access to educational opportunities for all citizens, in which the ability to pay fees should not restrict access to higher education. Therefore, governmental higher education institutions in Egypt are considered to suffer from more pressures than private higher education institutions. These pressures force institutions to try to overcome significant challenges arising from attempts to compromise between delivering reasonable educational services and the high demand on higher education. The higher education sector in Egypt has 2.4 million undergraduate students, 250,000 postgraduate students, and 63,000 staff members. It comprises universities and institutions of technical and professional training.

The higher education system is made up of 22 public universities, 20 private universities, 12 technical colleges, and 115 private institutions. Industrial, commercial, and technical institutes provide 2-year courses leading to diplomas in accountancy, secretarial work, insurance, computer or health sciences, and electronics. Graduates of the 2-year middle institutes can proceed to university education according to their field if they receive a minimum grade of "good"; they are admitted into the second year at the university (i.e., the 2-year diplomas will count toward the university degree as 1 year). Technical education schools provide 4- or 5-year courses leading to advanced technical education diplomas in commercial, industrial, and agricultural fields (Johnstone 2009). Depending on the field, a *license* (for humanities, arts, and law degrees) or *bachelor's degree* (for sciences, professional and technical degrees) is obtained after 4–7 years of study. The *master's degree* usually requires 2–3 years of study beyond the *bachelor/license* and typically requires a thesis. The highest degree is the *doctorate*. It takes at least 3 years including 2 years of research, beyond the master's, and a dissertation (Johnstone 2009).

Distribution of Educational Responsibilities

The main educational regulating body in Egypt is the Ministry of Higher Education, which is responsible for setting higher education policy and insuring its implementation in the various universities. It is in charge of higher education and supervises and coordinates all post-secondary education: its planning, policy formulation, and quality control. It also oversees teacher training for secondary education. The Ministry is aided by three executive bodies:

- The Supreme Council of Universities (composed of the presidents of the public universities, in addition to five members from the civil society), founded in 1950, formulates the overall policy of university education and scientific research in universities and determines the number of students to be admitted to each faculty in each university.

- The Supreme Council of Private Universities (composed of the presidents of the private universities, in addition to some public figures and civil society representatives).
- The Supreme Council of Technical Institutes (composed of the chairmen of the technical institutes in addition to public figures from the civil society).

The Private Universities Council develops the overall policy of private university education and determines the number of students to be admitted to each university faculty, the maximum tuition to be charged, and the admission criteria. In order to meet the needs of the increasing numbers of students and to fulfill the requirements of the job market in a period of communication and knowledge revolution, the Egyptian government considered introducing e-learning, especially in higher education, where most educational problems originate (Abdel-Wahab 2008). Although e-learning seems to be a promising opportunity for increasing educational equality, the acceptance of stakeholders is an important factor that could limit further e-learning developments in Egypt.

Financing

Although the cost of higher education is rising in most institutions worldwide, governmental higher education is still free in Egypt. Free governmental higher education led to a speedy increase in enrollment rates and consequently a decline in the quality of teaching and learning. Large number of students per class, underfunding of universities, and insufficient or poor equipment were the top reasons (Richard 1992; Rossiter 1997; Beckstrom et al. 2004).

The underfunding of public universities has also affected academic staff. According to Fahim (2009), about 75% of current public expenditure in higher education goes to wages. The ratio of academic to nonacademic staff is relatively high (1:0.7), which shifts a large share of current expenditures away from academic staff. Consequently, professors are neither paid enough nor rated on their performance or results of the grades at which their students pass or fail. There is nearly no motivation to attain a high standard of teaching excellence, thus leading to a low-quality level of teaching and learning. Learners are consequently faced with insufficient guidance and supervision (El Sebai 2006). Alternatively, setting up private tutoring programs in universities is a common method for mutual benefits to professors and students. It is an alternative route for gaining extra income for educators and achieving a better educational service for students (Richard 1992; Holmes 2008). Low funding levels for universities also limit the ability of institutions to play their role in spreading education and knowledge. Therefore, high levels of expertise are limited to specific fields only (Loveluck 2012), which can be seen in the high ratios of graduates from humanities disciplines compared to the low ratios of applied scientific disciplines (Issa and Siddiek 2012).

Admissions and Curricula Content

In Egypt, access to university is determined by the final secondary education exam called the "Thanaweya Amma." All students passing that national exam are ranked according to their grades and are given a choice of disciplines to choose from. A central management body, named "Maktab tanseeq," is then responsible for distributing students to faculties and universities, according to their choice, grades, and proximity to universities, with no further admission exams, except for some faculties, e.g., the Applied Arts faculty. Upon agreement of the Supreme Council of Universities and its committees, programs and course contents are developed at the faculty level. This involves determining the main outlines of the course contents and allowing the people in charge of the course relative freedom to choose reference books, course topics, etc.

Some Challenges Facing Egypt's Education System

In order to determine whether the further introduction of e-learning would improve the higher education experience in the Egyptian context, questionnaires were collected from the Egyptian E-Learning University (known as EELU) which was chosen to research e-learners; 371 were returned with valid answers from on-campus students and 27 were returned from e-learning students. The results show that existing problems of higher education in Egypt from the perspective of higher education students have been investigated first. The lack of practical work (77.5%) and lack of innovation in programs (62.2%) were the top higher education problems as reported by on-campus private and public higher education students, respectively (El-Gamal 2014a, b). On the other hand, both categories of students (public and private on-campus) denied that free education is considered one of the main higher education problems. Results reported for the latter point were 58.5% and 44.1%, respectively (El-Gamal 2014a).

Strains on Infrastructure

Investment in school facilities has not kept pace with the rapid increase in the numbers of students, resulting from high rates of population growth and rising enrollment rates in institutions. Overcrowding – with classes regularly containing between 50 and 90 children – and poor facilities do not create an environment conducive to learning. To alleviate the pressures caused by both of these factors, many schools operate in shifts, with students only attending for part of the day.

Poor Teaching Quality and Dependence on Private Tutors

In Egypt today, the teaching profession tends to be associated with a low social and economic status. This notion is reinforced by the meagre salaries – rarely amounting to more than EGP 1600 (USD 200) a month – and the poor quality of training. The poor quality of state-provided schooling has led to the emergence of an educational "informal sector" where private tutoring is used to fill the educational gaps left by the formal schooling system. According to CAPMAS (Egypt's Central Agency for Public Mobilization and Statistics), over 60% of investments in education are spent on private tutoring. It is prevalent in all types of school and leaves those students whose parents cannot afford private lessons at a disadvantage relative to their classmates. In this respect, it can be seen as another factor entrenching the social inequalities and stratification in Egypt to which the formal educational sector is already contributing. The prevalence of private tutoring also acts as a disincentive for teachers to complete their lesson plans. Many teachers double their jobs as private tutors in order to supplement their salaries. This creates a conflict of interest, as excelling in their state-funded lessons would reduce the incentives for students to pay them for additional support.

Poor Textbook Quality and Dependence on Private Books

As the result of the above two problems, students try to get high marks by all means to keep their parents happy; therefore, they try to solve exam problems from previous years to get familiar with the style of the test. However, the ministry textbooks do not provide previous exams nor do they adequately present the topics. This situation led private publishers to provide parallel textbooks for all levels of study. These publishers played an initial role in disseminating e-learning concepts, as they started to distribute CD-ROMs with interactive learning styles with their textbooks and eventually supported the textbook with websites that incorporate a learning management system (LMS).

Negative Attitudes Toward Vocational Training

A strong belief in the determinative nature of examination results has implications for the type of student who goes on to undertake vocational training. The majority of students attending Egypt's technical colleges are those who have failed to win a university place. There is an obvious correlation with the quality and capacity of those who pursue this track. One can argue that those who have pursued technical and vocational training are effectively "tracked out," with limited opportunities for further learning.

Inadequate University Access, Funding, and Research Capacity

In recent decades, the Egyptian state has channeled very low levels of funding into university research, limiting the ability of academic institutions to play an important role in the generation and dissemination of knowledge within Egypt and further afield. As a result, levels of expertise tend to be highly concentrated in a few centers of excellence (Loveluck 2012).

E-Learning in Egypt

Opening alternative e-learning educational tracks could be considered as a solution that would address many of the challenges in Egyptian education previously discussed. The electronic nature of online education provides a good chance for offering educational opportunities to students without the pressures associated with conventional higher education. However, the skills required to design and deliver an e-learning course as well as the skills desired by students to handle ICT issues effectively could act as a barrier to e-learning in higher education.

E-learning has been applied in Egypt in a number of projects that took place mainly in basic and undergraduate education (Fayek and Magda 2004; El-Khouly 2010), which adopted parallel distance learning tracks to the main present regular systems. The concept of establishing a complete e-learning university was not advanced in Egypt until 2009 when the Egyptian Ministry of Higher Education made its first attempt to launch Egypt's first electronic nonprofit university. It is assumed that introducing e-learning in Egypt could eliminate problems such as overcrowded classrooms and limited resources. The adoption of the new learning platforms in Egypt can provide an economic and more suitable solution to higher education problems by filling in the gap between the number of university places available in Egypt and the growing demand for higher education.

Since Egypt is taking its first steps in adopting e-learning in higher education, it could also be expected that the acceptance of online graduates by the job market might not be an easy task. Similarly, official plans and strategies must be adopted and announced in order to increase the awareness of the Egyptian society, including the job market's attitudes toward e-learning and its benefits. These plans should take into consideration the rules and regulations on which e-learning tracks are built and followed by online universities. Assuring the job market about the quality of e-learning graduates may have the potential of overcoming the cultural factors. Students may be willing to accept e-learning if the acknowledgment and appreciation of employers are guaranteed and vice versa.

It could be assumed that e-learning is seen by students and educators as a compromise solution between the deteriorating governmental higher education system and the high tuition fees of private universities. This solution seems to be clear to students on the one hand and has the potential for encouraging parents to encourage the pursuit of e-learning for their children's education on the other hand. Students believe that the effectiveness of the programs offered are the most important criteria required to encourage e-learning adoption, along with the presence of a reliable Internet connection. Unlike traditional students, students supportive of e-learning consider the accreditation of an e-learning-based certificate as highly important. It seems that e-learning students believe that the effectiveness of e-graduates in the workforce will help them in gaining the acknowledgment and appreciation of society regardless of the accreditation of the certificate (El-Gamal 2014a, b).

History of E-Learning in Egypt

The Egyptian government promotes ICT in education as it helps to improve the instructors' and learners' motivation to learn. In Egypt, e-learning results in a significant growth in the application of technology to facilitate learning (Hegazy and Radwan 2010). Since 1985, Egypt as a developing country has invested in constructing its ICT infrastructure (Kamel and Hussein 2002). Egypt has 52 universities, 22 government universities, and 20 private universities. However, these universities are not sufficient to serve all of the Egyptian population. The number of Internet users is rapidly growing, with access for 35% of the population in Egypt; however, the bandwidth in most locations is still less than 2 Mb/s (Ayad 2013). Internet access has been available to the public in Egypt since 1993. The Egyptian Ministry of Education (MOE) encourages the development of e-learning. In 2008, the Egyptian Ministry of Communication and Information Technology (MCIT) established plans for the infrastructure required for enhancing e-learning, including provision of universities with high-speed Internet networks, establishing videoconference links at all the universities, implementing wireless campus pilot programs, creating 52 e-laboratories in Helwan University as a pilot model (20 learners/computer), establishing e-content development labs in each university for helping staff produce e-learning materials, training both staff and administrators in efficient use of information technology, and inviting both international and local experts to review the current capabilities and technical materials for e-learning (MCIT 2010).

Afifi (2011) pointed out that Egyptian universities are taking advantage of some of the opportunities regarding e-learning method, namely, easing the overloaded classes in the Egyptian universities and flexibility in respect of time of learning, enhancing the students' ability regarding acquiring knowledge by themselves (autonomous learning), improving information retention, delivering education for local students in remote areas, increasing the number of enrolled international students, reducing the costs of education per student, and serving students with special needs. In addition, the study by Adams and Seagren (2004), cited in Mohammad (2008) stated that Egyptian universities should realize that e-learning will overcome limitations in time and space compared to traditional offline classes, expand an institution's geographical reach, provide the possibility of multiple learning practices based on self-regulated learning for adults, improve educational quality, provide interactivity in the process of communication, increase efficiency for institutions and students, and achieve customer satisfaction and cost-effectiveness compared to traditional classroom-based teaching and learning. Nevertheless, in e-learning research, learner motivation has recently received little attention in Egypt. Therefore, there is a need to understand and overcome the barriers to e-learning to be able to adopt this concept (Nooura 2015).

Egyptian E-Learning University (EELU)

In September 2005, the Ministry of Higher Education prepared a preliminary study for starting the project of the Egyptian E-Learning University (EELU) (http://www.eelu.edu.eg). In November 2006, an action plan was prepared for the university establishing the project's activities, phases, and tasks, as well as an implementation schedule and estimated budget. In June 2007, the Cabinet approved the establishment of the Egyptian E-Learning University. The presidential decree was issued in August 16, 2008, No. 233 establishing the first ever qualified Egyptian university for distance learning whose systems and technologies were completely based on e-learning. In October 2009, the university started its educational activities with two programs: "Computer and Information Technology and Business Administration" in three centers inside Ain Shams University, Tanta University, and Assiut University (EELU 2014). The Continuing Learning Center (CLC) of the university was opened in 2011. The university offers undergraduate programs in Information Technology and Business Administration and postgraduate programs in Masters of Education in E-learning, Masters in Software Engineering, as well as an MBA program.

Egyptian Education Initiative (EEI)

In May 2008, a significant step was taken when Egypt, at the World Economic Forum on the Middle East, celebrated the launching of the Egyptian Education Initiative (EEI) under the umbrella of the Global Education Initiative aiming to reform the Egyptian education system by using information and communication technology. The EEI was meant to address several challenges including overcrowded classrooms, unsatisfying teacher-to-student ratios, and incremental education costs. Thus, EEI aimed to stimulate learning skills; provide equitable and high-quality education for all learners regardless of their number, location, and gender; and transform learning into an interactive experience, which should ultimately support the efforts to foster a knowledge-based society in Egypt (MCIT 2008). To fulfill these aims, the Egyptian government set up a plan in 2008 to establish the infrastructure required for enhancing e-learning, which includes (MCIT 2008, 2010):

- Providing universities with high-speed Internet networks
- Establishing videoconference amenities linking all the universities

- Piloting the wireless campus
- Supplying 52 labs in Helwan University as a pilot model (20 students/computer)
- Establishing an e-content development lab in each university for helping staff produce e-learning materials
- Training both staff and administrators to use information technology efficiently
- Inviting world-class specialists and local experts to check the current availabilities to ensure that technical materials are sufficient, efficient, and in place (Afifi 2011).

The National E-learning Center of Egypt or NELC (http://www.nelc.edu.eg) represents the backbone of e-learning in Egypt, offering a wide range of services and support facilities for the university staff members to begin engaging with e-learning. The NELC includes several sections and provides various services for staff and content developers, such as instructional design course builder, virtual labs portal, learning style identification system, e-courses production management system, workshops and seminars, open source educational material resources, course development training programs, and external courses. Despite the various services provided through the center, the amount of e-content that has been developed and is being developed is still too small. The center uses Moodle VLE as the learning platform, but in 2009 it only contained 14 courses, which do not include content being taught across the 17 universities in Egypt (El-Zayat 2009).

Other Projects

RITSEC: The Regional Information Technology and Software Engineering Center (RITSEC) (http://www.ritsec.org.eg/) was established in January 1992, as a joint project between the United Nations Development Program (UNDP) and the Arab Fund for Economic and Social Development (AFESD), and is hosted by the Government of Egypt's Cabinet Information and Decision Support Center (IDSC). RITSEC provides e-learning programs which include Arab Child of the 21st Century and Little Horus Regional Distance Learning Program.

AOU: The Arab Open University (http://www.aou.edu.eg/) opened in 2003 and offers degrees via distance learning in an environment of supported open learning. It relies on course lectures laid out in well-prepared textbooks and supporting media such as audio and video cassettes, CDs, and websites. AOU has eight campuses in the Middle East and is affiliated with the UK Open University. Degrees may be awarded in the Faculty of Business Studies, Faculty of Educational Studies, Faculty of Information Technology and Computing, and Faculty of Language Studies (English language).

E-Learning Competence Center (ELCC)

The E-Learning Competence Center (ELCC) (http://www.mcit.gov.eg/) initiative between MCIT and Cisco was set up to create a national e-learning program, establishing an organization to lead and coordinate all e-learning projects in Egypt. The e-learning initiative will primarily upgrade the local corporate culture and support the private sector-driven economy. The ELCC will actively take steps to enhance workforce performance through high-quality, practical, state-of-the-art e-learning and human resources development activities in accordance with the evolving needs of the government and business communities (Hegazy 2010). It has several programs:

Content Development and Localization
The ELCC develops a wide array of e-learning content in different disciplines to provide organizations and individual learners with knowledge and skills needed to stay on the cutting edge of technology and leadership. The center also works with and coordinates the efforts of sector-specific, in-country agencies and independent subject matter experts, consultants, and translators to localize the curricula of learning material in a variety of disciplines in a way that captures the essence of the concerned culture/context and fully engages learners.

Lifelong Learning
The professional development and lifelong learning program of the ELCC focuses on enhancing the technical, professional, and entrepreneurial skills of the largest segments of citizens who have finished their formal education. Increased access, scalability, and outreach are at the heart of the center's lifelong learning program which is made possible through the tactical and efficient utilization of the latest e-learning tools and techniques.

National Delivery Network
The ELCC has created a nationwide delivery network through implementing a scalable plan to leverage and optimize the use of IT clubs all over the nation to act as outlets for the delivery of web-based content, online assessment, student performance tracking, hands-on labs, instructor training, and support and preparation for industry standard certifications. To date, the center has established around 700 local academies across the country where over 60,000 students, instructors, and administrators have participated in the program.

Research and Development (R&D)
The center's R&D program is responsible for the development, review, evaluation, and dissemination of quality e-learning standards among stakeholders involved in capacity building, content development, quality assurance, and infrastructure development in order to ensure sustainable and relevant e-learning for all.

Portal Development
The ELCC has a full portal development, web design, and web content management capacity of portals and has built expertise in designing, developing, and managing web portals using the latest ASP.NET and Web 2.0 technology and in accordance

with internationally identified and recognized portal development and web content management guidelines and standards.

Entrepreneurship Education Program
The ELCC is certified as an official training center for Cisco Entrepreneur Institute to help Egyptian entrepreneurs start and grow their own businesses based on practical and professional strategies using the institute's content and know-how to deliver its programs to SMEs through local institutes that are established by the center all over the country. In this capacity, ELCC has developed and localized Cisco's Business Essentials Course (iExec) and delivered training to 3000 entrepreneurs and 260 SMEs, certified 40 instructors as facilitators of the program, and certified 6 NGOs as official training centers for the program (ELCC 2017).

Private Companies

Nahdet Misr Publishing Group
Nahdet Misr (http://www.nahdetmisr.com) is a famous publisher in Egypt and was selected by IBM company to produce the content for the IBM Electronic University where the E-learning Educational Project (Electronic University) was implemented in collaboration with the Egyptian Ministry of Higher Education.

Arab Academy for E-Learning and Training
This academy exposes the new concepts of educational technology and different modern teaching methods to Arab speakers. Their site (http://elearning-arab-academy.com/) allows trainers to share their experiences and their knowledge in Arabic with academics and trainers from various categories who are trying to develop methods of teaching in their home institutions and to adopt the means of various modern technologies.

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

The Faculty of Science of Alexandria University created the first e-degree online in Egypt, a master's degree in neurobiology. The project was launched in December 2008 with the support of the AUF (the agency of French-speaking universities). The program of study started in October 2009 (Osmane 2010). In October 2009, EELU started its educational activities with two programs: "Computer and Information Technology and Business Administration" in three centers inside Ain Shams University, Tanta University, and Assiut University. In October 2010, an e-learning program was added which awarded the postgraduate diploma in this discipline. In February 2011, the university opened the Continuing Learning Center (CLC), which offers professional training courses to a wide variety of different Egyptian society sectors. Throughout the past 5 years, ELCC's National Delivery Network program was an overall success, resulting in:

- 690 local academies certified under the ELCC as e-learning delivery centers
- 58,000 participants trained (3260 instructors certified, 56,410 students trained)
- The ELCC established centers for e-learning delivery among:
  - Ministry of Education (schools) – 473 centers
  - Ministry of Higher Education (universities) – 24 centers
  - Nongovernmental organizations (NGOs) – 181 centers
  - Small and medium enterprises (SMEs) – 6 centers.

Future Development

The development of Egypt's education system is a national priority given the importance of education to development and progress in all fields. MCIT in cooperation with the Ministry of Education, the Ministry of Higher Education, the Ministry of Scientific Research, and other stakeholders has adopted various strategies and initiatives over the years supporting education development (2013). The primary objectives of the initiatives are:

- Strengthening the national commitment to building a model of educational reform that can be replicated in other Arab and African countries
- Promoting research and development and supporting scientific research in the field of ICT for education
- Establishing a culture of e-learning among public and private educational institutions and developing e-courses for use in state education
- Developing regulations and mechanisms covering the production and use of e-learning materials by educational institutions and determining standards for the evaluation of such materials
- Developing e-learning and content management systems for the Internet
- Developing multi-track e-learning packages for different learner levels, tailorable to individual needs
- Establishing social networks using cloud computing that enables the education community to open channels of dialogue and create a virtual community that promotes the exchange of information and enriches Arabic scientific content
- Providing 2G Internet technology
- Developing and promoting the use of simulation software and applications for educational use to provide users with an enhanced learning experience
- Providing an e-learning program customizable to the educational level of learners and promoting continuous learning based on adaptive and personalized learning techniques, which allows teaching and learning anytime and anywhere.

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Chapter 5
Iran

Kourosh Fathi Vajargah and Esmaeil Jafari

Abstract This chapter surveys the development and current state of e-learning in the Islamic Republic of Iran. The authors survey the general social, economic, historical, and demographic background of Iran and provide a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the authors speculate on the future development of e-learning in Iran. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Iran · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Iran is considered the 18th largest country in the world with 1,648,195 square kilometers in terms of area and is located in the northeast region of South Asia in the Middle East region, and due to its position with respect to the Middle East and Europe and Central Asia, Iran has an important geostrategic position. Tehran, the capital, is the largest city and is also the political, cultural, commercial, and industrial center of the country. Iran is a regional power and is a key player in the international energy security and the global economy as a result of its large reserves of oil and natural gas. The population of Iran stands at 78 million, with an average annual population growth rate of 1.29% in 2016, which suggests that the population growth is declining. According to the latest divisions of the country, Iran consists of 31 provinces.

Education System in Iran

The old training system was dominated for more than 40 years by the traditional structure of the education system of Iran. This system was based on the education system called Maktab khane (old-fashion Iranian school) in all parts of the country, and different schools with different specialties were formed. Textbooks and instructional materials were used in schools with only minor changes for at least three generations. Meanwhile, in the year 1971, a new nationwide educational system was introduced and experimentally carried out in several provinces. The above system covered 20% of schools by the year 1972, over 40% in 1973, and all high schools of Iran in the year 1975. In 2006, a new system was approved by the Parliament, and the classical education system was transformed because the old educational system was inefficient, and according to data obtained by the government, from every 100 people during a 12-year study period, only 12 students would receive a high school diploma. Before 1967, the country's education system consisted of 6 years of elementary school and 3 years of middle school; after 1967, it was changed to 5 years of elementary school, 3 years of middle school, and 4 years of high school. In 1991 it was changed again to 5 years of elementary school, 3 years of middle school, and 3 years of high school and 1 year of preuniversity. In 2002 the high school was changed from a semester to an entire school year. Finally, in 2009, the education system was transformed to 6 years of elementary and 3 years of middle school and 3 years of high school.

Since the government's main policies in the field of education have always been based on decentralization, all provinces are allowed to control the means of enhancing and facilitating reforms or running different educational programs. Among the Iranian government's future policies, to achieve this goal is to grant more executive powers to the provinces and the establishment of relatively independent education organizations in provinces and delegating many responsibilities of the central ministry to the said organizations. In addition, since 1999 the "schoolocracy" policy to improve the quality of education and decentralization policy in the humanity departments of education has been carried out. It is worth mentioning that during this period, in addition to granting more authority to the schools, teacher councils, student councils, and parent-teacher forums were also formed. This educational planning and management project includes parents and students as well.

Educational Policies

Among the most important educational policies in Iran after the Islamic revolution, the following items can be mentioned:

1. Reviewing and reforming the structure of planning and training programs and updating them in order to respond to local needs and new scientific approaches

2. Strengthening and developing higher education programs and improving their academic quality in order to train faculty members for educational and research centers, meeting professional needs of different sectors, and reducing sending students abroad
3. Establishing and strengthening new courses and education centers in basic and advanced sciences such as specific fields in basic sciences, information technology, and biotechnology
4. Organizing and implementing the Creative Talents Training Policy in higher education centers and formulation of specific educational and research regulations and standards
5. Providing opportunities and increasing access to university centers for talented people across the country and supporting the economically deprived to access university facilities and to complete higher education
6. Strengthening communication, compatibility, and correlation between the higher education system, technology development, and the labor market
7. Training new faculty members
8. Expanding and strengthening scientific-practical and vocational-technical trainings by coordination with production and service agencies

Among the most important educational planning done thus far to improve the education quality of educational centers, the following items can be mentioned:

1. Expanding internal efficiency of the educational system by identification of obstacles and removing them
2. Strengthening training facilitators and using the obtained data in educational programs in order to increase educational attainment and reduce repeated curricula and syllabi
3. Expanding external efficiency of the educational system by changing and reviewing syllabi, titles, and textbook contents in order to fit the quantity and quality of training materials with everyday needs and talents and potential capabilities of students
4. Emphasis on hiring qualified teachers, reducing the classroom population density, improving and expanding teaching aids and equipment, and employing specialist instructors in school consulting services
5. Developing educational guidance and consulting services compatible with specific needs of students through strengthening educational counseling centers
6. Restoring the balance between salaries and benefits of employed teachers, taking into account the required hours of work and the special expertise of individuals
7. Taking advantage of promotional methods in order to increase the employment of teachers in deprived regions through granting special privileges and increasing their basic salaries
8. Employing new teaching aids and training strategies to support innovative methods and the use of such methods in educational centers
9. Launching educational TV channels and publishing educational newspapers in order to facilitate communication and transferring the latest findings, concepts, and experiences to students

10. Implementation of applied researches in order to identify factors affecting the failure in learning and scholastic backwardness and providing educational projects based on the results of the mentioned researches. Designing comprehensive management training systems through designing a comprehensive data base
11. Expanding public participation in the field of education.

Educational Projects

Among the most important educational projects of the Ministry of Education, the following can be mentioned:

- Popular Participation Project in building schools in deprived areas
- Overcoming Deprivation Project in deprived areas
- International Education Plans and Projects
- Girl's Education Project
- Women's Education Project
- Refugee's Education Project
- Parent's Education Project
- Family Education Project.

Some of the most important general principles and objectives of education include:

- Describing the principles of Islamic culture and Shia Islam based on the holy Quran, the Sunnah, and Traditions of the Prophet (PBUH) and Morality of Ahl al-Bayt
- Promoting scientific researches and studies according to scientific, technical, and cultural facilities
- Promotion of science and technology for scientific and technological development of the country, especially in agriculture, industrial, and military areas
- Enhancement of intensive public training workshops
- Supplying social, economic, and cultural justice of all citizens
- Compliance with laws and regulations and development of moral virtues in society.

Educational Planning and Education Policy in the Field of Higher Education

Iran's Supreme Council of Planning is responsible for planning in the higher education system. This council performs the planning, preparation, and approval of educational bylaws and regulations of the universities and higher education institutions. The council consists of 9 planning groups, 68 specialized committees, 3 permanent commissions, and over 470 permanent members. It should be noted that groups and specialized committees generally include faculty members and experts in higher education and planning issues. The educational system of universities and higher education institutions is based on a unit system in which the volume of training courses is measured by the number of units of that course and passing or failing of students in a course unit is only limited to that unit.

Among the most important policies of Iran in order to promote cultural and social dignity and the mission of higher education institutions after the victory of the Islamic Revolution are developing a culture of scientific and social dialogue, criticism, and debates; creating a safe environment for promotion of culture, ideas, knowledge, and insights in the universities and community; providing a context for expert participation of academics in decision-making processes, decision-making, criticism, and reforming community affairs planning and development management of the country; supporting policy for scientific, educational, research, technical, political, and cultural associations of students and academics within the framework of laws and regulations; and providing intellectual and scientific fields of activity for students during their education in order to gain experience and familiarity with their thoughts, ideas, and demands through supporting the student magazine publications.

According to Iran's education system, opinion surveys, and the Information Bureau, among the most important policies of Iran for upgrading scientific, regional, and international relations in the field of higher education after the victory of Islamic Revolution are strengthening and expanding scientific, educational, and research exchanges between national universities and internal higher education institutions and accredited international science institutions and centers; the exchange of professors, students, and researchers with universities and research centers of the world; policies for promoting scientific and cultural participation of the Islamic Republic of Iran in international scientific institutions and communities; dedication to the development of the Persian language and the Iranian-Islamic culture in the Middle East and Asia; and strengthening the Persian language training centers in the world.

In the World University Rankings in 2014–2015, there were only two universities from Iran: Sharif University of Technology and Isfahan University of Technology. In the following years, the number increased to 8, and then in 2016, 13 Iranian universities were among the top 978 universities in the world. According to the *Times Higher Education World University Rankings* in the year 2016–2017, Iran University of Science and Technology, Sharif University of Technology, Amirkabir University of Technology, Isfahan University of Technology, K.N. Toosi University of Technology, Shiraz University, Tehran University, Tehran University of Medical Sciences, Ferdowsi University of Mashhad, Islamic Azad University of Karaj, Shahid Beheshti University, Yazd University, and Zanjan University may be among the best universities in the world. In 2017, Iran with 13 top universities in the world won the second place ranking in the Middle East after Turkey with 18 universities in the *Times* rankings. Meanwhile Egypt with eight universities, Pakistan with seven, Israel with six, and Saudi Arabia with four run the top universities in the Middle East.

E-Learning in Iran

In Iran, virtual education was included in the agenda of Tehran University, and plans of this type began at the end of the 1970s. In 2001, the Virtual University Site of Tehran University was launched with nine lessons for students at the University and was used the first semester of that year. In the same year, the Ministry of Science, Research and Technology announced the establishment of an online university under the supervision of the ministry, which would offer educational services as the first nonprofit educational institution across the country. Thereafter a number of universities announced the launch of e-learning as a part of their plans and presented some courses as a single lesson for students to attend. Shortly after universities attempted the use of e-learning, the Iranian system of education, which is the largest educational sector of the country, began its activities in this regard, and currently some private institutions also take advantage of e-learning methods. In 2007 the Ministry of Science, Research and Technology announced the newest technologies in distance education at the two international universities of Kish and Chabahar.

The increasing development of information technology has led to the establishment of virtual university centers in Iran. Online education in the country does not have a long history, but today is considered as the strongest teaching method. Iran Online University is the first higher education institution that has established e-learning in the form of a university for the first time in the country. This university is based on e-learning and will gradually cover a wide range of fields of study, with the help of information technology. Every year students of this university are accepted through a holistic admission system according to the regulations of the Ministry of Science, Research and Technology. Admitted students must comply with all rules and regulations of the Ministry of Science, Research and Technology and, in this regard, continue their education like other typical university students. Now in most universities of Iran, open and distance education are provided in the form of e-learning. Student admission for virtual training in different fields of study is available in many universities including the e-learning center of Zanjan University, Tarbiat Modares University, the Virtual College of Hadith Sciences, Amirkabir Virtual and Distance Learning Center, Virtual University of Science and Technology, Virtual University of Tehran, International Iranian University, Iran Online University and Khajeh Nasir University, Shahid Beheshti University and Islamic Azad University Electronic Campus, etc. The distance education approach is a good choice to internationalize the curricula because of its high flexibility and coordination with international curriculum, and the application of ICT will create new opportunities and enhance the curriculum development in order to meet the challenges in higher education (Fathi Vajargah and Khoshnoodfar 2013; Fathi Vajargah et al. 2011; Fathi Vajargah and Azadmanesh 2007).

According to recent studies, this type of education in Iran, despite being cost-effective compared to classroom training for training providers, has failed to provide a low-cost education for learners (Sayari and Lotfi Poor 2013), and also appropriate support and financial resources are not provided, and acculturation to the virtual education system is not adequate. There are additionally barriers and limitations in the use of these technologies in education, which cause the development and popularity of this kind of education to be held in low status in Iran. So in order to resolve these issues and achieve the full benefits of e-learning, appropriate actions need to be taken. Developing international cooperation among universities, using international languages in teaching, providing resources, reforming laws, and developing elements of curricula based on this approach are the most basic strategies in this regard (Fathi Vajargah and Khoshnoodfar 2013). The following items can be mentioned as some of the obstacles and restrictions in the use of e-learning in Iran: the lack of coordination of school teachers with respect to the rapid changes of hardware and software; the lack of adequate scientific background of some teachers and learners in the field of information and communication technology; weaknesses in the technical infrastructure (including lack of access to high-speed Internet service in some areas); the low speed of information exchange on the Internet due to the filtering out of some academic sites; the unstandardized educational content presented in some cases; the problem of time spent in e-learning in that learners often need a certain amount time to be able to communicate with their class and teacher; the high cost of this type of education in the country; the limited numbers of teachers willing to work in this domain; the lack of local training content; and the existence of centralized and unidirectional education systems in educational planning (Sayari and Lotfi Poor 2013).

Fathi Vajargah, Jahani, and Azadmanesh in a study in Iran entitled “Application of ICTs in teaching and learning at the university level” (2010) found “low computer literacy of faculty members – especially experienced faculty members – is considered one of the main obstacles to e-learning in Iran. Thus, the evaluation of ICT literacy of faculty members and planning for their professional growth will improve their performance in teaching and learning activities. There are several challenges in the application of ICT in Iran such as a lack of a national policy for the use of ICT in higher education, lack of appropriate investment, cultural barriers, financial challenges, lack of continuity and consistency in the use of ICT, and lack of regular and systematic educational programs.”

The current status of resources, facilities, and conditions for implementing ICT in schools is insufficient. Teachers identified in a 2014 study the facilitating factors of ICT applications in secondary schools (Fathi Vajargah and Saadattlab 2014). The use of e-learning in Iran follows six major fundamental objectives, as follows:

Educational objectives: empowering people for independent learning; discovering and developing hidden talents by creating a second opportunity for learning; developing students’ creativity through self-learning and self-exploration; and responding to the demand for education in the country (especially higher education)

Cultural objectives: paving the way for the free exchange of culture inside and outside the country; preparing the ground for cultural immersion which guarantees cultural survival of the country; preserving cultural, national, regional, and local attributes to protect the cultural originality against the phenomenon of globalization; and paving the way for cultural development among different social classes

Social objectives: promoting the establishment of social justice through knowledge dissemination as the foundation of social justice; providing the basis for sustainable development; using the informing capacity of the country to fulfill the right to know for all using the appropriate learning methods; and paving the way to ease tensions within families through acceptance of those applicants excluded from attending conventional universities

Research objectives: creating the spirit of research in people by encouraging them to do action research; paving the way for research on folk knowledge and systematizing the information of people about social issues and the way of resolving them; preparing appropriate fields for research in the world of work and local and regional employment; and developing the ability to analyze the data and use the results to improve the quality of life

Economic objectives: helping to provide skilled manpower for the community; enriching human capital and enhancing its efficiency and productivity; retraining employees to adapt to new occupational and professional developments without separating them from work and life; reducing costs through research and the use of the Internet and intranets; increasing the country's share of global wealth, according to the principle of nation's share of global wealth; and using virtual education as a powerful commercial and economic strategy

Scientific objectives: providing the grounds for interdisciplinary training and moving toward integrating natural sciences with human sciences; providing facilities for the participation of various social groups in the production of knowledge; production of information and knowledge which is essential for reasoned decision; creating motivation for partial knowledge learning in order to accelerate the cycle of knowledge; and paving the way for breaking the boundaries of knowledge.

Today the traditional form of classrooms is on the wane. Expanding the use of technology in education propels the education system to achieve higher goals, such as increasing the quality of students' learning and scientific and cultural growth; therefore, the number of smart schools is increasing every day in Iran. The presence of smart schools is one of the manifestations of using ICT in the educational system of Iran. Education based on ICT has an impact on the equality of educational opportunities by providing conditions such as low-cost educational opportunity, the possibility of using experienced teachers for remote and underdeveloped areas, opportunity to study for employees, opportunity to study for female students at home, accessibility to education by residents in remote and sometimes impassable areas, and having access to unlimited educational resources. For developing e-learning, a community must first possess the required infrastructures and elements to be able to succeed in this field; otherwise any action in this regard leads to wasting money. Jafari (2002) in his research defines infrastructures and elements for developing a virtual education system in the country as:

1. *Technology infrastructures*: communication systems infrastructure, networks, and Internet service providers
2. *Human infrastructures*: technical and support staff, technical and educational designers, faculty members, students, planners, and managers as the main users of the virtual education system
3. *Pedagogical infrastructures*: changing the paradigm of teaching and learning, changing controlled in-class learning to a self-paced learning system free from temporal and spatial constraints, new teaching styles (synchronous and asynchronous), new pedagogical ecology, moving from teacher-centered to learner-centered style, and changing from focus on learning to focus on teaching
4. *Cultural*, *social*, *and value infrastructures*: disseminating the culture of netocracy (Internet activism); educating global citizens to preserve national and local values; paying attention to the digital divide and promoting the fair distribution of learning and teaching, Internet, and network protocols; changing the social role of higher education; and introduction of new pedagogical culture (independence and autonomy of students)
5. *Economic infrastructures*: electronic commerce, income generating, new methods of allocation of resources and budget, new models of financing, marketing and expanding educational markets, economy without intermediaries, investment returns, macroeconomics, and indirect yields (expanding selection for students in terms of subject matter, teachers, media, price, speed, style of learning, etc.)
6. *Management and leadership infrastructures*: knowledge management; taking a bilateral strategy of competition and cooperation; a new leadership and management strategy including participatory management and proactive, dynamic, and futurist management; international and global perspectives of encountering with organizational issues; formulating policies and administrative rules for virtual education in various fields such as workload, methods of recruitment, and employing faculty members; validation and licensing; intellectual property issues; quantitative and qualitative standards; ensuring the quality, authenticity, and validity of information; electronic security measures; and acceptable applied policies
7. *Administrative infrastructure and support system*: electronic and paperless administration system; organizational, educational, and technical support system for students, faculty members, and staff; and access to digital resources and services and facilities necessary for the deployment of virtual education.

The development and permanence of each education system, such as universities, are dependent on the quality of its curriculum in addition to the infrastructural factors and budget. The method of designing a virtual curriculum has an important role in the learning of virtual students, and those involved in curriculum designing must employ the best practice principles of curriculum development and designing (Paulik and Camford 2001). The results of various studies (Clark and Mayer 2004) show that often pedagogical aspects are neglected in the curriculum designing for virtual universities. Improving the quality of virtual universities requires a systematic curriculum design in which the relationship between curriculum elements and how they are integrated with technology capabilities is shown (Porter 2004).

In the directive model of virtual university curriculum development, two important and influential factors must be considered. First, technology's capabilities and features must be understood, which means attention must be paid to communication and intelligence capabilities, personalized learning, interactive features, the capability to learn at any given time and space, and the multiple-offer feature of technology. Second, learner-centered theories must be implemented, which means in virtual university curricula design attention must be paid to learner activity, social interaction, and negotiation, providing multiple perspectives, providing authentic learning experiences, and providing problem-oriented positions and feedback.

The most important features of nine elements of virtual university curriculum in the country are, according to Seraji's model (2008):

The purpose of the curriculum: Virtual university curriculum goals must be aligned with the economic functions of higher education, the social functions of higher education, culture and experiences of the past (local and global), and academic subjects and the dominant philosophy of the community.

Selection and organization of the content: Components of the curriculum in a virtual university must be selected according to standards such as being deep rooted; demonstrating specialized knowledge; developing the skills of problem-solving, critical thinking, and creativity; and catering to the needs of students.

Learning activities: Capabilities and facilities of the virtual environment allow curriculum designers to design for virtual students based on the principles such as developing high-level cognitive skills, strengthening motivation and the sense of curiosity, and the adaptability of activities with different learning styles.

Grouping of learners: In the grouping of individuals in the virtual curriculum, principles such as learning objectives, amount of simultaneous presence, access to technology, etc. should be considered.

Materials and resources of learning: Learning materials and resources are valid information references that students may refer to while learning, thinking, and doing activities. Therefore, resources should be selected based on the learner needs and culture, being updated, encouraging learners to be active, and being appropriate to the overall objectives.

Place: The element of place in the virtual curriculum is considered in terms of the scope of the curriculum and is discussed according to interests, attitudes, language, culture, and needs of the audience.

Time: A curriculum designing group must decide what elements of the curriculum must be presented simultaneously and what elements must be presented asynchronously or separately.

Teaching: Teaching is an interaction between a teacher and a learner which is done based on a systematic and purposeful design with the intention of learning. Virtual schools have the task of facilitating the content, participation in discussions, management, evaluation, technical support, etc. for students and teachers. These tasks are selected according to principles such as interaction between teachers and students and facilitating cooperation between students.

Evaluation methods: In virtual curriculum design, evaluation techniques are selected based on the principles such as congruence of evaluation tools and tasks with learning goals, considering assessment strategies as part of the learning experience, utilizing various means for the evaluation and for the sake of providing feedback, and improvement of the learning process (Seraji et al. 2009, p. 101).

The results of a research which reviewed and identified characteristics of the virtual university curriculum in Iran (Virtual College of Hadith Sciences, E-Learning University of Science and Technology, and Azad E-learning center of Khajeh Nasir University) showed that in curriculum design, some factors influencing the curriculum have been neglected. Some of these factors, such as the formulation of objectives, form of content presentation, determining learning activities, and evaluation procedures, were not in accordance with the guidelines. Also in designing other elements of the curriculum such as learning resources and materials, teaching strategies, and the time and place domains, deviation from the sample patterns and paradigms has been noticed (Seraji et al. 2008, p. 97).

Teachers of e-learning programs need internships in a variety of areas, because many e-learning programs require electronic devices. The word electronic as a prefix for e-learning does not just mean that learning takes place on the basis of technological tools but also includes awareness about technological progress as well. Therefore e-learning teachers should be trained in areas of information technology and the Internet to be able to gather their students into a virtual classroom. In addition, they must have the ability to carry out all applications of e-learning successfully and keep pace with countries which are pioneers in the field of e-learning. Teachers must also be expert in educational counseling which is possible by their competence and expertise in the information services and sciences. Teachers also need to know that e-learning can be successful, preferred, and developed only if the abovementioned characteristics are well observed (Yuoel 2006).

Virtual Education Centers in Iran

More than 20 official centers of virtual e-learning related to institutions and centers of higher education are now registered and launched which provide a wide range of services to users. These services include creating educational opportunities at the undergraduate and graduate level and interactive groundwork for students and teachers at the doctoral and postdoctoral level. Certificates issued by them are of equal value with certificates issued by the common traditional education system of the country.

1. E-Learning Center of Quran and Hadith – vu.qhu.ac.ir
2. Virtual Training Center of Khajeh Nasir University – vumaster.kntu.ac.ir/lms
3. E-Learning Center of Shiraz University – http://vus.ir
4. Virtual College of Amirkabir University – vu2.aut.ac.ir
5. Virtual College of Iran University Science and Technology – www.iust.ac.ir/

6. Virtual College of University of Isfahan – vu.ui.ac.ir
7. E-Learning Center of Isfahan University of Technology – elearning.iut.ac.ir
8. Virtual College of Tehran University – utec.ut.ac.ir/web/utec/home
9. Al Mustafa Open (Virtual) University – fa.ou.miu.ac.ir
10. E-Learning College of Sahand University – vu-sahand.ir/elec
11. E-Learning Center of Shahid Beheshti University – http://lms.sbu.ac.ir
12. Faran Institute for Higher Education – http://faran.ac.ir
13. Noor-e-Tuba Institute of Higher Education – http://nooretouba.ac.ir
14. E-Learning Center of University of Sistan and Baluchestan – http://vu.usb.ac.ir
15. University of Islamic Culture and knowledge – www.ikvu.ir
16. E-Learning Center of University of Qom – http://vu.qom.ac.ir
17. E-learning Center of Islamic Azad University – http://www.iauec.ac.ir
18. E-Learning Center of Tarbiat Modares University – http://el.modares.ac.ir
19. E-Learning Center of Ferdowsi University of Mashhad – http://elc.um.ac.ir
20. E-Learning Center of PNU – http://lms.pnu.ac.ir
21. Virtual Learning Center of Imam Reza – http://virtual.imamreza.ac.ir
22. E-Learning Center of Tehran University of Medical Sciences – http://namad.tums.ac.ir/Cms.aspx
23. Virtual Learning Center of University of Guilan – http://lms1.guilan.ac.ir
24. Center of Excellence for e-Learning, Shiraz University of Medical Sciences – http://ceel.sums.ac.ir

The abovementioned centers form only part of the capacities in the field of e-learning in Iran. The E-learning Association of Iran (http://elearningassociation.ir) is one of the most active centers in the development and promotion of e-learning in universities and higher education and nonacademic centers as well across the country. The Iranian Research Institute for Information Science and Technology is among the legal members of this center as well. The Iranian E-learning Center of Higher Education (http://iranian.ac.ir) is the other major center. The Iran-Academy E-learning Center (http://www.iran-academy.org) offers nonformal courses in engineering and standards.

The possibility of the establishment of virtual education and e-learning is very low in terms of cultural conditions in Iran. One of the issues that has always been problematic in the culture of Iranian schools is coordinating the parents of students in certain areas of culture and education. Organizational institutions are faced with various problems in terms of behavior, age, style of relationships, and technological capabilities of the students and parents, and therefore the identification of key issues and providing solutions to them in order to eliminate these problems are necessary. These problems include:

1. Lack of an appropriate position for e-learning in organizations and institutions. Although virtual education leads to lower costs in implementing education, increases productivity, saves time, and removes the staff commute to educational sites, and many other benefits, the necessity to cultivate a culture of acceptance of the benefits of this type of education is still not clear to many educational managers and officials of organizations. The reason for this can be seen in the

absence of strategies in general and educational strategies in particular. The absence of strategies in organizations leads to dispersed activities and the use of old methods and techniques in performing tasks. Therefore, the absence of a suitable place for this type of education leads to educational activities with traditional methods and an increased educational budget. By using modern technologies, the cost of implementation of educational activities will be reduced, and their quality will be increased (Najafi and Mardani 2008).

2. Problems related to low information literacy of employees of institutions and organizations. A prerequisite for the implementation of e-learning is the information literacy of employees and system users. In organizations where technology is introduced, but employees do not have information and computer literacy, the following problems may occur: panic and anxiety in using computers; feelings of fear and shame from inability to obtain the necessary occupational skills; decreased ability to solve problems and a sense of frustration and concern about a significant increase in working hours despite commitments to increase the quality of work; decreased sense of responsibility; physiological and mood disorders; and thoughts of separation from other employees. There are other obstacles for the employees of organizations in the e-learning process in addition to the abovementioned ones. According to researchers these include situational, institutional, conditional, and informational obstacles. Situational barriers are derived from the individual's current situation in life. Institutional barriers come from policies, procedures, and performances of the organization. Conditional obstacles are related to values, beliefs, attitudes, and experiences of the user's personal life (Ziaee Parvar 2008).
3. Problems related to organizational training management systems. Existence of a teaching and learning management system in the organization is necessary for the implementation of this method. But the software available on the market does not meet the educational needs of organizations and institutions. In other words, the process of management, planning, and implementation of instruction in organizations is often different from prepared software packages available on the market. Accordingly, the organizational learning process should be analyzed by an experienced team with diverse expertise (software and hardware experts, education management and planning experts, experts of educational sciences, and psychology experts in educational technology), and then learning management software of any organization should be ordered from software companies according to the conducted analysis. In many cases software packages and platforms do not meet the needs of organizations and cannot cover their activities (Kambod 2006).

According to the general development of virtual education in Iran as well as the increasing number of universities that are willing to provide distance educational services, it can be understood that great steps have been taken in this regard, and it seems that distance education will be provided by most universities in the country in the near future. The most important problems that jeopardize the process of virtual education include lack of proper understanding of the needs of the users, delivering of inaccurate information, failure to adapt a face-to-face lesson to its electronic version, poor technical strategies, inappropriate training approaches, failure to comply with the required standards, the absence of the quality assurance system (efficiency evaluation system), and failure to provide appropriate and timely training.

According to the abovementioned problems, there are some necessary points for the achievement of online education systems: accuracy in selecting the audience and careful examination of their needs; proper selection of courses that must be provided virtually (not every course is suitable); choosing the right technology, taking advantage of virtual education standards; providing appropriate support services; preparing learners to take advantage of facilities and technologies; and creating a system suitable for evaluation and quality assurance (Delrooz 2007, p. 24).

With regard to the above factors, virtual education and e-learning development in the country require:

Creation of the required infrastructures: The priority at this stage is creating ICT development centers at the national, provincial, and regional levels. The mission of this center would be creating networks and appropriate communication infrastructures across the country; general access of all people to networks and computers; creating courses appropriate for e-learning; determining the policies, guidelines, and general objectives; and supervising the implementation of activities.

Human resources development: The most important condition for the creation and use of e-learning is the existence of competent human resources who should be educated by university centers.

Approval of required policies, *programs*, *and laws*: Because of the lack of regular, relevant, and coherent policies and laws in the e-learning process, approval of related policies, laws, and programs can be helpful in the development of e-learning.

Change of the curriculum: One of the requirements of the development of e-learning is changing the present curriculum. In this regard, the Supreme Council for Cultural Revolution, Secretariat of Supreme Council of Education, and Organization for Educational Research and Planning must review the necessary changes in the goals, content, teaching methods, evaluation, and certificate awarding of traditional curriculum and match them with the e-learning system.

Development of executive institutions for implementing e-learning: The popularity and development of e-learning requires the participation and cooperation of all governmental and nongovernmental institutions. In this regard, in addition to development of governmental centers such as Technical and Vocational Training Organization in regions and distance education institutions (in provinces and regions), we can get help from the capacity of the qualified nongovernmental sectors by facilitation of conditions (Atashak 2008a, b).

Iran with its young population and vast geographical area will not have much success in achieving comprehensive and sustainable development without seriously considering the issue of education. In fact, the advancement of education in Iran can have positive benefits by increasing productivity and entrepreneurship. But in order to achieve educational development and realize the major the goals of Iran today, Iranians need to invest heavily in this field. We are then faced with a major challenge due to the recent global changes to enter the information era where knowledge creates the highest added value, and we can overcome this challenge only with the use of e-learning.

There is no doubt in the necessity of developing e-learning in the country; what is important is the effective way and method of achieving this type of education. In general, the purpose of e-learning is to provide equal, free, and searchable access to education courses, to create an equal learning environment for different classes of people anywhere, and to optimize methods of presenting course material in order to learn more deeply and seriously. In such a learning environment unlike traditional education, individuals will benefit from topics according to their abilities (Poormonazah and Kheiri 2009).

One of the features of modern ICT which is considerable in all of its usages is the speed of its development internationally. The use of information and communication technologies as a means of development has received more attention in education. Converting paper texts to electronic ones, creating multimedia CDs, and then online instruction are good examples of the rapidity of e-learning development. Development indicators in higher education have always been based on the number of universities and educational institutions, the number of classrooms, the number of teachers, and their ratio to the students. The result is that today the efficiency and effectiveness of higher education are directly related to the use of information and communication technology (Karimi Alavijeh et al. 2010, pp. 182–183). It is believed that the use of information and communication technology in education can increase access to learning opportunities. These technologies can improve the quality of education with advanced teaching methods, enhance learning, and empower educational systems for better institutional management (UNESCO 2009, p. 9).

E-learning provides numerous opportunities for individuals to learn that were not previously possible; this way the chance of learning from a famous and authentic university is possible; there is no need for a change in lifestyle that might cause the person to leave his job or migrate with his family. Learning in an invisible class provides unlimited access to the information (Cheryl 2004, quoted in Yaghoobi et al. 2009, p. 162). Today due to the wide range of users of e-learning, training in the traditional pattern as one form of training for all is not possible anymore, and offering a personalized system that can automatically be synchronized with users' interests and knowledge is of great importance. In Iran, on the one hand, the number of applicants for higher education is increasing, and face-to-face courses cannot respond to these needs. On the other hand, a large percentage of higher education applicants are employees and experts with extensive family and social responsibilities such that attending face-to-face and full-time courses is not possible for them. Responding to the mentioned needs and providing them with an acceptable quality of education are two of the main challenges of the higher education system in Iran (Yaghoobi et al. 2009, pp. 161–162). According to the ICT infrastructures, the novelty of this technology in the country, and the type of culture and educational opportunities that this technology can provide, special attention must be paid to the use of ICT in education, particularly in higher education in the country. With regard to the possibility of using ICT at different levels across Iran, equal opportunities can be provided for residents of deprived areas in terms of education by providing access to higher education for all those interested in continuing their education, with the use of these technologies. However, it should be noted that due to the novelty of this method of teaching, there are currently a few obstacles along the way that will be eliminated over time in the near future. In Iran information technology is considered from two perspectives: increasing educational enrichment (quality of access) and increasing access to educational environments (quantity of access) (Montazer 2008, pp. 8–10). E-learning in the country is confronted with challenges, and e-learning development depends on removing them. These challenges include:

1. Lack of an integrated national policy about the use of information technology in education: The absence of an integrated national policy in the field of e-learning is due to the lack of national leadership in the field of ICT in the country, since the goals in Iran for development of information and communication, generalization of social justice and cultural development, economic development, educational development, or human resources development are still unclear. It is obvious that due to the lack of national policy in the field of ICT, the policy, purpose, audience, and levels of e-learning are also not accurately determined.
2. Lack of proper investment: Despite the obvious and increasing importance of e-learning, appropriate investments are still not being carried out in this regard compared to the traditional education. Another problem in this respect is the status of telecommunication infrastructures and lack of equipment and facilities needed for e-learning in the country.
3. Lack of agreement on the electronic learning: Because no official and scientific authority is in charge of electronic learning in the country, providers of this type of training have given numerous and sometimes opposite definitions of e-learning. Also, in many cases, the concepts of e-learning, electronic teaching, digital libraries, and virtual classrooms are all used in one sense.
4. Existence of multiple centers of decision-making: Currently, the Ministry of Science, Research and Technology, the Ministry of Education, the Supreme Council of Information, the Islamic Republic of Iran Broadcasting, and the Management and Planning Organization are jointly responsible for e-learning. Each of them applies various policies, guidelines, and instructions for this type of training.
5. Existence of multiple executive centers: The Institute of Distance Education (in public education), Technical and Vocational Training Organization (in computer skills), and some universities (in the field of in-service trainings) are among the main centers in implementing e-learning courses and are following different approaches in running these courses according to their different purposes and missions.
6. Low information literacy: The most important precondition for benefiting from electronic learning is possessing information literacy. This concept was widely

used by UNESCO and replaced the former definition of literacy (the triple skills of reading, writing, and counting) in the late 1990s; but unfortunately, this new concept has not found a proper status in the Ministry of Education and the Literacy Movement Organization in Iran.

7. Weakness of support system: One of the issues involved in the failure of electronic learning is the weakness of the educational support system. Causes include the weak enforcement of intellectual property rights, the absence of a Persian operating system, the inadequate support of the Persian font on the Internet, the lack of proper investment in the supply and production of software and e-content, and the lack of appropriate training (for teachers and students) to learn required skills for electronic learning.
8. Existence of the traditional educational system: Due to the traditional objectives, structure, methods, and educational content in the country, electronic learning has not been given the proper opportunities to develop. The traditional learning-teaching process has been shaped by the behavioral and cognitive approach in which the teacher has the dominant role in the training process, while e-learning development on the other hand is constructivist in approach in the teaching-learning process in which each learner is involved in the construction of his/her own knowledge (Atashak 2008b, pp. 151–153).

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Chapter 6
Iraq

Ahmed Sameer Alnuaimi

Abstract This chapter surveys the development and current state of e-learning in the Republic of Iraq. The author surveys the general social, economic, historical, and demographic background of Iraq and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Iraq. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and Web sites, appears at the end of the chapter.

Keywords Iraq · E-Learning · Web-based learning · ICT · Internet · Education · Distance learning

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Country Profile

History and Political Environment

The region of Iraq was historically known as Mesopotamia (Greek: "between the rivers"). It witnessed the world's first known civilization, the Sumerian culture. This civilization was followed by the Akkadian, Babylonian, and Assyrian cultures as early as 5000 BC. These civilizations were associated with the earliest evidence of human writing and some of the first sciences, mathematics, laws, and philosophies of the world. Therefore, the region of Iraq is known as the "cradle of civilization" (CIA 2016).

Formerly part of the Ottoman Empire, Iraq was occupied by Britain during World War I; in 1920, it was declared a League of Nations mandate under UK administration. Iraq attained its independence as a kingdom in 1932. A "republic" was declared in 1958, which was ruled by a series of presidents ending in Saddam Hussein, whose regime was ended in 2003. Territorial disputes with Iran led to an inconclusive and costly 8-year war (1980–1988). In addition, the economic sanctions following Kuwait's liberation imposed by the UN Security Council (UNSC) had devastating repercussions on the health, educational, economic, social, and political aspects of Iraqis (Shah 2005).

The USA led an invasion of Iraq in March 2003, which marked the end of the Saddam Hussein regime. Coalition forces remain in Iraq under a UNSC mandate, helping to provide security and to support the freely elected government. The Coalition Provisional Authority, which temporarily administered Iraq after the invasion, transferred full governmental authority on 28 June 2004 to the Iraqi Interim Government, which governed under the Transitional Administrative Law (TAL) for Iraq. Under the TAL, elections for a 275-member Transitional National Assembly (TNA) were held in Iraq on 30 January 2005. Following these elections, the Iraqi Transitional Government (ITG) assumed office. The TNA was charged with drafting Iraq's permanent constitution, which was approved in a 15 October 2005 constitutional referendum. An election for a 275-member Council of Representatives (CoR) under the new constitution of 2005 was held on 15 December 2005, which marked the transition to Iraq's first constitutional government in nearly a half-century (CIA 2016). This political background is extremely important if we want to explain why Iraq is lagging far behind the Middle East countries in education and electronic education in particular (Harif et al. 2016).

Geography

Iraq is located in the Middle East region, bordering the Arabian (Persian) Gulf, between Iran and Kuwait. The total area of the country is 437,072 km^2 and its waters cover 4910 km^2. Its borders are shared with the countries of Iran, Jordan, Kuwait, Saudi Arabia, Syria, and Turkey. Most of Iraq has a hot arid climate with subtropical influence, having cool winters with dry, hot, and cloudless summers. The northern mountainous regions along the Iranian and Turkish borders experience cold winters with occasionally heavy snows that melt in early spring (CIA 2016).

Iraq's topography can be divided into four physiographic regions: the alluvial plains of the central and southeastern parts of the country; Al-Jazīrah (Arabic: "the Island"), an upland region in the north between the Tigris and Euphrates rivers; deserts in the west and south; and the highlands in the northeast. Each of these regions extends into neighboring countries, although the alluvial plains lie largely within Iraq (Kennedy et al. 2016).

Economy

Iraq is seen as a wealthy country rich in natural resources like petroleum, natural gas, phosphates, and sulfur. Iraq's economy is dominated by the oil sector, which has traditionally provided about 95% of foreign exchange earnings. After the 2003 war, oil exports were around levels seen before Operation Iraqi Freedom, and total government revenues have benefited from high oil prices. Nevertheless, looting, insurgent attacks, and sabotage have undermined economy rebuilding efforts (CIA 2016). Transparency International ranks Iraq's government as the eighth-most-corrupt government in the world. Government payrolls have increased from one million employees under Saddam Hussein to around seven million employees in 2016. In combination with decreased oil prices, the government budget deficit is near 25% of GDP as of 2016 (Abadi agonistes 2016).

Communication Infrastructure

Mobile communications penetration in Iraq sits at around 81%. However, the parts of Iraq seized by rebel forces reportedly have very little mobile infrastructure left intact, with residents relying on satellite technology for communications. Subscribers to telecom services are 1.27 million for mobile broadband and 29 million for mobile phone services (BuddeComm 2016). Mobile-cellular telephone subscriptions were 101 per 100 persons during 2014. The fixed-broadband subscriptions (per 100 people) increased from 0.0% in 2005 to 11.7% in 2014. The percentage of households with a computer increased from 5.0% in 2005 to 46.0% in 2014. The percentage of households with Internet access at home increased from a very low percentage to 45.0% in 2014. Individuals using the Internet increased from less than 1.0% in 2005 to 47.7% in 2015 (World Bank Group (UTI) 2016). Internet services are provided using "communications cables" with links to the Fiber-Optic Link Around the Globe (FLAG)/FALCON, and the Gulf Bridge International (GBI), and TGN-Gulf international submarine fiber-optic cables were laid in 2011 (Mahlknecht 2016).

Demography and Social Structure

The country's population almost tripled between 1970 (10 million) and 2014 (35 million). Currently, the Iraqi population is mostly young, with 43% under the age of 15 and 16% under the age of 5. Two-thirds of the population (66.4%) live in urban areas. The total fertility rate was as high as 4.1 and the population growth rate was 2.9% in 2015. Internally displaced people constitute more than 3 million persons in 2014. Iraq ranked 121 out of 188 countries in the UNDP human development index in 2014, with 18% of the population living below the national poverty line (UNDP

2015). Iraqi ethnic groups are comprised of Arab (75–80%), Kurdish (15–20%), and other ethnic groups (minorities) like Turkoman and Assyrian (<5%). Islam is the religion of 97% of the population, while Christianity and other religions constitute only 3%. The two official languages are Arabic and Kurdish (CIA 2016).

Education System in Iraq

Education is a basic human right linked directly to economic growth and poverty reduction. In Iraq, it is state controlled and highly centralized. The Iraqi education system is jointly controlled by the Ministry of Education which runs primary and secondary schools and the Ministry of Higher Education and Scientific Research, which is responsible for universities and technical institutes. The latter are autonomous in a range of professional matters but are financed directly by the Ministry of Higher Education and Scientific Research, which maintains its central power to control critical decisions concerning facilities, admissions requirements, and the appointment of staff (Iraq-Education Overview 2016). In addition, the federal government of Iraq has to deal with a dual education system. The Federal Ministry of Education (MoE) administers 15 governorates in Iraq, whereas the KRG (Kurdistan Regional Government) Ministry of Education (KRG MoE) is responsible for the northern governorates of Dahuk, Erbil, and Sulaymaniyah. This dichotomy establishes two independently operating education systems that rarely, other than through the constitution and the national budget, converge into a centralized, consolidated national education system (UNESCO 2011a).

The state fully finances all aspects of public education. There are two types of finance: funding from the Ministry of Higher Education and Scientific Research and funding which covers private undergraduate education, which is provided by professional and private organizations and associations. The government is responsible for supplying books and teaching aids. Arabic is the primary language of instruction at most of these institutions, with Kurdish also taught in KRG regions.

Preschool education in Iraq is of 2-year duration and is open to children starting at 4 years old. Primary education is 6 years in duration and is compulsory through age 11. Secondary education is 6 years in duration and completed in two stages: intermediate and preparatory. Intermediate education lasts 3 years for students aged 12–14 years. Preparatory education also lasts for 3 years and is designed to prepare students for the labor market or university study. It is divided into two branches (scientific and literary), beginning with the second year of preparatory education, during which students pursue academic studies in the sciences or humanities. In addition, there is also a 6- or 3-year (depending on the point of entry) vocational preparatory stream of education, which covers industrial, agricultural, and commercial branches. Vocational preparatory education is designed to prepare students for work in the professions or for university study (Parliament of Iraq 2011). According to the Ministry of Planning – Iraq, the gross enrolment ratio in primary school was 87.0% and in secondary school was 44.7% for the year 2008. One should interpret these numbers with caution, since the situation in Iraq is fluid and violence is prevailing (UNESCO 2011b).

Tertiary education is open to students who satisfactorily complete secondary education. Programs at the undergraduate level are from 3 to 6 years in duration. Additionally, there are 2-year postsecondary institutes, which train students for various technical professions. Programs leading to postgraduate degrees are also available (UNESCO 2011a).

The Iraqi education system is struggling to overcome significant challenges, like shortages in physical infrastructure, materials, and professional educators at the national, governorate, and local levels. Illiteracy remains a major concern, with the 2007 Employment Survey conducted by the Iraqi Central Organization for Statistics and Information Technology noting that between 18% and 20% of adults are illiterate. Females are particularly disadvantaged in rural areas. After the long years of economic embargo, recurrent wars, and civil unrest continuing up until the present time of writing, many problems and major issues are affecting institutions of higher education. These issues include:

- Inadequate infrastructure and facilities, such as laboratories and libraries.
- Inadequate equipment in the faculties of engineering, science, and technical institutes.
- The need to establish channels of communication between colleges in Iraq and foreign universities.
- Weakness of the links between higher education, its graduates, and the labor market.
- The need for a comprehensive review of the management systems of higher education, including adaptation of curricula and contents of courses to keep up with changes in the social and economic situation in the country. It must develop a strategic plan to make sure that universities will lead in the role as mediator in the process of democratic transition and to ensure that officials take their roles based on their merit on a professional basis but not on political grounds.
- Reduction in government support for students and the lack of incentives for public and private sectors to play their part in supporting higher education and expedite implementation of projects and economic reforms in order to lift the pressures experienced by the community, which affect the scientific development.

E-Learning in Iraq

History of E-Learning in Iraq

The historical evolution of distance education in Iraq dates back to “educational television and radio systems” used to provide live or recorded lectures to home-based students after school time and groups of learners in faraway classrooms where some additional face-to-face interaction might be provided. This option was the only available type of distant learning for more than 30 years targeting secondary schools. It was never tested in the higher education context (Al-Radhi 2010).

The next phase marks the use of "multimedia systems" encompassing text-, audio-, video-, and computer-based materials and usually some face-to-face learner and teacher interaction. This type of learning is applicable to individuals and groups. For Iraq, this option started to be deployed with limited resources and applications in the higher education context during the 1990s and the start of the third millennium. Its availability was limited due to UN sanctions on Iraq (1990–2003) which brought highly negative consequences. The higher education system at that time faced serious negative consequences and catastrophes (Al-Radhi 2010).

Internet-based systems mark the third phase of distance learning, in which multimedia (text-, audio-, video-, and computer-based) materials in electronic format are delivered to individuals through electronic devices like computers. This type of learning is usually associated with access to databases and electronic libraries that enable teacher-student and student-student, one-to-one, one-to many, and many-to-many interactions, synchronously or asynchronously, through e-mail, computer conferences, bulletin boards, etc.

In the immediate post-2003 period, Iraq's already devastated technological abilities were further degraded tremendously. Now, several years after the US-led occupation, the country is slowly starting to join the rest of the internet-enabled world (Pfanner 2012). This newly expanding Internet service is faced by a very disorganized plan for how to establish and improve Iraqi educational institutions in their approach to implementing new technology. For Iraq, technology in education has started in partnerships with global higher education entities. The aim was hoped to be great, but with deteriorating security circumstances and the killing of many Iraqi academics, a new wave of skilled academics has immigrated from Iraq, which seriously compromised these efforts (Al-Radhi 2010).

Iraqi E-Government Project

The first evidence of e-governance in Iraq can be dated back to the year 2004, when the Ministry of Science and Technology (MST) signed a contract with an Italian company to formulate a plan for an Iraqi e-Government project. The first Iraqi e-Government project was a small project related to an e-traffic system. Eventually in 2010, the Iraqi government decided to develop an e-Government project whereby the five most vital ministries would link to the Prime Minister's office. The Council of Ministers order number 46 established the e-Government committee in 2009 and assigned the Ministry of Science and Technology the leadership task. Since then, each Iraqi ministry has an e-Government office (Mohammed et al. 2016). According to the United Nations' (UN) five stages of e-governance development (emerging, enhanced, interactive, transactional, and seamless), Iraq is in the emerging stage of using e-governance. The same situation applies to the current status of e-learning in Iraq (Al-Hashmi and Darem 2008).

E-Learning Projects and Initiatives

Iraq was the last country in the Middle East region that obtained Internet access. This service was forbidden for public use until 2000, whereas mobile telephones have only been used since 2003. The Arab Middle East region countries, except for Iraq, had already achieved various steps toward e-learning adoption by the end of first decade of the third millennium (Matar et al. 2010). Since then, e-learning initiatives have been introduced in a few Iraqi public universities, yet its endorsement is still at a preliminary stage up until now. Currently, 12 Iraqi universities are formally registered as using Moodle (a free Web platform for e-learning management), including these in the KRG (Moodle 2017). Referring to the list of Moodle-subscribed Iraqi universities, it was shown that the oldest university in Iraq and Middle East region, the University of Baghdad, has only two registered sites; one is a well-developed system (INLE.education) belonging to Baghdad College of Medicine and the other one is concerned with the rest of the university colleges. The Kufa University is unique among Iraqi universities in implementing a registered Moodle e-learning Web site in most of its colleges. Al-Kindy, Al-Nahrain, Babylon, Al-Qadisiyah, Diyala, Soran, and Sulaimani are other public Iraqi universities displaying an e-learning Web site registered on Moodle by the first quarter of the year 2017. In addition, only one private university appeared with a registered e-learning Web site, namely, Dijlah University (Al-Azawei et al. 2016a).

The previously mentioned higher education institutions of Iraq with a registered e-learning Web site represent only a small fraction of all the available institutions. In addition, one should stress the fact that having a registered Moodle Web site does not imply a fully functional e-learning system delivering a blended type of education. The majority of these e-learning platforms represent a starting point and a future template for delivering e-learning services. Depending on local expertise and professionals, both Baghdad and Kufa Colleges of Medicine have achieved excellent results in exploiting the functionalities offered by Moodle as a content and learning management system (CMS and LMS).

The University of Babylon followed another strategy. A custom-designed learning care system (LCS) was developed and implemented in the Department of Computer Science/College of Science in 2010, which was soon replaced by another custom platform the following year. Up until the end of 2013, the College of Information Technology adopted the Moodle LMS platform. The implementation of this project is still in the testing stage with limited functionalities till the end of 2016, and few colleges in the university started using it (Al-Azawei, A., Parslow, P., & Lundqvist 2016; Al-Azawei, A., Al-Bermani, A., & Lundqvist, K. 2016). An almost similar story occurred at Al-Nahrain University. The e-learning platform started as “Al-Nahrain Open E-Learning Project.” The aim was to develop a custom-made e-learning platform (Khmiss and Abir 2009). However, the project could not secure enough official support for its maintenance and is replaced nowadays with a Moodle e-learning Web site. In conclusion, the available academic resources or even official reports about the current status of e-learning applications in Iraqi universities are very limited and scarce (Al-Azawei, A., Parslow, P., & Lundqvist 2016; Al-Azawei, A., Al-Bermani, A., & Lundqvist, K. 2016).

The Ministry of Education (MoE) has expressed interest in promoting the use of ICT in education including e-learning applications. The Ministry currently possesses an e-gate used primarily for compiling job opportunities and submissions. During 2007, ESCWA gave momentum to an ICT for Education in Iraq project in cooperation with UNESCO. The project aimed to build sustainable capacity in the Iraqi MoE for the continuing quality improvement of teaching and learning focusing on the use of information and communication technologies (ICT) (Al-Radhi 2010).

Barriers and Setbacks for E-Learning in Iraq

According to Al-Radih, "sectarian tensions, violence and continued displacements of persons within Iraq and its neighbouring countries have prevented Iraqis from enjoying a sense of progress or even hope that the situation will change for the better. Political milestones achieved to date have not yielded the anticipated impact on the quality of life for the general population, let alone its transformation to the Information Society. There remain daunting challenges in the provision of basic services, respect and application of the rule of law, systematic human rights, transparency and accountability within governmental institutions and policies, and real transition to democracy and economic prosperity" (Al-Radhi 2010).

Above all, Iraq is in bad need of a stable electricity resource. In a 2015 Brookings Institute report, it was stated that "in the wake of ISIS advances, however, the Ministry of Electricity instead announced grid losses of more than 8,000 Mega Watts of electric power. Most Iraqis complain from shortages in electricity supplies" (Al-Khatteeb and Istepanian 2015). Equipment and technology can be bought, installed, and maybe turned on; however, maintaining and advancing the field continue to be a stumbling block due to the lack of basic necessities, the simplest of which is electricity and the most complex of which is human capacity, which continues to be drained at an ever-increasing pace (Al-Khafaji 2016).

One can identify two major barriers for the e-learning initiatives to flourish in Iraq. The first refers to *institutional constraints*: the lack of regulations and proper plans has now become the hallmark in Iraq, because most of the government departments and bodies work within old standards and most of them still work with the laws of the 1940s and even earlier from the Iraqi Kingdom in 1921. These governmental structures must be restructured again with new institutional concepts and work with upgraded technologies to keep pace with the rapid advancements in every aspect of life. Most of the politicians in Iraq talk about building Iraq with institutional concepts, but nothing takes place or occurs on the ground. The second barrier refers to *planning constraints*: Iraq has a real shortage of planners and designers who can make a road map for executing projects with the new international standards. Planning for e-learning projects in Iraq is not a case of bringing computers and servers into Iraq this year but a long-term plan that needs a road map to do it (Elameer and Idrus 2011).

A Successful Iraqi E-Learning Project

Success stories always happen, even in the context of the unprecedented national hardships of Iraq already mentioned. The paragraph below is dedicated to describing a successful e-learning project that was started and sustained with exceptionally limited resources, depending on local professionals only. This story can serve as a template to lead planners for feasible ways of making e-learning a popular strategy for higher education institutions of Iraq.

INLE (Iraqi Network Learning Environment) is the official e-learning portal of the Baghdad College of Medicine. The Moodle server was installed and launched online on 10 January 2014. The Web address is http://inle.education. The name of the Web site mimics that of Nottingham University's e-learning system "NLE" in recognition of the inspiring role of that university in starting the Moodle e-learning system. The first online blended module in research methodology was started on INLE by the personal effort of a single Iraqi scholar and delivered to postgraduate students in the medical college to show the feasibility of the project to college management. The second step was to start a Moodle server for the whole medical college. The server and basic installation were donated by the International Medical Corps (IMC).

The INLE started with the research methodology module and e-learning module for the first-grade medical students, which contained .pdf files and short teaching videos developed by professors in the IT department team. An online bank of multiple choice questions (MCQ) was developed for many modules available to facilitate formative assessments online using INLE for the first three grades of students enrolled in these modules.

The basic idea of Moodle is to let professors run their own online courses; therefore, a training workshop for module moderators and professors is periodically provided. An online Moodle training course is available at the INLE site at this time. Each of the college professors has a user name and password for the INLE and is expected to manage his/her own online module, by uploading teaching material and interacting with students.

A decision was made by the e-learning team of the IT department in the medical college to provide the online e-learning services for medical students in parallel to the installation of the new "integrated system-based curriculum." During the time these lines were written, the 1st, 2nd, 3rd, and 4th year medical students and their professors are using this important online resource. Most of the server and online education system administrative work is done by the local IT team (five core members) depending on self-learning, since no previous training was afforded to the IT team on server maintenance and Moodle maintenance.

A total of 132 modules (courses) are currently available on INLE. An additional 32 modules are also available covering Moodle training for professors and training of administrative college staff on computer skills and extracurricular activities like magazines, conferences, preview, and evaluation courses (special purposes). The students can see a plethora of uploaded material types, ranging from .pdf files, PowerPoint presentations, audiobooks, voice lectures, video lectures, and interactive lectures. Other activities like glossaries, choices, databases, assignments, and

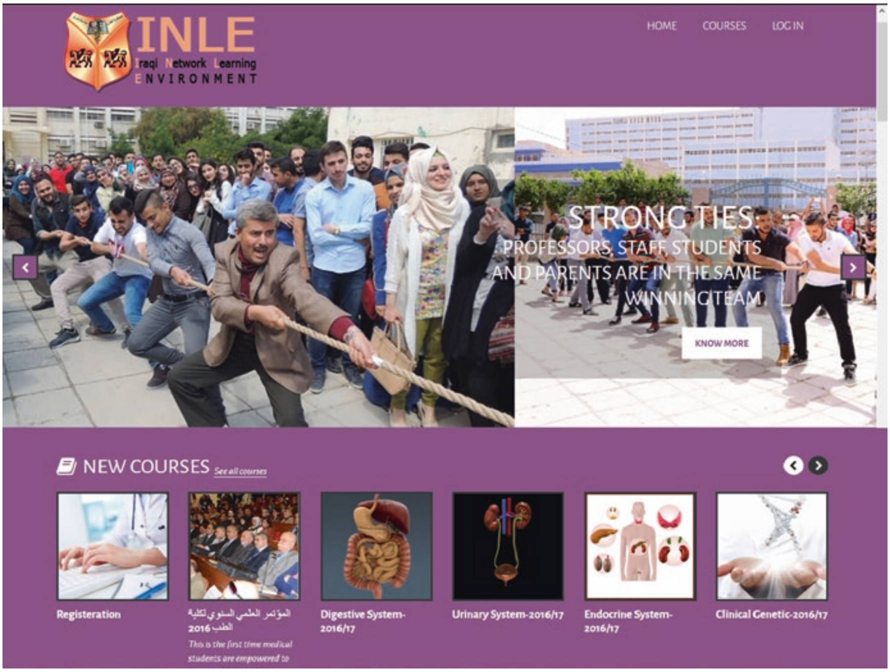

Fig. 6.1 INLE homepage

workshops have been used to enhance the learning experience of students. "Discussion forums" are attached to each module. News and notifications are securely and timely delivered to enrolled students. Online formative quizzes with instructive feedbacks are available in most modules. Module evaluation and feedback for each module are being practiced and data is documented. A smartphone application is also used by students in this respect (Fig. 6.1).

For the first time ever in the Iraq higher education system, the curriculum is documented and made transparent for students, professors, managers, and accrediting bodies. The interaction of students with learning materials and activities is recorded and can provide valuable data for portfolio assessment of each student. Almost seven million user activity logs were documented by the INLE server during its 3 years of function. A total of 1254 registered users with 144 professors (with a teacher role assigned to them) were given user names and passwords on INLE. The activities used by its Moodle system modules were as follows:

Type of activity	Count
Assignment	13
Book	1
Choice	17
Database	1
Feedback	70
Folder	69

Type of activity	Count
Forum	183
Glossary	4
Label	73
Questionnaire	31
Quiz	95
File	1760
URL	188
Workshop	4
Question bank	0
MCQ	1118
Drop on image	1
True/false	8

Future Development

The road map to future development in e-learning at the national level should start with policy reform and development, institutional development aiming to change old standards, upgrading the universities' infrastructures with reforms, and finally investing in capacity building (Elameer and Idrus 2011). A consensus on the best e-learning platform for Iraqi higher educational institutions is needed to have a strong starting point for future development. It seems that the Moodle platform, being free of charge to install and upgrade, having a strong international community of users, and being already tested in some Iraqi universities is the most eligible candidate (Fig. 6.2).

Iraqi universities need to deal with e-learning on two different levels. The first is the recognition of e-learning degrees. So far, the Ministry of Higher Education and Scientific Research (MOHESR) does not recognize any online degree. This issue needs to be addressed by adopting some guidelines and protocols to recognize some online degrees earned from reputable institutions. Much work is urgently needed at the policy level to create an environment that fosters the development of e-learning programs. The second is deriving more benefits from e-learning and e-technology in ordinary degree programs offered by Iraqi universities. This might include video conferencing, online and off-line lecturing, virtual labs, and distributed joint projects in order to enable the use of these techniques (Sufyan et al. 2011).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

Currently, Iraq is in the primary (emerging) stage of adopting e-learning; therefore, no certified e-learning educational programs are available at this time. Some personal or institutional efforts for training in e-learning are present, but e-learning is still not accredited or certified in Iraqi education.

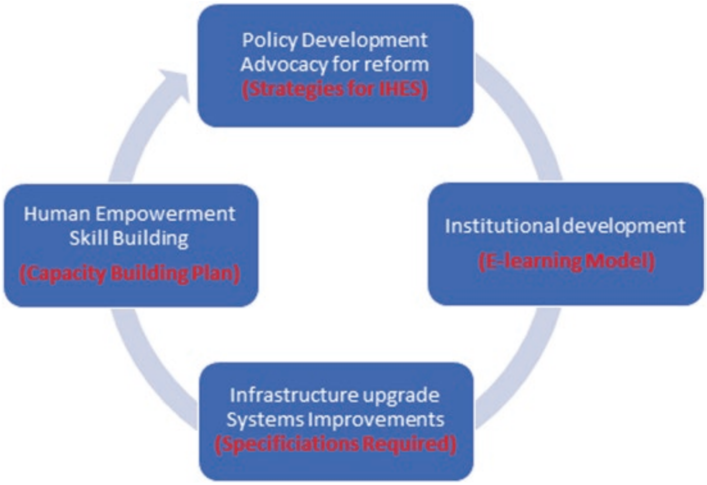

Fig. 6.2 Road map for e-learning in Iraq (Elameer and Idrus 2011)

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Chapter 7
Israel

Yoav Yair

Abstract This chapter surveys the development and current state of e-learning in the State of Israel. The author surveys the general social, economic, historical, and demographic backgrounds of Israel and provides a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. This chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Israel. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Israel · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Introduction

This chapter describes and reviews the latest developments in utilizing technologies in K-12 and in higher education throughout Israel and offers an updated and concentrated summary on e-learning with special focus on innovation and entrepreneurship in the EdTech sector. Different aspects of how learning technologies and e-learning models are being used in different settings will be described, among which are distance and collaborative learning models, online video, and MOOCs. The review is based on an extensive literature survey assembled over the past two decades on e-learning research and numerous studies and internal reports from Israeli universities, governmental agencies, and educational bodies.

Country Profile

The State of Israel was founded on May 15, 1948, after the end of the British Mandate over Palestine, as the national home of the Jewish people. It is a western democracy that resides on the eastern coast of the Mediterranean Sea and is neighbored by Lebanon, Syria, Jordan, Egypt, and the Palestinian Authority. The total land area of Israel is 20,770 km^2, and it has a population of 8.594 million people (of which 6.425 million are Jews and 1.788 million are Arabs; based on the Central Bureau of Statistics, 2016 at http://www.cbs.gov.il/), leading to a population density of 413.77/km^2. The two official languages in Israel are Hebrew and Arabic. Israel is secular in governance but holds firmly to religious values such as no work, transportation, or commerce in the Sabbath and on religious holidays. There is freedom of religion and sacred places are maintained by law. The capital of Israel is Jerusalem, where the parliament (Knesset) and government offices are located (Yair 2010). The leading economic heart of the country resides in the Tel Aviv metropolitan area, with its culture, business, and financial centers. In the north, Haifa is the largest port city and a major industrial hub, and Beersheba is a growing metropolitan area that is transforming the Negev desert in southern Israel.

The discovery of major natural gas deposits in offshore drillings in 2012 enabled Israel to achieve relative energy independence for the foreseeable future while introducing renewable energies which are slated to reach 17% by 2020 (compared with 1.7% in 2015). Israel is also a global leader in water technologies and managed to overcome the decades-long decrease in available water (a result of regional climate change in the entire Levant) by desalinating seawater from the Mediterranean. The country is largely self-sufficient in food production due to intensive development of the agricultural and industrial sectors (major imports are coal, grains, and beef).

Being a religious center for three major religions, Israel has a significant tourist industry, due to the perception that it is “the Holy Land,” which ensures a flux of pilgrims and tourists visiting the various historical and sacred sites. Israel is also a major cultural center with numerous theaters, film festivals, and a young and active cinema industry. The National Library of Israel (http://web.nli.org.il/) hosts copies of all locally published books and journals (in print or digital formats) in Hebrew and other languages and is responsible for cataloging and safeguarding the nation's cultural heritage. The country is known to be a publishing powerhouse, with over 6899 new titles published in 2014. There are over 2400 publishers operating in Israel: academic, commercial, private, and governmental. The largest 20 publishers are responsible for 52% of the market.

Internet Technology, Infrastructure, and Organization

Israel is a member of the Organisation for Economic Co-operation and Development (OECD) since October 2010 and is measured against the standards of the developed world. Based on the UNDP data for 2014, the Human Development Index (HDI) of Israel is 0.894 (number 18 in the world) with a mean value of 12.5 years of schooling. Based on the Bank of Israel data (www.boi.org.il/), the nominal GDP of Israel in 2015 was 290.08 billion USD, with a per capita GDP for Q3/2016 of $35,300. The Israeli economy is strong and boasts a robust high-tech industry, sometimes referred to as the "start-up nation" or "Silicon Wadi," with Tel Aviv ranking 5th in the global start-up ecosystem ranking for 2015 [based on "e-commerce genome" by COMPASS, https://blog.compass.co/]. Based on user statistics collected by one of the leading communication and technology companies in Israel (Bezeq) and published in 2016, there are 6.4 million Internet users in Israel, and the average accessible bandwidth is 65 Mbps (megabits per second, a common measure of data transfer speed), an increase of 30% compared to the year before. Cloud storage of information and data is practiced by 60% of users. Compared with OECD countries, the cost of Internet surfing at 30 Mb rate in Israel ranks among the cheapest globally (24 USD). Approximately 10% of households are considered "smart homes" and enjoy high-speed broadband connectivity.

The Israel Internet Association or ISOC (http://en.isoc.org.il/) was established in 1994 in order to promote the use of the Internet within Israeli society. This not-for-profit organization is managed by leading figures from the academic, industry, and public sectors. The ISOC is mandated with allocating domain names, and it presently manages over 237,748 ".il" domains. The ISOC works on narrowing the "digital divide" in Israeli society and strives to promote Internet usage among third-age (elderly) individuals. Special focus is given to the Israel-Arab society that lags behind the Jewish population. The ISOC has been running the W3C office in Israel and participates in the national standards institute. It has strong ties with the Hebrew version of the Wikipedia and maintains the PikiWiki free image collection of Israel, which hosts digital images of Israel's history, geography, and culture (www.pikiwiki.org.il).

The Israeli chapter of Wikipedia was launched in 2003 (https://he.wikipedia.org/) and contains the Hebrew version of Wikipedia, and holds 200,662 entries as of January 2017, maintained by a group of 43 system operators and a group of editors. Based on the Wikimedia organization statistics for October 2016, Israel holds one of the highest ratios of editor number per million speakers (93). The Hebrew Wikipedia is being used by the general public and by teachers and students and has an average 34,285 views per hour (compared with over 6.1 million for the English version). Periodically it launches special initiatives for compiling new entries in specific knowledge domains (e.g., the Physiwiki competition for writing or translating entries in physics, in collaboration with Israeli universities).

Education System

Formal Education

Education in Israel is compulsory from kindergarten to high school age. The State Education Law, passed in 1953, established five types of schools: state secular, state religious, ultraorthodox, communal settlement, and Arab schools. Based on the Ministry of Education's statistics for the school year 2014/2015, there were 1,660,925 pupils in schools, with an additional 470,596 registered in public kindergartens. The majority of school pupils are Jewish (73.9%), followed by Arabs (18.7%) and Bedouin (5.4%). Based on demographics, it is predicted that in the 2013–2019 period, the average annual growth rate in pupil numbers will be 1.68%, leading to a total number of 1,744,457 by 2019. The fastest-growing sectors in the educational system are expected to be the state religious schools (17.7%) and ultraorthodox schools (23.8%), indicative of the change that the Israeli society is undergoing in recent decades. After completing 12 years of study, pupils are required to undergo matriculation exams in order to receive a high school diploma, which is a prerequisite for continuing into higher education in the country's 8 research universities (excluding the Open University which has an open admission policy).

When it comes to the introduction of e-learning into formal education, the Ministry of Education published in 1993 a master plan for introducing computers into Israeli schools. The declared target ratio was one computer per ten students, along with establishment of protocols and procedures for purchasing the needed software. Since that period of time, considerable budgets were allocated to schools for purchasing and maintaining the necessary hardware and for training teachers and teacher support centers. Based on an Israeli parliament report (Vorgan 2010), the number of computers in elementary and high schools in Israel was 123,386 with a ratio of 12.7 students per computer. The report points to significant gaps between different geographical areas and communities, with urban centers clearly leading over rural ones (the worst ratio reported was 32.4 students per computer, in non-Jewish schools). The primary budget for computers in schools comes from the National Lottery Program that diverts some of its earnings for philanthropic purposes (it also supports the establishment of science education centers in most of Israeli cities). In an attempt to bridge the digital gap, the "Computer for Every

Child" program was launched in 1995. Since its opening, the program distributed more than 120,000 computers to families in the lowest socioeconomic levels. In 2016, the target number was an additional 6000 computers, bringing the total number to 126,000. Research showed that the level of technology literacy in children who received computers greatly increased (>60%) (Internal Project Report, 2015; http://www.maly.co.il/profile/research-surveys). A similar project aimed at empowering teachers was launched in 2006 by the Athena Foundation (www.athenafund.org) with the concrete goal of distributing laptops to teachers. Over 11,000 teachers in 430 cities and towns across the country were chosen, and they took part in this "Laptop for Every Teacher" initiative.

As part of the implementation plan of ICT usage in schools that started in 2011, the Ministry of Education initiated and ran an extensive teacher training program, in order to create pedagogical leadership in ICT usage in schools. Two types of personnel were trained and tasked with the systematic ICT reform: a school ICT coordinator who was in charge of ICT reform within their own school and the regional ICT advisor, in charge at the district level and operating in several schools. Avidov-Unger and Inbal-Shamir (2013) conducted an evaluation research of this process ($n = 226$) and found that if the insertion of ICT into schools was accompanied by a reciprocal pedagogical change, the empowerment of the ICT leaders was significantly stronger compared with schools in which no change in teaching had happened. As part of the ICT reform, in each city in Israel, there is a local "pedagogical center" that offers courses and supports teachers in all aspects of ICT. Communities of practice emerge on the school level, aided by technological tools such as Facebook and WhatsApp Messenger, but also on national disciplinary and thematic levels, bringing together teachers from all across the country (e.g., teachers in biology, history, mathematics, etc.).

Higher Education

The higher education system in Israel is managed by the Council for Higher Education (CHE) (http://che.org.il/) which is an independent legal entity, headed by the Minister of Education of the Israeli government. By law, the CHE has an autonomous Planning and Budgeting Committee (PBC) that receives its budget from the government and is responsible for the allocation of resources to the institutions. There are presently 63 institutes of higher education in Israel, which include universities, private and public colleges, and teacher training colleges. There are eight research universities and seven universities teach toward all academic degrees: the Tel Aviv University, Hebrew University of Jerusalem, University of Haifa, Bar-Ilan University (in Ramat Gan near Tel Aviv), Ben-Gurion University of the Negev (in Beersheba), Ariel University (in Ariel), and Technion (in Haifa). The Weizmann Institute of Science (in Rehovot) teaches only toward higher degrees, while the Open University of Israel – which has a nationwide coverage – does not offer PhD programs.

Based on the official statistics, in a general population of over 8.594 million (October 2016), the total number of students registered for all higher education degrees in the academic year 2015/2016 was 309,870, and it has increased by a mere 1.2% compared to the year before (Council of Higher Education (CHE) 2016). This increase is a considerable slowdown compared with the annual growth rate in the mid-1990s, which was 8.4%, which is partly related to demographics. Based on the CHE report, there are 193,615 students studying for BA/BSc degree: 38.4% are registered in the major universities, while 48.6% attend colleges, and the rest study at teacher training colleges. The colleges were the largest and fastest-growing sector in the higher education system in Israel showing a steady growth over the last decade. There were 58,305 students registered for MA/MSc degrees; the vast majority of which study in the research universities (38,780; 66.5%). The number of PhD students in Israel now stands at 10,895, showing a slowing down in the enrollment rate reaching an asymptotic growth since 2010.

The higher education system in Israel seems to have reached saturation in terms of student numbers and now experiences the internal shifts, reflecting changes in the job market and economic growth in certain sectors (computer science, law, medicine). A notable clear trend is the steady decline in the numbers of students in the humanities, from 18.5 to 6.2% in the past decade, leading to the closure of several university departments that had marginal numbers of enrolled students.

The number of senior faculty in Israeli universities and academic colleges has increased from the minimum it reached in the previous decade, and now there are 5240 faculty in the universities and 1781 faculty in colleges (private institutions not included, since they are not funded by the PBC). The number of junior faculty and external (part-time) faculty is 3913. These numbers reflect a reversal in government policy, after years of decreasing government funding, which led to a decrease of thousands of faculty positions in all Israeli universities. A special effort was put in recent years into stopping the "brain-drain" phenomena, where young researchers go to postdocs at (mostly) European and American universities and do not return to Israel. This effort promised tenure track and accelerated entrance into universities for returning young scientists; however, its success rate is still unclear, and only a few Israeli scientists returned.

A major backbone component for Israeli universities is the Inter-University Computation Center (IUCC; http://www.iucc.ac.il/; MACHBA in Hebrew) that was established by the CHE and is supported through its PBC (Planning and Budgeting Committee). This compact administrative body is in charge of the academic IT infrastructures, digital information services, educational technologies, and grid computing. The IUCC operates as an umbrella framework that deals with promoting and facilitating cooperation among its member institutions in computing and ICT issues, as well as between research institutes and organizations that operate in the field of learning technologies and IT (such as the Israel Internet Association). The Center for Digital Information Services (CDIS or MALMAD) is part of the IUCC, in charge of purchasing, licensing, and providing IT services for universities and colleges in Israel. The CDIS is tasked with purchasing licenses of digital resources for researchers and scholars, through university libraries that share joint access and subscriptions to digital collections and publications. The Israel Center for Learning Technologies (Hebrew acronym MEITAL) is also operating under the IUCC and mostly deals with dissemination and implementation of new ICT into the higher education system (Yair 2010). The MEITAL acts as a loosely connected professional network for ICT practitioners in all academic institutions in the country, focusing on new learning technologies and their implementation and evaluation. The MEITAL collaborates with the MERLOT open educational resources repository (https://www.merlot.org/merlot/index.htm); however the level of usage of such Reusable Learning Objects (RLOs) remains very low, likely because they are in English and an overwhelming majority of academic courses in Israel are taught in Hebrew.

In 2010, the CHE launched the I-CORE program, run jointly by the PBC and the Israel Science Foundation (ISF), in order to encourage the establishment of centers of research excellence in universities. The idea was to consolidate specific strengths in Israeli research centers and universities by offering significant budgets that will enable "brain gain" (bringing back Israeli scientists from abroad) and foster inter-university collaborations. The I-CORE program invested in upgrading research infrastructure in an attempt to encourage innovation and multidisciplinary R&D. In the domain of e-learning, the I-CORE established the LINKS center at Haifa University (Learning In a NetworKed Society; www.links.org.il/en/links/i-core). The LINKS center brings together researchers from the Technion (Israel Institute of Technology), Ben-Gurion University of the Negev, and the Interdisciplinary Center (IDC) Herzliya.

The Government's "Digital Israel" Initiative

Following a government decision in 2013 (#1046), a national initiative on the digitization of governmental assets for promoting the connectivity and openness of multiple services and topics was launched. It is presently being managed through the Office of Social Equality (http://www.gov.il/he/Departments/digital_israel). The initiative aims to foster ease-of-access to services and information in five major areas: health, education, economy, welfare, and governmental interfaces. The stated goal of the initiative was to build the required infrastructure in order to improve and adapt governmental services in these areas to the reality of the twenty-first century while striving for innovation and for offering many online services to the highly accessible and Internet-savvy Israeli population. Citizens can now utilize the platform to search for needed information and to get updated news on events and open calls for research, as well as save time in making payments, ordering medical appointments, and submitting reports to governmental agencies (e.g., income tax, social security). The Israeli government joined the D5 Charter in 2014, a group that joins together the most digitally advanced governments in the world (together with the UK, South Korea, Estonia, and New Zealand). The D5 aims to share and consolidate best practices among the partners, in order to improve public services and to meet the growing needs of the increasingly digitized economy. The first and foremost guideline is to meet user needs, by offering public services based on open source, open standards, and transparent data. The key principles of the D5 Charter were, in essence, guidelines for the establishment of the "Digital Israel" initiative, as they clearly portray the roadmap for achieving the required goals.

With respect to education, the Digital Israel initiative aims to foster collaboration and innovation by various means. For example, the "Ed.il" project is part of the Israel Innovation Institute (www.israelinnovation.org.il/education) that in 2015 established an "innovative education community," which in essence is a voluntary group that brings together teachers, education technology experts, researchers, and entrepreneurs. The main challenges that the Ed.il project proclaims to tackle are the difficulties facing the formal educational system in attracting and preserving quality personnel. This group operates a community page on Facebook with 750 members and organizes meetings and conferences on various topics (gaming in education, MOOCs in education, APP2Youth competition). The digitization of books for the formal K-12 system is led by the Ministry of Education and the Office for Social Equality, and in 2016 there were over 1000 schools that used digital versions of books as part of an effort to increase accessibility and to reduce printing and the weight of schoolbags that children carry. The portal (http://ecat.education.gov.il/digital-books) allows a selection of books on citizenship, English, geography, biology, biotechnology, history, geography, and other topics, for various age groups and in differing subscription models.

Another pillar of the Digital Israel initiative is the establishment of a national e-learning platform for education, based on the edX design and tools. This is a joint effort with the Council for Higher Education (CHE) and will produce a single unified platform that will offer multiple academic and vocational courses to the Israeli public. The multilingual interface (Hebrew, Arabic, and English) will ensure the availability of developed courses to large audiences of students, teachers, and lifelong learners drawn from the heterogeneous Israeli society. The stated domains are occupational English and Hebrew (for the orthodox ultrareligious Jewish and the Arab minority populations, respectively), digital literacy, and professional development for periphery populations and educators.

The first set of courses in this framework was launched in 2016 by the Open University of Israel (after receiving substantial funding from the CHE's Planning and Budgeting Committee (VATAT)), and it deals with teaching academic English to students in the higher education system. The open-access portal was developed by the Center for Technology in Higher Education ("SHOAM") and includes hundreds of video lectures, divided into four difficulty levels (http://study.onl.co.il/). Learning tools such as self-tests, quizzes, and learning strategies and management manuals are offered, but the responsibility for learning and the pace are determined by the learners. Students can study online freely, and they need to show proficiency in academic English and pass the national standard test. The portal is a transformation of traditional methods of teaching English in universities and colleges throughout Israel, where it is mostly taught in the conservative face-to-face method with little or no usage of advanced technological tools. The introduction of the new portal may lead to a slow phaseout of the traditional teaching method, as more institutions will adopt the new model. Early adopters such as the Interdisciplinary Center (IDC) Herzliya are experiencing a transition period in which a hybrid model of the online courses with classroom-based face-to-face exercises is being practiced.

Open Educational Resources (OERs) and MOOCs

The OER movement was launched by MIT's OpenCourseWare (OCW) project and created a fundamental change in the way universities showcased their learning materials, courses, and syllabi (http://ocw.mit.edu/index.htm). Their motivations were complex and not always purely altruistic or noncommercial, as noted by Walsh in *Unlocking the Gates* (2011) which, in a prophetic sense, heralded the MOOC movement. Indeed, the emergence of massive open online courses (Koller 2015) found the Israeli HE community ready for adoption, and in a rather short time span, the Tel Aviv University, Technion, and Hebrew University of Jerusalem offered courses on the Coursera platform (https://www.coursera.org/). As soon as the potential of MOOCs became evident, this necessitated considerable investment of faculty time, interface design, video and computer graphics, and IPR issues as well as institutional organization of the business model. The Virtual TAU brand of Tel Aviv University conducted pilot studies to evaluate the implementation of MOOCs in the academic curriculum (Soffer and Cohen 2015). The decision was to allow students to get academic credits for completing MOOCs as part of their electives within their study program, a fact that increased internal participation and the completion rate (89 out of 93 in the *What a Plant Knows* botany course, 17 out of 28 in *The Fall and Rise of Jerusalem* history course). The courses were open to the general public and attracted ~50,000 enrolments from 126 countries (though successful completion was not reported, it is easy to deduce it was very low from the rapid decline in participatory entries along the semester; see Figs. 7.1 and 7.2).

The Open University opened several MOOCs in different languages (http://mooc.openu.ac.il/en/) that were based on the heritage of its OCW project (Yair 2010). Four courses were offered in a self-paced learning model: "Genocide" in Hebrew and English, "Educational Psychology" in Arabic, "Jews and Christians" in Russian, and "The modern Middle East" in Hebrew. The courses relied heavily on videos recorded at the Open University studios and necessitated building a separate LMS (learning management system) to monitor and manage student participation. These MOOCs were part of the European OpenupEd project that was created by the EADTU (http://www.openuped.eu/) (European Association of Distance Teaching Universities) to serve as an umbrella for a wide offering of MOOCs by different universities in Europe. These Open University MOOCs do not award credits for Israeli students, and so no statistics on completion are available. The present status of MOOCs at the Open University is unclear, and they were discontinued.

In an effort to increase inter-usage of e-learning courses by Israeli universities, in 2016 the CHE issued an open call for funding the development and sharing of

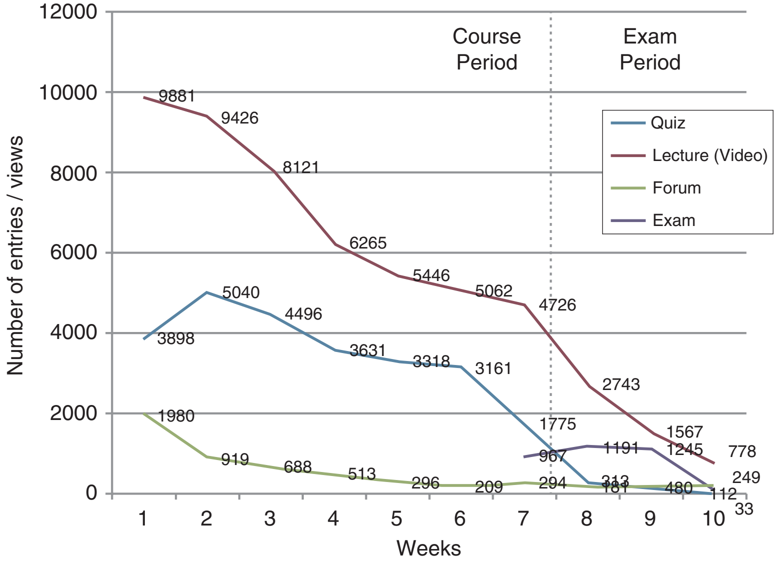

Fig. 7.1 Student participation in the course *What a Plant Knows*

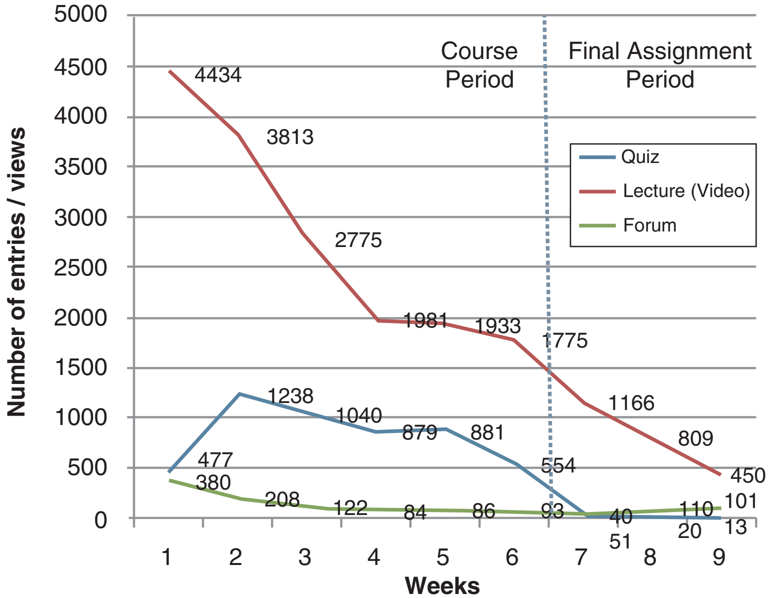

Fig. 7.2 Student participation in the course *The Fall and Rise of Jerusalem*

introductory-level courses which are taught at all HE institutions in the country (e.g., statistics, research methods, introduction to psychology, basic sociology, etc.). The first round of courses in this call is being developed at the present time, and so its success cannot be evaluated yet.

The EdTech Sector in Israel

The usage of ICT in the Israeli formal education system experienced rapid growth in the first decades of the twenty-first century, following the growth of the EdTech sector and the implementation of a nationwide program to computerize schools. As early as 1980, the Israeli Association for Information Technologies in Education (MOACH, which means "brain" in Hebrew; http://www.moach.org.il/) was established as a professional community of researchers, developers, and practitioners. The rapid emergence of new technology stood in contrast with the very slow adoption rate within the Israeli educational system. The MOACH community jointly worked on defining standards and modes of use and evaluation and encouraged teachers and educational leaders to take an active part in designing new pedagogies and methodologies for introducing IT into the educational system. A key leader in the development and implementation of technological innovation in education is the nonprofit Center for Educational Technology (CET; http://www3.cet.ac.il) in Tel Aviv that was formed (along with Educational Television and the Open University of Israel) by the Rothschild Foundation. The CET is an educational organization that develops books, learning materials, online tools and software, and other technology-based programs for the Israeli K-12 system. It offers the largest and by far the richest learning environment in the country known as OFEK (which means "horizon" in Hebrew) (http://ebag.cet.ac.il/). In 2012, the CET had launched the EdTech innovation center MindCET (http://www.mindcet.org/en/) that searches for new ideas in the effective usage of learning technologies within the Israeli educational system. The MindCET acts like an innovation hub and offers a platform for teachers, researchers, and entrepreneurs that wish to experiment and develop new educational concepts and applications. It is located in the city of Yeruham in the northern Negev desert of southern Israel and through its accelerator program succeeded in launching several new start-up companies. MindCET is supported by Intel, Microsoft, the Hebrew University of Jerusalem, and the Weizmann Institute of Science. The MindCET program holds an international competition named "Global EdTech Startups Awards" that strives to create a dynamic ecosystem for a global audience.

Several notable educational technology companies in Israel are:

(a) The eTeacher Group (http://eteachergroup.com/) is a for-profit company operating in local and international markets. It offers a synchronous platform for one-on-one dialog-based mentoring to students by a network of professional educators. This synchronous solution operates four large international schools with thousands of students, which study in a hybrid model involving classroom practice and online tutorials. The eTeacher Group also offers a special program to teach computer coding at young ages, aiming to develop young technological leadership (techleaders.co.il).

(b) BrainPOP (http://www.brainpop.co.il/, operating in Israel since 2005) offers more than 850 short animations in various knowledge domains, aided by interactive learning tools and promoting project-based learning. The target audience is elementary and junior high schools and is available as an application for mobile platforms such as smartphones and tablets.

(c) Matific (http://www.matific.com/isr/he) has revolutionized the teaching of mathematics for young ages (from kindergarten until 6th grade) by using computer-based games and virtual laboratories. The learner's progress is monitored, and adaptive digital interactions are tailored to his/her personal learning curve. This method contains hundreds of learning activities and is easily adaptable to blend in with the traditional classroom teaching style and existing books. The company now operates in more than 20 countries worldwide.

(d) CodeMonkey (https://www.playcodemonkey.com/) is a gaming-based approach for teaching children (ages 9 and above) the basic principles of computer code writing. In the game, the learner controls an ape that needs to collect bananas by overcoming different obstacles. The game requires textual code writing and is well suited for playing in classrooms, including an array of 20 activities that enable teachers to monitor progress and respond to difficulties. The game has become popular in Israel with >250,000 participants in the Israeli Cyber Olympic Games, which were based on CodeMonkey. The game is now available in 15 languages.

(e) TinyTap (https://www.tinytap.it/activities/) offers an open digital toolkit for developing educational games by teachers (parents) to deliver concepts and knowledge in a fun, game-oriented manner. An international community of developers created hundreds of learning objects in various languages, which can be grouped into courses with several study units. Learners are required to play and achieve a certain mastery level before proceeding to the next one.

(f) Time To Know (http://timetoknow.com) was founded in 2005 and offers integrative solutions for computer-based teaching of English, mathematics, sciences, and language skills. The students can use a variety of platforms (desktop in class, mobile at home) to learn and practice, while teachers are able to track and monitor progress of each individual's performance. The Time To Know solution is implemented in 350 schools in Israel and also in France, Singapore, and the USA.

There are tens of other start-up companies that operate in the educational technology sector in Israel, and venture capital (VC) and investment funds show considerable interest in new and emerging solutions for the educational challenges of this era. The EdTech Israel portal (http://edtech.org.il) aims to consolidate the ecosystem of investors, educators, and developers and to foster further growth. One of the effective vehicles is organizing the national annual EdTech Summit, which brings together all the relevant players. In the 2016 summit, there were 48 companies and start-ups and 120 entrepreneurs, accompanied by researchers and educators from Israeli universities and relevant ministries. The growth in this sector is predicted to continue in the coming decade as the predominance of Internet access and numbers of tablets, handheld devices, and smartphones in Israel are accelerating.

National Conferences and Professional Meetings

There are two major annual conferences on e-learning in Israel that have a long history and cater to the professional community of researchers and practitioners in universities, teacher training colleges, and educational institutes. The Research Center for Innovation in Learning Technologies at the Open University of Israel (formerly named the Chais Center; http://www.openu.ac.il/innovation/index.html) hosts the "Learning in the Technological Era" conference (Eshet-Alkalai et al. 2006). This 2-day international conference focuses on theoretical research and experiments conducted in different venues. Already, 12 conferences have been conducted, and the meeting has become a learning arena for students at MA programs in educational technology taught at different higher education institutions. A selected compilation of presented abstracts is submitted for publication in a special issue of the *Interdisciplinary Journal of e-Skills and Lifelong Learning* (IJELL) (Geri et al. 2015). Table 7.1 summarizes the milestones and evolution of that conference from its inception in 2006.

The second largest national conference is the annual MEITAL Conference (Yair and Shmueli 2014). This meeting's theme is "new technologies and their evaluation in teaching and e-learning" and is held each year on a different campus within the higher education community. The community of practitioners uses the conference to showcase best practice and specific case studies of applied e-learning in different institutions. Due to the fact that not all universities and colleges in Israel are members of MEITAL, and because it focuses almost solely on higher education, it is smaller in scope. The MOACH national conference used to be the influential meeting place for the K-12 computers-in-education community for over 20 years; however, in the past decade, it seems to have lost its central place and has been discontinued. The I-CORE LINKS project at Haifa University holds annual meetings dedicated to the theme of the project "Learning in a Networked Society."

Individual universities and colleges throughout the country hold their own internal annual conferences, targeting mostly their faculty members and students. For example, since 2014 the Holon Institute of Technology (HIT) conducts a full-day conference with specific focus on interface design, gaming, virtual reality, mobile applications, and video usage. The Beit Berl Academic College that specializes in teacher training organizes an annual "Digital Pedagogy" event, in order to update and share new pedagogies and tools to students and future teachers. The MOFET Institute for Research, Curriculum, and Program Development for Teacher Educators (www.mofet.macam.ac.il/) holds an annual meeting for education professionals (a concept of "train the trainers"), along with numerous workshops, seminars, and online tutorials on specific issues in the Israeli educational arena.

Table 7.1 Summary of the first decade of the "Learning in the Technological Era" conferences held at the Open University of Israel

A decade of Chais conferences				
	Milestones	Chais conference papers	Chais conference posters	IJELL special series papers
2006	The first Chais conference held on March 1, 2006	34		
2007	Collaboration with EDEN	40	8	
2008		47	17	
2009	IJELLO (currently IJELL) special series of Chais conference best papers launched	47	11	13
2010	The Research Center for Innovation in Learning Technologies is inaugurated	39	15	9
2011		42	9	9
2012	Chais conference becomes a 2-day event. The first best student paper award conferred	40	30	8
2013		40	32	5
2014		36	41	5
2015	The tenth Chais conference held on February 10–11, 2015	34	34	10
	A decade of Chais conferences	*399*	*197*	*59*

Source: Geri et al. (2015).

E-Learning Degree and Certificate Programs

Several colleges and universities offer BA and MA degree programs in e-learning and educational technologies. Below is a brief review of the leading programs.

- The Holon Institute of Technology (HIT) offers a BA in learning technologies, a 3-year practical program focused on design principles, web interface, mobile platforms, and interactive media. The students are expected to develop a product together with an industry partner during their final project.
- The Center for Academic Studies (http://www.mla.ac.il/) is a public college that offers a master's degree in education, with a track on e-learning. This program is based on a blend of theoretical and practical courses, aiming to utilize different tools for various knowledge domains and learner types (including special needs).
- The Kibbutzim Seminar in Tel Aviv is one of Israel's oldest teacher colleges and offers a special MA program of technology in education (http://www.smkb.ac.il/techonology-in-education). This degree is aimed for teachers in regular and special education. Students are trained in using digital tools for teaching and developing educational (mobile) applications and online virtual courses.

- The Open University of Israel offers an MA program in the department of psychology and education in two separate tracks: learning technologies and learning systems. The programs are built on joint basic courses comprising 20 credits and additional specialized 16 credits (36 credits total). Students can choose to complete the program with or without thesis, based on their performance.
- Tel Aviv University offers MA and PhD programs in technology and learning within the school of education. This interdisciplinary program focuses on three main pillars: cognitive aspects and learning sciences, Internet-based applications and e-learning systems, and technological aspects of advanced learning systems.
- Haifa University (http://www.edtech.haifa.ac.il/) offers a 2-year MA program in educational technology (36/40 credits for non-thesis/thesis tracks, respectively). The program is embedded in the LINKS I-CORE excellence center and contains courses designed for training and instruction in organizations and high-tech companies, to complement the educational system.

Institutional ICT and LMS Support Centers

With the accelerated pace of ICT adoption on campuses, many universities established internal support mechanisms for faculty and students. The digital literacy of faculty and students is not always sufficient to use the local learning management system (LMS), and so specific tailor-made courses are given at the beginning of the academic year. As most HE institutions use the Moodle learning system, there are shared applications developed on this open platform, and either the computer unit or private companies are tasked with implementation and support. Even the Open University, which had developed its own Hebrew-based LMS in the mid-1990s (Yair 2010) and had led the local community in terms of user statistics and amount of use, decided to abandon it and to adopt Moodle in 2011 (a process that necessitated migrating the accumulated educational resources into the new format). In most Israeli higher education institutions, there are rather small and efficient ICT units that deal with pedagogy and faculty support, and the bulk of the technical infrastructure, administrative services, and online capabilities are managed by the institutional computer unit.

Future Directions and Challenges

Israel is a technological powerhouse and a constant source for innovation. In the EdTech sector, it leads in the development and dissemination of innovative learning methods, and new trends and concepts are experiencing growing adoption rates in the K-12 formal education system, in teacher training colleges, and in higher education. Nevertheless, significant challenges are emerging, which necessitate fresh and new approaches, accompanied by extensive research:

(a) *Ethics*: the introduction of high-level digital resources and the increased access to online academic learning materials (including OCW from leading universities) have increased the amount of cheating and non-original work. Universities are grappling with means to stop "cut-and-paste" practices and to administer policies that will address such issues (Harmon et al. 2010; Rotem et al. 2016).
(b) *Reduced attention in lecture halls*: as noted by many researchers, there is an acute decline in the attentiveness of "Generation Y" students while in the classroom or lecture hall, likely due to the prevalence of smartphones and laptops. Universities are looking into new models such as "flipped classroom" and interactive polling software to engage students in a more profound manner.
(c) *Critical thinking skills*: one of the major issues in HE is the reduced ability of modern students to distinguish between quality, authentic resources and fake or illegitimate resources. This universal issue is being taught from early ages and in academic courses.
(d) *Reading in digital format*: there are clear indications that reading from screens is not as deep and meaningful as reading from printed texts and leads to a "false mastery" perception by learners and shallower understanding (Ackerman and Lauterman 2012). There are indications of a decreasing level of proficiency and expression in submitted assignments.
(e) *Gamification*: the incorporation of games and simulations into courses is becoming a popular method in the formal educational system. The pedagogical benefits of such simulations and the acquired skills have been recognized. This trend is expected to grow, especially in higher education and corporate/professional arenas.

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Chapter 8
Jordan

Mofeed Abumosa and Sawsan Mashal

Abstract This chapter surveys the development and current state of e-learning in The Hashemite Kingdom of Jordan. The authors survey the general social, economic, historical, and demographic background of Jordan and provide a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Jordan. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Jordan • E-learning • Web-based learning • ICT • Internet • Education • Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Jordan is situated in the southwestern part of Asia at a significantly strategic site, forming networks of links between the Arabian Peninsula to the south and Mesopotamia and Syria in the north. It is a small kingdom located in the heart of the Middle East, northwest of Saudi Arabia (744 km), south of Syria (375 km), southwest of Iraq (181 km), and east of Israel and the Occupied West Bank (238 km, 97 km). Jordan has access to the Red Sea via the port city of Aqaba, located at the northern end of the Gulf of Aqaba. A person in Jordan can go directly to the geographic coordinates: 31 00 N, 36 00 E. The population of Jordan is as a social unit interconnected, despite the great diversity of their origins, their demographic and sociological differences, and the diversity of their natural environments. According to *ALRIA* newspaper (considered as an official paper), the published official statistics on the inhabitants report 6.6 million Jordanians, 1.2 million from Syria, 634,000 from Palestine, 39,000 from Egypt, 130,000 from Iraq, 31,000 from Yemen, and 23,000 from Libya. Total population in 2012 was 6,508,887 (July 2012 EST.). It should be noted that there has been a jump in population due to the regional refugee problems (Qadamani 2016).

The total area is 89,342 sq. km and the capital is Amman. Arabic is the official language, but English is widely spoken. Jordan's currency is the Jordanian Dinar or JD. The rate of exchange is currently 1JD = 1.4 USD. The time zone is GMT + 2 (in winter, +3 in summer), or 7 h ahead of US Eastern Standard Time, and summer time is observed from April through September. Jordan has a combination of Mediterranean and arid desert climates, with Mediterranean climates prevailing in the north and west of the country, while the majority of the country is desert. Generally, the country has warm, dry summers and mild, wet winters, with annual average temperatures ranging from 12 to 25 C (54 to 77 F) and summertime highs reaching the 40s (105–115 F) in the desert regions. Rainfall averages vary from 50 mm (1.97 inches) annually in the desert to as much as 800 mm (31.5 inches) in the northern hills, some of which falls as snow (CIA World Factbook 2017).

Government and Political Environment

The Hashemite Kingdom of Jordan is a parliamentary, hereditary, and monarchic state where loyalty is for God, the homeland, and the King. His Majesty King Abdullah II is the Head of State, the Chief Executive, and the Commander-in-Chief of the Armed forces. The king practices his executive authority through the Prime Minister and the Council of Ministers or Cabinet. The Cabinet is responsible to the elected House of Deputies which, along with the House of Notables (Senate), constitutes the legislative branch of the government. The judicial branch is an independent branch of the government. Since 1989, all elements of the Jordanian political spectrum have embarked together on a road to greater democracy, liberalization, and consensus building. These reforms, which were guided by the late King Hussein, have placed Jordan on an irreversible road to democratization. The result has been greater empowerment and involvement of everyday citizens in Jordan's civic life, contributing to increased stability and institutional-building which will benefit the country far into the future.

Since His Majesty King Abdullah II assumed the throne in 1999, Jordan has embarked on some broad economic reforms in a long-term effort to improve living standards. The Jordanian government has worked closely with the IMF, practiced careful monetary policy, and made significant progress with privatization. The government also has liberalized the trade regime sufficiently in order to guarantee Jordan's membership in the World Trade Organization (2000), an association agreement with the European Union (2000), and a Free Trade Agreement with the USA (2000). Jordan has also signed a Bilateral Investment Treaty with the USA (Quick Facts 2017).

Education System in Jordan

According to the official website of the Jordanian Ministry of Education (Educational System 2017), the philosophy of education in Jordan is based on Islamic Arab civilization, the principles of the Great Arab Revolt, and the Jordanian constitution.

(a) The national bases of pan-Arab and human:

1. Jordan is a part of the Arab Nation, and the Jordanian people are indivisible from the Islamic and the Arab Nations.
2. The Arabic language is an essential pillar in the existence of the Arab Nation; its unity and renaissance.
3. The Palestinian cause is crucial to the Jordanian people.

(b) The social bases:

1. Jordanians are equal in political, social, and economic rights and responsibilities and are distinguished only by what they contribute to their society and their belonging to it.
2. Respect for the individuals freedom and dignity.
3. Education is a social necessity and a right for all, each according to his intrinsic abilities and potentials.

(c) General objectives:
The general objectives of education in the Kingdom emanate from the philosophy of education and are exemplified in shaping a citizen: believer in God, adherent to homeland and nation, endowed with virtues and human aspects, and mature physically, mentally, spiritually, and socially so that each student, by the end of the educational cycles, shall be able to:

1. Use Arabic language in expressing himself and in communicating easily with others.
2. Vigilantly comprehend facts, concepts, and relations connected with the natural environment, both locally and globally, and effectively use them in life.
3. Comprehend Islam as an ideology and Sharia' and vigilantly exemplify its values and trends.
4. Vigilantly comprehend technology and acquire skills of using, producing, and developing it, and subjugate this technology to serve the society.
5. Think objectively and critically and adopt scientific methods of observation, research, and problem-solving.
6. Adhere to citizenship rights and shoulder the related consequential responsibilities.
7. Invest personal potentials and free time in developing knowledge, innovation, invention, and the spirit of initiative, and work toward its completion and in innocent entertainment.

(d) The educational policy principles:

The educational policy principles are manifested in the following:

1. Orienting the educational system to have better suitability to both individual and societal needs and establishing a balance between them.
2. Emphasizing the importance of political education in the educational system and enhancing the principles of participation, justice and democracy, and their practices.
3. Enhancing scientific methodology in planning, conducting and evaluation of the educational system, and developing research, assessment, and follow-up system.
4. Expanding educational type in the educational institutions to have them involve programs for special education and others for gifted learners and for those with special needs.
5. Emphasizing the fact that teaching is a message and a career that has its own ethical and occupational basics.
6. Enhancing pride in the scientific and social status of the teacher for his distinguished role in building-up the individual and society.

The Educational Cycles and Their Objectives

(a) The educational institutions are classified in terms of their cycles in the following types:

   1. The pre-school (kindergarten) cycle of maximum 2-year duration
   2. The basic education cycle of 10-year duration
   3. The secondary education cycle of 2-year duration.

(b) Upon instructions issued by the Minister, it is allowed to:

   1. Accelerate gifted students by reducing the academic scholastic years needed to accomplish the primary stage for the period that does not exceed 2 years.
   2. Reduce the number of scholastic years needed to finish secondary education in accordance with the semester's system or according to foreign programs and does not exceed 3 semesters excluding summer semester.

The Basic Education Cycle

(a) Basic education is compulsory and free in the government school.
(b) A child is accepted in the first year of the basic education by completing 6 years of age by the end of December of the school year he is enrolled in.

(c) A student is not to be expelled from school before completing 16 years of age, except for those with health problems stated in a report and signed by a specialized health committee.
(d) Basic education is the base for education and the cornerstone for building-up national and pan-Arab unity, developing intrinsic potentials and attitudes, and orienting students accordingly.
(e) This cycle aims at realizing the general objectives of education and preparing the citizen in all aspects of his personality, physical, mental, social, and spiritual, so that he shall be able to:

1. Vigilantly acknowledge Islam's history, principles, provisions, and values and exemplify them ethically and behaviorally.
2. Acquire the basic skills of the Arabic language so that he becomes able to use it easily.
3. Realize essential facts relevant to the natural and geographical environment on the Jordanian, Arab, and world levels.
4. Exemplify the social behavioral basics and respect the traditions, habits, and sound values of his society.
5. Love his homeland, feel proud of it, and hold the consequent responsibilities.
6. Acquire the basic skills of at least one foreign language.
7. Comprehend scientific basics of all exposed types of technology and exploit them in daily life.

The Secondary Education Cycle

(a) Students enroll in the secondary education cycle, according to their abilities and interests. Secondary education provides specialized cultural, scientific, and vocational experiences which shall meet the existing and anticipated needs of the Jordanian society and of such standard which helps the student continue higher education or join fields of work.
(b) This cycle aims at building up a citizen who shall be able to:

1. Use his Arabic language to enhance his scientific and literary knowledge to consider the constituents of the correct linguistic structure and to relish the arts of the language.
2. Have cultural identity derived from his nation's past and present civilization and be aware of the necessity for.
3. Conscious openness to world civilization and contribute to its development.
4. Interact with the cultural environment of his society and work toward its development.
5. Endeavor for the prosperity, eminence, and pride of his country and for participation in resolving its problems and bringing about its security and safety.

6. Perform his duties and adhere to his rights.
7. Work with a team spirit, be aware of the bases and forms of consultation and democracy, and apply them in his dealings with others, and believe in the principles of social justice.
8. Be aware of international issues and problems and perceive the importance of international understanding and peace built on right and justice.
9. Master at least one foreign language.
10. Investigate information source and master the processes related to collecting, storing, and processing data, as well as ways of benefiting from them.
11. Relish artistic work and express his artistic tendencies in producing positive artistic works up to the standard of his abilities and potentials.
12. Develop himself through self-learning and continued learning throughout his life.
13. Exemplify Arab and Islamic values and human perfection in his behavior.

Secondary education consists of two major streams:

(a) Comprehensive secondary education stream with a common general educational basis and specialized academic or vocational education.
(b) Applied secondary education stream which is based on vocational preparation and training.

The conditions for acceptance in secondary education are determined in accordance with regulations issued by the minister according to bases decided upon by the council.

Collecting school donations in governmental educational institutions is permitted for the purpose of promoting the educational process, in accordance with regulations issued for this purpose (Educational System 2017).

E-Learning in Jordan

Telecommunications in Jordan

Jordan has an extremely developed communications infrastructure. Jordan's telecom infrastructure is progressing at a very rapid pace and continually being updated and expanded. Communications in Jordan take place across many media, including telephone, radio, television, and Internet. Jordan has been one of the most active countries in the region in terms of initiatives aimed at revolutionizing its telecommunications industry.

Jordan has divided its telecommunications and created a Telecommunications Regulatory Commission (TRC), which has authority to license private sector projects; TRC allowed for service providers and established a policy-making body. In a step to privatize the telecommunications sector, Jordan corporatized the Telecommunications Corporation, a government-owned entity, and created Jordan

Telecommunications Company, a public shareholding company that has opened most activities to private operators. Corporatization of state enterprises in Jordan is regulated by the Companies Law, which allows the transformation of these enterprises into public shareholding companies fully owned by the government. The government has also granted numerous licenses authorizing the provision of data transmission services, Internet-related services, private payphone operations, and private wireless equipment services. Many of the companies providing these services have attracted significant foreign investment. The fastest growing area, like most of the region, has been in the area of cellular services. In 1994, Jordan licensed Jordan Mobile Telephone Services (Fastlink) as the first cellular service provider in the country, and the rate of growth has been impressive (Telecommunications in the Middle East 2017).

Some important facts about telecommunications in Jordan taken from the CIA *World Factbook* indicate that there are 614,000 (2006) main telephone lines in use and 4.343 million (2006) mobile cellular telephones. The general assessment of the telephone service is that it has improved recently with increased use of digital switching equipment; microwave radio relay transmission and coaxial and fiber-optic cable are employed on trunk lines; growing mobile-cellular usage in both urban and rural areas is reducing use of fixed-line services; and internet penetration remains modest and slow-growing domestically. In 1995, the telecommunications law opened all non-fixed-line services to private competition; in 2005, the monopoly over fixed-line services was terminated, and the entire telecommunications sector was opened to competition. Mobile-cellular usage is increasing rapidly, and teledensity is approaching 75 per 100 persons internationally. Jordan is a landing point for the Fiber-Optic Link Around the Globe (FLAG) submarine cable network that provides links to Asia, Middle East, and Europe. Jordan has 3 Intelsat, 1 Arabsat, and 29 land and maritime Inmarsat terminal satellite earth stations as well as a fiber-optic cable to Saudi Arabia and microwave radio relay link with Egypt and Syria. Jordan is a participant in Medarabtel (Middle East Telecommunications Project of the International Telecommunications Union). In 2007, there were 2500 Internet hosts. In 2000, there were only 5 Internet Service Providers (ISPs) in Jordan, but by 2006 there were 796,900 Internet users (CIA World Factbook 2017).

History of E-Learning in Jordan

E-learning approaches have become the main interests of educators in many countries. Jordan is one of those countries which has embraced e-learning projects, and the Jordanian universities have started to execute e-learning projects intending to improve the effectiveness and efficiency of the educational process for both teachers and students. By a brave vision of His Majesty King Abdullah II, Jordan has strived toward constructing a knowledge-based economy, where the generation and the use of knowledge will add considerably to economic development and wealth making. Therefore, the whole country started a real revolution with a firm political will. Government organizations have embraced new tools for improved production, and educational systems have motivated new learning methods aligned with the new advanced network connectivity and state-of-the-art technologies.

Jordan's first real distance learning attempt was made in 2002. The Ministry of Education of Jordan and the ministries of planning and information technology and telecommunications moved toward achieving national e-learning through the formation of national knowledge networks, where the use of ICT was a base for the transition to the e-learning system. This e-learning system depends on the progress of self-learning and critical thinking as an alternative to the traditional educational approaches, which heavily depend on instruction by the teacher or lecturer.

This initiative requested to provide all e-learning means and tools for more than 3000 schools all over the Kingdom of Jordan so that the part of the teacher evolves toward a coordinator and a facilitator rather than an instructor showing the students. The teacher's new role is to help the student access unplanned information, activities, and gather information on their own.

The main thrust of e-learning in Jordan to date has naturally come from the Ministry of Education (MoE) and who, as part of its overall strategy to employ Information and Communication Technology (ICT) in education, established a facilitating body – the Queen Rania Al Abdullah Center for Information and Educational Technology. Contemporary developments in ICT have encouraged an increasing interest in e-learning pedagogy to extend access to learning and promote lifelong learning among citizens through the use of ICT. In view of that, the Ministry of Higher Education and Scientific Research (MoHESR) has established a National e-Learning Strategy for Higher Education Institutions with a mission: "To support institutions of higher education in their move towards embedding eLearning appropriately using technology to transform education into a learner-centric system that is internationally distinguished in its quality and impact, to foster innovation and excellence in teaching and learning, and to support employability of lifelong learning" (2017).

This strategy offers the strengths, weaknesses, opportunities, and threats for embracing e-learning in the higher education institutions in Jordan and then sets forward seven strategic goals:

1. To enable institutions to adopt e-learning and facilitate widening access to learning
2. To support institutions in their strategic planning with a holistic approach to embedding e-learning including implementation, administration, and change management
3. To create a culture and awareness for e-learning
4. To establish a robust, integrated virtual learning environment
5. To assure the quality of e-learning and its impact on students' teaching, learning, and assessment experience
6. To promote learning and educational technology research that focuses on student learning rather than on technology and on faculty and staff development
7. To lead the move toward instilling lifelong learning and enabling connections between academic learning and experiential learning.

These goals are succeeded by definite objectives with actionable strategies to accomplish the set goals. The strategy is intended to set up the design plan for policy creators to implement e-learning within the higher educational systems in Jordan. The steering committee will continually measure progress toward meeting the goals, offer yearly reports and bring partners up to date, and keep the flexibility to review the set goals and plans as external and internal conditions change.

Projects, Programs, and Initiatives

The Ministry of Education (MoE) has carried out exceptionally hard work to apply ICT in schools, wherever computer labs have been present in public schools and also prepared with computers, Internet lines, and items such as printers, scanners, and data show projectors. The MoE has created the e-learning portal (EduWave) (EduWave 2017) which allows all learners to connect easily through discussion forums, e-exams, e-mails, and additional media. This portal also improves education by supporting the innumerable e-content subjects, such as Math, Science, English and Arabic languages and IT, in addition to The Civic and Health Education. The MoE has also started teaching computer courses since 2000 for grades 7–11. The Jordanian education system has embraced several ICT training courses directed to develop the use of ICT in the classroom and has been eager to encourage all teachers to join all these courses including International Computer Driving License (ICDL), Intel Teach to the Future, World Links, iEARN, and CADER (Projects 2017). These courses are aimed at improving teachers' ICT proficiency at three levels: ICT skills, pedagogical skills, and curriculum training. The ICDL course focuses on improving teachers' ICT skills, including word processing, spreadsheets, and surfing the Internet. In contrast, the Intel Teach to the Future program aims to train teachers and students to use technology effectively in the classroom (The Intel® Teach Program 2017), and World Links focused on preparing students, teachers, and the educational system to enter the information age through providing schools and teachers with the skills and educational resources to make use of ICT (World Links 2002). In addition, Change Agent for Arab Development and Education Reform (CADER) offers a Higher Education Diploma in ICT, which specializes in training teachers to use modern pedagogies and integrate them with ICT. While the iEARN course had been adopted early in 2004, it was then rejected during the early stage of its implementation, as it appeared to focus only on the student side of the education system.

The Intel Teach program's introduction in Jordan in 2003 followed the Ministry of Education's Education Reform for the Knowledge Economy (ERfKE) and The Jordan Education Initiative (JEI) initiatives (Ligh 2008; MoHE 2017). As a result, the program arrived at an appropriate time. Because the program directly targets the goals of both initiatives, Intel Teach was recognized by the MOE and soon became the primary method for training educators in how to integrate technology in the classroom and help students develop crucial twenty-first century skills. To date, 33,000 teachers – 60 percent of public school teachers – have been trained through the Intel Teach Essentials program, reaching approximately 700,000 students throughout Jordan. Intel Teach is one of only two programs of the sort recognized by the MOE in Jordan, and the Intel program is easily the most powerful choice. The MOE has established such confidence in the Intel program that they now offer teachers who have participated in the program the chance to benefit professionally and financially for their participation and learning. After completing the program, teachers take an automated test; if they pass, they are eligible to be promoted in rank and qualify for a 15 percent increase in salary.

Additionally, the MOE has made a commitment to train 10,000 teachers in the Intel Teach Thinking with Technology Course, which promotes students' higher-order thinking using Internet tools. The MOE has expressed the desire to train an additional 10,000 educators (20,000, total) by the year 2011. The Minister of Education has also requested to implement the Intel Teach Advanced Online Course in Jordan, allowing teachers further support after their initial training, as well as access to an online community of teachers around the world.

The Ministry of Information and Communication Technology (MoICT) has started the National Broadband Network Program (NBN Program) which helps to develop Jordan's educational system by increasing ICT dissemination in universities, community colleges, schools, and learning centers all over the Kingdom. This high-speed, fiber-optic-based network was estimated to link nearly 20% of Jordanian schools by 2011.

The Jordan Education Initiative (JEI) has begun as the first model that establishes true incorporation between the public and private sectors. It was started by the World Economic Forum and the Jordanian Government during the meeting of the Forum that took place under the patronage of His Majesty King Abdullah II at the Dead Sea in June 2003. The initiative was launched in the attendance of over 100 local and international members, with the goal of backing up Jordan's efforts in enhancing the general level of education, encouraging creativity, increasing capabilities, and building a knowledge economy by using the up-to-date technological tools in 100 public schools, afterward named "Discovery Schools" (*Learning* 2017).

The Jordan Education Initiative is one of Her Majesty Queen Rania Al-Abdullah's nonprofit organizations that ensured, since its launching 6 years ago, the care and support of Her Majesty through her close follow-up to every creative and innovative endeavor. Because of this attention and follow-up, many countries have requested the help of this initiative, particularly in terms of electronic curricula, providing infrastructure for operating technology in education, and in the application of creative and distinctive programs for the advancement of the educational process involving "The Student, The Teacher, The School Unit."

The JEI has operated in the Discovery Schools and has thus far impacted 80,000 students and 3000 teachers, and delivered a technological working environment and electronic resources, as well as other exceptional and qualitative accomplishments. The initiative was registered as a nonprofit organization and had the honor of Her Majesty Queen Rania Al-Abdullah to launch the second phase of the initiative in 2008.

To follow up on the hard work made in the field of carrying out specified studies to measure the effect of ICT on education, the MoICT, the MoE, and the JEI have piloted an inclusive survey of all local and private Jordanian schools to measure a set of indicators in the use of ICT in education, which in turn will help in taking resolutions that are based on dependable and up-to-date data. A committee from the three parties was formed in order to plan and implement the study and examine the findings. The three parties signed a Memorandum of Understanding (MoE) on January 5, 2011, recognizing the tasks and responsibilities allocated to each party in order to reach satisfactory results.

We can say that from 2003 until 2009 the process of integrating ICT in education was centralized by MoE, but after 2009 the MoE allowed every school to guide its own efforts in integrating ICT in education. The graphs (Figs. 8.1 and 8.2) below indicate the spread of ICT in schools (*Reports (Arabic)* 2017).

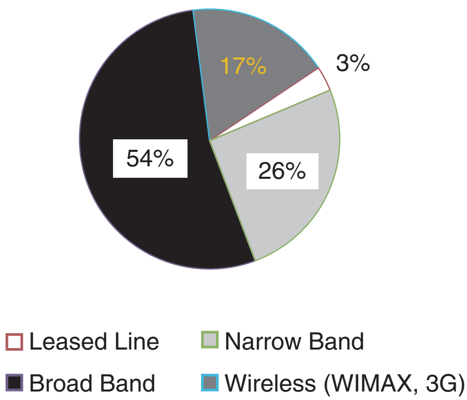

Fig. 8.1 Percentage of schools with Internet access by connection type. *ICT Use and Penetration in Schools of Jordan July 2012*

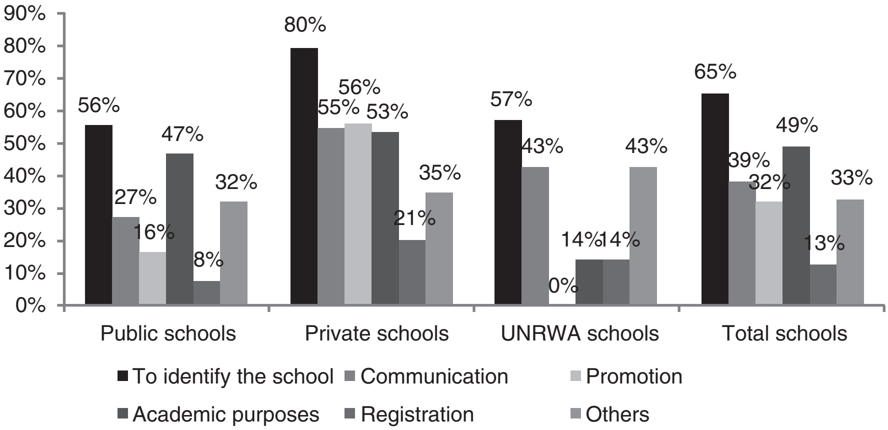

Fig. 8.2 Percentage distributions of schools connected to Internet and have (website, webpage and blog) per sector and use purposes

International Collaborations

Jordanian institutes are in general relatively open to international collaboration. Public organizations regularly send their top students on scholarships to acquire graduate degrees (Doctorates in particular) in order to come back and teach at the university level after graduation. Some private universities have been doing this also but on very small scale because of the cost. Anywhere internship or optional courses are part of study plans, universities help their students to experience such periods of training and study outside Jordan if students have the financial ability to do so, for example, through the Erasmus program (*National Erasmus+ − Jordan* 2017).

Participation in EU Programs

Tempus

Jordan has taken part in the Trans European Mobility Program for University Studies (Tempus Programme) since 2002. Tempus supports the modernization of higher education in the EU's neighboring area. Tempus encourages institutional cooperation that includes the European Union and Partner Countries and focuses on the reshaping and modernization of higher education systems in the Partner Countries of Eastern Europe, Central Asia, the Western Balkans, and the Mediterranean region (National Erasmus+ Office of Tunisia 2017). Tempus has made good contributions toward reforming and developing the higher education system and institutions in Jordan. The most evident and sustainable contributions were in curriculum reform. Through Tempus projects, Jordanian universities were able to create with the help of European specialists a number of new master's degree programs in several fields of study.

To be capable to teach the new courses, a number of new facilities were founded and some existing ones were improved. These consist of mainly computer labs with state-of-the-art professional software, servers to present the e-learning material, video conference facilities, and specialized equipment for certain disciplines. Several Tempus projects introduced the use of ICT in teaching, learning, and in the classroom, and several projects developed a number of courses on the web that may be used for open learning. Examples of these projects include Open Learning Models and Technologies, the ICT Learning Pentagram, and Diploma in Public Policy and Child Rights.

All of this work, together with the experience acquired through the interchange of faculty members between Jordan and Europe, has changed the way faculty members in Jordan teach their courses and communicate with students. Such activities have provided teaching staff with a number of techniques that enrich the way they deliver their courses, which will improve the skills and quality of graduates.

Tempus projects have improved the quality of the educational programs through the contribution of EU professors and experiences in the definition of some curricula and the improvement of other programs and study plans. In addition, these plans also improved the methods of preparing for the courses and their assessment and evaluation. Jordanian students gained from Tempus and other EU programs directly and indirectly. Tens of Jordanian students took part in exchange visits to Europe, and similar numbers of European students participated in exchange visits to Jordan. During these visits, students joined short summer courses (2–4 weeks duration), participated in case studies, and did internships. Through these activities, Jordanian students were able to be exposed to and better understand the European system of higher education, the educational structure in Europe and the interrelated institutions, and have a better understanding and appreciation of the universities in Europe.

Because of these projects and the activities involved, many Jordanian students from those who were participants in Tempus projects have already gone to Europe to continue their graduate studies. Through the Establishing Quality, Relevant and Collaborative Industry-Oriented IT Education project, the German-Jordanian University achieved a number of agreements with the main industries in Jordan and Germany to allow students to do their internships and for teaching faculty to spend some time in the industry. Such agreements also enlarged the presence of representatives from these sectors on the academic boards of the institutions and departments, which would improve the applicability of courses to the needs of the community, and would result in better and more suitable jobs for the graduates.

Over the past 10 years, about 15 Jordanian universities and organizations have established relations and collaborated with their corresponding European partners. Tempus projects have helped in establishing new links or strengthening existing ones. These links will form a good and firm foundation for future cooperation between Jordan and Europe that will last for many years to come. As a matter of fact, this has a significant value, equal to or even greater than the direct benefits gained from projects in their particular themes. In addition to relations with the EU, Jordan has also established relations with universities in seven Arab countries through Tempus projects.

EQTEL Project (Enhancing Quality of Technology-Enhanced Learning at Jordanian Universities)

EQTeL (Enhancing Quality of Technology-Enhanced Learning at Jordanian Universities) aims to develop the quality and significance of technology-enhanced learning (TeL) at Jordanian higher education institutions and to facilitate the country's more seamless inclusion into the European Higher Education Area. The main project objective is to enhance, develop, and implement accreditation standards, guidelines, and procedures for quality assurance of TeL courses and study programs at a national level. The new standards will assimilate the quality of TeL courses offered by higher education institutions in Jordan and would consequently be incorporated into existing legal acts and regulatory documents at both institutional and national levels. Implementation of the new standards will be ensured through establishing a capacity building program that provides extensive training for all levels of staff involved in accreditation or delivery of TeL programs, from teaching staff, trainers, evaluators, official accreditation reviewers, and higher education public authorities.

This will result in improving staff competencies in defining and applying a standardized quality assurance system and defining national standards for TeL taking into account quality references and guidelines commonly shared with Ministry of Higher Education and Scientific Research as well as the Higher Education Accreditation Commission. The project will also seek the possibility to develop a close connection with the Bologna 3-degree cycle structure to allow for better definition and positioning of the training programs. This is in agreement with the European Neighbouring Policy and the Catania Declaration of January 2006. Internal and external mechanisms for "Quality Control and Monitoring" of the project will be realized, continuously maintained, and evaluated at several levels. The project may make a wide impact on the national accreditation system in Jordan, and thus synergy of the universities, the ministry, and HEAC is the best guarantee for the sustainability of the project beyond its lifetime (Tempus IV Projects 2017).

Erasmus Mundus

Based upon the recommendations of the Minister of Higher Education and Scientific Research, Minister of Planning and International Cooperation, and the Minister of Finance, the Council of Ministers adopted a Decision in its meeting on December 21, 2014, to establish a National Erasmus+ Office, as an autonomous legal entity to replace the National Tempus Office.

The Erasmus Programme, or "European Community Action Scheme for the Mobility of University Students," was founded to promote and facilitate students completing part of their studies at universities in other EU countries. To encourage international study, Erasmus makes closer links between higher educational institutions so that thousands of students can study at some of Europe's top universities. Students spend 3–12 months doing part of their degrees overseas, taking advantage of the arrangements of programs of study created by the Bologna Process. The Bologna Process is a collective effort of public authorities, universities, teachers, and students, together with stakeholder associations, employers, quality assurance agencies, international organizations, and institutions, including the European Commission.

Erasmus Mundus (2009–2013) is a collaboration and mobility program in the area of higher education receiving powerful international attention. It functions through three actions:

Action 1: Erasmus Mundus Joint Programmes (Master Courses and Joint Doctorates)
Erasmus Mundus Joint Programmes are operated by consortia of higher education institutions (HEIs) from the EU and (since 2009) elsewhere in the world. They offer a combined course and joint or multiple diplomas following study or research at two or more HEIs. Master Courses and Joint Doctorates are carefully chosen each year

following a Call for Proposals. There are currently 123 Master and 24 Doctorate programs offering EU-funded scholarships or fellowships to students and scholars from all over the world.

Action 2: Erasmus Mundus Partnerships (Former External Cooperation Window)

Erasmus Mundus Partnerships bring together HEIs from Europe on the one hand and from a particular region in the world on the other. Together the partnerships manage mobility flows between the two regions for a range of academic levels – bachelors, masters, and doctorate, post-doctorate – and for academic staff. The program is focused on geographical "lots" of countries or regions covered by the EU's financial instruments for cooperation. These lots include most Tempus countries. New partnerships are selected each year through Calls for Proposals.

Action 3: Erasmus Mundus Attractiveness Projects

This action of the program funds projects to enhance the attractiveness, profile, image, and visibility of European higher education worldwide. HEIs (and other key players in the HE sector) may apply (see: Erasmus Mundus Programme 2017).

In 2014, the European Union launched the Erasmus+ program in order to enhance exchange between members of Higher Education Institutions in Europe and the rest of the world. Since then, the German-Jordanian University has established several partnerships with distinguished universities all over Europe. The Erasmus+ program provides GJU undergraduate students the opportunity to spend one semester at one of the partner universities. The program supports the student with a monthly scholarship that covers living expenses as well as a travel allowance.

The Erasmus programs will provide a wide range of opportunities for Jordan to expand and refine its e-learning capacity through exchanges with European countries with more advanced e-learning infrastructure and technology-based pedagogical culture. For example, in 2015, Jordan's Erasmus+ Office launched the "Improving Higher Education Quality in Jordan using Mobile Technologies for Better Integration of Disadvantaged Groups to Socio-economic Diversity." According to the partners, which include Bulgaria's Plovdiv University "Paisii Hilendarski," UNED (Spanish University for Distance Education), RAVE (Ravensbourne Higher Education Institution) in the UK, University of Jordan, Jordan University of Science and Technology, and Princess Sumaya University for Technology in Jordan, "the project is aiming [for] the development of an adaptive curriculum in engineering education that is based on digital learning resources for mobile devices, responds to the requirements for modernization and accessibility of the Jordanian high education system to improve the educational integration of disadvantaged learners in the educational system - groups in risk whose special needs or socioeconomic status significantly restrict their ability for adequate education" (*Improving* 2017).

A similar Erasmus+ collaboration involving institutions from Jordan, Palestine, Denmark, Spain, and the UK is the "Modernization of teaching methodologies in higher education: EU experience for Jordan and Palestinian Territory" project launched in 2015. According to the Erasmus+ Office in Jordan, "the project aims at modernization of Higher education methodologies with cooperation of EU experiences, by establishing well equipped centers, which engage technology with the teaching process and it will be used to train Professors, Lecturers, Trainers whom already exist in Partner countries and Trainees in best practices of ICT in education….its direct aim is to share, collaborate and enhance the capacity of both Jordanian and Palestinian partner universities to modernize educational programmes with state-of-the art educational technologies" (*Modernization* 2017). The goals of the program will be achieved through the following means:

- Training and follow-up with lecturers/professors on how to develop, share learning objects, and collaborate their e-courses on the portal.
- Establish a well-equipped national center in both Jordan and Palestine interested in modernizing higher education and moving toward knowledge-based economy.
- Create a hub of competences aiming to improve quality of teaching and learning by building the capacity of the PC universities how to evaluate, develop, and design e-curricula, as well as hosting a portal for sharing these experiences.
- Enhance the cooperation EU partners through mutual visits to develop strategies how to move from teaching and learning and develop scalable sustainable solutions.
- Create a pool of experts and clusters of targeted disciplines (Engineering and science) to be as a critical mass toward moving to knowledge-based economy and twenty-first century skills (*Modernization* 2017).

E-Learning Education Certifications and Accreditations

E-learning certifications and diplomas obtained at virtual institutions both inside and outside of Jordan can be recognized in Jordan under the rules below relating to nontraditional education. E-learning falls under the category of nontraditional education, which is defined as teaching based "mainly on interactive communication through technological means of communication like e-learning, integrated education, distance education, and open education" (MoHE 2017).

Rules for Recognizing Nontraditional Higher Education Institutions and Equalizing Their Certificates

Rules for Recognizing Educational Institutions and Their Branches that Provide Nontraditional Education

1. The educational institution must be recognized by the competent official authority in its country, and it must be accredited either by the accreditation panels in such country (if there exists an effective system for accreditation and quality assurance of the nontraditional education) or by an international accreditation panel approved by the Ministry.
2. Any institution willing to obtain recognition must fill out the required information according to the Form adopted by the Commission in order to examine it

and take the appropriate decision. However, the following conditions must be observed:

A. The minimum study period required to obtain an academic degree must not be less than the study period required to fulfill the requirements of the corresponding degrees in the traditional education system.
B. Members of the teaching staff must have the necessary expertise to carry out electronic education.
C. Electronic educational courses must be available through the course teacher or the competent technical unit and according to the university's educational programs.
D. Sufficient number of references, books, and periodicals must be available in the digital library, which must include files that cover the programs provided by the university and comply with the internationally recognized programs.
E. Technological infrastructure and advanced technical capabilities that ensure the security and safety of information and continuity of communication with the recipient must be available.
F. In order to ensure network security and protection and continuity of operation, two identical groups of computer servers (in which identical learning materials and data are stored) must be available in two geographically separated locations.
G. Direct interactive communication via electronic means must be available between teachers and students, especially as regards the supervision over dissertations.
H. The university must be able to hold, and directly supervise, exams via electronic means and in specific locations through mechanisms that ensure integrity of implementation (MoHE 2017).

Equalization of Certificates Issued by Educational Institutions that Provide Nontraditional Education

The following are the prerequisites for equalizing certificates issued by educational institutions that provide nontraditional education:

1. The educational institution must be recognized by the Ministry; however, if it is not in the list of accredited institutions, the Commission may examine such case provided that such institution and its certificates and academic degrees are recognized in the country of study.
2. Study programs of any educational institution must be accredited by the accreditation panels in the country such institution is located if there exists an effective accreditation and quality assurance system; otherwise, the institution must be accredited by an international accreditation panel approved by the Ministry.
3. Certificates issued by educational institutions that provide nontraditional education may not be equalized for the following majors: medicine, dentistry, pharmacy, nursing, medical laboratories, veterinary medicine, applied or complementary

natural sciences, engineering, basic sciences (physics, chemistry, biology, etc.), and other sciences that require laboratories and practical application.

4. Courses whereby a particular academic degree was obtained shall not be considered for obtaining a higher degree.
5. The Commission may consider equalizing certificates obtained through joint study programs held between two or more nontraditional educational institutions recognized by the Ministry, provided that such programs are accredited in accordance with joint agreements between such educational institutions (MoHE 2017).

Future Development

As mentioned in the 2014 Arab Thought Forum, Jordan is moving into a time of fast-moving knowledge-driven information technologies and networks which promise the possible transformation of every classroom preparation. The influence of the use of computers and communication technology will not be restricted to the learning process (teachers and students) but will change the entire institutional infrastructure and expectations of performance inside the education system. Jordan is going through a revolution period in building human capital unparalleled in human history. Education faces the overwhelming challenges of preparing individuals for the information – age society:

- How to manage a mass of information
- How to prepare the most effective human capital for the brain-intensive marketplace
- How to prepare adaptable human resources to face the doubts of a global economy
- How to modernize to keep up with a high-speed, knowledge-driven, competitive economy at the workplace.

Languages, science, and mathematics need to be taught from early childhood to build the microchip of the brain for "acquiring" and not "learning," creating an early childhood environment rich in languages, science, and mathematics that stimulates the child's ability to acquire knowledge unconsciously, instead of through active learning.

By analyzing the analysis in this chapter, we can make some recommendations that may be beneficial to universities and decision-makers in executing e-learning projects in Jordan:

Mode of e-learning delivery Jordanian universities are still at the early phases of moving from traditional education into the e-learning modes. It is anticipated that the blended approach will be more appropriate (face-to-face and online interactions). Using a blended approach may be an effective delivery mode and could lead to overcoming many of the current challenges such as improving the relationship between learners and students, increasing the understanding level of the benefits of e-learning, increasing the level of consciousness about knowledge and skills desirable for using e-learning, and the change in the attitudes of management. In addition, blended learning is permitted by current legislations of the MoHE, while fully online courses are not.

Awareness Generally there is still a lack of awareness among the main stakeholders (instructors and students) of the efficiency of e-learning. Many lecturers believe that the traditional learning method is better. Workshops and training courses are required to be set up to raise the consciousness level of top management, instructors, and students of e-learning. Such consciousness will overcome some of the difficulties such as feeling that e-learning will threaten instructors' roles, problems related to the culture of e-learning users, not taking e-learning seriously by users, and the negative assumptions of users and universities to e-learning.

Top management support Reducing the unfamiliarity of decision-makers in higher education institutions about e-learning advantages will lead to increasing the rate of acceptance among users and reduce the effect of some problems related to the culture of developers, educators, and learners toward e-learning systems.

Legislation of e-learning in higher education Legislation of e-learning in higher education in Jordan limits the level of adoption of e-learning systems in Jordanian universities as the entirely online certificates are still unrecognized by the Ministry of Higher Education (MoHE) regardless of the quality and source of these certificates. A national committee is planned, which represents the several stakeholders such as representatives from the Ministry of Higher Education, Ministry of Education, and Ministry of Information and Communication Technology and representatives from both private and public universities. The goals of this committee are to evaluate the legislation of distance learning in developed and developing countries; develop regulations and standards for e-learning systems; begin accreditation policies for online certificates; raise the awareness level of e-learning in higher education; encourage and support e-learning in higher education; observe and control e-learning practices in higher education; train and develop e-learning content experts; start developing standards of quality e-content; and encourage e-learning knowledge sharing among higher education institutes in Jordan.

Stakeholders

The questions placed to us are straightforward but challenging. What is best for the work that we do? What would guarantee that we could continue to develop in the future?

At the practical application level we can see the cooperation and collaboration among the e-learning stakeholders in Jordan in Fig. 8.3. The stakeholders of e-learning are the Ministry of Education and the Ministry of Higher Education and Scientific Research, Queen Rania Foundation, the universities, and the private schools.

The Ministry of Education and the Ministry of Higher Education and Scientific Research are embracing e-learning in a way that enables widespread innovative uses of learning technology throughout the institutions. Edraak is a nonprofit massive

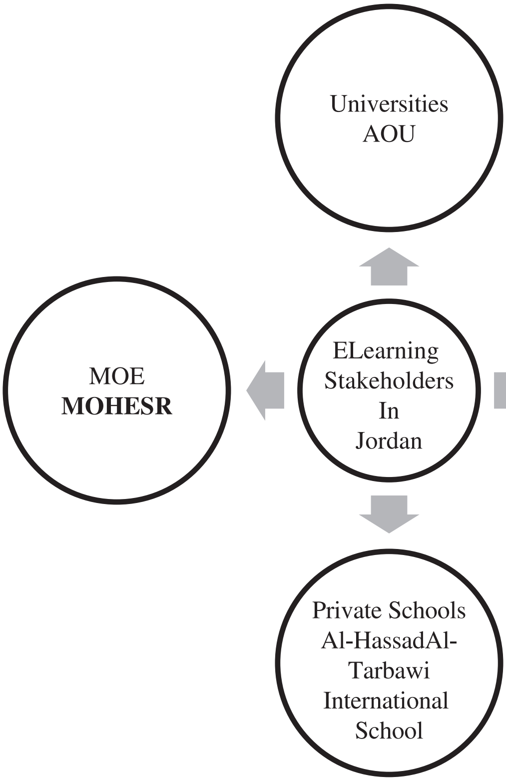

Fig. 8.3 E-learning stakeholders in Jordan

open online course (MOOC) portal launched by Queen Rania Foundation (QRF) for the promotion of knowledge in the Arab world. Edraak uses the open-source edX platform by edX, which is also used by two global MOOC providers: XuetangX in China and the French Université Numérique (Edraak 2017).

QRF contracted several regional and international scholars from prestigious universities to design and deliver the courses. Among the pioneers that joined forces with QRF was the American University of Beirut that contributed two courses. Courses from QRF are offered primarily in Arabic, but translations of courses from prestigious universities like Harvard and MIT are also available (QRF 2017).

Since its founding in 2002, the Arab Open University has been striving to set standards for open and blended learning in Jordan. AOU maintains an official branch in Jordan. Open learning is a concept that was not existent previously and has been confused with other concepts such as “study by correspondence” or “distance education.” The university adopts the concept of blended learning whereby the traditional classroom face-to-face lecturing is blended with modern techniques of e-learning that maintain direct and constant contacts with students via LMS, SIS, video conferencing, multimedia, and computing laboratories. Arab Open University launched on November 27, 2011, a massive open online course (MOOC) portal called Class Central which offers Free Online Courses. Now AOU is planning to develop its own version of MOOC. It is expected to be completed by summer 2017 (Arab Open University 2017).

As for the contribution of the private schools, Al-Hassad Al-Tarbawi International School has taken part in a number of Generation Global video conferences. Generation Global is an international education program which prepares students to deal with difference, giving them the skills and experience they need to navigate the world in a peaceful way. Since 2009, the program has been working in Jordan to increase interactions between students from diverse backgrounds and support dialogue and understanding (Akram 2017). It is evident that each stakeholder is striving to develop e-learning in their own field. However, the future of e-learning lies in the cooperation and collaboration of these stakeholders with each other.

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Chapter 9
Kuwait

Salah Al-Sharhan

Abstract This chapter surveys the development and current state of e-learning in the State of Kuwait. The author surveys the general social, economic, historical, and demographic background of Kuwait and provides a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Kuwait. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Kuwait · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Country Profile

Kuwait is a small Arabian (Persian) Gulf state located directly south of Iraq and bordering on Saudi Arabia to the west and south. Most of the population is concentrated in cities on the coastal line, and only a small portion of the land can be farmed due to harsh desert conditions of high temperatures, low rainfall, and lack of soils. Summer temperatures reach 44–54 °C, and precipitation averages from 25 to 180 mm per year, which classifies Kuwait climatically as hyper-arid desert (Kuwait 2017). Almost all domestic water derives from seawater desalination plants. Along with Bahrain, Kuwait was one of the first Gulf nations to rapidly modernize after the discovery of oil in 1938. Oil remains the main industry, with 101,500 million barrels of proven crude oil reserves, the sixth largest in the world (OPEC 2017, p. 26). Before oil, economic activity centered on shipbuilding, fishing, and trade. Kuwaiti wooden dhows were highly prized ships throughout the Gulf.

Politically, the country is a hybrid constitutional democracy/hereditary monarchy, with an elected National Assembly and an Emir from the Al Sabah family (which has ruled Kuwait since the Seventeenth century), who appoints the prime minister, who in turn appoints other government ministers. Due to vast government oil revenues and a small population, Kuwait has built a comprehensive social safety net, with free or heavily subsidized housing, education, medical care, and water.

In 1982, the world's third largest stock exchange – Kuwait's Souk Al-Manakh Stock Market – collapsed, causing 94 billion dollars in losses and sparking a Gulf-wide recession. In 1990, Iraq invaded and annexed Kuwait due to claims of slant drilling into Iraqi reserves and disputes over Iran-Iraq War debt. A US-led coalition expelled the Iraqi forces, but retreating troops set fire to 600–700 oil wells causing an unprecedented environmental and health disaster as dense smoke filled the air, and petroleum spilled onto the land and in the sea.

According to the official website of Kuwait's Public Authority for Civil Information (2017), the country's total population is 4,463,920 for July 2017, with expatriates accounting for more than 69.64% and Kuwaiti citizens representing 30.36% of the total population. Although Kuwait has a relatively high Human Development Index at 0.800, it has recently lagged behind the other GCC nations except for Oman (UNDP 2015). Considered as the first Gulf country in democracy and modernization, Kuwait supports an active theater, television drama, and arts culture, and Kuwaiti media is popular throughout the Arabic-speaking world. Kuwait has established both a Higher Institute of Dramatic Arts and the Higher Institute of Musical Arts.

Education System in Kuwait

As was the case with most of the pre-oil Gulf, formal education did not exist in Kuwait before the 1930s, except for the few Quranic schools – the Katatib – which taught basic reading, writing, and maths. In the 1920s and 1930s, several schools for merchants and girls appeared with a small number of government-financed schools. A government system of public education arose between 1945 and 1960 when oil revenues became available for public services. All education, including higher education, is free for Kuwaiti citizens and some other categories; other expatriates attend separate private schools. The Ministry of Education oversees K-12 education, while the Ministry of Higher Education administers colleges and universities and coordinates the many study abroad programs.

Kindergarten is free but not compulsory; elementary or primary school (ages 6–11) consists of grades 1–5; intermediate school (ages 11–15) encompasses grades 6–9; and secondary school (ages 15–18) consists of grades 10–12. Elementary and intermediate school are compulsory but not secondary school (Alfar 2013, p. 644). Throughout the K-12 years, standard topics are taught as well as Islamic studies and English and Arabic languages. In the later years, computer science and information technologies are added. When students pass their required number of units, they are awarded the General Secondary School Certificate (GSSC) and may proceed to higher education.

The Public Authority for Applied Education and Training (PAAET) supervises vocational training in the country, usually 2-year degrees in technical studies, business, education, and health sciences, in addition to training institutions such as secretarial studies and communication and navigation. Kuwait University (founded 1966) is the main public university. Arab Open University has its headquarters in Kuwait. The private higher institutions have started in 2002, by launching the Gulf University for Science and Technology, with curricular or affiliation agreements with overseas universities in Australia, the Netherlands, or the USA.

Under the current Kuwait National Development Plan, educational reform is ongoing with targets to improve all educational indicators by 2035. For example, the "Integrated System for Education Reform" and "Preparation of National Standards for Education" programs will develop national curricula to international standards by 2020 (KNDP 2017). Similar programs will address educational inclusion, the improvement of administration, citizenship and national unity programs, and assessment and quality standards.

E-Learning in Kuwait

Introduction

It is evident that the learning process today has been expanded to utilize and accommodate the new educational technologies and new forms of learning, such as electronic learning (e-learning) and mobile learning (m-learning). This is obvious as technology advancement is taking place, resulting in the widespread use of mobile technologies, which offers opportunities for new methods of learning, both outside and inside the classroom. E-learning can be defined as the integration of conventional teaching and online learning and content in its different formats to be delivered using different ICT and educational technologies (Al-Sharhan et al. 2006). Generally speaking, it is what occurs when education is delivered and supported by ICT technologies and networks such as the Internet or intranets where the learners are able to learn any time and any place and are transformed into self-learners. In Al-Hunaiyyan et al. (2017a, b, c), the authors defined m-learning in the context of a holistic approach to technology-enhanced learning (TEL) as the "learning strategy that provides students with the 21st-century learning capabilities in order to enable them to utilize a wide range of the portable computing devices. These devices are connected via the smart classroom network or the Internet to smart components or online interactive educational content and learning resources. It means to be connected with a learning environment that is controlled by the teacher (instructor) using the Learning Management System (LMS) or tools of Social Online Learning (SOL) that achieve a collaborative, interactive and innovative learning environment."

Thus, these definitions incorporate both e-learning and m-learning and, in general, the provision of technology-enhanced learning within the conventional classroom environment. Hence, in many countries, where national e-learning initiatives were successfully implemented, in the USA, Europe, and Asia, for example, e-learning is considered as the cornerstone of the entire educational process in order to transform it from memorization and negative educational experiences into interactive innovative education (Kong et al. 2017). In today's advancement of educational technology, it becomes evident that certain technological, pedagogical, cultural, and social innovations should be elaborated and merged into the conventional learning environment and space to foster creativity and an interactivity environment. In addition, serving the latest education pedagogies by using the most modern means of communications such as computers, networks, and interactive multimedia technologies in addition to delivering electronic resources through different means remotely or within the classrooms becomes a necessity. In the GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE), where the affordability of ICT technologies and the Internet penetration rates are among the highest in the world, these issues become a challenge. For example, "the Middle East online education and e-learning market was valued at US$ 558.1 million in 2016 and is expected to register a 9.8% CAGR" (Reseach&Markets 2017). Hence, it is essential in the GCC to keep pace with the rapid global technological developments and to develop new generations in which innovation, skills, and competencies are combined for maximum impact on the countries' advancement. The direct impact of such development is that the educational process of the educational system should be transformed into the global knowledge and pedagogies of twenty-first-century learning. This is due to the fact that e-learning offers the opportunity to improve the quality of the learning experience for students, develop the most skilled and talented global labor force, and build human resource capacity and, by creating a self-learning generation, increases the supply of highly qualified people with the skills required by high demand markets. Furthermore, the challenges across the GCC in implementing and utilizing the TEL share many commonalities such as the lack of a holistic approach, low levels of private sector participation, challenges regarding quality, and lack of a change management model, to name a few. While the success of some of these initiatives remains to be established, still there are significant lessons that can be leveraged by certain experiments, and it is important to review some of the recent approaches that have been executed in different countries.

This chapter highlights the e-learning initiatives and status in Kuwait both in the K-12 public system and the higher education institutions. It also presents the perceptions and challenges of e-learning in Kuwait and concludes with presenting two case studies; the first is related to the Ministry of Education e-learning strategy and project, and the second is related to the implementation of e-learning in the Gulf University for Science and Technology (GUST).

The rest of this chapter is organized as follows: the section "Education System in Kuwait" presents the e-learning "Benefits and Importance" to the Kuwait educational system. After that, the "Kuwait E-Learning Strategy in K-12 Schools" of the Ministry of Education is presented in the section "E-Learning in Kuwait," while the section "E-Learning Benefits and Importance to the Kuwait Educational System" sheds light on the e-learning initiatives in Kuwaiti higher education institutions. The challenges and barriers of an efficient e-learning in Kuwait are presented in the section "Kuwait E-Learning Strategy in K-12 Schools." Case studies about e-learning in the Kuwait Ministry of Education and the experience of one university, namely, GUST, are introduced in the sections "E-Learning in Kuwaiti Higher Education Institutions," and "Challenges and Barriers to E-Learning Adoption in Kuwait" concludes the chapter.

E-Learning Benefits and Importance to the Kuwait Educational System

Recent research supports the effectiveness of e-learning and mobile technology in education. The literature indicates that e-learning and m-learning, and e-learning as its general umbrella, offer considerable benefits to build and support creative, collaborative, and communicative capacities within learning environments. Several authors refer to the capacity of mobile learning to enhance collaborative learning (Barker et al. 2005; Colley and Stead 2003). Other benefits of e-learning and m-learning may include extending learning and teaching beyond the traditional teacher-centered classroom, providing flexible and innovative learning environment at anytime anywhere, and generating new technology-enhanced learning; it is demonstrated that e-learning and m-learning "allow access to learning materials at any time and place, and this has been shown to improve students' learning outcomes," making learning more personalized (Picek & Grčić 2013) and providing opportunities for individualized, situated, collaborative, and informal learning (Cheon et al. 2012).

Such key benefits of e-learning were the main reason of the high recommendation of it to be implemented in Kuwait, in addition to other drivers behind the e-learning initiatives in Kuwait such as the Ministry of Education e-learning strategy and the e-learning strategies in the higher education institutions in Kuwait such as Kuwait University, Public Authority for Applied Education and Training (PAAET) (Al-Ali 2010), and the Gulf University for Science and Technology (GUST 2017). Furthermore, the Kuwait strategy of educational development emphasizes an efficient utilization of the e-learning and m-learning technologies to provide the learners with a flexible and interactive learning. The flexibility of online learning in terms of the time, place, and open access to knowledge resources, such as computers, the Internet, and software, are some of those direct benefits. Also, interactive technologies support many different types of learning styles and environments such as interactive search, both textual and voice recognition based, or adaptive tutorials, learning by doing; also, simulations or models of scientific systems, and virtual environments assist the different types of learners (Laurillard 2006). In addition, an efficient implementation of e-learning in Kuwait can achieve great benefits to the schooling system, learners, families, and other stakeholders. Specifically, it can make a significant change in how students in the schools learn, develop, and master their skills and how much they enjoy learning.

Another factor that encourages and supports e-learning in Kuwait at the level of higher education is the fact that it can prepare students to be efficient in their university life, acquire self-learning skills, and solve problems related to the students' capacities, attendance, and dynamic curricula in the higher education institutions. Today, higher education institutions in Kuwait, and also globally, should reconsider the teaching and instructional methodologies and move toward effective methods such as learning by doing, research-based learning, and student-centric teaching. To achieve such an important goal, universities and higher education institution must encourage the professors and instructors to be acquainted with the use of new technologies to meet the requirements of the learners and of twenty-first-century learning. However, these institutions should develop a clear strategic and innovative plan that clearly identifies a management structure that supports and encourages innovation and identifies a process of change management and an integrated framework/model of implementation that incorporates the knowledge (lower levels) and the authority/power (top levels). Furthermore, higher education must aspire to a realignment of research and teaching and to teaching methods that support students in the generic skills, not only the acquisition of knowledge in a negative manner. In Kuwait, higher education institutions are paying increasing attention to these facts and concentrate more on enhancing the teaching environment. For example, in the Kuwait University Strategic Plan (2013–2017), one of the strategic goals of the Plan (third goal) is to "enhance the teaching skills of the academic faculty members to achieve teaching excellence" (Kuwait Univeristy 2017). Therefore, e-learning could be a reliable means by which higher education institutions can make the "learner's interaction with the academic material feel like a personalized learning experience, focused on their needs and aspirations, developing their skills and knowledge to the high level universities always aspired to, while doing this on the large scale. E-learning enables academics and students to communicate through networks of communities of practice in the cybernetic approach that makes change and innovation an inherent property of the system. At the same time, we need a way of creating the common infrastructure of agreed standards of interoperability that enable, and do not frustrate innovation" (Laurillard 2006, p. 76).

Kuwait E-Learning Strategy in K-12 Schools

Kuwait announced its national e-learning strategy in 2008 where a team from the Ministry of Education, Kuwait University, Public Authority for Applied Education and Training, Gulf University for Science and Technology, and RedSoft of Kuwait worked on developing it. The teams realized the fact that a successful e-learning system must orchestrate different technological, pedagogical, cultural, and social components where the integration of these elements creates real challenges during

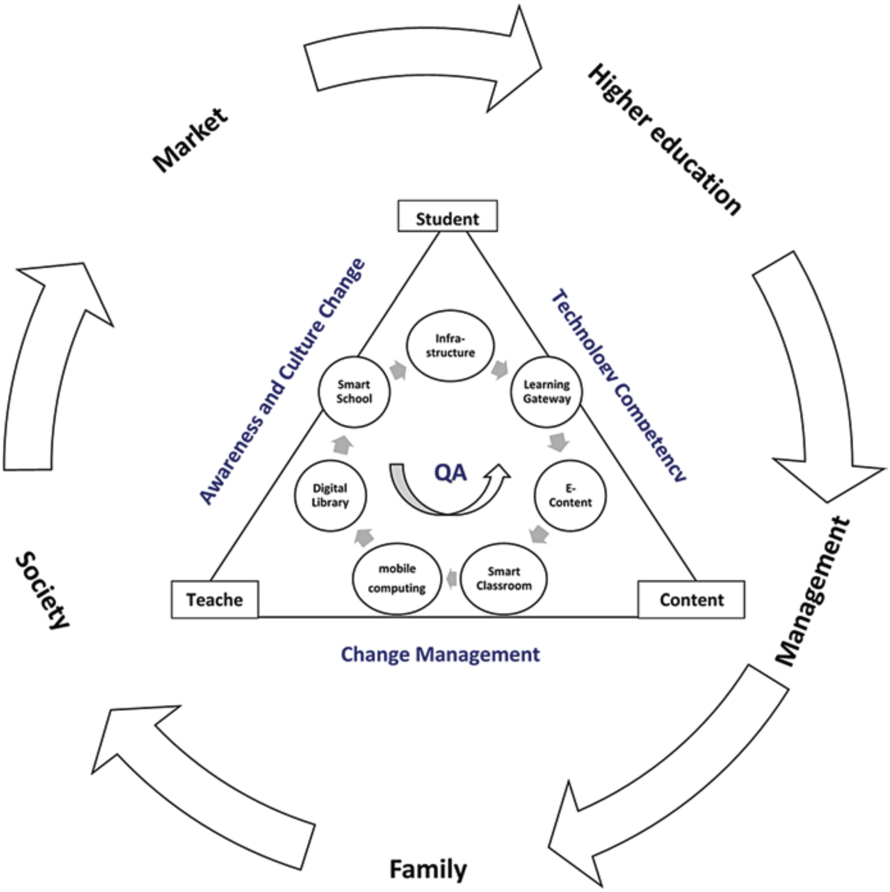


Fig. 9.1 E-learning model of MOE in Kuwait

the implementation. Examples of these components are an efficient infrastructure, smart classroom technologies, providing an efficient learning management system (LMS), designing and developing online digital content, change management, teacher readiness, and society awareness. In addition, any e-learning adoption must match learners' expectations in order to keep them motivated and attracted to the system. Learners and instructors also must have efficient tools for knowledge presentations, searching for information, and retaining information to improve the standard and quality of education and also to remain competitive in the education market. Hence, the e-learning strategy team emphasized to develop a scientific model of the e-learning system in Kuwait along with an integrated framework to implement the project. The model was based on the work of the author in Al-Sharhan et al. (2006) and was customized to fit a large scale of implementation. The model of the Kuwait e-learning strategy is depicted in Fig. 9.1.

The proposed model extends the previous delivery model and addresses all the factors that may affect the conventional educational systems (student-teacher-curricula) and transform it into a twenty-first-century learning system. These factors can be classified into factors related to the internal and external environments of implementing an efficient e-learning. By the internal environment, we mean the school environment and its e-learning elements as explained in the next subsection. The external environment means all the factors that have a direct impact on the school e-learning environment such as the educational management, the society, the family, the higher education, and the labor market factors. The model also incorporates certain variables to guarantee the success of the implementation, namely, change management, teacher readiness and awareness, and cultural change.

Implementation Framework

To guarantee a successful implementation of the e-learning system and environment in Kuwait schools (please refer to the case studies section), the above model requires an efficient and integrated implementation framework that incorporates all the different elements and projects of the e-learning initiative in Kuwait. The integrated framework is depicted in Fig. 9.2 and is formed of the following components:

1. The infrastructure component

   This component aims at providing a high-performance data center in the MOE head office and the required computing devices in the schools, along with providing the network facilities in the schools. The infrastructure is designed in such a way to serve both centralized and decentralized configurations. With the recent advancements in computing, the ministry is considering a private e-learning cloud computing solution.
2. Educational portal and learning management system

   This component provides a single sign-on portal and learning management system (LMS) or what is called the *Kuwait Learning Gateway*. It provides a full-fledged LMS and collaboration tools for the learning process and learning space. It also provides a complete hierarchy of public websites for the different stakeholders in the e-learning initiative. The educational portal design of the Ministry of Education in Kuwait was designed according to the highest international standards such as the latest SCORM compliance in order to present the e-curricula, and with this, it will be compatible with other international standards such as older versions of SCORM, AICC, and IM.
3. Interactive e-content

   The target of this component is to digitize the conventional curricula of the ministry and transfer all the textbooks into interactive online subjects presented on the portal and tracked by the LMS. The electronic content is an essential asset of accumulated knowledge and, therefore, must be designed as high-quality, accurate material and according to the international standards in this area.

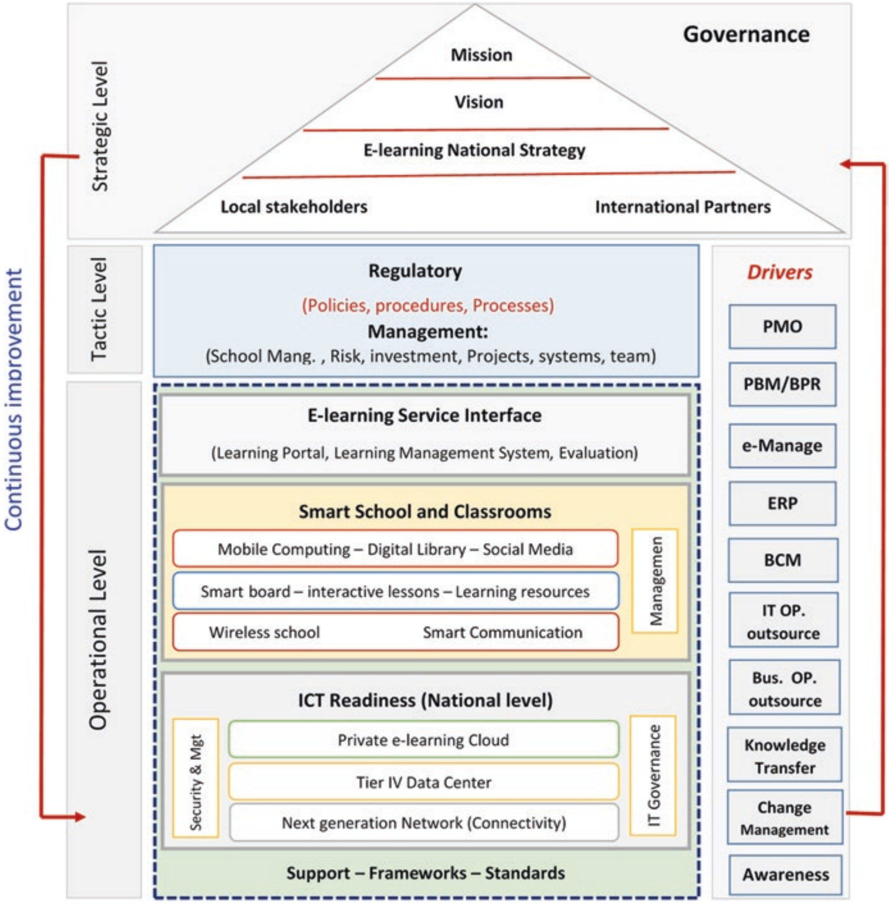


Fig. 9.2 Integrated implementation framework of the e-learning project in Kuwait

4. Smart classrooms and multimedia

   The smart classroom component is an essential part of a successful blended learning project on the large scale. It provides not only an interactive learning environment but different learning spaces that enable the different students to be effective learners. For details on this component, please refer to the section "E-Learning Benefits and Importance to the Kuwait Educational System."

5. Online services

   The portal also provides other essential services to the Ministry of Education in Kuwait, such as:

   – Student information system (SIS)
   – Teacher information systems (TIS)
   – E-management and HR and online services
   – Students' counseling.

6. E-library and learning resources

   The main objective of the e-library project is to design and develop Kuwait e-library and to make available the information materials and diverse learning resources and provide a digital library for all students and teachers to enable students to have full access to these resources enabling them to be self-learners and for the teachers enabling them to be facilitators.
7. Teacher readiness

   Implementing an e-learning system imposes a new modern and technological environment in schools. In addition, this technology introduces many challenges that face the teacher and force him or her to keep pace with modern developments, whether educational or technological or behavioral developments. Hence, this component aims at preparing and training the teachers and ensuring their continuing professional development.
8. Awareness, culture, and media

   Awareness has a vital role to ensure the success of e-learning projects due to the fact that these projects target different levels in the society and deal with behavior change. E-learning works directly to introduce new educational models, skills, and attitudes at the level of the schools, managements, families, and society. Hence, an efficient awareness and cultural change component are of vital importance.
9. Change management

A change management plan has identified the main change management phases, including preparing for change, managing change, and reinforcing change, as well as evaluation assessments to measure the effectiveness of the change management plan in satisfying the needs of the Ministry of Education.

For more information about the model and the implementation framework, the reader may refer to Al-Sharhan and Al-Hunaiyyan (2012).

Smart Classrooms

The above framework of implementing e-learning in the schools of the Ministry of Education in Kuwait introduces a new model of smart classrooms. The concept of the smart classroom introduced in Kuwait's schools is not to be associated with a conventional classroom that is equipped with technology as in the infancy of e-learning (Bautista and Borges 2013). Rather, it is a learning space that has now several dimensions, namely, the face-to-face learning space and the virtual learning space. In these multidimensional spaces, pedagogical change management and innovation become a necessity to present real twenty-first-century smart classrooms.

In the implementation model, a smart classroom consists of several components to form an interactive and interesting learning environment that enriches the teaching methods and develops the students' skills and raises their academic level and

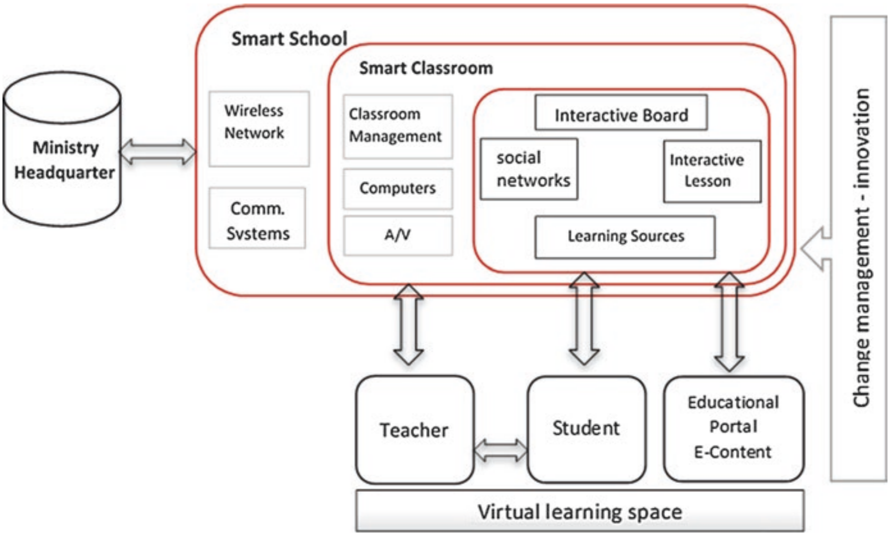


Fig. 9.3 The smart classrooms model

allows them to participate more in the learning process. Overall, the smart classroom consists of the following components. These components are from an educational technology perspective, and the innovation and pedagogical change management will add the dimensions of real “smartness”:

- Interactive smart whiteboard
- Classroom and multimedia control center
- Computers and one-to-one devices that serve the students inside or outside the classroom
- Audio/video elements such as data show, projectors, and recording systems
- Classroom management system, which is highly efficient software that allows the teacher to have full control of the smart classroom components and students’ equipment.

The smart classroom components interact with the other components of the e-learning system to form a unique learning environment that will cause a quantum leap in education in the Ministry of Education and will contribute effectively to move toward twenty-first-century education. The proposed smart model in this work incorporates all the essential components of a smart classroom including the multidimensional learning space, integrated levels, technologies, innovation, and change management. Figure 9.3 depicts this model.

In May 2010, the Kuwait Ministry of Education won the Technical Initiative Award in the education sector at the annual Middle East Conference and Exhibition, held in the UAE, in recognition of the efforts devoted to establishing the vision and strategy of innovation in Kuwait as well as the change of the educational system through the use of the latest digital technologies. This conference is a global platform for all educational technology and continues to explore technology and knowledge in order to meet contemporary challenges and improve people's learning styles. The Ministry of Education has launched the "Computer for Every Individual" initiative under the umbrella of the Infrastructure Modernization Project, aiming to provide tablets for all teachers and students in Kuwait. The first phase of this initiative targeted 82,000 students and teachers across six educational districts to provide the latest technologies that provide better learning experiences and to raise the level of student attraction and equip them with the basic digital skills needed by modern workplaces.

The Ministry's project promotes the integration of technology into education by providing teachers and students with Microsoft Windows based on predesigned teaching materials and applications to facilitate usage. One thousand teachers from six learning regions have received special training as part of this initiative, and by training the trainers, now these teachers are armed with the knowledge and skills to train other teachers on how to effectively use technology and attract students within classrooms.

Further, the Global Education Monitoring Report mentioned that Kuwait has developed the education sector through the development of curricula, the promotion of effective education, the construction of distinguished universities, and the stimulation of higher education, in the interest of the sector. The government launched the second phase of the project to improve the quality of education in schools by the end of March 2015. The Ministry of Education of Kuwait, the National Center for Education Development, and the World Bank began implementing a 5-year technical cooperation agreement that focuses on education reform. The main agenda of the program is to provide support for capacity building, improving the quality of education and teaching, and overseeing its impact on schools and students. The share spent on education in Kuwait is (15%) as per stats of 2016.

E-Learning in Kuwaiti Higher Education Institutions

Kuwait University (KU)

Realizing the huge potential of e-learning in the offered services of the higher education, new initiatives were noticeable and deserved praise, support, and encouragement. Kuwait University e-training was a developmental tool that allowed students to benefit educationally in their own time and their own pace. This learning initiative can be accessed from the convenience of a student's desktop computer. However, this developmental tool was not intended to replace instructor-led training courses. In fact, it was designed to supplement traditional methods and provide a greater opportunity for students' skill development (http://onlinetrain.kuniv.edu/ldap/).

Health Sciences Center (HSC) e-learning in Kuwait University is another success in the endeavors of the higher education institutions of Kuwait. HSC was estab-

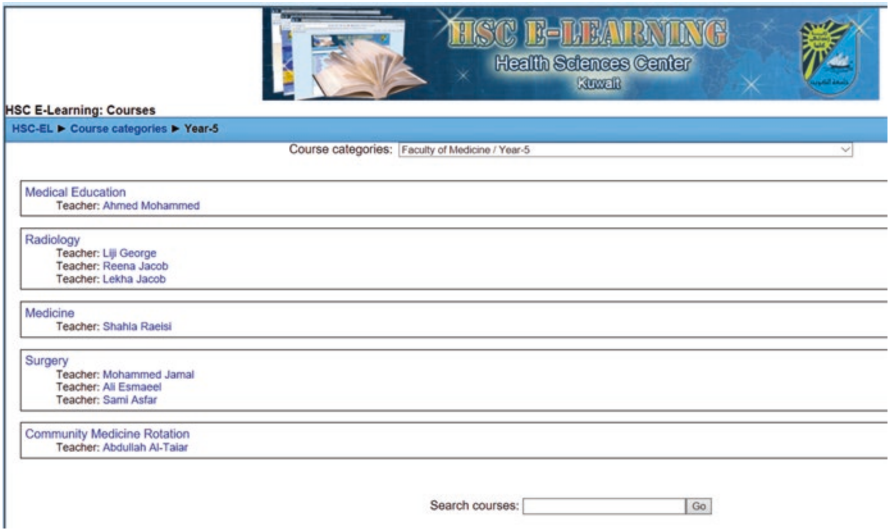


Fig. 9.4 KU ministry of medicine LMS

lished to be the governing institution for the Faculty of Medicine, the Faculty of Allied Health Sciences, the Faculty of Pharmacy, and the Faculty of Dentistry. E-learning has benefited the faculties efficiently as it has displayed the Moodle site of each school and offered courses online (http://elearn-fahs.hsc.edu.kw/course/category.php?id=2). Shown below in Fig. 9.4 is a sample page from the Moodle site of the Faculty of Medicine/year 5 of Kuwait University:

The Public Authority for Applied Education and Training (PAAET)

Based on the PAAET mission that strives to achieve the development of e-learning systems for students and distinguished members of the governing bodies of teaching and training authority and the community to improve the process of education and training and the optimal use of modern technologies, PAAET has encouraged creativity and innovation in the development of the use of e-courses and technical systems.

In May 2017, the PAAET Faculty of Nursing launched an e-learning system in an effort to promote further interaction between teachers and students. The project was initiated in the faculty, and PAAET senior administrators trust that it will prove instrumental in improving the quality of education as the cutting-edge techniques such as e-learning systems can be a solution to problems that encumber conventional education. This initiative aims to pursue incorporating the latest instructional methods to ensure a top-notch education for students.

In March 2016, PAAET launched the electronic learning system (Moodle) for automating the work within the authority. The system was implemented in coordination between the departments, colleges, and institutes of the authority with the full knowledge of the electronic aspect and its ability to facilitate workflows and benefit the students, faculty members, and staff. The electronic system was introduced for the first time to PAAET by PAAET Research Department when the team was working then on the PAAET e-research support project.

E-Learning in a Private University in Kuwait: GUST as an Example

The Gulf University for Science and Technology (GUST) is the first private university in Kuwait launched in 2002. The e-learning arm of the university is the E-learning Center of Excellence (ECE) which was launched in 2005. It "aims at creating an active online learning environment to enhance the classroom-based learning on one hand, and open new avenues for flexible continuing education on the other. The mission of the ECE is to provide GUST students and faculty members with online personal development tools in order to regularly improve their knowledge and skills. In addition, the ECE aims at enhancing the on-campus classes with the latest learning and teaching technologies available worldwide. The ECE closely collaborates with the university administration, academic units, and faculty and student communities to enhance the overall learning experience by introducing e-learning tools, methodologies, modules, and access to world-class knowledge resources" (GUST 2012).

The LMS platform of the university has been branded as MyGUST portal. Within the portal, several tools like Document Sharing, Assignments, Dropbox, Discussion Board, Chat, etc. are integrated for collaboration. MyGUST benefits both the students and faculty. This is one major contribution toward GUST's predominance in teaching and academic activities. Faculties can track the usage statistics to monitor the development of the student. Tools like Announcements keep the student informed about the events of the course, while Assignments and Quizzes keep students involved in activities involved in exam preparation. Tools such as Dropbox, Grades, Reports, etc. provide the faculty in-depth information about the strengths and weaknesses of the student, which makes it easy for them to rectify and guide the student. The Conference tool allows the faculty to be in touch with the student thereby extending the possibilities of remote teaching and learning.

It has also integrated other major components of this institution within the portal, e.g., email, student information system (SIS), e-library, GUST website, and bulletins and publications. These activities provide the entire GUST community with a ready platform to explore and exploit the very best of teaching and learning capabilities.

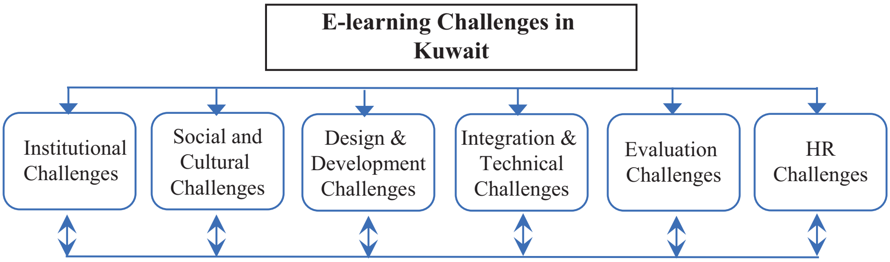


Fig. 9.5 E-learning challenges in Kuwait

MyGUST runs on the Moodle platform. "Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. Powering tens of thousands of learning environments globally, Moodle is trusted by institutions and organizations large and small, including Shell, London School of Economics, State University of New York, Microsoft, and the Open University. Moodle's worldwide numbers of more than 90 million users across both academic and enterprise level usage makes it the world's most widely used learning platform" (MyGUST 2017; Moodle 2017). More details on the utilization of this e-learning system are presented in the section "E-learning in Kuwaiti Higher Education Institutions" (Case studies).

Challenges and Barriers to E-Learning Adoption in Kuwait

Research literature supports the effectiveness of utilizing e-learning and mobile learning in education. Literature indicates that there are considerable benefits to build and support creative, collaborative, and communicative capacities within learning environments (Alhazmi et al. 2014; Carliner and Shank 2016). However, designing and developing an efficient holistic e-learning approach within the educational environment is still a challenge to most educators due to the complex environment that incorporates many pedagogical and technological elements, and in the case of Kuwait, these challenges have extra dimensions of complexity. Although e-learning offers many apparent benefits, there are a number of crucial issues related to using technology in education, which includes pedagogical, technological elements, and social aspects. The following sections address and discuss some of the challenges imposed by the implementation of e-learning in Kuwait. These issues are management and institutional challenges, integration and technology challenges, cultural and social challenges, educational and instructional design challenges, evaluation challenges, and HR resources challenges. These challenges are summarized in Fig. 9.5. It is worth mentioning here that although focusing on the barriers to e-learning might be construed negatively, it is not the intention to discourage using learning technologies. Rather, the aim is to increase awareness and understanding in regard to the overall nature of issues experienced by e-learners.

Management and Institutional Challenges

The management of K-12 and higher education institutions in Kuwait are increasingly acknowledging both the external factors (technology, stakeholders, competition, etc.) and internal factors (technological and pedagogical approaches) in e-learning. Management needs to define a clear policy and to have a wide-scale implementation of e-learning with a clear technical and pedagogical plan. The lack of support and institutional policies were cited as institutional obstacles in a 2013 study (Ismail et al. 2013). In Kuwait, these requirements are easy to be satisfied in the smaller private educational setting. However, in the public educational system and the public higher education institutions, namely, KU and PAAET, the decision is not that easy. This is due to many reasons such as the lack of a national strategy of innovation that encourages and integrates these institutions to create innovative solutions. In addition, the bureaucratic system in the public systems makes the process of decision-making a complicated one. This fact has been proven by many researchers. For example, Wilen-Daugenti has pointed out that university management is aware of the impact of rapidly changing technology but is found to be extremely conservative and reluctant to make large investments (Wilen-Daugenti 2009).

Integration and Technology Challenges

Technical difficulties are a significant aspect in the implementation and integration of e-learning technologies in education. These difficulties result from the rapid change in technologies, programs, and devices, in addition to the difficulty of adapting every new innovation as well as the training required in order to ensure an efficient workflow. Qureshi et al. listed some of these difficulties which include "installation, availability of latest technology, fast internet connection, and uninterrupted supply of electricity, maintenance, administration, security and absence of technical support" (Qureshi et al. 2012). Some of the serious difficulties confronted are getting technology into educational life, providing a proper environment, ensuring the readiness of students and faculty members, and their ignorance of the positive and negative role of the technology in education. In the Kuwait experience, one can easily detect that there are technical challenges related to the infrastructure, software development, technical support, security, and technical knowledge of instructors, students, and other stakeholders, which must be considered when implementing any e-learning project. However, this is not limited to Kuwait as many countries lack quality expertise in technical support and maintenance of Information and Communication Technologies (ICT) (Carliner & Shank 2016).

Social and Cultural Challenges

The success of implementing e-learning depends on several factors that have to be met in order to ensure achieving its mission. This can be summarized in “producing pioneer generations and promoting the Arab community to become the society of science, knowledge and production.” Cultural differences in relation to perceptions and attitudes toward technology are key factors for both the acceptance of these types of technology and for their future use (Al-Oteawi 2002). Introducing e-learning to a new culture brings many issues that need to be investigated. It is very important first to understand the nature of the target culture and to use the findings as a basis for e-learning and m-learning project implementation (Al-Hunaiyyan et al. 2008a, b). Furthermore, resistance to change is a great challenge. Some educators resist the idea of integrating this technology into their practice because of the constraints it presents to them. Studies report that resistance to change plays an essential role in accepting technology in education (Kim and Kankanhalli 2009; Nov and Ye 2008). In the Kuwait e-learning strategy, a solution to this challenge was creating a professional development model and teacher training course that can foster collaboration among instructors to become comfortable in the environment while using this technology in and out of the classroom. A detailed description of the model can be found in Al-Sharhan and Al-Hunaiyyan (2012) and Al-Hunaiyyan et al. (2012).

Evaluation Challenges

Evaluation is one of the biggest challenges when changing the teachers’/instructors’ ways of thinking about the education pedagogy. The e-learning environment requires a new way of thinking and continuous effort to prepare teachers to design the syllabus and education pedagogy based on the latest scientific means. Also, evaluation is an essential activity in the life cycle of any interactive learning system. E-learning adds additional challenges to evaluation, especially in terms of technology and learning outcomes. The evaluation strategies of higher education have been focused on the face-to-face mechanism with learners in classrooms and laboratories. At the present time, e-learning adds complexity to the evaluation process as it is forcing educational institutions to consider e-learning or m-learning technical capabilities, pedagogical issues, and cultural and social factors. Messinger has addressed the questions “How to evaluate the effectiveness? How to assess learning outcomes?” (Messinger 2012). It is evident that this is a universal challenge and is not limited to Kuwait. However, the e-learning strategy should identify the attributes and the tools to create a good evaluation mechanism. The model of evaluation adopted in Kuwait e-learning strategy is based on the popular four levels of Kirkpatrick’s model (reaction, learning, behavior, and results) (Kirkpatrick & Kirkpatrick 2006; Chrysafiadi & Virvou 2013).

Pedagogies and Educational Design

To design any learning solutions based on utilizing technology, developers must understand the three types of design, that is, instructional (or learning) design, which is the educational design of the application; interface design, which is transparent to the user; and graphic and screen design, which is the design of the visual display. The more emphasis the developer places on these designs, the more useful and functional the application will be. In Kuwait, the main challenge facing the e-learning project is the availability of expert instructional designers that can transform the pedagogical aspects of Kuwait curricula into efficient interactive courses.

Case Studies

This section presents two case studies of e-learning implementation in Kuwait. The first is related to the implementation of the e-leaning strategy of the Ministry of Education. The second case study is related to one of the universities in Kuwait: Gulf University for Science and Technology.

E-Learning Implementation in Kuwait Ministry of Education

The proposed integrated e-learning model has been utilized to implement the national e-learning strategy in the Ministry of Education (MOE) of Kuwait starting from 2010. In Kuwait there are 850 public schools spread across six educational districts (year 2010). The MOE caters to around 500,000+ students spread across kindergarten, primary, intermediate, and secondary schools. The following Table 9.1 depicts the situation at MOE Kuwait.

Table 9.1 Public schools in Kuwait

	Schools		Classrooms		Teachers		Students	
Stage	M	F	M	F	M	F	M	F
Kindergarten	199		1807		0	6332	20,930	22,190
KG1–KG2					6332		43,120	
Primary education	133	126	2912	3029	1366	21,376	68,848	74,925
Year 1–year 5	259		5941		22,742		143,773	
Intermediate education	100	106	2172	2288	8331	10,223	51,419	55,244
Year 6–year 9	206		4460		18,554		106,663	
Secondary education	65	74	1307	1659	5859	7415	28,712	38,577
Year 10–year 12	139		2966		13,274		67,289	

The MOE has launched a national e-learning project in Kuwait based on the Kuwait e-learning strategy that was developed in 2008. The implementation plan of the e-learning project was divided into three phases as follows:

1. *Phase I*: high schools (year 10–12)
2. *Phase II*: intermediate schools (year 6–9)
3. *Phase III*: primary schools (year 1–5).

Phase I has been launched in 2010 and caters to 80,500 students and teachers. In this phase, the infrastructure project, the learning gateway portal and LMS, the smart classrooms and schools (~4500 classrooms), and the teacher readiness and awareness projects have been completed and implemented to serve students in year 9–12, and 139 secondary schools spread across the six educational districts.

The proposed model for m-learning has been implemented in phase I of the e-learning project in Kuwait. The MOE distributed 80,500 one-to-one devices to students and teachers in the academic year 2015/2016. Currently, the Teacher Readiness Program is executed to prepare the teacher for the new era. This program is designed by the e-learning team at MOE and international vendors.

E-Learning at the Gulf University for Science and Technology

MyGUST was implemented in the university in 2010 using Moodle v1.9. Moodle is cost-effective and matches leading competitors feature for feature; the university decided to scrap the other two platforms and focused mainly on enriching the implementation of Moodle within the university. During its early years, MyGUST has started mainly with common features: to post resources and activities. However, as the LMS evolved and upgraded to Moodle v3.1, currently all the courses offered in the university have their online counterpart in MyGUST. It has also tremendously expanded its features from simple posting to the use of online collaborative tools, plug-ins, and modules that had been contained within the platform itself. Among these features are (Moodle 2017):

1. Basic plug-ins

   • Attendance

   – The attendance activity allows teachers to maintain a record of attendance, replacing or supplementing a paper-based attendance register. It is primarily used in blended learning environments where students are required to attend classes, lectures, and tutorials and allows the teacher to track and optionally provide a grade for the student's attendance (Moodle 2017).

   • Turnitin (plagiarism tool)

   – Turnitin is a commercial plagiarism detection system which requires a paid subscription to use.

- Lightbox Gallery

– This resource allows you to create "Lightbox" enabled image galleries within your Moodle course. As a course teacher, you are able to create, edit, and delete galleries.

- Questionnaire

– Custom survey creation.

- Text to Speech

– Text to Speech is a Moodle block that reads out loud the content of a resource.

- Students Tracker

– This block aims to give teachers and staff a simple tool to view how many students didn't visit a course for a long time and doing so tries to reduce student absences.

- Hot Potato

– The Hotpot activity module allows teachers to administer Hot Potatoes and quizzes via Moodle. These quizzes are created on the teacher's computer and then uploaded to the Moodle course.

- H5P Interactive Presentation

– This allows creation and uploading rich content inside the LMS for free. One of the great benefits with using H5P is that it gives you access to lots of different interactive content types.

2. Lecture capture

- BigBlueButton (lecture capture)

– BigBlueButton is an open source web conferencing system for distance education. The goal of the project is to enable universities, colleges, and K-12 to deliver high-quality learning experiences to remote students (Moodle-wiki 2017).

- Assignment annotation

– Annotate is used by top universities worldwide as a way for instructors to engage with students, allowing meaningful discussions on course materials. It can also be used to review assignments in a flexible way that otherwise would only be possible on paper.

3. Moodle Mobile

- Moodle Mobile supports the creation of mobile content in Moodle that will engage the students in and outside the classroom and will be able to communicate and collaborate more effectively.

4. SCORM
   - SCORM is all about creating units of online training material that can be shared across systems. SCORM defines how to create “sharable content objects” or “SCOs” that can be reused in different systems and contexts.
5. Safe Exam Browser
   - Safe Exam Browser is a customized web browser, available for Windows and Mac Operating Systems that must be downloaded and installed on the computer that the student uses to attempt the quiz. The restrictions placed on students are similar to those in pop-up window case, but because Safe Exam Browser is software running on the student’s computer, it can do a much more effective job of restricting their actions.
6. Progress bar
   - A time management tool for students that shows progress in activities/resources of a course.
7. Catalog
   - It provides a visual and central place for a teacher to access everything he can use in his course (activities, reports, blocks, etc.).
8. Advanced file repositories (Google Drive, Dropbox)
9. Setting up course information and required textbook in course
   - Oohoo Tab Display
   - Bootstrap Elements.

Apart from these features, effective summer semester 1 of academic year 2016–2017, the university has implemented a pilot of the gradebook integration between MyGUST gradebook and student information system (SIS). With this setup, faculty are no longer manually entering the final grades in SIS. Instead, MyGUST provided an integration module that allows the automatic transfer of final grades to the SIS. This move of the university is intended to eradicate the double work in the entry of grades to the SIS, as well as enriching the usage of gradebook as the sole source of grade information for all courses.

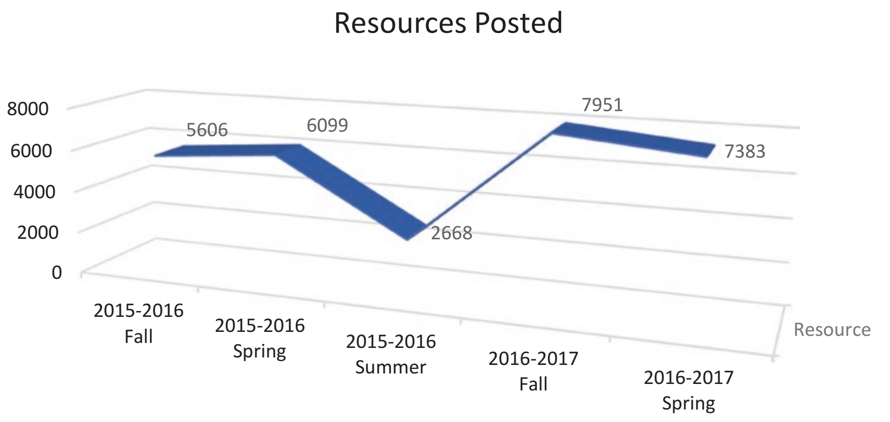
Table 9.2 below shows how the university through the years ensured that courses offered are always provided with its equivalent course in MyGUST.

Posting of online resources such as topic files and folders has increased dramatically due to the university’s efforts to enrich the usage of blended learning as explained in Fig. 9.6.

In addition, online assessment tools such as quizzes had been widely used and accepted by both faculty and students because of its quick results, flexibility, and increased security. This growth of the online assessment tools is presented in Fig. 9.7.

Table 9.2 Online courses on MyGUST

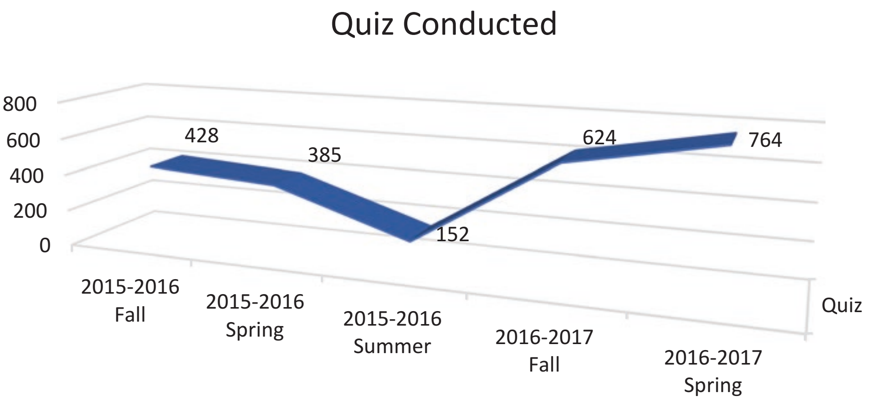
Semester	Actual courses offered	MyGUST courses: Online courses created	MyGUST courses: Online meta-courses created
2014–2015 fall semester	627	703	104
2014–2015 spring semester	608	655	126
2014–2015 summer semester	265	309	41
2015–2016 fall semester	620	708	112
2015–2016 spring semester	626	699	114
2015–2016 summer semester	287	335	50
2016–2017 fall semester	663	634	112
2016–2017 spring semester	654	650	117



	2015-2016 Fall	2015-2016 Spring	2015-2016 Summer	2016-2017 Fall	2016-2017 Spring
Resource	5606	6099	2668	7951	7383

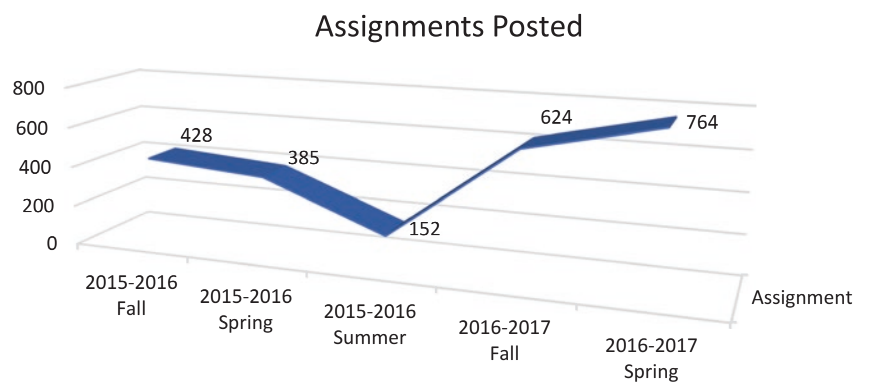
Fig. 9.6 The resources posted on MyGUST

On the other hand, online homework assessment such as assignments had been supported because students found it was "quick and easy" and allowed them to work at their own pace, on their own time. Students also appreciate having an immediate feedback about their performance in the format of their score, the correct answers to the questions, and the ability to follow their grades in the gradebook. Some students liked the ability to "get ahead" by completing assignments far in advance of the due date. This performance is shown in Fig. 9.8.



	2015-2016 Fall	2015-2016 Spring	2015-2016 Summer	2016-2017 Fall	2016-2017 Spring
Quiz	428	385	152	624	764

Fig. 9.7 Performance of the online assessment tools



	2015-2016 Fall	2015-2016 Spring	2015-2016 Summer	2016-2017 Fall	2016-2017 Spring
Assignment	428	385	152	624	764

Fig. 9.8 Assignments posted to the LMS

Conclusion

This chapter sheds light on the e-learning initiatives in Kuwait along with the e-learning strategy of the Ministry of Education and the e-learning initiatives in the higher education sector. For a proper implementation of m-learning, it is important to understand and overcome the challenges which are discussed in this article such as management challenges, design challenges, technical challenges, evaluation challenges, and cultural and social challenges. Within the Kuwait educational sector, there have been outstanding initiatives to incorporate ICT into education at the national level, including the use of mobile technology in learning. However, the study reports some social and cultural issues that may act as barriers to e-learning implementation.

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Chapter 10
Lebanon

Fawzi Baroud

Abstract This chapter surveys the development and current state of e-learning in the Lebanese Republic. The author surveys the general social, economic, historical and demographic background of Lebanon and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country and challenges and barriers to ICT implementation in education, business and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives and projects throughout the country. Information is additionally provided on accreditation, teacher training programmes and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Lebanon. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Lebanon · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Lebanon is the progeny of complex historical antecedents that give its current political system a predominant intergroup contentious character whose parameters are difficult to discern due to a labyrinth of multilayered social and political impediments. Lebanon's geography made the country a sanctuary for minority groups who, towards the end of the seventh century, started to flee religious persecution in neighbouring countries and sought refuge in Lebanon's impassable mountains. The latest refugees who have started to flock into the country in large numbers since 2011 are Syrians who currently constitute 1.5 million persons, or almost one third of the Lebanese population, imposing unprecedented social, economic and political pressure on the country's existing delicate demographic multi-confessional structure and degenerating economic situation. At present, Lebanon accommodates 18 officially recognized Christian and Muslim religious sects that represent the country's social fabric. Political affairs among these confessional communities are regulated by various political power-sharing formulas defined by informal or formal pacts and acknowledged by the country's influential religious communities and political leaders. The political system is described as consociational, i.e. a 'fair-weather model' (Hanf 1993) or a sort of 'live and let live' (Bashshur 1988) pattern for multi-communal coexistence. Under this arrangement, the President of the Republic is a Christian Maronite, the Speaker of the House a Shiite Muslim, and the Prime Minister is a Sunnite Muslim.

Lebanon extends for 10,452 square kilometres. It is located on the Eastern Mediterranean shores, its anti-mountain range and the fertile Bekaa plain separate the country from Syria to the East and the Great River and Akkar region separate it from Syria to the North. In addition, Lebanon borders Israel to the South. These borders were demarcated by the French Mandate in 1920 transforming semi-autonomous Mount Lebanon during the Ottoman rule into a wider geopolitical entity, a potential viable state that would accommodate the country's diverse confessional communities.

Ever since its formation by the French Mandate in 1920, population issues have been problematic in Lebanon. An accurate figure of Lebanon's population is nearly absent since a population census showing the size of confessional communities is a heated political issue. The last official census took place in 1932, i.e. 11 years before Lebanon's independence in 1943, showing then a slight Christian majority over Muslims and thereby legitimizing the Christian Maronite presidency of the Lebanese Republic. Subsequent population estimates over the years have been guesswork. For instance, according to the 2016 *CIA World Factbook*, the population of Lebanon is estimated to be 6,237,738 as of July 2016. However, a study conducted in 2012 by Statistics Lebanon, a Beirut-based research firm, estimated the population of Lebanon to be 4.3 million. Despite inconsistent census statistics in Lebanon, the country's population pyramid shows a youth bulge and equal population distribution between males and females (see population pyramid in Fig. 10.1).

Education System in Lebanon

Lebanon's consociational governance model has clear implications for its educational system in that it is structured into private and public institutions which reflect the country's social mosaic and thereby accentuates diversified educational policies and practices. In fact, despite its relatively small geographic area and population, Lebanon has a large number of schools and higher educational institutions. Lebanon's educational system can be characterized in several key aspects: firstly, the establishment of schools and higher educational institutions, mostly private, started long before the declaration of Lebanon as a state by the French Mandate in 1920. These private educational institutions were founded either by Protestant or Jesuit missionaries or funded and owned by Lebanese confessional communities, mainly Christians. These schools enjoy a constitutional right to run their private affairs, which have clear implications for their educational policies and practices.

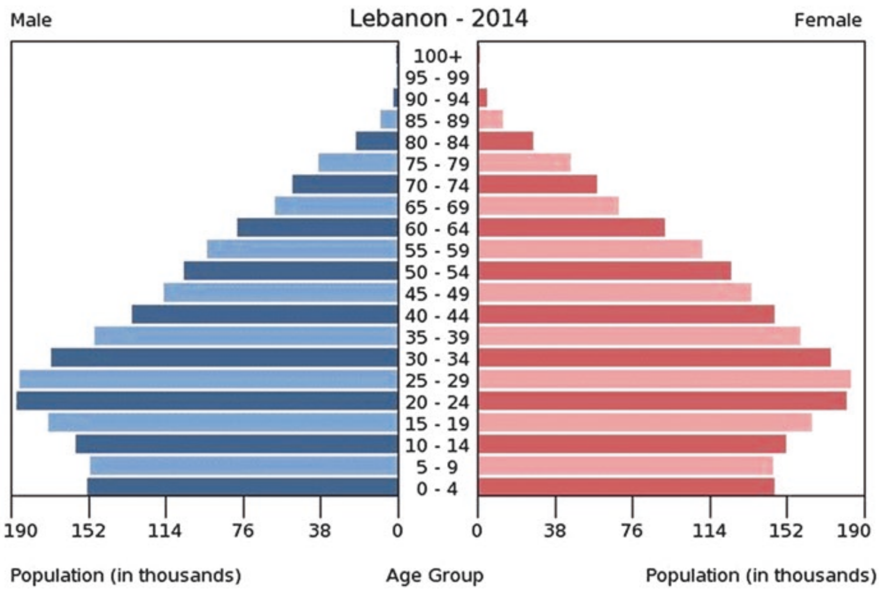

Fig. 10.1 Population pyramid of Lebanon in 2014 (Source: 2016 CIA World Factbook, http://www.theodora.com/wfbcurrent/lebanon/lebanon_people.html, accessed September 20, 2016)

In particular, the Lebanese Constitution echoes Article 8 of the French Mandate in 1920 which stipulated 'the right of each community to maintain its own schools for the instruction and education of its own members in its own language, while conforming to such educational requirements of a general nature as the administration may impose, shall not be denied or impaired' (Khalil 1962, p. 96). Article 10 of the Lebanese Constitution of May 26, 1926 states 'the religious communities shall have the right to maintain their own schools provided they do not transgress upon public order. They should conform to the general prescription related to public instruction and regulations laid down by the state'. As a result of this constitutional legacy, schools and higher educational institutions are characterized by their diversity of using foreign languages as media of instruction besides Arabic and the variety of educational models they follow. In particular, these educational institutions are based on the French, Arabic, American or British systems of education.

The sections that follow discuss Lebanon's three sectors of education (schools, vocational education and training centres, and higher educational institutions). The term 'higher educational institutions' will be used throughout this chapter since the Decree of 1961, which deals with the organization of higher education in Lebanon, places all universities, colleges and university institutes operating in the country within higher education. The legacy of the past has shaped the structure of education in Lebanon today. The system is structured into general education, higher education, and vocational education and training. In turn, each of these segments is divided into private and public sectors.

General Education: Origin of Schools

The historical establishment of schools in Lebanon is traceable to foreign involvement in Lebanese political and cultural affairs as well as to competition among Western countries over the country's resources (Hudson 1968). This competition reached a peak in 1861 following a civil war that broke out among Lebanon's confessional communities in the Mount Lebanon region which was the nucleus of today's Lebanon. The Christian Maronites (Catholics) were sponsored by the French, and the Druze (branch of Islam) by the British, the Greek Orthodox, and by the Russians, while the Muslims were left without a sponsoring country because the Ottoman Empire which was mainly Muslim had lost ground in favour of Western European powers (Salibi 1985; Meir 1985). This competition led to the establishment of schools and higher educational institutions in Mount Lebanon to provide education for members belonging to the sects that the interested powers at the time had sponsored. According to Bashshur (1988), missionary education in Lebanon took the form of proselytizing non-Christians to Christianity.

An important aspect of missionary education was in Lebanon's exposure to aspects of globalization and modernization (Szyliowcz 1973) which brought with it early technology, foreign languages and Western lifestyle. This development was borderless as Western missionaries were given prerogatives by the Ottoman Empire to establish their cultural and educational institutions in Lebanon (Spagnolo 1977; Salibi 1977). Most importantly in relation to technology, the spread of printing from Lebanon at the beginning of the seventeenth century facilitated a modern renaissance in the Arab world (Hitti 1957). Christian religious establishments played a major role in housing and facilitating printing presses. The first printing press imported into Lebanon by Maronite monks of the Monastery of Saint Quzhayya was in 1610. The second press in the entire East was that of the Monastery of Saint John Sabigh, the Showyri, Khunshara, in 1734. The latter was known for printing liturgical books. Thus, Mount Lebanon was not only receptive to Western missionary education and ideas but also committed to using early forms of technology such as the printing press for the purpose of disseminating knowledge similar to ICT use today which seeks, among other things, to spread information and facilitate wider access to learning resources.

Types and Structures of Schools

Schools in Lebanon are of two types: private, which includes philanthropic and foreign schools, and public schools, which are funded and supervised by the state (Bashshur 1988). However, officially, schools in Lebanon are of three types: *public* (non-fee-paying), *private* (fee-paying) and *private subsidized by the government*. The administration of public schools is centralized and is run by the Ministry of Education (Legislative Decree Number 10832, October 9, 1962). On the other hand, private schools are run either by confessional communities or private associations and individuals as legitimized by Article 10 of the Lebanese Constitution of May 23, 1926 and by Decree Numbers 7962 of May 1, 1931, and 7000 of October 1, 1946.

Schools owned and run by private associations had different educational purposes, and schools controlled by individuals were mainly commercial (Bashshur 1988). Moreover, foreign schools are mainly French, American and British. French, British and American schools constitute a complete educational ladder from kindergarten to preuniversity. British and American schools are comparatively few in number compared to the French ones (CERD 2015).

On the other hand, before World War I, Lebanon had only one public school (Matthews and Akrawi 1949). However, areas outside the present Lebanese territories, which were parts of Beirut and Damascus and subject to the direct rule of the Ottoman Sublime Porte, had public schools administrated by Nizam Al Maarif Al Uthmani (Ottoman Ministry of Education) (Abu Mrad 1985). These schools formed the nucleus of the current Lebanese public school system when the former Ottoman regions were annexed to Mount Lebanon by the French mandate in 1920.

Public or state schools are run by the government. This type of school started to grow shortly before Lebanon gained its independence in 1943. However, despite their growth, they do not outnumber private confessional and foreign schools even today. The total number of schools as of 2014–2015 is 2974 of which 44.1% are public, 12.9% private semi-subsidized by the government and 40.6% private fee-paying (CERD 2016). Despite the expansion of schools in the public sector, their share of enrolment remained around the 28.4% level as compared to 53.9% in private fee-paying schools and 14% in private semi-subsidized schools. There are also UNRWA schools for Palestinian refugees, which enrol 3.58% of students in Lebanon (CERD 2016). This enrolment rate is important to document since one of the reasons behind students' low enrolment in public schools is the lack of high-quality teaching, poor buildings and lack of essential educational facilities and infrastructure needed to support teaching and learning as compared to the private sector (LAES 2006).

Access to Schools

Access to schools in Lebanon is high compared to neighbouring Arab countries. For instance, in 2014–2015, 1,002,277 male and female students were enrolled in Lebanese schools both private and public (CERD 2016). Figure 10.2 shows the Gross Enrolment Ratio (GER) trend in Lebanon.

Educational Reform

With the conclusion of Lebanon's protracted civil war in 1989 by virtue of the National Reconciliation Charter known as the Ta'ef Accord, the Lebanese government, in cooperation with various civil society organizations, unions, syndicates

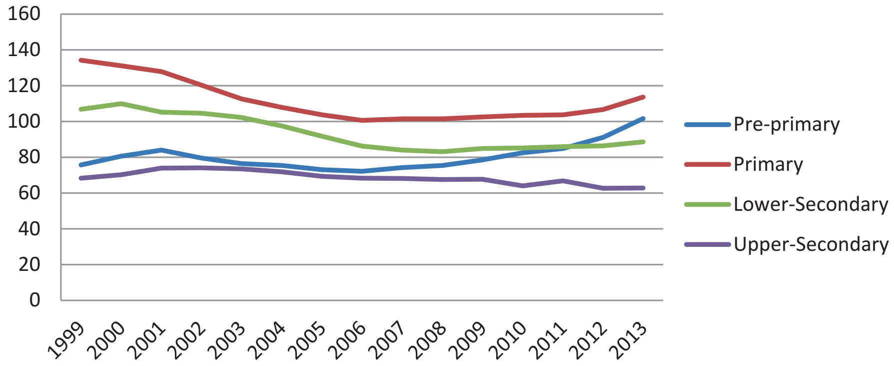

Fig. 10.2 Trend Line Gross Enrolment Ratio of males and females (1999–2013) (UNESCO statistical data base 2015)

and private institutions, mobilized ways to set reform plans for the three segments of education: general education (GE), higher education (HE) and vocational education and training (VET). These reforms were considered vital strategic conduits for promoting national reconciliation and economic development as they pledged to revamp Lebanon's stagnant 1968 curriculum and replace it with a new one that would address Lebanon's post-war needs for economic development and social cohesion. The educational reform plans were based on six constitutional articles (Ta'ef Accord 1989, pp. 14–15):

1. Provide formal education for all and make it compulsory at the primary level, at least
2. Emphasize freedom of education in accordance with the law and regulations
3. Protect private education and strengthen state control over private schools and textbooks
4. Reform the VET sector and strengthen its role to meet the reconstruction and economic needs of the country
5. Reform the Lebanese University
6. Revise the curriculum so as to enhance national belonging, cohesion and spiritual and cultural openness, as well as standardize history and civics textbooks in such a way that they resocialize Lebanese youth along national unitary lines.

The reconciliation charter called the Ta'ef Agreement which ended the civil war in 1989 brought important changes in education by establishing that education be provided to all and shall be compulsory up to the elementary stage at least. It added that freedom of education shall be continued according to the general laws and regulations of the government and that private education shall be protected (Hiro 1993). As part of the new educational reforms, the Ministry of Education through the CERD introduced a new national curriculum in 1997 by Decree 10227, replacing the 1968 curriculum which was criticized on a number of grounds including over-reliance on rote learning, teacher-centred approaches, outdated books and content and lack of citizenship socialization of youth (*The New Framework for Education* 1997).

The new national curriculum, which has been implemented gradually since the school year 1997/1998 to the present, structures education into four main cycles. Preschool education is the lowest educational stage and includes kindergarten. This cycle is followed by basic education, which is structured into two cycles: 6 years of primary education and lower secondary education that lasts for 3 years as follows:

1. Pre-elementary education (3–6-year-olds)
2. Cycle 1: Grades 1–3 for (7–9-year-olds)
3. Cycle 2: Grades 4–6 (10–12-year-olds)
4. Cycle 3: Grades 7–9 (13–15-year-olds)
5. Cycle 4: Grades 10–12 (16–18-year-olds).

Primary and lower secondary education make up 'basic education' which is normally completed by a student at the age of 15. There remain two main options after the successful completion of basic education. These are general secondary education leading to the baccalaureate with four mainstream educational options, namely, socio-economics, humanities, life sciences and general sciences. In addition, there is a separate option which is technical education and vocational training offered for those who would consider vocational education. At present, there is much discussion on the issue of teacher training and the ability of schoolteachers, particularly in public schools, to implement the requirements of the new curriculum which aimed at providing up-to-date education that emphasizes student-centred pedagogy, self-inquiry learning, mastery learning and problem-solving education (Vision document, LAES 2006). However, the author has learned from the IT teacher training programme designed by the Faculty of Education at the Lebanese University to train 1200 schoolteachers from public schools beginning in 2010 that although ICT equipment was provided for the training, there has been little use of this, and schoolteachers' prime interest in the training itself was to pass the 4-month mandatory training period for promotion, salary increase and job security purposes. However, these facts may not necessarily apply to schoolteachers from private schools since these schools enjoy a semi-autonomous status in recruitment, training and teaching.

Vocational Education and Training (VET)

Another segment of education in Lebanon is vocational education and training (VET). The first technical public school in Lebanon was established in Sanayeh, Beirut, in 1904. During the 1960s Lebanon laid emphasis on vocational education and training which led to the establishment of the vocational city at Dekwaneh in the eastern suburbs of the capital Beirut in 1962. The aims of the provision of vocational education in Lebanon have been to offer practical learning opportunities to students outside the realm of formal mainstream education, connect students' practical skills with the requirements of the labour market and therefore strengthen the country's economy. In terms of structure, the Legislative Decree 9404 dated May 4, 1962 divides vocational and technical schools into four categories: schools for vocational training without a degree, vocational schools with a degree, hospitality industry schools and technical high schools. The field of specialization at these schools is of two types: (1) vocational rehabilitation and (2) technical education.

The total number of students enrolled in VET in 2014–2015 was 86,250. Over the years, this segment of education has witnessed an increase in enrolment due to the following: (1) the inability of many students to further their formal education due to financial constraints; (2) the new national curriculum provided opportunities to students to enrol in VET schools, with the possibility of joining majors in mainstream higher education at a later stage, namely, engineering as is the case of the Baccalaureat Technique (BT) and Technicien Supérieur (TS) certificates; and (3) sizeable numbers of the unemployed seek VET in order to find job opportunities upon graduation. Thus, the increasing emphasis on the importance of vocational education and training in Lebanon in line with the various governmental and non-governmental initiatives to promote tertiary education capable of responding to the emerging economic needs of post-war Lebanon cannot be considered as sole factors underpinning the increase in numbers of vocational and technical schools.

Introduction of IT in the Vocational Education and Training Sector

The penetration of IT into the vocational education and training sector is still in its early stages. Attempts to introduce IT into the vocational education and training sector are limited and mostly undertaken by the private sector with an outreach very much concentrated in Beirut, Mount Lebanon and major cities (ETF 2005). Although both government and NGOs have taken up initiatives for setting up e-systems and networks for vocational training and education in the public and private VET sector, these initiatives are still in their early stages of implementation. Much of the focus is now on ICT equipment, although there is discussion about teacher training which usually recommends better and up-to-date equipment for successful training, utilizing the notion that for any successful teacher training to take place, more equipment is needed (Vision Document, LAES 2006).

To summarize, although there is a national drive towards reforming the vocational and technical education sector in Lebanon, the VET sector still experiences the following issues: little emphasis is given to ICT; the share of ICT in the national educational plans is extremely narrow and almost always limited to private piecemeal initiatives. In the early 1990s, the VET Directorate General conducted new executive studies to keep abreast of the latest developments in IT. These studies, which were financed by the World Bank, covered the following:

- Computerization of budgeting procedures at the VET Directorate General
- Follow-up of students at public schools and institutes and updating their registration files

- Computerization and updating of the files of private schools and institutes
- Computerization of the entrance examinations for public schools and institutes
- Production of application programmes for establishing a database for official examination questions.

Not all of the above steps were implemented due to a lack of follow-up on the implementation process. The reason for this lack of implementation is due, partly, to political instability in Lebanon besides the economic degeneration of the country which makes the implementation of educational projects including technology quite difficult. This situation, however, is different in private higher educational institutions which are self-financed, and their revenues depend on students' tuition fees and external research funding.

Higher Education

Lebanon's higher educational system is characterized by the presence of private institutions, which are based on the American credit system of higher education, the French system or the Arabic one as outlined in the previous chapter. The reason for this complex mixture of systems is rooted in the coexistence of several distinct social groups which make up the plural social fabric of Lebanon. Some of these groups seek to acquire American-type education, while others attend French-style higher educational institutions which articulate their cultural traditions resulting from their long-standing cultural allegiance with France. At present, there are 41 private higher educational institutions and one public, the Lebanese University. The private sector houses 120,163 students as opposed to the Lebanese University which accommodates 242,724 students (CERD 2016).

The conditions of higher education in Lebanon are not atypical in neighbouring Arab states. The most noticeable criticism made against educational institutions is their remarkable failure to contribute to the process of social change in the context in which they are embedded, by remaining very traditional. This state of affairs coincides with a period of development in Web resources, which over the last few years have boosted the expansion of online teaching and learning in Lebanon (Kramer 2000). In fact, criticism of higher educational systems in Lebanon and the Arab states is currently leading to greater interest in quality education and evaluation processes which at this time are seen as inadequately developed for a full-fledged reform plan.

E-Learning in Lebanon

The recent remarkable surge of online communication has brought e-learning to higher education in worldwide contexts. The impact has been the increase of students enrolled in e-learning courses. For example, in the United States (US), 61% of the presidents of 4-year liberal arts colleges state their institutions offer classes that are taught exclusively online, and 79% of the presidents of research universities and 82% of the presidents at community colleges report the same, but, more importantly, 51% of the college presidents say online courses provide the same value as face-to-face programmes (Parker et al. 2011). The US Department of Education reported that students enrolled in e-learning classes 'on average, performed modestly better than those receiving face-to-face instruction' (US Department of Education 2010). Despite advances in e-learning implementation in educational contexts, e-learning in Lebanon can be best described as scattered piecemeal initiatives undertaken by private higher educational institutions and private schools. A more specific picture of the historical development of e-learning is provided in the sections that follow, centring on schools and higher educational institutions.

E-Learning in Lebanese Schools

E-learning in schools in Lebanon is a fledgling learning tool, and the main focus in the curriculum is on teaching students how to use technology. The national curriculum of 1997 introduced an IT course to be offered for 1 h per week to the third cycles (Grade 7 through 9) of basic education and throughout the various sections of the secondary cycles. After assessing the degree of success or otherwise of the experience of IT courses on the existing curriculum, the teaching of IT was to be extended at a later stage to all educational cycles of the national curriculum.

The general aims of the IT curriculum are to develop positive attitudes towards computers and reinforce students' self-confidence through the efficient use of this technology. In addition, the new IT curriculum aimed to establish the value of the educational and economic role of the computer as well as its function in facilitating communication. In keeping with Lebanon's historical openness to world cultures, an important aim of the curriculum was to facilitate interaction with other cultures and civilizations through various programmes and computer networks. In relation to learning, the IT curriculum aimed to develop creativity, logical thinking, problem-solving and analytical skills through programming. An important aspect of the new curriculum was to recognize the uniqueness of the computer as a programmable machine which can perform specific tasks upon the user's orders and help students acquire basic computer concepts and their use in various cultural, industrial and commercial domains needed in the labour market (Decree 10227, 1997). An important feature of the new curriculum is its relation with the labour market whether in terms of needs, skills and competencies or in training of students in ICT use. According to Najib (2000), this relation was weak in Lebanon in 2000 since there was no mechanism in place to provide students with training opportunities in the economic and production sectors, which resulted in gaps between what they learned and what they will face after graduation, and this situation is interpreted by employers as evidence of low quality in the education of students.

Yaghi (1999) evaluated the IT curriculum introduced in Lebanon in 1997. His study showed that one of the advantages of the new curricula in Lebanon is the introduction of a new subject –informatics – to be taught at the intermediate and secondary level at the rate of 1 h per week. Yet, despite its importance, Yaghi reported a number of deficiencies in the curriculum due to the following reasons:

- One hour is barely enough to train students in using the computer to acquire such basic skills as electronic typing and drawing.
- The new curriculum overlooked ways of introducing the computer as a means of teaching other subjects.
- The curriculum focused on training students in using computer skills more than in developing such intellectual skills as problem-solving and decision-taking.
- The curriculum did not allocate any instructional time for using computers at the elementary level.

More importantly, Yaghi questioned the value of textbooks and curricula if computers are unavailable in schools. In fact, as part of the ICT policy initiative, computers and communication networks (intranet and Internet) were introduced gradually into both private and public schools. However, a digital divide, which denotes that there is a disparity in terms of access to the information about and the subsequent use of ICT (Choudrie and Weerakkody 2007), was evident in the distribution of IT facilities across private and public schools with the former having more technology equipment and facilities than the latter.

The introduction of IT as a subject in schools was one of the innovations introduced by the 1997 curricula. From personal experience as an author who worked on the IT curriculum at the Centre for Educational Research and Development (CERD), the author of this chapter found that the IT curriculum is limited to technical skills and does not stress its use in other subject matter areas or in autonomous learning. In addition, IT as a subject matter has not been assigned any weight in school evaluations or in official examinations. One of the obstacles facing the contribution of education to building an information society is the delay and slow pace of equipping public schools with computer laboratories and Internet access. Another obstacle is the lack of qualified informatics teachers in public schools. Lately, the Ministry of Education launched many experimental projects in this respect, such as the 'Manara' project that included 17 public schools, the 'Partners in Lebanon' project which involved 200 teachers and the MOS project that involved 75 teachers a year over a period of 5 years. However, these projects remain limited in their scope and do not follow a comprehensive plan, the lack of which renders such projects unsynchronized in their goals and mechanisms. Even if equipment is made available, the greatest obstacle will be how to use IT in teaching in such a way as to make technology an effective tool that aids students in learning, both in school and at home, and not just in locating information but also in answering questions, choosing relevant information and constructing knowledge through individual and group efforts.

E-Learning in Higher Education

Three major case studies have been conducted on e-learning in higher educational institutions in Lebanon. Abouchedid and Eid (2004) reported faculty members' interest in adopting e-learning in their teaching and research and their recognition of e-learning as an effective tool for meeting a globally challenging and exponentially growing information economy. Faculty members' positive attitudes towards e-learning showed a departure from the hesitant educational policy-making process in the Arab region, which often adopts a 'traditionally' demarcated, reserved view concerning the implementation of e-learning and distance education. This finding coalesced with many studies conducted in the West, which showed a significant increase in support for the implementation of e-learning and concomitant styles of pedagogy in the education and training sectors (Nasser and Abouchedid 2000). Baroud (2011) conducted a comprehensive and in-depth case study into e-learning implementation in a private higher educational context in Lebanon. His study showed a major change in faculty members' attitudes towards e-learning implementation in teaching and learning from 2001 to 2009. The main intervening variable was training, where faculty members' attitudes towards e-learning had changed significantly after being inducted into successive e-learning training workshops. Hesitant faculty members in 2002 became staunch supporters and endorsers of e-learning in 2009 following training and institutional motivation to reward e-learning users. The study has underscored the importance of training in changing attitudes and facilitating organizational change towards adopting innovation in pedagogy.

Baroud and Abouchedid (2010) examined two case studies in two other private higher educational institutions in Lebanon. In one of these institutions, access to computers and software such as PowerPoint, Word, Excel and FrontPage and Internet facilities were provided to all faculty members, students and staff in order to engage them with technology in the educational process. Faculty members at this institution received training on the use of WebCT as a *Virtual Learning Environment (VLE)* in addition to courses on the use of technology in teaching and learning across all faculties. Since the year 2002, the university has shifted from WebCT to Blackboard (Bb) and offered training on the new platform with emphases on synchronous and asynchronous learning to facilitate learning and research among students and faculty members.

At the second university investigated, a survey on the use of ICT conducted by Souto-Silva (2005) showed the general satisfaction of faculty members and students with the use of the various forms of technology in teaching. However, survey results showed that a large number of faculty members were doubtful about the utility of the *Virtual Learning Environment* (*VLE*) in achieving course objectives and learning outcomes. Training and preparing faculty members and students to use technology for achieving pedagogical outcomes were emphasized.

In a recent symposium organized in September 2016 as part of a Tempus-funded project titled Apprentissage à Distance et Innovation Pédagogique ('ADIP') involving a consortium of higher educational institutions in Lebanon, university representatives criticized the absence of ministerial regulations and policies of e-learning. In lieu of this, higher educational institutions supplement their face-to-face teaching with e-learning through either Bb or Moodle as a *VLE* accenting a blended pedagogical mode of delivery. Thus, e-learning is part of internal university policy and practice rather than the result of ministerial policies and procedures; e-learning implementation in higher education is rendered as piecemeal initiatives deprived of ministerial legal guidance. In addition, the first e-learning workshop organized by the Higher Education Reform Experts (HERE) in collaboration with the Ministry of Education and Higher Education (MEHE) in Lebanon called for promulgating policies, regulations and guidelines for e-learning implementation in higher education in addition to the provision of training for teachers and postgraduate students. The e-learning debate in Lebanon continues to take place at the higher education and ministerial levels, yet little tangible outcomes have been achieved with regard to the crafting of ministerial policies and regulatory procedures for recognizing and legally implementing e-learning in the Lebanese higher educational landscape.

E-Learning Education Programmes, Degrees, Associations, Certifications and Accreditation

Despite the burgeoning educational laws and decrees in Lebanon since the 1990s, little emphasis was accorded to promoting or institutionalizing e-learning in educational institutions legally. However, outside the government's legal education box, e-learning integration into the curriculum is left at the discretion of either institutions of higher education or schools, mainly private ones. In addition, the MEHE does not recognize online and distance education degrees, hitherto being regarded as sources for diploma mills due to the absence of ministerial decrees and regulations or even robust quality standards that would distinguish between diploma mills and online or distance education degrees. Thus, accreditation of e-learning in Lebanon is non-existent.

Future Development

In seeking to reform universities in Lebanon, the concept of e-learning should be entrenched in teaching and learning for innovation, cutting costs, as well as for mobility and internationalization of programmes. However, to achieve this strategic option, Lebanon is in dire need for a guiding National Qualifications Framework (NQF) besides policies and procedures for legalizing e-learning implementation in higher education and recognizing online and distance education degrees needed to strengthen Lebanon's participation in the internationalizing of its higher educational institutions besides enhancing their competitive edge in an ever-changing global economy. A recent Tempus-funded project titled 'Euro-Mediterranean Integration through Lifelong Learning' (EU-MILL) which ran for a period of 3 years (2013–2016) entailed the development of pilot online courses by participating higher educational institutions from Lebanon, Morocco, Tunisia and Algeria alongside partnering institutions from Portugal, Finland and Spain. The online courses that were developed in Moodle by partnering institutions sought to provide professional skills and competencies to staff and employees from the productive economic sectors in each country such as health, banking and tourism, with an eye on promoting economic development and social cohesion in each participating country. The online training gave partners confidence that online courses carried out through centres of lifelong learning in participating universities could yield positive models as well as examples to be replicated in formal higher educational contexts.

Based on Lebanon's higher educational needs to institutionalize and legalize e-learning in teaching and learning, the following two immediately pressing recommendations should be taken into consideration:

- Establish a common system of credit validation, recognition and accumulation of credits to ascertain shared criteria based on skills, knowledge and competencies acquired via e-learning. This approach should facilitate mobility among students from different countries and learning environments, particularly when it comes to equalizing and recognizing degrees attained through e-learning.
- Establish a quality assurance system specific for e-learning that would assure the quality of programmes in terms of input, output and outcomes.

Without progress taking place on the track of developing e-learning policies, other developments in pedagogical innovation, transferability, mobility and internationalization of programmes in higher education will be ephemeral.

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Chapter 11
Libya

Aisha Ammar Almansuri

Abstract This chapter surveys the development and current state of e-learning in Libya. The author surveys the general social, economic, historical and demographic background of Libya and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country and challenges and barriers to ICT implementation in education, business and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives and projects throughout the country. Information is additionally provided on accreditation, teacher training programmes and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Libya. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Libya · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Libya is one of the North African countries, situated between 20°–34° north latitude and 10°–25° east longitude. It is the fourth largest country in Africa with a total area of 1,759,540 square kilometres and a long 1,955 kilometre border on the Mediterranean Sea where the majority of the population live. Most of the country (94%) is covered by the Sahara Desert which is sparsely populated. Libya is bordered by six neighbours: Egypt, Sudan, Chad, Niger, Tunisia and Algeria. The capital of Libya is Tripoli, known as Tarabulus (*World Factbook* 2016). The location of Libya is a unique climatic zone where as many as five different types of climate can be observed; however, the main climatic influences in Libya are the Mediterranean Sea, the Sahara Desert and the mountain region (Almansuri 2010).

The last official *Statistical Book* published in 2010 from the Ministry of Planning, Bureau of Statistics and Census Libya (2013) estimates the population of Libya in 2010 as 5,702,000, and mapsofworld.com (2016) cited the estimated population of Libya in 2012 as 6,733,620, and the countrymeters.info (2016) stated that the population of Libya in January 2016 was estimated to be 6,271,218 people. In more detail, *The CIA World Factbook* (2016) estimated the Libyan population in July 2014 as 6,244,174 people, with about 46.1% between the ages of 25–54 years (male 1,509,108/female 1,370,709), 18.2% between 15–24 years, 26.9% between 0–14 years, and 3.9% are 65 years and over. The disparity in estimating the Libyan population can be explained by the consequences of the 2011 revolution which eventually removed Muammar Qaddafi as leader; however, the population can be generally estimated as 6,300,000 people.

Historically, Libya has been exposed to varying degrees of foreign control over the centuries: Phoenicians, Carthaginians, Greeks, Romans, Vandals and Byzantines have ruled all or parts of Libya. The Greeks and Romans left impressive remains. Muslims led Libya from the seventh century AD onwards, and during those centuries, most of the native people (Amazigh) adopted Islam. The Ottoman Turks dominated Libya from the sixteenth century until Italy invaded in 1911 and made Libya a colony. From 1943 to 1951 different parts of Libya were under the control of Britain, France or Italy. Libya was the first country to gain its independence through the United Nations in December 1951 and became the United Libyan Kingdom. In 1969, a military-led coup overthrew the royal government and established the new Libyan Arab Republic (Almansuri 2010). Since 2011, a public revolution has occurred following the Arabic Spring, and the country is still experiencing political divisions.

The ethnic groups in Libya are divided into 97% Arab and Berber (Amazigh) and 3% other nationalities. Over 97% of Libyans are Sunni Muslims, and only 3% are from other religions. The essential attitude in designing Islamic urban spaces is to have a balance between the family's need for privacy and the need for a common bond with all society. Accordingly, the acceptance of Islamic ideas by the Libyan people has had a clear effect on culture and society, and the Islamic principles and sociocultural values in Libya play a very important role in controlling and directing the behaviour of people within internal and external spaces. The Libyan government always considered Arabic as the only official language and never taught or even used the Berber language (*World Factbook* 2016). However, after the revolution of 2011, native people raised their voices to include their languages as official languages along with Arabic in the new constitution.

In the field of higher education, most of the students in top faculties such as medicine and engineering are women, and Kumar and Arteimi (2010) report that more than 80% of the students in the Faculty of Medicine are female. They believe that this percentage will have consequences, and the problem will occur when those female students get engaged or married, usually leaving the faculty; and if they leave in the final year, it may be difficult to practise medicine in the future. Moreover, female students, who wish to make their career in the field of medicine, find it difficult to keep their knowledge updated due to the culture of Libya. For instance, most women are not free to go out of the house at late times individually, and they are nervous in travelling long distances or abroad. Consequently, the degree of women's participation and contribution in healthcare is reduced due to their lack of updated knowledge. Kumar and Arteimi believe that e-learning can be the best solution for them to update their knowledge and upgrade their skills without interfering with their own valuable cultural patterns.

The Internet and social media play a strong role in changing the peoples' relationships, as well as placing the most common things that they need to know within easy reach. Kenan et al. (2013c) confirmed that Libya is witnessing an active era for all forms of networking and social media, especially the young generation. Recently, most of the Libyan youth in general (and higher education students in particular) are using online tools to share information and knowledge and discuss issues related to their studies. They have demonstrated their love of using modern technology and their passion to use all kinds of electronic devices through social communication channels. This is evidenced by the increased sales of computers and smart phones.

After the discovery of oil in the 1960s, the Libyan economy depended primarily upon income from the oil sector, which contributes about 95% of export earnings, 80% of GDP, and 99% of government income, in addition to natural gas and gypsum. The extensive income from the energy sector combined with a small population provides Libya with one of the highest per capita GDPs in Africa (*World Factbook* 2016). Hamdy (2007) confirmed that the United Nation's Human Development Index places Libya at the top of all African countries. In relation to education, Othman et al. (2013a) stated that the civil war in Libya in 2011 influenced the country's economy and has critically affected its telecommunications sector. It is estimated that more than US $1 billion's worth of telecom infrastructure has been destroyed, including about 20% of the country's cell sites. Reconstruction efforts have started, and with an estimated 76% growth in GDP in 2016, the country's economic production is expected to return to pre-war levels. Also, Linvill (2013) believes that Libya has the human and financial resources available to change its current higher education system into something capable of meeting its future requirements, with support from the international community. This belief is confirmed by Benghet and Helfert (2014) who stated that Libya has been able to increase its economic and educational position over the years, and these efforts could help in introducing modern methods of learning into the higher education system.

The World Bank (2016) considered that although Libyan oil and gas licensing rounds drew high international interest, Libya has to increase security and establish a more permanent government to be able to offer more smart financial terms on contracts because the political conflict has taken a severe toll on the economy, which has remained in decline for the third consecutive year in 2015. Accordingly, Libya's economic and current account shortages continued in 2016, with the budget shortage at about 60% of GDP and the current account shortage at 70% of GDP. In the next few years, as oil production reaches full capacity, growth is projected to rebound at 46% in 2017 and 15% in 2018. Extended political conflict, with lower international oil prices, has affected public finances severely, as the budget shortage rose from 43% of GDP in 2014 to 75% of GDP in 2015. The deficit was mainly financed from the government's deposits at the Central Bank of Libya (CBL).

Education System in Libya

For over 40 years, Libya was running as a closed economy. Those years of separation led to a severe failure in the provision of quality in all aspects of the economy and education; for instance, from the early 1980s, extensive corruption in education occurred with the exclusion of teaching foreign languages in schools, which led to a serious lack of student motivation, hence a decline in the quality of education delivery (Taghavi 2013). This fact is recognised by Tamtam et al. (2011), who believe that the education system faced many problems during the period of the 1980s and 1990s, mostly in the use of language of instruction and changes in the education system. Also, a World Bank Report (2006) confirmed that the lack of diverse language skills in Libya has considerably decreased the number of students and their ability to use available international data due to language barriers. Moreover, Linvill (2013) of the Associated Press reported that as part of Qaddafi's movement to "eliminate foreign influence", English and French textbooks at Tripoli University were burned by university officials. This book burning continued for a decade and took place regardless of student complaints, although the fact remained that most technical and medical courses at the university were taught using English language textbooks. This gap left a lost generation of students in terms of language skills. On the other hand, Libya has created a very strong culture of education because the Libyan government has regularly allocated more than 30% of the national budget solely for the education sector. Basic education has been kept free for all citizens, and up to the secondary level, it is compulsory. This certainly explains the strongly growing student community in Libya (mapsofworld.com 2016). Othman et al. (2013a) confirmed that Libya has a high rating for literacy in the context of the Arab world. Moreover, Tamtam et al. (2011) stated that in the early 1980's, about 70% of men and 35% of women were literate. This has improved in 2004 to a 90% literacy rate for men and more than 70% for women. The improvement for women comes from the good attendance of girls in the first stage schools. Furthermore, Taghavi (2013) states that nearly 1.7 million of the Libyan population of approximately 6 million are students and around 16% study at the tertiary level, including those in the higher technical and vocational sector. The number of such students has been growing at a remarkable rate of 2.5% per annum since 1975.

Basic Education

The education system in Libya can be classified into a number of stages, starting with the compulsory primary stage for 6 years, followed by the elementary school for 3 years which is compulsory also, and in the third stage, students have to choose the kind of high school (general or specialised) they will attend or an intermediate vocational centre or a teacher training institute; up to this stage, all levels of education have two semesters per year, and the last level for students who pass the high school with adequately high marks can move forward to higher education. Clark

(2004) and Taghavi (2013) state that preuniversity schooling is divided into three sections, primary, elementary and secondary school, and basic education is compulsory and includes the first 9 years of education. Basic education consists of the 6 years of primary school split into a 4-year period and a 2-year period and the 3 years of elementary school. Compulsory education has an open path through the successive educational stages, with assessment at the end of the fourth, sixth and ninth grades. The main curriculum includes Arabic language, Koranic studies and Islamic morals, mathematics, sciences, history, geography, art, music, physical education and principles of technology. Secondary education covers 6–7 years divided into a 3-year cycle of "elementary" school that concludes the compulsory part and 3–4 years of an "intermediate" cycle, consisting of general science and arts. The main curriculum in the secondary education includes Arabic language, Koranic studies and Islamic morals, English, mathematics, history, geography, biology, chemistry, physics, principles of technology, art, music and physical education. Before the revolution, there was another course called Jamahiriya which everyone studies at all stages of education, but after the revolution, this course was cancelled.

Clark (2004) explained that in the 1980s, a new educational structure reformed the intermediate education to prepare students for specialisation at university and to provide those students not destined for higher education with a practical vocational base in preparation for the labour market. This structure includes six main specialised fields: basic sciences, engineering and industrial sciences, medical sciences, agricultural sciences, social sciences and fine arts and media. Students who fail in completing the full 9 years of basic education are offered a chance to register in vocational programmes of 1–3 years to train students in a practical skill in readiness for the job market, which results in the awarding of the Lower Certificate. In the academic year 1998/1999, there were 398 basic vocational training centres servicing more than 130,000 male and female students.

Higher Education

Higher education in Libya is provided by universities (both general and specialised) and higher technical and vocational institutions, which include universities and higher technical and vocational institutions, such as higher teacher training institutes; higher institutes for trainers (training future higher technical institute instructors); higher institutes for technical, industrial and agricultural science; and some research and educational institutions such as scientific research centres established in such fields as health and pharmacy, education, the environment and basic sciences. Since 1990, all universities require an admission score of 65% or better on the secondary education exam; some faculties, such as medicine and engineering, require scores exceeding 75% for admission (Clark 2004). The university sector in Libya started in the early 1950s with the establishment of the "Libyan University".

It has campuses in Benghazi and Tripoli, and it has grown over the years to include faculties of Arts and Education, the Faculty of Science, Faculty of Economics, and Faculty of Commerce, Law, and Agriculture.

University-level studies are divided into three stages: bachelor's degree, master's degree and doctorate (Rhema and Miliszewska 2010). El-Hawat (2003) and Tamtam et al. (2011) stated that rapid changes occurred in the education system after independence, and about 13,418 students were studying in university during the academic years 1975–1976. In 2004, about 200,000 students were studying in Libyan universities, with another 70,000 studying in higher technical and vocational training colleges. Also Clark (2004) confirmed that many institutions of higher learning have been established throughout Libya to accommodate the growing interest in learning; the increased participation of the Libyan government in education and the tuition-free aspect of Libyan education contribute to the high acceptance rate of higher education programmes. Moreover, Linvill (2013) specified that the system has been able to give all willing Libyans an education because there are seven major universities across Libya, even though they are overburdened. Furthermore, mapsofworld.com (2016) stated that, in Libya, there are nine major universities and about 64 vocational institutes and smaller public universities. Therefore, Libya has suitable physical infrastructure and faculties, many of whom were educated in the United States and the United Kingdom. Linvill recommended that Libyan universities need to improve modern education practices, information technology and organisational management methods to sufficiently develop physical and human resources in Libya.

The higher education system is financed by, and under the authority of, the state; however, the Open University is the only institution within the public sector that relies to some extent on tuition fees paid by students. Other public institutions of higher education depend on the national budget (El-Hawat 2003). Consequently, in recent years, policymakers have allowed the creation of private institutions of higher education through what are known as educational cooperatives, resulting in the establishment of more than five private university colleges and higher education institutes in a three-year period between 1997 and 2000 (Hamdy 2007). Clark (2004) argued that the improvements in private instruction have led to a heated public debate over the role of the government and the private sector in education provision and whether the quality of education being offered by the private sector is of an adequate quality.

Regarding postgraduate studies, Said (2005) explained that in 1973 several Libyan universities started postgraduate programs. In 2004, the number of graduate students who applied for master's degrees from Libyan institutes in different disciplines was about 3150, and only 40 students had acquired a PhD certificate from the three main institutes. Although seven or eight institutes now have the resources and educational position to award PhDs, many students, specifically in engineering, science, management and finance, found it essential to receive PhDs from universities abroad, and there were some 3500 who studied abroad in the academic year of 2004/2005.

E-Learning in Libya

According to Hamdy (2007), the national policy for ICT in Libyan education was launched in 2005 and is mainly managed by the Ministry of Education and the Ministry of Vocational Training with the contribution and support of the General Postal and Telecommunication Company and Libya Telecom and Technology. Each ministry is in charge of its designated sector of education. The ministries also cooperate with each other in matters that are linked to one another. However, Kumar and Arteimi (2010) believe that Libya lags behind in terms of usage and maintenance of ICT infrastructure, and the process of applying the national ICT policy in specific developmental projects in different areas in general is still in the early stages. This is confirmed by Kenan et al. (2015) who acknowledge that ICT tools were separate from the improvement process, and there are limited connections between the provision of ICT and the improvement process in higher education in Libya. Rhema and Miliszewska (2010) and Rhema et al. (2013) also confirmed the absence of educational technology knowledge and basic computer skills in Libyan education that leads to a lack of adopting ICT for teaching in the higher education sector. On the other hand, Othman et al. (2013b) acknowledge that although ICT is widely used in daily teaching and learning in the Libyan higher education sector, there are many challenges affecting its application, listed as follows:

- No proper ICT infrastructure available
- Insufficient network facility
- Limited educational software products
- Absence of technical departments
- Lack of Libyan specialists to develop an online learning and teaching environment
- Language and cultural background of the teacher and students.

Lately, it is believed that the improvement in higher education cannot be achieved without improving ICT tools to meet the needs of education management and administration and to support teaching and learning. And as Libya is still new to technology in terms of its ability to run large-scale ICT programmes, there is a need for cooperation between the government and the private sector. Libyan universities and HEIs need to adopt a suitable strategy to change the educational situation and follow the international standard and compete with other countries (Kenan et al. 2015). Rhema and Miliszewska (2014) suggest that decision makers and management teams are the key to resolving challenges faced by the educational organisers by adopting ICT and the computer networks in the educational environment.

The government is determined to provide tools and ICT skills on a large scale to all sectors of the country. This view is confirmed by many authors such as Kumar and Arteimi (2010) who specified that the Libyan government has started strategic initiatives to improve overall the Libyan e-learning infrastructure; they provide as an example, the Office of Teaching Media and Equipment which provides computers and all of the audio and visual teaching media, equipment and tools for training workshops and school laboratories. In addition to the initiative to provide 1 million computers to 1 million Libyan children within 18 months, the government began a programme to connect Libya to the global educational community through broadband Internet, WiMax, mobile technologies, etc. Also, Benghet and Helfert (2014) clarified that the government system plans to improve and expand the ICT substructure of Libya. Its general development strategies focus on the implementation of ICT within teaching, together with higher education. These plans aim to reform completely educational procedures, together with the enlargement of learning prospects and informing the logical content of teaching materials. Accordingly, the Libyan Section of Education has laid emphasis on creating new methods of education that raises the level of teaching in Libya.

The government's policy aims to enable access to ICT through the provision of computers and the Internet. Hamdy reported in 2007 that the policy was in its early stages with the aim of improving the quality of education through ICT by the following means:

- Adopting modern techniques and methods in education
- Encouraging the scientific community to engage in research within the community
- Encouraging the private sector to get involved in funding higher and specialist education
- Developing open and distance learning as well as continued education
- Encouraging higher education.

The early policy of e-learning in Libya has been summarised by Farrell and Isaacs (2007) as supporting the government's initiatives on the Interim Poverty Reduction Strategy Programme (iPRSP) using ICT and standardising ICT operational systems and administrative procedures. The early policies also aimed to set up the framework to develop and implement ICT programmes in the regional and local communities and additionally to increase the national academic curriculum to create careers in the ICT sector and raise overall awareness.

Hamdy (2007) stated that reform plans to develop ICT infrastructure in Libya and include it in education by the government are considered key components in overall governmental development plans. He reported on the three main ICT initiatives and projects in Libya before the revolution: (1) the Ministry of Vocational Training programme in late 2006 sent 200 postgraduate students to the United Kingdom to do an intensive 1-year course in modern management techniques and management within the education system in Libya; (2) the Libyan General Company for Postal Services and Telecommunications (who owns and operates Libyan Telecom and Technology (LTT) and offers Internet access) offered a programme for teachers and staff training in ICT and supported ICT for education which is a governmental initiative; (3) UNESCO and the government offered many projects such as National ICT project – the project activities included the establishment of local area networks (LANs) within all 149 faculties belonging to various university campuses and institutes and of a wide area network (WAN) forming the Libyan Higher Education and Research Network (LHERN).

Hamdy also envisioned the creation of digital libraries/portals of educational resources and the development of ICT-enhanced learning solutions such as e-learning, tele-education and telemedicine. An important component of the project is the training of faculty (digital literacy, basic ICT skills, advanced teacher training on using ICTs in teaching and courseware development) and staff (system administrators, media centre specialists, etc.). In addition, the project foresees the creation of a national ICT resource centre for educators and the automation of university management systems through ICTs (e.g., student information systems, university procedures, financial operations, etc.). In addition, the Ministry of Education made an effort to develop and modernise the educational system in Libya through the National Initiative for the Introduction of Computers project; this initiative aims at importing and installing 3400 computer laboratories at all elementary and primary schools at the estimated cost of about USD $95 million. Further plans include model schools – in the future, about 400 model schools nationwide are going to be set up to offer modern and up-to-date courses as well as being equipped with the latest technologies and learning facilities. The government also planned OLPC7 e-learning projects for inexpensive educational laptop support. The One Laptop Per Child (OLPC) organisation, a non-profit US group, had the goal of supplying machines to all 1.2 million Libyan school children by June, 2008. Libya was promised 1.2 million computers, one server per school, and a team of technical advisors to help set up the system, satellite Internet service and other infrastructures. The country will invest USD $250 million in the project. Othman et al. (2013b) stated that, as a sign of approval and support of these initiatives, the government started a USD 60 million e-learning pilot project in September, 2009. However, Kenan et al. (2015) clarified that the government policy system that plans to support the LHEIs has been changed since 2011.

These e-learning policies are planned for the short term, and there are some signs that they are being followed upon and implemented. The Ministry of Communication and Informatics (2013a, b) in their July 2013 Newsletter Issue 1 clarified that the Libyan people have developed and changed in different ways, and the need for an approach that would ease government responsibility for providing educational services is becoming increasingly critical. Accordingly, the Libyan government authorised the Ministry of Communications and Informatics (CIM) to develop an e-government strategy to develop the right foundation for this transformation and thus launched the eLibya Program. The major goals of putting technology at the centre of government operations are to improve the services provided to all people and businesses of Libya wherever they are and at all times, using modern communication networks and systems, and also to decentralise government services and increase accessibility to these services for the Libyan citizen. Efforts are directed to deliver on two main elements: the first is to develop an understanding of the readiness to provide robust and effective eservices and the second element is to develop the eLibya future-looking strategy and operating model, and based on the first element, the latter will be developed. The CIM believes that considerable efforts are required for eLibya to become a reality. It is essential to address the role of ITC as a facilitator to provide citizens with the diverse services the public wish to receive. To manage the transition, the right steps must be taken to develop a well-expressed strategy that covers all government projects. Twenty percent of the assessment and benchmarking phase has been completed in 2013, and CIM is planning to launch the framework development phase to detail the vision, mission and objectives of the eLibya Program.

In their Newsletter Issue 2 in November 2013, CIM (2013b) indicated that the eLibya Program completed a major milestone of the strategy development phase including the participation of the Libyan government. Efforts were started in parallel to identify and detail the requirements for quick wins and the frameworks for the three priority sectors (Education, Health and Commerce), which are expected to positively impact the Libyan citizen and other business sectors of Libya. A team from CIM and specialised experts will assess the readiness of the technical infrastructure and the associated ability to provide business services for these sectors. The methodology includes gathering and analysing different sets of information using a systematic and standardised methodology that includes, but is not limited to, meeting with the various organisations that represent these sectors from the public and/or private sectors.

After completing the assessment phase and the eLibya Strategy Development Workshop, eLibya team members will work on the following tracks.

Design of Future Integrated Architectures Track

Future integrated architectures for eLibya Program will be developed and will include the following:

1. *Electronic delivery channels*: the team will use a combined methodology for selecting and prioritising the services to be transformed and provided in electronic format.
2. *Architecture for a government secure network and shared applications*: this architecture will define how government objects will be linked between each other; also it defines the method for managing shared applications for related parties to exchange data in a cost-effective manner that will promote a fast cycle time.
3. *Infrastructure and central data centre architecture*: this architecture will define the mechanisms to link government activities through a safe and effective electronic network, including the need to ensure the exchange of information, and maintain databases safely and effectively. In addition, a focus on the business continuity will be achieved through the national information centre and disaster recovery centre architectures.

Quick Wins Track

To facilitate and deliver the required changes, eLibya Program will use international experience and specialisation to determine available options and supervise the implementation of “quick wins”. Quick wins are planned in the following areas:

1. eCorrespondence system
2. E-government portal
3. Data centres
4. Email
5. Preparing post offices to provide e-government services.

The government will also develop eHealth, e-commerce and e-education frameworks. The framework for these sectors has been prioritised because of their importance to the Libyan citizen and economy. A team from CIM and specialised experts will assess the readiness of the technical infrastructure and the associated ability to provide business services for these sectors. The team will identify the detailed requirements for developing these sectors from a technical perspective based on international best practices. Then the team will also identify selected framework design principles for these sectors to provide e-services based on modern technologies and meet the relevant needs of Libyan citizens and investors in a seamless and secure fashion. In the Newsletter Issue 3 on February 2014, CIM (2014) stated that the e-government has reached an advanced stage in its progress, and the final draft of the e-government strategic framework is complete. Along with this completion, other phases were launched such as the e-government governance including all its subreports: the eGovernment Strategy Implementation Readiness Assessment, eHealth and e-commerce frameworks and the requests for proposals (RFPs) to achieve the quick wins. The completion reports will be released in the near future. Regarding the e-education framework, the related team has met with the officials at the Ministry of Education to provide electronic educational services.

The International Telecommunications Union (ITU) states that as part of its efforts to provide better services for the Libyan citizen, the government of Libya after the revolution in 2011 has taken the approach of approving a new regulatory environment for telecommunications as the Libyan Ministry of Communications and Informatics has chosen a high-level committee of telecommunication experts and lawyers from the Ministry as well as from outside to draft a new Telecommunication Act that will replace the existing law and propose an inclusive new Telecommunication Act for Libya based on best practices (2013). The aims of the new law are:

- To create an independent telecommunications regulatory authority
- To encourage and protect competition in the telecommunications market
- To ensure delivery of the highest quality of services at competitive prices
- To encourage Libya’s private sector to improve telecommunication services in the country.

Similarly, a Libyan national frequency plan (LNFP) developed by an international high-level team of experts in close cooperation with Libyan experts from the Ministry of Communications and Informatics covering the frequency range from 8.3 kHz to 275 GHz is being developed. The ITU (2014) stated that Libya has approached the ITU seeking to establish world-class ICT facilities for the country. Deputy Minister for Communications and Informatics Mr. Mohamad Benrasali asked for the ITU's support in preparing a master plan to modernise ICT infrastructure in Libya. In addition, the Libyan government is focusing on e-government as a powerful tool for public service delivery, and the government is aiming to establish a regulatory framework that would encourage investment in developing the ICT sector and rebuilding infrastructure. The ITU has committed to sending an assessment mission to Libya about eLibya initiatives that include open government, e-government, e-commerce and e-education. The Libyan government has laid down a timeframe of 2 years to reach its objectives of modernising the ICT sector.

E-Learning Education Programmes, Degrees, Associations, Certifications and Accreditation

The first study of the application of e-learning systems in Libya was in 2006 by Albadree, who explained that, although teachers have taken courses on e-learning since 2002 and e-learning was sequentially used in the higher education exam process in 2005, the application process is still in the beginning stages and the effort to assess e-learning remains at the study phase, because of the limitation of current information and infrastructures skills (Benghet and Helfert 2014). This is confirmed by Rhema and Miliszewska (2010) who reported that Libyan universities still use face-to-face communications between students and teachers. However, some Libyan universities, such as Tripoli University, Benghazi University, and Academy of Postgraduate Studies and Economic Research, have the basic ICT infrastructure for e-learning; accordingly, the application of e-learning and the use of ICTs in Libya are still in an early stage.

Kenan et al. (2013c) reported that most Libyan universities have not employed staff members with formal qualifications in either distance learning or e-learning because the Ministry of Libyan Higher Education does not identify distance learning and e-learning as valid modes of education. However, as a step towards distance learning, Tripoli University in 2003 provided a video-conferencing service that was used in online examinations, similar in structure to the theoretical part of the UK driving test. Elzawi and Wade (2012) confirmed that the Libyan government does not approve a degree obtained through either through distance learning or e-learning. Without the approval of the Ministry, students cannot gain any advantage in the workplace from their online degrees.

Artemi and Aji (2009) confirmed that Libya's Higher Education Institutes (LHEIs) are still facing a critical shortage of skilled specialists who can provide basic and progressive programming for planning, designing and implementing branched information systems and managing the huge scale of national e-learning projects. Another problem is the high wages expected by skilled technical staff, which challenges the government's ability to provide commensurate salaries which are competitive with private companies. Kenan et al. (2015) agreed that the LHEIs have found it hard to encourage technicians to assist them in expanding and building networks, developing and managing administrative systems, research and the curricula of the courses and the applications. A number of LHEIs have worked hard to solve this problem by launching wide-ranging and continuing professional development programmes for their staff and utilising their computer science, electrical, network and computer engineering departments. Also, Bukhatowa et al. (2010) believe that many challenges face Libyan universities to improve the quality of education services and the efficiency of education procedures and to commence new teaching and learning methods. These challenges can be solved by providing better teacher training and qualifications, finding ways for implementing e-technologies and providing professional development and technological infrastructure. Kenan et al. (2013b) also believe that solutions can be achieved by the governmental departments and the private sector who should be encouraged to sponsor the development of Internet technologies in HEIs and to provide a staff who are capable in such technologies and encourage LHEIs who have success in the application and organisation of collaborative learning and the Internet technologies and applications in order to share their achievement with other institutions. On the other hand, Benghet and Helfert (2014) think that e-learning in Libya has enormous prospects to creatively meeting the challenges of higher education, and the Libyan institutions of higher education could move education forward using e-learning. The extensive and constant improvement of the information and telecommunication technologies in Libya indicates that society is ready to accept and embrace e-learning completely. However, special care should be taken to analyse the opportunities and factors that can influence e-learning adoption and implementation.

Future Development

From the above introduction about adapting e-learning in Libyan education, it is clear that using ICT and e-learning in Libya's education system could support the learning process by bringing instruction to students who may have difficulty accessing educational systems and by facilitating communication anytime and anywhere. Accordingly, the Libyan national ICT policy for education aims to provide access to ICT tools and to build a strong infrastructure. It also promotes research and development to ensure the provision of suitable learning and human resource development, since the investment in human resources is the key factor to achieve the goals and objectives of the national ICT strategy.

The future of e-learning in the Libyan higher education institutions (LHEIs) and the universities in Libya should not only be creating a perception of progress but should also be executing and implementing online solutions in reality. Therefore, there is a need to adopt suitable strategic planning for the future of these HEIs, as well as to increase competitive advantage in the changed educational situation. This trend of improvement depends on the presence of greater leadership, complex communications and teamwork. Consequently, the HEIs which initiate the acquisition and use of new technologies, updated syllabi, and quality assurance in education must implement technical knowledge that can increase and improve a competitive environment and formulate an effective strategy for Libyan higher education. It is important for the HEIs to determine how to use technology as a teaching tool framed within their particular learning educational paradigm and to change their existing teaching and learning methods in accordance with the educational model related to e-learning.

In addition to the previous suggestions to improve the future of higher education and achieve the best application of e-learning in Libyan universities, some other useful recommendations advised by the author in a previous study (Almansuri and Elmansuri 2015) can be summarised as follows:

Recommendations for institutions:

- Libyan institutions have to accept e-learning and to realise the potential of ICT and to start quick technological development.
- Senior managers should support the implementation of e-learning and allocate a fixed budget.
- Instructors should be offered suitable training to be updated on changes to software and hardware.
- The ways of teaching and learning should be improved and appropriate training provided at different levels.
- The content of e-learning courses should be designed to meet the requirements of the National Qualifications Framework (NQF) and Libyan Qualifications Authorities (LQA).
- Learning management, including the management of the curriculum, staff and use of management information should be improved.
- Research for future developments should be carried out and connected with advanced resources over the world.
- Qualified staff and changing to e-learning should be implemented gradually in a correct manner.

Recommendations for governmental higher education policies:

- Improve physical resources, including accommodation, computer and other ICT-related resources.
- Provide a suitable fund and lots of careful planning and expertise.
- Share and coordinate resources between different institutions and encourage the successful institutions to share their success with other institutions.
- Increase partnerships between government and the private sector.
- Integrate e-learning into the education system and ensure the development and motivation towards e-learning.

Finally, it can be summarised that the Libyan government has been attentive in improving education in Libya and has created many large projects to provide ICT infrastructure for Libyan institutes; however, these projects seem to be on paper only, because they do not appear in reality as they are presented solely in documentation. After the revolution, many large projects have also been designed to change the education system in Libya to meet international standards; for now, however, it is still too early to judge the implementation of these projects as the civil conflict has not finished yet. All Libyans hope things will get better soon.

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Chapter 12
Morocco

Rachida Ajhoun and Najima Daoudi

Abstract This chapter surveys the development and current state of e-learning in the Kingdom of Morocco. The authors survey the general social, economic, historical, and demographic background of Morocco and provide a review of its educational system. Analysis and statistics on the information and communication technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the authors speculate on the future development of e-learning in Morocco. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Morocco · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: Kingdom of Morocco, http://www.maroc.ma/en/content/map-morocco

Introduction

The progress of nations hinges on the development of human capital, a true steam engine of their evolution. One nation that has adopted policies to promote the development of human capital is Morocco. This nation places its emphasis first and foremost on education, access to information, and vocational training as a means to develop the skills and know-how of its citizens, thereby encouraging creativity and innovation. In this regard, Morocco has initiated several strategies to improve the quality of education. Novel concepts in training and distance learning (e-learning) are a part of this initiative.

In this chapter, we will present Morocco's experience with e-learning. First of all, we will focus on the development strategies adopted by the country and the infrastructure at its disposal related to information technology (IT). Secondly, we will present the main e-learning projects currently in place, describe the evolution and maturity of these projects, and determine prospects for their development.

Morocco: The Sustainable Development Context and Innovative Strategies

The Kingdom of Morocco is a Muslim-majority country located in the northwest of the African continent, between the Mediterranean Sea and the Atlantic Ocean. The country has a long coast, but it also contains four main mountain ranges, as well as deserts to the south of the kingdom (Moroccan Sahara). The administrative capital of the country is Rabat. With an area of 710,850 km^2 (COP 2016), it has a population of around 34 million people of Arab and Amazigh culture (HCP 2015, p. 12). Since its independence in 1956, Morocco has adopted a democratic and pluralistic political system. Thus, several constitutional referendums and legislative and communal elections have allowed the Moroccan people to freely express their will and to exercise their full sovereignty effectively.

Currently, Morocco is growing rapidly economically and socially. The dynamism of the country is reflected on the one hand by a policy of openness toward its African partners, Arab countries, the United States, Russia, and the European Union. On the other hand, its internal policies and major national projects aimed at sustainable development, and social welfare reflects its internal vitality. Indeed, Morocco has put in place major national strategies in several sectors, for example, the Green Morocco Plan, the Rawaj Plan, the Solar Plan, the Azur Plan, the Halieutis Plan, the Maroc Numeric 2013 plan, and the National Human Development Initiative (INDH). It has also developed important transportation, energy, and technological infrastructure to accompany these changes. We highlight the strengths of our digital economy in the following sections.

The Context of Evolving Development

Morocco is undergoing profound changes in various fields of activity. Consequently, its infrastructure is always changing and evolving, particularly technological infrastructure. For example, the telecommunication sector was liberalized in 1998 and was therefore strengthened by an upgraded legislative framework and increased competition. The application of new information and communication technologies (ICTs) in mobile telephony, computing, and Internet access also played a role in allowing this sector to prosper. Figure 12.1 shows the evolution of the sector since 2004.

A survey carried out by the National Telecommunications Regulatory Agency (ANRT) shows a significant increase in private usage of mobile phones, which reached 94.4% in 2015. Meanwhile, the usage of fixed landline telephones continues to decrease, from 24.1% in 2014 to 22.3% in 2015. As for computer usage, the rate reached 54.8% in 2015 according to the study. Private internet usage reached 66.5% in 2015, compared with 50.4% in 2014 (ANRT 2016).

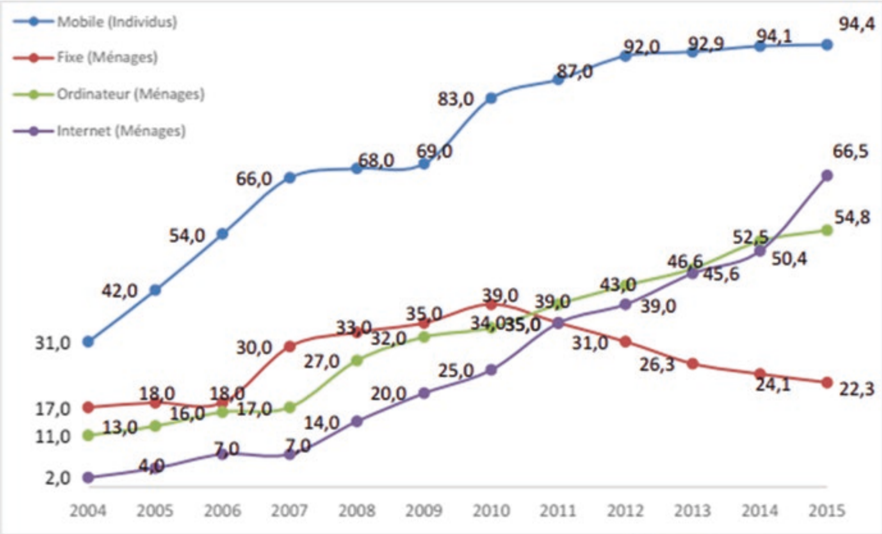

Fig. 12.1 Evolution of information and communication technologies (TIC) of individuals aged 12–65 years and households in electrified zones (percentage, 2004–2015) (*Source*: ANRT survey on the access and usage of Information and Communication Technologies by households and individuals in Morocco in 2015. Blue, individual mobile line; red, fixed household line; green, household computers; purple, Internet access (households). Retrieved from https://www.anrt.ma/sites/default/files/publications/enquete_tic_2015_fr.pdf)

The Digital Economy and Sustainable Development: Strategic Priorities of Morocco

Due to the increasingly large telecommunication infrastructure, and sufficient amount of IT equipment, in order to ensure the transformation of the country into an information and knowledge society, Morocco implemented the national plan Maroc Numeric in 2013. This plan aims to transform information and communication technologies (ICT) into a vector of human development, one of the pillars of the national economy, and a source of productivity for the various economic sectors as well as for the public administration. The plan also aims to position Morocco as a technological hub in Africa.

In fact, the ease of use of administrative procedures for citizens represents one of the priorities of this plan. This same priority is part of a larger program, namely, the e-Government program. Indeed, this program consists of a portfolio of 89 projects and services with a total investment of more than 200 million dollars (Gouvernement du Maroc 2011, p. 4) (Fig. 12.2).

In order to consolidate the efforts of the state to strengthen its digital economy, the Ministry of Industry, Trade, Investment and Digital Economy launched in July 2016 an agency whose mission is to accompany the implementation of the Maroc

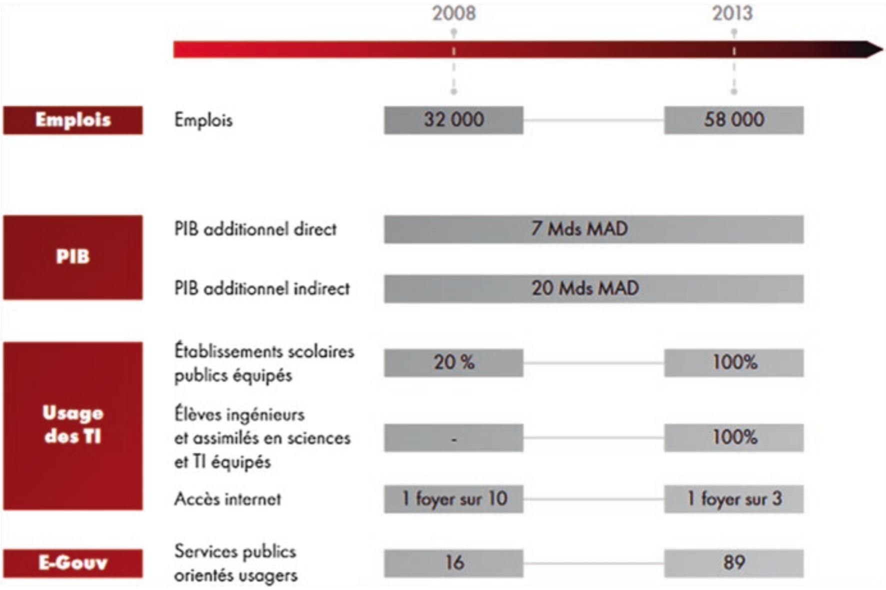

Fig. 12.2 Principal objectives in numbers of the strategy Maroc Numeric 2013 (*Source*: Stratégie Nationale pour la Société de l'Information et de l'Économie Numérique, Ministère de l'industrie, du commerce et des nouvelles technologies, http://www.egov.ma/sites/default/files/MarocNumeric2013.pdf)

Digital 2020 plan which is a continuation of Maroc Numeric 2013. At the social level, Morocco set up a national initiative for human development (NHRI) in 2005 which is a permanent project that puts people at the heart of development. The plan essentially aims at expanding access to basic social services and promoting income-generating activities. Persons with specific needs are meant to be the beneficiaries of this plan (INDH 2016).

Within the same objectives to improve the standard of living and well-being of citizens, and aware of the important role that education plays in supporting national development strategies, Morocco has also put in place the vision 2015–2030. This vision addresses reform of the Moroccan education system through the creation of 26 educational projects divided into the following four areas: parity and equal opportunity (eight projects), quality for all (seven projects), advancement of the individual and society (seven projects), and governance and change management (four projects) (Portal of Morocco, *Réforme du système éducatif* 2016c).

Educational System in Morocco

Education remains a major concern for the country, which invests a significant part of its budget in this sector. Indeed, the share of the budget dedicated to the Moroccan education system in all jurisdictions reached 22.24% of the general budget in 2015

(Chamber of Representatives 2015, Annex No. 1). Moreover, education reform is one of the royal priorities to rehabilitate the Moroccan schools and improve development (Chambre des Représentants 2015, p. 5). The Moroccan education system is organized on two levels: basic education and higher education. Afterwards, continuing, vocational training, and nonformal education represent options to extend education. Since 1999, a national education and training charter aims to advance the sciences and technology (Special Commission on Education Training, p. 6).

Primary and Secondary Education

Primary and secondary education is placed under the supervision of the Ministry of Education. According to Article 32 of the Moroccan Constitution, "basic education is a right of the child and an obligation of the family and the State." Both compulsory by 1960, basic education includes preschool education for 3 years (not supervised by the Ministry of National Education, with 59.7% enrolment in 2007) and primary education for 6 years (supervised, 94% enrolment in 2007). At 12 years of age, secondary education begins and encompasses 3 years of general education followed by 3 years of subject-specific study. The latter is divided into four branches: scientific, literary, technical, and traditional (Koranic schools). Arabic remains the predominant language in schools, while French is used for technical subjects.

Higher Education

Morocco is home to the oldest university in the world, "Al Quaraouiyine" in Fes, founded in the ninth century. And today Morocco grants the right of access to "a modern, accessible and quality education" to all its citizens as specified in Article 31 of its Constitution. However, only after national independence did the country open its first modern university, Mohammed V University, in 1957. And since the 1980s, an increasing flow of students along with socioeconomic development has improved higher education in Morocco. Under the guidance of the Ministry of Higher Education, Scientific Research and Training, new challenges and needs are being met through the creation of more universities.

There are now 24 universities (public and private) of higher education in the country, as well as a large number of private and public training institutions, which train students for middle to senior management positions in 3 or 8 years after the end of the high school degree. Moroccan universities follow the European LMD system (License, Master, Doctorate). Study plans are based on three grades: Bachelor (six semesters), Master (ten semesters), and Doctorate (lasting between 3 and 6 years). In addition, the courses offered by academic institutions are organized into cycles, courses, and modules culminating in the obtainment of a national diploma. Figure 12.3 below summarizes the structure of higher education in Morocco and the key figures (Benaich 2015, slides 4–5).

Secteurs d'enseignement	• L'enseignement supérieur public • L'enseignement supérieur dans le cadre du partenariat • L'enseignement supérieur privé
Instances contributives à la gouvernance	• Le Conseil Supérieur de l'Education, de la Formation et de la Recherche Scientifique (CSEFRS) • La Commission de Coordination de l'enseignement Privé (COSESP) • La Commission Nationale de Coordination de L'enseignement Supérieur (CNCES) • Le Conseil de Coordination • L'agence Nationale d'évaluation et d'assurance qualité de l'Enseignement Supérieur • La Commission Nationale d'accréditation et d'Evaluation (CNAE)
Domaines de formation	• Formation économique, juridique, administrative et sociale • Formation scientifique et technique • Formation pédagogique
Chiffres clés (2014-2015)	• 24 universités dont 13 universités publiques, une université publique à gestion privée ; 5 universités dans le cadre du partenariat ; • 125 établissements universitaires publics et 58 établissements de formation des cadres; • 5 universités privées et 212 établissements privés. • 745.843 é tudiants dont 48% de femmes. • 69.950 de diplômés des universités en 2014;

Fig. 12.3 Structure of higher education in Morocco (*Source*: S. Benaich (2015). *Les TIC dans l'enseignement supérieur au Maroc*, http://www.aui.ma)

Professional Training and Continuing Education

The strategy for the development of vocational training is structured around three actors:

- The Ministry of Employment and Vocational Training
- Consultative bodies such as the National Commission for Vocational Training and Development Councils
- Training operators, such as the Office for Professional Training and Promotion of Work (OFPPT), and the training departments of the ministries.

The strategy is aimed at finding qualified candidates for enterprises. It promotes youth employment and improves the employability of workers. Ensuring the technical know-how and well-being of civil servants is considered a national priority. Various reforms and the modernization of the public sector are integral to realizing this priority. To this end, the government signed a framework agreement on November 19, 2015 implementing a re-qualification program for 25,000 graduates wanting to obtain the Certificate of Professional Competencies. Since 2016, this program has assisted unemployed workers adapt their skills to the needs of the labor market. Vocational training and continuous education are provided by public and private institutions to promote performance in the workplace.

Nonformal Education

Nonformal education (NFE) has historically been in connection with organizations connected to the mosque, the zaouia (madrasa), and the trade communities. Not until 1997 did the Ministry of National Education create a program in partnership with nongovernmental associations to offer a second chance for education to the children and young people who dropped out of formal schooling (Département de l'alphabétisation 2014, p. 5). It should be noted that the various programs to support schooling since independence earned Morocco the Confucius Prize for Literacy in 2006 (UNESCO 2006). At the moment, the NFE strategy includes three programs: the Educational Watch Program, the Educational Support Program, and the Re-education and Integration Program (Département de l'alphabétisation 2014, p. 7). More than 46,000 students enrolled in the 2013–2014 school year (Département de l'alphabétisation 2014).

In general, education in Morocco has undergone several reforms and is still a priority in the country. The objective of accelerating the process of development has led to the implementation of the National Education and Training Charter, which brought about the Emergency Plan. This plan, formulated between 2009 and 2012, is ambitious in its participatory approach, its involvement of the citizenry, and its monitoring of actions with a platform for change management (Messaoudi 2013, pp. 38–39).

On August 21, 2013, His Majesty King Mohammed VI addressed the deficits of the Moroccan education system and announced his contingency plan. He emphasized the need for aligning education with the labor market by improving vocational training and solving the problems of obsolescence in certain areas currently taught. In this sense, the Higher Council for Education, Training and Scientific Research (CSEFRS) has in turn formulated a new strategic vision of educational reform called "Strategic Vision for 2015–2030," promoting equity, quality, and progress (detailed later in the section E-Learning in Morocco: ICT in Promoting Equity and the Quality of Training). And indeed, the concern for improving the quality of learning, the need for creativity and autonomy, and the availability of infrastructure and a large number of technological devices has allowed for a relatively smooth integration of e-learning into Morocco education.

E-Learning in Morocco: ICT in Promoting Equity and the Quality of Training

Several ICT projects have made Morocco very dynamic in the field of education. These new technologies ensure de facto sustainable development, the promotion of fairness, access to information and training, and the guarantee of continuous improvement in the quality of learning. The integration of technology in the field of learning has given rise to e-learning, which is already an alternative to a traditional process constrained by time and space limitations. Thanks to successive technological developments, e-learning is being adopted by schools, universities, and companies in Morocco to provide knowledge and skills in specific fields. Morocco has developed a growing interest in this mode of learning for research, collaboration, and a multitude of other initiatives. In this section, we will present the advances of e-learning in Morocco in three phases ranging from birth to maturity. We pay particular attention to the projects of universities and ministries of education and higher education.

The Birth of E-Learning in Morocco (1997–2004)

The first phase of e-learning in Morocco, as in most countries, was very modest and characterized by scattered initiatives to integrate ICTs as a medium of communication and a platform for the transmission of knowledge. However, e-learning began to flourish with the establishment of international collaborations between universities. Among the collaborative projects Morocco benefited from was PRICAM (Institutional Strengthening Program with a Training Mandate). PRICAM was initiated in 1997 and brought together universities in Canada and Morocco (Ajhoun 2013, p. 5). The project aimed at improving the quality of teaching in the faculties of sciences and technologies and exploring new techniques in teaching.

Another initiative of the Euro-Mediterranean Information Society, the EUMEDIS collaboration project (2002–2005), focused on modernizing the most strategic sectors and reinforced existing methodologies and support instruments. As part of this project, MEDFORIST emerged and was oriented toward the production of new teaching resources. Additionally, UNESCO initiated AVICENNES, its solution for the production, evaluation, certification, and distribution of electronic courses in its virtual library. The MEDNET'U project also offered a platform for the production and distribution of multimedia courses.

The FORCIIR project, carried out in collaboration with the School of Information Sciences, the Cooperation and Cultural Action Department of the French Embassy in Morocco, and the School of Librarians, Archivists and Documentalists (EBAD) of the University Cheikh Anta Diop of Dakar, had a similar vision to previous projects at the time. It provided certification for e-learning platforms and developed educational content in documentary engineering, archives management, and information management (FORCIIR 2005). Finally, the research team Computer Networks and Multimedia (RIM), brought together at the École Mohammadia d'Ingénieurs (EMI), experienced early success and produced a PhD program. Overall, international collaboration was fueled by research teams with a common interest in e-learning as a priority research area and a source of innovation and creativity.

As for the public sector, several ministries benefited from funding aimed at modernizing the public administration by adopting new management and training methods. In 2003, the Ministry of Finance received funding from the FOMAP (Public

Administration Modernization Fund) to set up an e-learning system (http://forma-net.finances.gov.ma/). However, the adoption of e-learning by ministry staff was met with some resistance at first. This resistance was mainly due to the lack of information about e-learning's principles, objectives, and the opportunities it offered. In addition, this method of training presented other limitations for staff, such as their inexperience with this modality and technical problems.

E-Learning in Morocco: The Proliferation of Projects and Approved Efforts (2005–2010)

In the early stages of e-learning in Morocco, many projects were initiated and e-learning became an engine for sustainable development, contributing effectively to improving the quality of teaching and learning. In the following, we present the advancements of various training components initiated by the Ministry of Higher Education, the Ministry of National Education, and various other ministries.

Ministry of Higher Education

Early on, the Ministry of Higher Education implemented e-learning educational strategies. The Moroccan Virtual Campus (CVM) was created in 2005 and produces and collects content and pedagogical practices relating to support modules for face-to-face teaching. Within the framework of this project, pedagogical resource centers (CRUs) were set up in most Moroccan universities. The main objectives of CRUs are to contribute to content scripting, management, and resource security and also to support the administration and organization of content. CRUs have become a cornerstone to promoting e-learning in Morocco. The most active center is located in Rabat at the Mohammed V University, which was created in 2005 and transformed into an e-learning center in 2011 (elearning.um5.ac.ma). It adopted the Moodle platform for e-learning courses and Open edX for MOOCs.

International collaboration has continued to boost e-learning in Morocco. For example, the CoseLearn project aims to boost digital resources in public universities. This project is a result of North-South cooperation and began at the Ibn Zohr University with the support of the Swiss Agency for Development and Cooperation. The project promoted e-learning in ten African francophone countries including Morocco.

Other forms of collaboration have also contributed to the advancement of e-learning. Since 2005 the Hassan II University offers a diploma course in hybrid mode learning (blended learning). Supported by the Agence Universitaire de la Francophonie (AUF), the course awards a Master of ITEF (Engineering and Technology of Education and Training). Since 2008 the Mohammed I University of

Oujda provides assistance in receiving a Bachelor's degree in Commerce and Sales as well as a Master's degree in Marketing. The Mohammed I University works in partnership with the AUF and the University of Montpellier. It is certified by a double diploma and is aimed primarily at active professionals or job seekers who wish to complete their training (Gattioui 2014). Projects have proliferated and research efforts have become more international. The research team LeRMA (Learning and Research in Mobile Age), housed at the engineering school ENSIAS at UM5-Rabat, was able to defend five doctoral theses and three authorizations thanks to the internationalization of research.

Ministry of Education: Teacher Training in ICT and E-Learning

Over the last decade, the Ministry of Education has been working to prepare teachers for the adoption of ICTs and consequently created the Innovatice Project. The Innovatice Project is the Moroccan version of Microsoft's "Innovative Teachers" program. The Ministry of National Education and Microsoft have organized the annual Teachers' Forum, which hosts a national competition presenting innovative projects using ICTs in education. The first forum was held in 2005, and since then, hundreds of primary and secondary school teachers have participated annually (Abourriche et al. 2012, pp. 146–147). The study by Abourriche et al. (p. 50) concluded that teachers who have the best integrated technological tools are often those who have attended one or more training courses on the use of ICTs. Access to ICTs in their institutions has also motivated them to become producers of high-quality digital educational resources.

In 2006, the GENIE program (Generalization of Information and Communication Technologies in Teaching in Morocco) was launched with the objective of training over 200,000 educators and administrators (teachers, head teachers, inspectors, etc.). It encompassed three main areas: equipment, training, and digital resources (ANRT 2016).

The Birth of Start-Up E-Learning

Following the emergence and proliferation of e-learning projects in several government ministries, particularly those responsible for basic and continuous training, and after the growing interest of research teams in the field, e-learning start-ups began to emerge. Learning Design (http://www.e-learningdesign.com/) is one of these start-ups and was a cooperative effort of the Association of Pedagogical Expertise and New Technologies. Founded in 2006, it currently offers e-learning solutions for the development of customized courses and cross-disciplinary training modules (project management, marketing, management, etc.). Proactech (http://en.proactech.net/) is another example of a company operating in the field of e-learning. Founded in 2007, it specializes in the development and integration of online training solutions and content. Its flagship product "Proactech e-Learning Academy" includes more than 700 hours of interactive training. The birth of these and other companies in this constantly evolving field reflects an unprecedented desire to make e-learning a genuine driving force for the development of the country.

E-Learning in Morocco: Toward Maturity 2010–2016

The multitude of projects and the importance of Moroccan experiences up until 2010 have given e-learning a strong foundation in Morocco. Subsequently, between 2010 and 2016 educational establishments have added numerous projects, and the themes for reflection on e-learning have multiplied. With the exponential growth in e-learning, Expert Consulting Maroc was founded to create a national e-learning barometer; to date, two barometers in total have been published (www.expert-consulting.ma/infos.php?p=7). The traditional form of face-to-face learning is still the dominant form of learning in Morocco as 73% of institutions use it, but the second barometer indicates that combining face-to-face learning with online learning has become a growing trend. About 18% of all institutions in Morocco adopt this blended approach. The second barometer also reveals that organizations are offering more and more business-oriented online training, in addition to cross-training and generic training modules. In general, the results of the 2014 barometer show a significant change in the modes and practices of training adopted by public and private institutions in Morocco. This reflects a certain degree of maturity and opens new perspectives on the improvement and development of e-learning in Morocco. This change is shaping the development of collaboration with several international institutions, the proliferation of research teams in most Moroccan universities, and the organization of a considerable number of international conferences focusing on e-learning in Morocco.

Ministry of Higher Education

In recent years, universities have received a massive influx of students, particularly in the open-access institutions where the majority of students are enrolled. At the same time, the educational physical infrastructures remain limited, and human resources are insufficient to guarantee the effective management of face-to-face training for all students. Nevertheless, the technological infrastructure in Morocco has grown exponentially, and the available amount of computing devices and particularly mobile devices has significantly increased over the recent years.

Furthermore, the improved rate of connectivity has become a crucial factor in the popularity of e-learning at universities. These advantages have favored the adoption of e-learning as a mode of learning in the university context. During this period 2010–2016, training leaders (administrative head, teacher) are more and more interested in this mode of education. Other academic bodies responsible for e-learning have emerged with strong participation in national and international efforts for projects involving the production of digital resources (e.g., Erasmus-plus). These efforts gave birth to the Massive Open Online Courses (MOOC) that were quickly adopted by the universities. The UM5-Rabat was behind the production of the first Moroccan MOOC (http://elearning.um5.ac.ma/). This MOOC concerns general accounting. The course is in high demand among university students and individuals in vocational training. The first edition was launched at the end of 2014 as a SPOC (Small Private Online Course). The second edition of the MOOC registered more than 2000 Moroccans, and 37% of the learners finished the course completely.

It should be noted that these MOOCs reside on the open-source Open edX platform installed on a server of the UM5-Rabat University. Following the success of this experiment, teachers throughout Morocco have attempted to develop MOOCs at their respective universities (mooc.um5.ac.ma). Moreover, international collaboration has arisen during the development of various projects, particularly those supported by the AUF and the FUN project (France Université Numérique). An example of this collaboration is the creation of a Master's degree in ISIF (Engineering and Information Systems and Training) which offered higher education degrees for specialists in information systems and engineering.

The cooperation with African countries has been reinforced by distance education. The International University of Rabat (UIR), which in 2014 received a grant of 9.42 million Moroccan dirhams from the African Development Bank (AfDB), has a distance education program that enhances the digital heritage of the university (UIR 2014). In addition, several universities are keen to maximize the quality of their training and set up innovative projects aimed at managing and securing data and offering students and researchers a space for high-quality learning and collaboration. The Cadi Ayyad University in Marrakech is one example of an institution which developed its digital library and its datacenter to facilitate the massive access of learners to its teaching resources (https://www.uca.ma/fr/mooc).

In addition, the Ibn Zohr University of Agadir recently developed its own e-learning Center UIZ (http://www.cvm.ac.ma/), which has set as its main objectives: content production, pedagogical practices, and support of professors for the online training modules or courses. The Al Akhawayn University in Ifrane (AUI) set up a center in 2012, the Learning Technologies Center (CLT) (http://clt.aui.ma/), to help teachers integrate ICT into their courses and customize their own learning platforms (https://my.aui.ma/ics). Since 2015, the CLT also facilitates the development of MOOCs at Moroccan public universities and for the general public (AUI MOOC platform: http://mooc.aui.ma/). As a result of this notable evolution of e-learning in higher education, we can confirm that most Moroccan universities have become aware that e-learning represents, in the future, an alternative to classical (face-to-face) education and a major opportunity to improve quality and maximize the effectiveness of learning. Moreover, this new form of education employs strategies to adapt to the digital, technological, and educational changes and developments of the twenty-first century.

Ministry of Education

In the phase between 2010 and 2016, the Ministry of Education's strategy focused mainly on three different but complementary axes: training, equipment, and digital content. An example of the training axis is the Itqane Project: a joint pilot project that includes the Ministry of Education, Al Akhawayn University, and USAID (US Agency for International Development). Its main objectives are to lower failure and dropout rates in colleges by improving the quality of teaching and student learning. From 2011 to 2013, this project was divided into two phases. The first phase (2011–2012) aimed at training individuals with a "learning by doing" approach. In the second experimental phase (2012–2013), participants were asked to experiment with the e-learning training materials produced by teachers at the various Regional Centers of Education and Training (CRMEF). Analysis of the results showed that the objectives of the training were achieved (Lahmine et al. 2014, p. 18). Around 45% of the participants were very satisfied with the materials, and 48% were moderately satisfied. As for the use of equipment, the GENIE program was updated in 2009 (ANRT 2016; Allali 2013, p. 2) to ensure a smoother process for all the stakeholders including administrative staff, learners, etc. (Allali 2013, p. 2). In addition to these enormous projects in both the Ministry of Education and the Ministry of Higher Education, other government departments and enterprises have used distance training for the in-service training of their staff.

Public Administration and Enterprises

Similar to the universities, training through e-learning has also been essential in the public sector. In recent years, several public institutions have set up bodies dedicated to e-learning training. For example, the postal service Barid Al Maghrib adopted e-learning in 2012 via the university UBM (Poste Maroc 2012, p. 18). Poste Maroc offers annual leasing and integration into its platform of e-learning modules. By the end of 2015, the group planned to integrate a number of modules (in Arabic, French, and English) into the training platform Interactive Multimedia (image, sound, etc.), designed by internationally recognized specialists (Poste Maroc 2015).

In 2015, the Agence Maghreb Presse also set up a new training scheme for its staff, namely, the launch of MAP Academy (MAP 2015, p. 1). The objective of the project was to enable journalists and staff in regional and international offices to benefit from quality training and to facilitate the integration of new recruits. MAP Academy is carried out in collaboration with the IDEO FACTORY Group on the basis of the CEGOS Group's training platform. This platform encompasses 13 themes and nearly 400 training modules (MAP 2015, p. 2).

In the spirit of cooperation, the Office for Professional Training and Promotion of Work (OFPPT) partnered with Microsoft in 2012 to enable young Moroccans to benefit from certified curricula (OFPPT 2012). Thus, a telecom national operator launched the employability portal aimed at integrating young Moroccans into the knowledge society by facilitating their access to the labor market; over 500 online courses are offered (OFPPT 2014). The partnership with Microsoft has also resulted in the creation of 100 Microsoft IT Academies that adopt e-learning to train and certify young Moroccans. As for Moroccan companies, continuing professional training is a key element for competitiveness as it ensures quality and efficiency. Consequently, several Moroccan companies have begun to adopt e-learning as a method of distance learning.

Consolidation and Mutualization of E-Learning Efforts: Strategic Plans and Support Programs

As a governance strategy, the Supreme Council of Education, Training and Scientific Research (CSEFRS) planned out the 2015–2030 Vision for education in Morocco based on three foundations: quality for all, equity, and equal opportunity (CSEFRS 2015, p. 14). These foundational principles have been translated into 23 levers with defined actions, where distance learning and training become essential means of establishing an efficient and attractive school environment (Lever 7) and to promote lifelong learning (Lever 19).

Alongside these initiatives, the following programs initiated by the Ministry of Higher Education support the Vision 2015–2030 (Benaich 2015, slide 17):

- *INJAZ program*: The INJAZ program launched in 2009 (http://www.injaz.ma/) is among the unifying projects for the development of the information society in Morocco. It aims to make a laptop and a high-speed Internet connection available to selected university students each year, according to specific eligibility criteria. During the first 5 years (2009–2015), 106,000 students benefited from this project, representing an overall coverage rate of almost 84% of eligible students. For the 2016 program, a budget of 30 million US dollars was reserved for the equipment for 64,000 students.
- *MARWAN network*: The MARWAN network is the National Teaching and Research Network created in 1998 (www.marwan.ma). This network is set up by the Ministry of Higher Education, Scientific Research and Management Training (MESRSFC) and managed by the Network Operation Center under the CNRST. Since July 2010, the MARWAN3 version interconnected by an IP address serves the majority of educational and research institutions in Morocco. To meet the growing needs of Moroccan universities in terms of bandwidth and advanced network services and to comply with the evolution of international

communication technologies, the Ministry has launched a project called MARWAN4. This new version of the MARWAN network, which is currently being prepared, will integrate the technical developments of recent years. It will be operational starting January 1, 2017. MARWAN 4 will be connected to the Internet from the core of the network with an initial rate of 20 Gbps distributed in two geographical locations. The throughput for each establishment is between 100Mbps and 5Gbps according to a set of criteria based on the number of Internet users.

- *Net-U program*: Under the Net-U program, MESRSFC plans to cover all national academic institutions and cities with Wi-Fi. This program aims to extend access to ICTs and also allow the university community to exchange content and access services offered at the campus level. In its first 2017 phase, the Net-U program will cover between 100 and 150 academic institutions and cities.
- *E-Sup program*: The program's goal is to standardize ICT in higher education in order to align Morocco with international standards. Its objectives include supporting the production of digital educational content and developing digital resources and services for teachers, administrative staff, and students. A budget of $8 million USD is earmarked for this program.

In parallel with the efforts made by the various state bodies, the civil society initiatives listed below actively contribute to the improvement of the quality of training and guarantee more equitable access:

- *The Digital Center for Educational Learning* (*CNAP*) is an example of the mobilization of civil society. The Digital Center for Educational Learning (http://e-cnap.com/) is a Moroccan nonprofit association founded in 2012 in the city of Temara. It is active in the field of distance education. Based on the principle of sharing in the fields of pedagogy and pedagogical engineering, CNAP's mission is to improve the performance of pedagogical actors using ICTs. The CNAP has implemented three mechanisms. In the 2012–2013 school year, the ENTIC (Digital Work Environment for Information and Communication) was launched as a distance learning project enabling beneficiaries to discover the different functionalities of the digital working environment TRIADE. Then, in 2013–2014, the "mediatization of courses" system was set up to help Moroccan and foreign pedagogical actors develop their skills in media coverage and course scripting. Finally, in 2014–2015, the CNAP team proposed free distance education on multimedia animations for Moroccan and foreign educators. This last training registered more than 3000 participants (eCnap, slide 18).
- *The E-Omed Association* (*Open Space for the Mediterranean*) is based on inter-university cooperation across the shores of the Mediterranean. E-Omed was created in 2011 (www.eomed.org) and is dedicated to helping all actors (countries, institutions, and individuals) improve training and research. Specific objectives include identifying existing digital resources and identifying those to be adapted, developed, and codeveloped. The Association also is working on an indexing tool that will be offered to partners as a mutual and shareable resource (eOmed 2016).

Conclusion and Perspectives

Learning has always been a driver for the development of countries. It is one of the vital sectors that can definitely benefit from ICT through e-learning. E-learning is an important opportunity in formal and informal settings for knowledge acquisition, and Morocco has made considerable efforts to bring e-learning to its citizens. Morocco's digital strategy has enabled the development of physical infrastructure, connectivity, and digital services. Notable advancements in recent years extend from the technological component and range from scattered initiatives to the pooling of efforts to national and international collaborations. The awareness and openness of policy-makers, educators, and researchers have contributed positively to the adoption of e-learning. Nevertheless, Morocco has not yet fully taken advantage of the opportunities offered by e-learning to overcome the problems that hamper education. Here, several strategic reflections are being carried out by numerous bodies to remove the obstacles hindering the continued growth of e-learning culture in Morocco.

At present, several strategic plans are being formulated by several bodies. We cite the one being prepared by the CSEFRS to propose new measures to remedy the obstacles hindering the emergence of an e-learning culture in Morocco and fostering the acceleration of e-learning usage efficiently in the different sectors. This strategy for "e-education in Morocco" is in preparation and planned for the first quarter of 2017.

The national strategy to integrate e-learning in society must include the development of a quality approach model, the motivation of all the players to guarantee their commitments, and finally legal regulation of the field in order to guarantee equivalence. These new strategies in the field must combine technologies and pedagogies that foster a dynamic environment for the acquisition of knowledge. E-learning can capitalize on the strengths of the country in terms of the results of research work, the constantly evolving infrastructure, and the high level of mobile equipment available, thus fostering social learning based on collaboration and creativity.

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Chapter 13
Oman

Ali Sharaf Al Musawi

Abstract This chapter surveys the development and current state of e-learning in the Sultanate of Oman. The author surveys the general social, economic, historical, and demographic background of Oman and provides a review of its education system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Oman. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Oman · e-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Oman Profile

The 309,500 square kilometer Sultanate of Oman is situated in the southeastern part of the Arabian Peninsula. The country ranges from the barren "Musandam Peninsula" that projects into the Strait of Hormuz in the north to the fertile "Batinah" plain that extends southeast toward the "Capital Area" from the vast sandy edge of the "Empty Quarter" to the mountains of the near tropical "Salalah" plain in the south. The interior parts of Oman are dominated by mountains simply called "Al-Hajar" or "The Rock." The Sultanate of Oman has enjoyed a long history of trade with China and India benefiting from her geographical position at the periphery of the Arabian Peninsula. This, in turn, has led to an enlarged maritime potential for the country. The Omani society consists of four basic groups: those who live by fishing, seafaring, and trading, the agriculturists of the "Batinah" coast and the interior who employ traditional systems of irrigation, the mountain people of "Dhofar" and the "Musandam," and the Bedouin (MOI 2015, p. 12).

Although most Omanis are Muslim, some hold different religions such as Hinduism and Christianity. In addition to Arabic, many Omanis have acquired languages such as English, Swahili, Baluchi, Persian, Urdu, and Sindhi. The people of Oman, who number 3,311,640, have remained Arab despite a history of immigration. Of this population, 577,293 are non-Omanis. Following the accession of His Majesty Sultan Qaboos bin Said Al Said to power in 1970, Omanis returned in large numbers following a call from the Sultan to return and help in the development of the country. The Sultanate is divided into nine governorates and regions. Each governorate consists of states that share common cultures, habits, Arabic dialects, history, traditional clothing, and traditional occupations. The chief of state and government is His Majesty the Sultan who appoints the cabinet of ministers. The Oman Council consists of the State Council (upper chamber) and the Consultative Council (lower chamber); this body has the power to propose legislation and advisory powers. Sultan Qaboos's extensive modernization program has opened the country to the outside world. Oman's moderate, independent foreign policy has sought to maintain good relations with all Middle Eastern countries (CIA 2015).

Oman's oil revenue has been consistently invested in the national infrastructure, particularly roads, schools, hospitals, and utilities. More than ever, the country is poised to take advantage of its strategic trade location on the Indian Ocean and the Gulf to further its economic growth and role in the world. "The other sources of income, agriculture and local industries, are small in comparison and count for less than (1%) of the country's exports. Industries contribute only 4%, but there are governmental plans to increase this. Oman has other mineral resources including copper, asbestos and marble" (Al Musawi 2010a). "The fall in crude oil prices to below US$100 per barrel in late 2014 led to the introduction of a range of temporary precautionary measures aimed at safeguarding the stability of Oman's financial and economic position and the gains of its development process, while ensuring its citizens' daily lives and living standards" (MOI 2015, p. 256).

Education System in Oman

In 1970, there were only three boys' schools in the whole Sultanate, with a total of 909 male students and 30 teachers. So great was the public demand for education that in the early stages, schools had to be set up in tents and classes held in shifts. Enrollment started to be one of the priority issues on the education planners' agenda. Large numbers of teachers had to be recruited from other Arabic-speaking countries such as Egypt and Jordan. At the beginning of 1992, there were 823 schools for general education, with 387,289 students of both sexes. In 1991, the total number of teachers was 15,187, of which 11,190 were expatriates. The Omani education system was composed of 6 years of primary school followed by 3 years of preparatory education and 3 years of secondary education. Preschool education is provided to children less than 6 years old by the private sector. Oman retains a number of international schools, a majority of which are private ones. Supervision of both public

Table 13.1 Funding resources of the Omani education system in 2013 (OMR)[a]

Item	General budget of the country according to the Royal Decree	The revised budget of the Ministry of Education	Percentage allocated to the Ministry of Education
Current budget	3,475,000,000	879,991,000	25.32%
Capital budget	25,000,000	1,608,000	6.43%
Development budget	1,400,000,000	141,838,258	10.13%
Total amount	4,900,000,000	1,023,437,258	20.89%

[a]Source: MOE (2013).

and private schools remains the responsibility of the Ministry of Education (MOE 2013). However, it seems that a centralized approach to human resource management in the education sector adds administrative costs while reducing managers' flexibility and initiative in personnel management. There should be greater decentralization including recruitment, remuneration, and performance management. Table 13.1 shows the funding details of the educational process in Oman.

Basic Education

In 1994, a report from the Ministry of Education appeared on obstacles it is facing and how to improve the outcomes. In 1995, the government responded in its Vision 2020 with the following goals:

1. Continue spreading education in all parts of the country.
2. Improve the current curricula taking into account what is current in science and technology advancement.
3. Improve the educational practices to also include current technology in education.
4. Advance staff development technically and administratively.
5. Create a basic education that can prepare students to continue their education or join the workforce.
6. Prepare students that can join the workforce with minimum training (MOE 2012).

In 1995, the Ministry of Education prepared a report on how to implement the new education reform. The fifth 5-year plan 1996–2000 focused on the development of human resources. In 1997, the Minister of Education at the "Consultative Council" stressed the importance of the reform and shared with members the new changes. Those included changing the structure of the Ministry of Education with the Royal Decree 91/97 and the Ministerial Decree 36/97, revising the aims of education, and abolishing the afternoon schools. The new basic education system consists of a unified 10-year education (4 years for cycle 1 and 6 years for cycle 2), provided free by the government in the Sultanate of Oman for all children of school age. The first schools started to introduce the new system in the academic year 1998/1999.

> The new system meets students' basic education needs in terms of knowledge and skills, enabling them to continue their education and training according to their interests, aptitudes and dispositions. It also prepares them to face the challenges of present circumstances and future development in the context of comprehensive social development. The aims are to integrate theory and practice, thought and work, education and life with comprehensiveness in developing all aspects of a whole personality (Al Musawi 2010a).

In addition, the new system aims to develop the acquisition of self-learning skills in the context of a lifelong education, inculcate the values and practices necessary for mastery and excellence in learning and teaching, and meet the needs of human development in the context of comprehensive social development (Al Balushi 2000).

To enable the implementation process of the basic education, the ministry was restructured with new directorates specifically for curricula, human resources development, and IT. New facilities are introduced in the schools including learning resource centers (LRCs), computer and science laboratories, life skills, and music rooms. The class period is extended from 35 to 40 min and schooldays from 4.5 h to 6.5 h (6–8 periods). In addition, the curriculum content improves by reducing the theoretical content, connecting the material to the student's life, connecting the curriculum to the student's environment, and aligning the content and the plan of the curriculum with the student's level at each educational stage. New subjects such as informational technology and life skills are introduced. Teaching methods improve through teachers basing their teaching and evaluation on experiential learning. Further, formative assessment of a wide range of aspects of learning with a wide range of assessment techniques is also put in place (Al Balushi 2000). The basic education system expands to post-basic education for the 11th and 12th grades leading to tertiary or higher education after students enter the general secondary education diploma examination.

Oman's education system has achieved great success in terms of equalizing opportunities among its citizens, particularly between men and women. The quality of education has improved dramatically, and the initiation of students to new information technology has advanced at a rapid pace. Better-trained teachers have been employed, and the mechanism of professional development and upgrading of teachers and other educational personnel has proceeded satisfactorily (Issan and Gomaa 2016). Among the noticeable benefits of education reform has been the dynamic development of the Ministry of Education and to reinforce its management and planning capacities as well as to bring education closer to the high economic and social objectives of the long-term vision. However, "there is always the necessity of greater coordination between the perception and activities of all Ministries and institutions concerned with the development of human resources, which the Higher Education Council can provide" (Rassekh 2004, p. 32).

Special Education

In the education sector, there were 11,626 students with learning difficulties in 2014. This includes 182 schools that practice inclusion of 1390 visually and mentally disabled students with normal ones. Inclusion arrangements in the schools take three forms. First, the Learning Disabilities Program offers special educational courses for students with disabilities in government schools. The program was launched in 2 schools in 2000, and by the academic year 2006–2007, it was successfully integrated into 178 schools all over the Sultanate. Second, Special Needs Integration Programs were launched in 2005–2006 as separate classes in public schools, and these classes were reserved for students with hearing and intellectual disabilities. The program started in two schools in Al-Batinah and Al-Sharqiya regions, and by the year 2006–2007, it had covered four other regions. Third, there are special education schools for the blind, the deaf, and with intellectual disabilities. In 2012, the Ministry of Education and the World Bank prepared a report entitled "Education in Oman: The Drive for Quality," which states that "the ministry actively promotes peace, respect, diversity, democracy, and multiculturalism that have been incorporated in new school frameworks and learning resources that the teachers' guides for all subjects reflect these goals or aspirations" (MOE 2012).

Higher Education

There are over 50 public and private higher education institutions in Oman. The Ministries of Higher Education, Manpower, and Health administer those institutions. The Ministry of Higher Education sends students on scholarships abroad. There are currently Omanis studying in Australia, Europe, and the United States. The Ministry of Higher Education administers six Colleges of Applied Sciences to provide the current Manpower market in fields such as business administration, communication, design, and IT with one of them offering an education degree. Graduates with the general secondary education diploma centrally apply for admissions at public and private higher education institutions through a unified online system (MOHE 2016b). The ministry also has a department that approves private colleges and universities and encourages the private sector to form universities and colleges. Most of the private sector's HE institutions focus on business administration and computer sciences. They are usually affiliated with European and American institutions. The language of instruction in these institutions is mainly English (MOHE 2012). Al Harthy (2011) found that few private institutions attempted to diversify the mechanisms of quality assurance to show that they provide relatively high-quality study programs, while many of them considered academic affiliation with recognized international universities. The higher education sector needs to reallocate funds from non-pedagogical items to quality-enhancing inputs or to increasing enrollments that could help make this sector more effective and efficient.

Sultan Qaboos University

Sultan Qaboos University is the sole state university. It seeks to promote the principles of scientific analysis and creative thinking; to participate in the production, development, and dissemination of knowledge; and to interact with national and international communities. It admitted its first students in the fall of 1986 with enrollment based largely on secondary school performance. The university is self-administered and run by the university council and the vice-chancellor and his assistants for academic, research, and finance affairs. It has nine colleges including Agriculture and Marine Sciences, Art and Social Sciences, Economics and Political Sciences, Education, Engineering, Law, Medicine, Nursing, and Science. The Colleges of Arts and Social Sciences, Economics and Political Sciences, Education, Law, and Nursing offer bachelors and master's degrees. A few departments have doctoral programs, but the preponderance of graduate work is at the master's level. The university has grown rapidly over the years, and as the number of students finishing secondary school goes up each year, SQU enrolled over 19,000 students in 2013. Instruction occurs in either Arabic or English, depending upon the college and department. For example, the College of Arts and Social Science teaches in Arabic, while English is the language of instruction in Medicine. Grading is done using a standard 4-point scale. In addition to Omanis, the university recruits Arabs and expatriates as academics. A number of Omanis are sent to pursue their technical training or postgraduate studies overseas (SQU 2015). The university enjoys efficiency gains from a large degree of autonomy in terms of administrative and financial control, and this greater freedom from civil service and financial rules has contributed to its gains in efficiency and productivity (see www.squ.edu.om).

Vocational and Technical Training

The Ministry of Manpower operates seven colleges of technology and one higher college of technology in Muscat. The ministry has developed a vocational/technological training which will keep abreast of the requirements of the Omani labor market for a skilled and semi-skilled national workforce (Al Rawahi 2011). The Ministry of Health administers a number of health institutes to prepare assisting medical staff like nurses, paramedics, and pharmacists. The Ministry of Awqaf and Religious Affairs administers the College of Sharia Sciences. The Central Bank of Oman administers the College of Banking and Financial Studies. The technical education sector and its institutions have expanded in capacity and diversity, offering specialized courses in many fields and gradations of technical qualification, in keeping with the constantly changing needs of the labor market and workforce. In the 2014/2015 academic year, 10,262 school-leaving holders of the secondary diploma were accepted into the country's technical colleges through the harmonized central admissions system, making up a ratio of 32.5% of all third-level acceptances into state-run institutions (MOI 2015, p. 213).

E-Learning in Oman

Oman's rank on the ICT Development Index improved from 68 in 2010 to 54 in 2015 (ITU 2015, p. 12). Almost 95% of the families in Oman have smartphones. The use of mobile phones starts at an early age. Among adolescents 15–19 years, 91% of males and 83% of females already own a mobile phone, and it is quite homogeneous throughout the country and among the population groups (ITA 2015). A gender-based ICT usage study revealed that the male-female ratio is almost 1:1. The dominant age group in the population pyramid is between 15 and 64 years of age. The results showed that in Oman, males normally spend more on ICT than females and that around 54% and 46% of males and females, respectively, use the Internet in the Sultanate. The demand and access to Internet services are closely related to the availability of the means of access such as computers, fixed-line, and public access centers such as Internet cafes. It was also evident from this survey that on average, an Omani individual spends USD 7.8 per month for Internet access (ITA 2015; Al Musawi 2010a).

Applications in Government

The National Information Technology Strategy was launched in November 2002. The Information Technology Authority (ITA) was set up to be responsible for implementing this strategy in terms of the IT infrastructure projects, supervising all projects related to implementation, and providing professional leadership to various other e-Governance initiatives of the Sultanate. The goal includes a significant improvement in the quality of services the government provides to its citizens (ITA 2015). The digital society plan of action (e-Oman) incorporated a range of initiatives toward provision of government services through electronic channels, building ICT capacity within various segments of the corporate sector and the common public. The e-Oman mission shows that it encompasses a wide range of initiatives and services to improve the efficiency of government services, enhance the activities of businesses, and empower individuals, citizens, and staff with skills and knowledge to meet society's needs and expectations and to direct Oman toward becoming a knowledge-based economy. The implementation of the e-Oman strategy makes it possible to conduct remote meetings and teleconferences as well as process e-mails and facilitate other means of telecommunications. The Telecommunications Regulatory Authority (TRA) is a governmental agency established in 2002 to regulate telecommunication activities at the national level (ITA 2015; Al Musawi 2010a). Telecommunication services in Oman include providing fixed-line and Internet services, fiber optic projects, microwave link, and wireless connectivity for broadband services. Such services connect to the Internet, using a Wi-Fi-enabled laptop, PDA, or mobile. According to Abanumy et al. (2005), the Omani e-government website still needs considerable efforts to provide accessible websites for services for that part of the population with special needs.

Applications in Education

Most of the Omani education institutions at all levels have adopted the concept of e-learning in which education and training programs are presented to the students over the Internet. The Ministry of Education has made great strides in expanding access to computers in schools and in integrating e-learning in the curriculum using its e-portal and multimedia packages. Information technology is now taught in all schools as a separate subject from grade 1 to grade 10 in basic education. In grade 11, the ICDL (International Computer Driving License) is a required course, and each student has the opportunity to learn IT skills. At each grade level in the second cycle, students have two ICT classes every week. Teachers encourage students to use laptop computers and data projectors to make presentations in subject classrooms. In addition, curriculum units in other subject areas complement many of the concepts and skills introduced in the ICT curriculum. The ministry has recently signed a contract with Petroleum Development Oman (a national oil company) to set up a virtual library for basic education schools. In addition, the ministry has benefited from the ICDL training conducted by the ITA covering all its teachers. Further, the ministry in cooperation with ITA signed contracts with USAID, Microsoft, and Intel to train the Omani teachers (see, e.g., Sales et al. 2008).

The majority of the Sultanate's higher education institutions offer programs in ICT or computer science and offer ICT majors, and the percentage of students enrolled in ICT majors is 19% out of all students enrolled in higher education institutes (MOHE 2016a). The Ministry of Higher Education has put a particular emphasis on improving the learning methods by developing and implementing a unified e-learning management system (Blackboard) intended to improve the e-learning skills supported by a learning resource center that provides IT services for about 1500 students and 150 staff members (Al-Gattoufi et al. 2007). Many higher education institutions have equipped their campuses with office and portable computers, LCD data shows, Internet and intranet links, e-mail facility, plasma screens, multimedia laboratories, and e-learning management systems (Al-Musawi 2007). At Sultan Qaboos University, the public university, faculty members use the Internet in their instruction, but it was found that web-assisted instruction is equally effective as face-to-face instruction in students' achievements (Al Musawi & Abelraheem 2004b). The Omani branch of the Arab Open University (AOU) is a full-fledged distance learning higher education institution. Its case will be discussed later. The Ministry of Higher Education has also approved several accredited distance/online universities for Omani students to study through. Those include a list of Arab, regional, and international universities. Distance learning materials and software used in traditional and electronic formats are copyrighted. Copyrights in Oman are protected under Royal Decree 37/2000. The Ministry of Commerce and Industry in association with the World Intellectual Property Organization (WIPO) organized an international seminar in Oman and discussed the theoretical framework of intellectual property (ITA 2015; Al Musawi 2010a).

ICT Indicators in Public Education

A project to measure the ICT indicators in basic education schools was conducted by MOE in collaboration with ITA and UNESCO in 2011. Findings show that the rate of computers per student is 10.9, and the rate of using computers for educational purposes is 41.3. The percentage of students' use of computers and the Internet at school is 88.7%. The percentage of availability of the MOE education portal is 100%, LRCs 89.2%, intranet 84.5%, the Internet 86.7%, and computer labs 68.8%. The percentage of members of the administrative and teaching staff and the technical staff in the Sultanate who own mobile phones is 99.9%. The proportion of schools which held internal training workshops on technology use in instruction is 91% (MOE 2011).

The MOE Education Portal

The education portal is the umbrella term to collate all the IT initiatives and services within the MOE IT master plan which enables the administration, curriculum and assessment, content and learning resources, physical and technological infrastructure, and human capital development. The main objectives of the education portal are to link all components of the education system using a group of programs and services through the Internet to facilitate communication within the educational process and present it in an effective and attractive manner for students, teachers, parents, and administrators (MOE 2011). Several studies show that employing e-management potentials in the three fields of organization, evaluation, and planning exists at a high level in Oman and that the beneficiaries are satisfied with the education portal services/access and appreciate the role played by the service providers (Al Sawafi et al. 2014; Alamri 2013; see also http://home.moe.gov.om/english/).

E-Learning Application in Higher Education

The Ministry of Higher Education has collaborated with Edutech Middle East, a leading provider of technology-enabled information and learning solutions, toward improving the learning methods by developing and implementing a unified LMS which serves the new form of these colleges (Al-Gattoufi et al. 2007). The initiative has provided a centralized learning platform that is now facilitating information sharing and dissemination among 10,000 students enrolled across the colleges geographically spread across the country. The Blackboard LMS enables the colleges to post their courses online and provide information to students about the various courses and programs offered across colleges. Bentley et al. discuss the evaluation of a blended learning MBA program provided by a UK university at one of its

Omani private sector HE partners, finding that an e-delivery approach is well suited to work-based part-time MBA students. This is because they are relatively mature, already business aware, and conversant with information technology and have access to the e-learning facilities and resources required (Bentley et al. 2010).

Sultan Qaboos University

The Sultan Qaboos University uses Moodle LMS as the backbone of their e-learning system. Course contents are available online for the students and lecturers who can use e-learning as their virtual classroom. There is an increase in staffing for support of faculty design and use of e-learning in their teaching. An e-learning strategy was put forward in 2016 proposing a gradual cross-campus approach to enhance the e-learning initiatives at the university where all colleges should show a range of e-learning, from e-enhancement to totally online courses. As graduates should be prepared to be effective in their professional world and be lifelong learners, it is proposed that all students should be able to enroll in at least one online course in their professional program of study. In addition, the strategy outlines running training courses to develop faculty expertise in e-learning design and support their endeavors. It also initiates quality control measures for course production to maintain teaching excellence (SQU 2016). Studies conducted at the university show that the students have appreciated the importance and the use of the LMS as it is easily accessible from any Internet-enabled location at any time (Naqvi 2006; Al-Khanjari et al. 2005a, b). Results also show that e-learning enables cooperative learning among students and closes the gap between the student and the teacher and between students themselves.

The National Research Council

The Research Council offers several e-systems that serve to process, issue, and manage research at the national level. The research submission system facilitates opportunities for researchers to submit research proposals, with the ease of applying online and tracking the evaluation status of the proposal. This electronic system allows the researcher to complete the proposal form, share it with collaborators, and then submit it electronically. The electronic research directory maintains a list of organizations, researchers and their projects, publications, and awards.

> A Grant management system facilitates the payment process for researchers in different institutions. It aims at managing the grant life cycles. It addresses all the management issues such as record keeping, compliance, organizing, checking and communicating. The digital academic library serves the purpose of fostering creativity and providing access to knowledge to college and school students. It seeks to educate and train students with sound knowledge and facilitates access to all advancements in existing and emerging technologies (TRC 2016; see https://home.trc.gov.om/tabid/40/language/en-US/Default.aspx).

Research Projects

A shortage in the research literature can be seen in the fields of cultural issues relevant to the Internet such as copyright use and the digital divide. There is also a need to measure the quality of e-learning and its benchmarking and standardization in Oman and the region. However, research on using e-learning on different platforms and applications by university students is found in the literature. For example, Masters and Al-Rawahi (2012) conducted a study aiming to identify the impact of minimal support on medical students' mobile learning activities and found that all students used their mobile device as telephones and used most of the sophisticated applications. Barriers were screen size, cost, limited memory, and battery. Advantages were timesaving and ease of access and use. Another study aimed to analyze and evaluate students' knowledge and awareness about m-learning and indicated good m-learning awareness and acceptance level and showed students' positive attitude that reflected student interest in the use of mobile devices as learning tools (Sarrab et al. 2013). Studies show that Omani students increasingly use the Internet and social networking sites (SNSs) and that the use of wireless connections and mobile technologies spreads quickly among the students and that they frequently use the Internet, e-mail, and search engines for educational purposes. Research shows that resource sharing is the most influencing determinant in the decision of Facebook usage in higher education, followed by perceived usefulness, perceived enjoyment, collaboration, and social influence (Sharma et al. 2016; Al Musawi & Amar 2015). Another study shows that the major reasons for frequent use of SNSs are sending information and sharing news and that lack of experience and insufficient time and IT skills are effective factors for not using SNSs. Google Groups, Facebook, and Yahoo are the most popular SNSs used by Omani students (Al Kindi & Alhashmim 2012).

A nationwide research project financed by The Research Council was conducted in 2012 to measure the effectiveness of the e-Lab on Omani students' learning of science concepts and skills. The research findings prove that the e-Lab improves the skills acquisition, students' appreciation of classroom environment, and their positive attitudes toward the use of e-Lab technology (Al Musawi et al. 2015). The study of Porcaro and Al Musawi (2011) showed that linking higher education to workforce skills using computer-supported collaborative learning (CSCL) can make lecturers understand how to modify their courses' methods and design considerations with self-reflection and strong collaboration with local practitioners to uncover any hidden assumptions in the design or implementation. The Omani case study shows that the outcomes of applying CSCL environments in the university context outweigh the barriers to adoption. A 3-year strategic research project to measure the effectiveness of the design and use of new software for learning Arabic was conducted in 2011. It was found that teachers mostly use computer software and presentation devices to introduce and explain their language lessons. In addition, language software was designed, produced, implemented, and evaluated for its impact on learners' language skills. Findings show that student achievement improved and the students' attitudes are positive toward the use of the software (Al Musawi et al. 2016).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

Education Technology University Programs/Degrees

In 2005, the College of Education at Sultan Qaboos University opened a new department offering a bachelor's degree in instructional and learning technologies (ILT) to prepare information technology teachers and learning resources specialists. The first batch of graduates from this department entered service in the schools in 2009. The department's mission is to achieve excellence in its provision of teaching, research, and social services in the field of education technology. Students enrolled in this program must complete 125 credit hours. The program offers a broad range of courses aimed at developing and enriching students' knowledge and personal competency in both education and instructional and learning technologies and providing a sound theoretical basis for IT teaching in Oman and for further study (Al Musawi 2010b). The department started an MA program in fall 2016 (see http://www.squ.edu.om/coe/About-Us/Departments/Instructional-and-Learning-Technologies).

The Omani branch of the Arab Open University (AOU)

> provides open opportunities of studies for professional development and lifelong learning and to produce graduates who are capable of embracing current and emerging technologies, and who are competent in working in a global economy. The AOU branch in Oman started its operation in 2007 after being granted approval by the Ministry of Higher Education. The AOU with its emerging information technology platforms has opened new learning opportunities. It offers bachelor's degree programs in business, English language, and in IT for those in the upper age group, those who are employed, and those belonging to the lower and middle-income strata of the society (Al Musawi 2010a).

It also started a MA in education technology in 2010. The open learning platform of this program relies heavily on the tutoring process that aims, in turn, at promoting a proactive environment of learning. All services provided by AOU for students or staff are part of the LMS, which facilitates online access via this platform (Abu-Shawar 2014).

External Reviews and Accreditation

The ILT department at SQU passed 2 external reviews in 2009 and 2013 and gained the sixth rank among the top 20 graduate programs in the area of learning, design, and technology as measured by the number of publications in the journals *Educational Technology Research and Development* and the *Journal of the Learning*

Table 13.2 ISTE key assessment of ILT BA program[a]

Type of assessment
#1: Licensure assessment or content-based assessment for educational content
#2: Assessment of content knowledge in the program specialization
#3: Assessment of knowledge to plan, design, develop, and implement curriculum instruction for technology Integration and assessment
#4: Assessment of internship/clinical practice to demonstrate candidate. Demonstrates candidates' knowledge, skills, and dispositions and their ability to plan and implement professional experiences required for a coaching instructor
#5: Assessment of ability to support student learning and development. Demonstrates candidates' knowledge, skills, and dispositions that they can plan, design, model, and analyze data in effective learning environments
#6: Assessment of ability to provide technical support in learning environments. Demonstrates candidates' knowledge, skills, and dispositions that they can maintain technologies and problem solve technical issues
#7: Assessment demonstrates candidate's ability to contribute to development of shared vision in planning for the integration of technology in schools
#8: Assessment demonstrates candidate's ability to collaborate effectively; plan, design, develop, model, and communicate within online learning environments to demonstrate best practices for coaching

[a]Source: ILT (2016).

Sciences in the *Education Media and Technology Yearbook* (Orey et al. 2010). The International Society of Technology in Education (ISTE) accredited the BA program in 2016 for 6 years. The program's idiosyncratic nature was found to most closely meet ISTE technology coach standards best and fit the role of the graduates in both tracks as IT teachers and LRC specialists. Key assessments used to improve the course content are listed in Table 13.2. The program accreditation was part of the accreditation of the college by the Council for the Accreditation of Educator Preparation (CAEP). The accreditation process began with the development of the College of Education Conceptual Framework (CF) in the spring of 2009. A review of literature, a study of international teacher preparation models, a SWOT analysis, and a stakeholder study led to the college's CF and its five themes: academic rigor and specialized experiences, diversified teaching, dispositions and values, research culture and lifelong learning, and technological skills (COE 2016).

Other education programs exist at Omani private institutions such as Sohar University and Nizwa University, and education technology is only taken as a subject in undergraduate studies or as a thesis topic at the graduate level. The national accreditation council usually accredits these institutions' programs including the AOU MA program. This council was set up in 2001 to regulate the accreditation, assessment, and quality control of the Sultanate's higher education institutions, and several plans and programs have been drawn up to guarantee the standards of the higher education sector. It issued a standard classification of the education framework designed to organize the entire scope of topics that could be studied in diploma and degree programs (OAAA 2016; see also http://www.oaaa.gov.om/Default.aspx).

Teacher and E-Learning Instructor Training Programs

The MOE mainly uses traditional training that requires physical attendance, accommodation, facilities, and other costly requirements. However, the ministry attempts to adopt e-training as an approach to offer various types of formal training and self-learning through online workshops to teachers, administrators, and e-learning instructors. For example, during the first half of 2016, eleven e-training programs in different areas, two of which are in technology design, are conducted using Moodle LMS. In addition, a link of four educational regions with the main training center in Muscat is installed through a visual communication system. The following outcomes have been achieved (HRD 2016):

1. Qualified human resources located at the main training center are used to manage the system.
2. The ministry becomes self-sufficient without having to rely on other external training agencies.
3. Ease of adapting the learning environment according to the training requirements.
4. Reduced costs in the coming years.
5. Ensuring that backup systems of files, data, and programs are secured as a reference in case of sudden malfunctions.
6. Establishing high-level infrastructure to ensure efficient and fast operation.
7. Strict confidentiality of all data of the virtual environment.

Studies show that there is a lack of training courses for teachers, especially courses that teach them how to produce and develop their teaching materials (Al-Senaidi et al. 2009). In addition, it was found that even though ICDL training programs (run by ITA for staff) are effective at teaching basic skills in computer and application use, the training is not effective in training educators on critical assessment of technology or in how to use technology in the classroom (Al Hatmi 2009).

Omani Society for Educational Technology

In response to academic and training needs, Omani specialists in education and information technologies have formed a professional society, the Omani Society for Educational Technology (OSET). As an ICT in education expert group, OSET, which was formally inaugurated in 2007, aims to:

1. Conduct research on education technology's impact on education in Oman and the Gulf states.
2. Present the society role and emphasize its contribution to the socio-educational developments.
3. Form a niche to the Omani/Gulf specialists and develop their experiences.

4. Keep abreast of the technological innovation in education and disseminate their applications within the Omani society.
5. Link with similar associations in the Gulf and other parts of the world (OSET 2016).

OSET has conducted many workshops, seminars, and plans to have its fourth international conference in 2017. It also plans to issue a specialized reviewed journal of its own (see Future Developments section and http://en.omanset.org/).

Conferences

The Sultan Qaboos University and the Omani Society for Educational Technology have organized many international conferences with themes such as education technology, e-learning, m-learning, and other related topics since 1999. These conferences have attracted a large presence of Omani, local, Arab and international experts, and teachers and professionals. These conferences focused on discussing important issues related to exploring updated technologies and their relation to teaching and learning. They produced dozens of research articles in addition to running training workshops and software showcases in Oman, the Gulf, and the Arab world. The conferences helped to exchange experiences and explore possible educational implications in the field of technology and possible solutions to accommodate/employ them in education. It provided opportunities for participants from different contexts to share their best practices in using technology in education such as learning using tablets, open educational resources, cloud computing, flipped classrooms, social networks in learning and teaching, massive open online education courses (MOOCs), educational games, open software applications, virtual labs in the teaching of science, e-books, and virtual museums (OSET 2016; see also http://icoet2015.omanset.org/en/).

Future Development

Oman plans to extend its efforts in the fields of digital society and citizenship (ITA 2015). However, impediments exist and hinder these efforts specifically in the education sector. For example, Al-Senaidi et al. (2009) found that five factors are perceived as barriers to adopting information and communication technologies in Omani higher education, namely, lack of equipment, lack of institutional support, disbelief of ICT benefits, lack of confidence, and lack of time. Therefore, the plans require setting the infrastructure and quality measures to enable education institutions to prepare the digital citizen through the training of students about/through the means of technology and information. It requires e-learning instructors to train teachers to develop their learning materials that are compliant with international industry standards. The need remains to design and implement flexible and efficient training programs about/through e-learning platforms.

Researchers in Oman need to conduct action and empirical research to investigate the effectiveness of e-learning components in learning and training environments and present their findings to the decision makers. They need to elaborate their research to include evidence of international and regional collaboration to ensure the impact of their findings on the decision making process and to convince top administrators of the value of e-learning. Researchers should study the effect of cultural values and preferences in e-learning design and implementation.

The Omani Society for Educational Technologies needs to be more active on issues in the field of e-leaning implementation and should help in strengthening technology applications in education through conducting national projects and workshops and publications of research in the *Omani Journal of Educational Technology*, a biannual refereed journal. Its efforts should be orchestrated with other national agencies such as ITA and TRC to develop e-learning applications in the country.

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Chapter 14
Palestine (West Bank and Gaza Strip)

Khitam Shraim

Abstract This chapter surveys the development and current state of e-learning in the State of Palestine (West Bank/Gaza Strip). The author surveys the general social, economic, historical and demographic background of Palestine and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country and challenges and barriers to ICT implementation in education, business and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives and projects throughout the country. Information is additionally provided on accreditation, teacher training programmes and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Palestine. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Palestine · West Bank/Gaza Strip · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: United Nations Office for the Coordination of Humanitarian Affairs, https://www.ochaopt.org/

Country Profile

Political and Geographic Boundaries

Palestine is a historic region, located on the eastern shore of the Mediterranean Sea. It extends from the Mediterranean Sea in the west to the Jordan River in the east and from the boundary of Lebanon in the north to the Gulf of Aqaba in the south (PASSIA 2006). Palestine's land has repeatedly shrunk following successive occupations by the Ottomans, Britain and Israel. The Palestinian Territories (PT) and geographic boundaries are still unclear and subject to change over time due to the Palestinian-Israeli struggle. The British mandate over Palestine lasted from 29 September 1923 until 14 May 1948, but, by 1947, Britain had appealed to the United Nations (UN) to solve the complex problem of the rival Palestinian and Jewish claims to the land. To overcome this problem, the UN solution was to divide Palestine into a Palestinian Arab state and a Jewish state (Fig. 14.1a). After the Arab-Israeli war in 1948, the state of Israel was created, covering 78% of Palestinian land with the West Bank (WB) being united with Jordan and the Gaza Strip (GS) coming under the control of Egypt. In 1967, a second war between the Arab countries and Israel broke out. As a result, the WB and the GS were occupied totally by Israel (PASSIA 2006).

The first intifada (meaning "uprising" in Arabic), from 1987 to 1994, was a major factor leading to the Oslo peace process and to the creation of the Palestinian National Authority (PNA or PA). The PNA was established after the signing of the "Declaration of principles for an interim self-government arrangement" by the Palestine Liberation Organization (PLO) and the Israeli government in Washington on 13 September 1993, which called for Israel's withdrawal, first from Gaza and Jericho and then from the WB. The PA consists of two geographically separated territories: the WB and the GS. The proposed territories of the WB and the GS total about 6257 km^2, of which the GS accounts for 378 km^2. Israel's control over the PT is divided into three sectors: one sector under Palestinian control is called region A; a second, which is jointly controlled by Palestinian and Israeli authorities, is called region B; and a third sector, which remains under total Israeli control, is called region C (Fig. 14.1b) (PASSIA 2006). The PNA divides the PT into 16 governorates: Jerusalem, Ramallah, Hebron, Bethlehem, Nablus, Jenin, Tubas, Tulkarm, Qalqilyah, Salfit, Jericho, Gaza, North Gaza, Rafah, Khan-Yunis and Deir el-Balah.

> The State of Palestine was proclaimed on 15 November 1988 by the PLO in Algiers as a government-in-exile which unliterary adopted the Palestinian Declaration of Independence. The State of Palestine claims the West Bank and Gaza Strip, with East Jerusalem as the designated capital. The declaration was promptly acknowledged by a range of countries, and by the end of the year the state was recognised by over 80 countries. As of 14 September 2015, 136 of the 193 member states of the UN and two non-member states have recognised the State of Palestine. Many of the countries that do not recognise the State of Palestine nevertheless recognise the PLO as the representative of the Palestinian people (International Recognition of the State of Palestine n.d.)

Fig. 14.1 (**a**) Palestine's UN Partition Plan, 1947 (Source: www.mideastweb.org/mpalestine.htm). (**b**) WB region in Oslo Process, 1995 (Source: www.passia.org/)

In June 2002, the Israeli Authority began constructing a wall in the PT. The wall has created several barriers to movement, separated families and individuals and totally destroyed the Palestinian economy (OCHA 2008). A 703-km-long complex series of 8 to 9-meter-high concrete walls, electronic fences, observation towers, trenches, patrol roads and razor wire has been used to block Palestinian pedestrian and vehicular movement inside the WB and East Jerusalem. The wall is twice as high as the historic Berlin Wall.

In addition to the Palestinian-Israeli conflict, an internal crisis has continued with unstable relations between the main Palestinian political parties: Fatah and the Islamic Resistance Movement, HAMAS. Since June 2007, in practice, there have been two authorities in control, with the Hamas takeover of the GS and Fatah exercising control in the WB (OCHA 2008). The concerns are that the situation will continue with high levels of internal Palestinian conflict, high levels of Israeli occupation operations and minimal or non-direct donor support from foreign governments (OCHA 2008).

Demographics

The Palestinian Central Bureau of Statistics (PCBS) estimated the population at 4.68 million in 2015, distributed as 2.86 million in the WB and 1.82 million in the GS. "Gaza's population is expected to increase to 2.1 million people in 2020, leading to a density of more than 5800 people per square kilometer" (PCBS 2015). Palestinian society is made up of two main categories: citizens and refugees. The problem of refugees remains a priority in any political settlement. The data shows that 41% of the population in the PT are refugees. The Palestinian refugees still live in very crowded areas with desperate health conditions. The population of the WB and the GS is characterized by a very young age structure; 39.4% of the population in the PT are aged less than 15, and the percentage of Palestinians who are above 65 is only 2.9% (PCBS 2015). Palestine is a homogeneous society with 95% of the population being Muslim and 5% professing Christianity, Samaritanism and Judaism. The Arabic language is the main language in Palestine; Hebrew is spoken by many Palestinians, and English is widely understood (PCBS 2015).

Socio-economic Situation

Labour force participation is relatively low due to the large percentage of the population under 15 years (39.4%) and the low female participation rate (in 2015 the participation of women in the labour force was 18.8% as opposed to 71.7% among men) (PCBS 2015). In 2014, agriculture represented 3.8% of the gross domestic product (GDP) in both the WB and the GS as compared with 5.8% in information and communication, 14.5% for industry and 49.8% for services. The World Bank (2016) report shows that the lack of a clear political horizon towards peace and the pending reconciliation between the WB and the GS governments create an unsustainable economic situation. Even though donor aid had increased government-funded services during 2007–2012, this growth model has proved unsustainable. Donor support has significantly declined in recent years, and, naturally, aid cannot sustainably make up for inadequate private investment, constrained by weak investor confidence due to the ongoing restrictions and the lack of political progress. Thus, growth started to slow in 2013, and the Palestinian economy contracted in 2014 as a result of the Gaza war. Recovery has started, but real per capital GDP in 2015 is estimated to have remained constant. By mid-2015, unemployment was still unacceptable with rates reaching 16.3% in the WB and 41.6% in GS. Given the ongoing crisis and its limited natural resources, Palestine relies increasingly on UN and international partner NGOs' emergency programmes.

Towards a Knowledge-Based Society in Palestine

One of the most significant implications of the ongoing conflict in Palestine is ICT proliferation. ICT is important to reduce the impact of the current conflicts in two ways. First, ICT is providing a communication tool to mitigate the effects of the physical fragmentation created by Israel's closure policy and the separation wall. Second, ICT is helping to build human, social and economic development. As a result, for Palestinians, support of "ICT became a staple feature of policy recommendations from the international community such as the World Bank, the United Nations Development Programme, the European Union and others" (Zureik et al. 2006).

Many agencies and organizations have been established with the mission to leverage ICT in all fields to facilitate Palestinian life and contribute steadily to Palestine's economic growth. For example, the Palestinian Information Technology Association (PITA), being a membership-based organization, facilitates policies, mechanisms and the environment to support public-private partnerships locally and internationally. A number of ICT initiatives were also introduced including Zinnar (e-Government; http://zinnar.pna.ps/InteroperabilityPortal/), the Palestine Technology Park, Falastinyia (enhancing women's participation in ICT) and Josoor (Academic-Technology collaboration; http://www.birzeit.edu/en/news/pita-pmdp-offer-academic-technology-collaboration). To foster innovative ideas among the entrepreneurs and ICT firms, several exhibitions (e.g. GITEX, Expotech, The Arabic Digital Content Competition) are organized annually.

Between 2000 and 2016, the Internet World Stats (2016) cited the penetration rate of Internet usage in the WB as 63.2% compared to 57.4% for the Middle East region as a whole (2016). This figure is considerably higher than other neighbouring countries. In 2014, 48.3% of households in Palestine have an Internet connection and 51.0% own a smartphone, and these rates are rapidly increasing (PCBS 2014). Due to Israel's refusal to release the frequencies required for 4G and 5G cellular networks, mainly for economic and security reasons, the Palestinian ICT sector lacks the necessary resources and infrastructure for continued ICT development, especially in growing subsectors such as cloud computing and mobile applications (Mercy Corps 2013).

Education System in Palestine

On 28th August 1994, authority over education in the WB and the GS was transferred from the Israeli Civil Administration to the newly established Palestinian Ministry of Education and Higher Education (PMEHE). The PMEHE is responsible for the administration and development of the Palestinian educational system at all levels: pre-school, basic education, secondary education and higher education. It was the first time in history that the Palestinian people were building and managing their own national education system.

General Education

A major challenge which faced the Ministry during the first year was that two different educational systems had been implemented, one in the WB and the other in the GS: the Jordanian system in the former and the Egyptian in the latter. Thus, the first step the PMEHE took was to unify the systems in the WB and the GS by changing the education structure. The education system is compulsory through the basic education stage from grade 1 to grade 10 covering ages 6–15. Secondary education consists of academic and vocational education for grades 11–12. Academic education includes the science and humanities streams. Vocational education includes five streams: commerce, agriculture, industry, home economics and tourism. In Palestine, three different types of schools provide general education:

- Government schools: Supervised by the PMEHE. Pupils in these schools pay tuition fees; those who cannot afford this fee are exempted from it.
- UNRWA (United Nations Relief and Works Agency) schools: These follow the same structure and curriculum as the government schools. Only refugee pupils are accepted into these schools free of charge. UNRWA schools offer only basic education up to grade 10, and then students who successfully complete the tenth grade are accepted into government or private schools.
- Private schools: These schools are managed by individuals and charitable societies and follow the same structure and curriculum as the government schools. Pupils who attend private schools pay a tuition fee, which varies from one school to another.

In the school year 2014–2015, the total number of students in the WB and the GS was 1,171,596; the percentages of the students in government, UNRWA and private schools were 66%, 24.6% and 9.4%, respectively. The number of secondary students enrolled in vocational education was 14,796 of the total number of secondary students 140,452. Female participation in vocational education remains low due to the limited offerings of suitable programmes and sociocultural conditions including early marriage and parents' preference for academic education. The net enrolment rate in basic education was 93.6% (92.7% male, 94.6% female) during the year 2013–2014, and the net enrolment rates for secondary education were very low at 69% (PMEHE 2015).

General Educational Budget

The financial resources for general education in government schools are:

1. The central government acting through the national budget, coming from income tax, allocated to the PMEHE. In 2016, 18% of the total government budget was allocated to the education sector. Current expenditure, mainly salaries, is paid through the Palestinian Ministry of Finance.

2. Households who pay student contributions to the schools or direct expenses for their enrolled children. Education is practically free for all, but there are annual student fees as a contribution: NIS 50 (US$12) per year at the basic level and NIS 70 (US$17) per year at the secondary level.
3. External and international agencies such as the European Union, World Bank, UNESCO and others. These provide financial aid through specific development projects such as curriculum development, teacher training and equipment.
4. Municipalities acting through education taxes levied for the provision of land, the construction of school buildings and repairs.

Strategic Plans

In 1998, the PMEHE started moving from responding to the emergency situation towards developing a strategic plan. The first Five-Year Development Plan (5YDP) (2000–2005) was based on the main principle of Millennium Development Goal 2: access to quality education for all. The Ministry also has a positive view of gender equity; there was special attention and care paid to encourage and facilitate the access of girls into education in general and of children living in remote areas as well as of children with special needs (PMEHE 2000). While the first 5YDP emphasized quantitative terms in order to maintain universal basic education, the second 5YDP (2008–2012), which is called the Education Development Strategic Plan (EDSP), aimed at reforming and developing the education system by addressing, in a comprehensive manner, the quantitative and, most importantly, qualitative priorities of education. In the second 5YDP, special attention was given to the utilization of ICT in the learning process to improve the quality of education to equip students with the knowledge and skills to meet the challenge of rapid technological revolution.

The third Education Strategy 2014–2019, *Palestine 2020: A Learning Nation*, envisions what Palestinian general education should be like in the year 2020. This plan emphasizes a comprehensive reform of the general education curricula and assessment and evaluation system. The Ministry is "paying attention to all aspects that contribute to expand the scope of the educational system's performance beyond achievement in local and international tests, to include a focus on citizenship, 21st century skills, student-centered learning, and promoting opportunities for creativity, entrepreneurship and well-being". Further, the Ministry pays special attention to

> Formulating systematic policies with a clear vision to use ITC in the educational process and reconstructing a clear infrastructure for ITC covering all schools in an equitable manner. The Ministry will adopt a sequential curriculum reform approach starting with the lowest grades of Grade 1 and 2 in 2014, which will then be tested in the following year while Grade 3 and 4 are being reformed and so on. Every year two grades will be reformed with the goal that by the end of the 6-year strategy a completely reformed curriculum will be in place that is at the heart of the shift from the memorization and exam-driven model to student-centred dynamic pedagogies" (PMEHE 2014).

Higher Education

Higher education in Palestine is a relatively recent development, with the first Palestinian universities created in the 1970s during the Israeli occupation. Since 1994, however, the landscape of higher education in Palestine has undergone rapid expansion and diversification in an attempt to meet increasing social and economic demands for higher education. PMEHE has diversified its offered degree programmes to include university graduate and undergraduate degree programmes, technical and professional degrees granted by polytechnic institutes, community colleges and even open degree programmes. There has also been a related expansion in the quantity and types of institutions and a shift away from a near exclusive emphasis on public institutions (EACEA 2012).

For the academic year 2015–2016, there are 52 accredited higher education institutions (HEIs) in Palestine, which provide education and training to more than 216,028 learners (Fig. 14.2). HEIs offer 4-year (5 years for engineering and pharmacy and 6 years for medicine) bachelor degree programmes and 2-year master's degree programmes and, in some cases, diploma programmes. There are also 3-year doctoral degree programmes offered by three universities: An-Najah National Universities (PhD in Chemistry and Physics), Birzeit University (PhD in Social Science) and Islamic University of Gaza (PhD in Arabic, Islamic Studies and Math). The HEIs are grouped into four categories:

1. Conventional/traditional universities (three governmental, eight public and three private).
2. Open education (Al-Quds Open University) with 22 branches distributed all over the country (17 in the WB and 5 in GS).

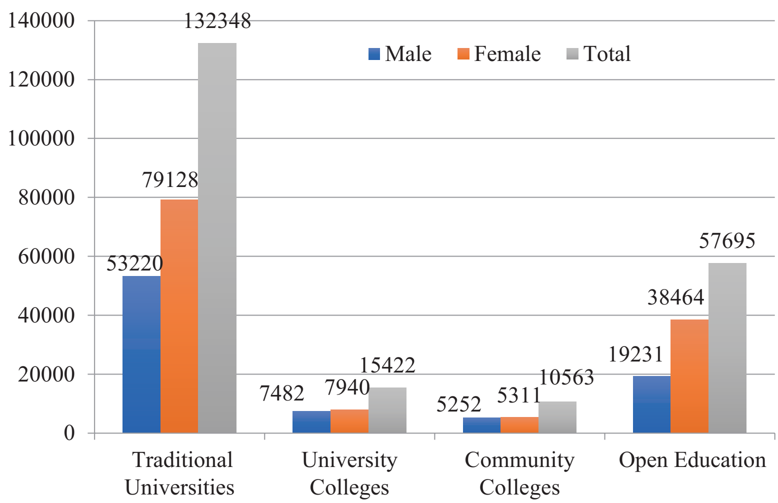

Fig. 14.2 Number of students enrolled in the HEIs by gender in 2015–2016

3. University colleges (13 in WB and 6 in GS); 9 public, 4 private and 2 operated by UNRWA.
4. Community colleges (11 in WB and 7 in GS) – all are private.

The PMEHE governs and finances the governmental HEIs in the WB (Palestine Technical University-Kadoorie and Al-Istiqlal University) and in the GS (Al Aqsa University). The public universities (An-Najah National University, Birzeit University, Al-Quds University, Bethlehem University, Hebron University, Palestine Polytechnic University, Al Azhar University, Islamic University of Gaza, Palestine University and Gaza University) are non-profit and originally created and owned by local charity associations and NGOs.

They depend on fundraising and receive partial government funding. "Between 60–70% of the budgets of public universities are covered by tuition fees. Since there is no regularity and consistency in the payment of tuition fees, most universities suffer from yearly budget deficits," which has serious negative impacts on the quality and relevance of tertiary higher education in Palestine (EACEA 2012).

HEIs endeavour to meet emerging challenges in an era of globalization by advancing the use of new information technologies as well as strengthen international collaborations in the knowledge and skills necessary for the advancement of tertiary education. A number of interuniversity cooperation programmes are currently in operation, including PEACE, QIF, PFDP, Erasmus+ and Horizon 2020. They are supported by partners such as the World Bank, European Union, UNESCO, USAID and the Welfare Association. The PEACE Programme (Palestinian-European Academic Co-operation in Education) was established in 1992 to promote intellectual cooperation between 23 Palestinian universities and 54 European universities through facilitating access, transfer and adaptation of knowledge within and across borders. The main activities of the PEACE are exchange of staff and students, grants for Palestinian students and young academics to complete graduate studies abroad and academic projects aimed at enhancing teaching and research at Palestinian HEIs.

The Palestinian Faculty Development Program (PFDP) (2005–2015), funded by USAID and the Open Society Institute, and administered by AMIDEAST, aims to increase capacity within the higher education sector in the WB and GS, address long-term issues of reform in teaching and learning practices and promote an institutional culture of teaching and learning. In addition, PFDP played a crucial role in the establishment of centres of innovation and excellence in teaching and learning in many Palestinian universities (AMIDEAST 2005).

The Tertiary Education Project (TEP) (2005–2011), jointly funded by the World Bank ($10 million) and the EU (€4.9 million), supported HEI innovation programmes to improve the quality of higher education (http://TEP.ps). A key component of TEP is the Quality Improvement Fund (QIF), whose main objectives were assisting HEIs to make their study programmes more relevant to the needs of the job market and economic development and more competitive with international standards. Through QIF, the PMEHE set up a competitive system of grants to promote and finance innovative projects prepared by HEIs and aligned with the above objectives. Since its inception in 2005, QIF has funded 45 subprojects that have led to the establishment of over 24 partnerships between HEIs and organizations from the private and public sectors in WB and GS. The World Bank provided an additional fund of $US4.2 million (2009–2012) for the Tertiary Education Project (TEP-AF) to support the implementation of a teacher education strategy by the QIF. Another project is Education To Work Transition Project (E2WTP) (2012–2017) (QIF $US6.5 million), which seeks to foster partnerships between HEIs and employers in order to make HEI programmes more relevant to the needs of the labour market.

Despite these achievements, the quality of higher education in Palestine has not kept pace with international standards. According to the Webometrics ranking July 2016, an annual ranking of the top universities around the globe, the Palestinian universities remain largely absent (2016). In 2016, An-Najah National University reached number 1702, and Birzeit University was 2069. They are by far the highest placed, just outside the top 1500. Meanwhile, some Palestinian universities are making their mark in the QS ranking top universities for the Arab Region 2016, where Birzeit University is among the top 50 universities among the Arab universities and An-Najah National University and Al-Quds University are at the level of 60–70. Therefore, a comprehensive reform of the higher education system is needed to address the skills gap, fuel economic development and put Palestine on better footing for advancement and competition in a technologically driven, knowledge-based world.

E-Learning in General Education

ICT and E-Learning in General Education

Since 2002, the Palestinian Ministry of Education and Higher Education (PMEHE) has given special attention to the use of technology and innovation in education. It designed and implemented several ICT initiatives to widen and deepen the inclusion and usage of IT in teaching and learning processes by focusing on main components, including technology curriculum, infrastructure, e-content and capacity building. In 2003, PMEHE launched its first technology curriculum starting from grade five. This curriculum, which was limited to teaching IT skills, is currently being replaced by a new curriculum that emphasizes the integration of emerging technologies in teaching and learning. Along with the introduction of an expanded curriculum, PMEHE has focused on improving the infrastructure of ICT in education through incorporating computer labs into the school system. As of the year 2014–2015, more than 78% of government schools have computer labs equipped with powerful computers, robust enough for an Internet connection, and around 72% of the schools are connected to the Internet (PMEHE 2015). The typical connection is ADSL, which costs NIS 100 ($US25) per month. In addition, and through various interventions such as the Intel project, MSN, SEED and Belgian Technical

Cooperation (BTC) e-learning programme, PMEHE has aimed to build the capacity of teachers in using technology in teaching and in developing e-content.

With the cooperation of many national and international organizations, substantial investment and considerable efforts have been made in supporting schools to make the most of new technologies. The PMEHE is involved in a number of ICT projects and the most prominent are (UNESCO 2014):

- The Palestinian Educational Initiative (PEI) was launched in 2005, with the overall objective of improving the utilization of ICT in the education system through public and private collaborations. PMEHE and the Ministry of Telecommunications and Information Technology, as well as nongovernment stakeholders and international organizations, were encouraged to become involved in the implementation of ICT-related initiatives. However, PEI collapsed due to widespread corruption and political rivalry between the main Palestinian political parties: Fatah and Hamas (PEI 2005).
- The Model Schools Network (MSN) Program was launched in 2007 and funded by USAID. The MSN Program seeks to introduce a student-centred contemporary approach to teaching and learning in the fields of English, Science and Mathematics for basic education in grades 1–9. To this end, MSN has developed and is delivering an in-service training programme to provide school teachers with the knowledge and skills necessary to teach and lead more effectively within the Palestinian context. It blends face-to-face training and online support through a virtual learning environment. The programme supported 17 private schools in the first phase and 40 public schools in the second phase. The second phase also included scholarships for students and a number of initiatives to train teachers from 12 private schools in GS. The MSN also provided more than 700 notebook computers to teachers to be used in their classes.
- Intel Teach project was launched in 2008 and supported by Intel. The project focuses on training teachers to engage effectively with their students, using a combination of technology and creativity. The training programme is divided into 5 training phases and employs 40 teachers as part-time trainers. To date, two phases have been completed; in phase 1, “Getting started”, 12,000 teachers and in phase 2, “Essentials”, 1000 teachers were trained.
- Palestine Scientific and Technology Fair is an annual competition, which began in 2010 and is sponsored by Intel. The competition allows students from grades 9 to 12, working on science and technology projects to compete and exhibit their work at an international fair. Each district selects the best three or four projects in the district and sends them to PMEHE, which, in turn, selects the best three to represent Palestine as international inventors in the Intel International Science and Engineering Fair (Intel ISEF) in the USA and in the Intel Science Competition Arab World. Since the launch of the competition, Palestinian participants have received several international awards. For this year’s competition, the competing students started an initiative to develop mobile apps. The initiative is a good example of a student-centred approach that enhances entrepreneurship, creativity and self-confidence among students and teachers.

- Reinforcing e-learning in Palestinian schools was a 4-year project (2011–2015) financed by the Belgian Technical Cooperation (BTC). The main aim of the project was to produce digital content for grades 5–10 and make it available through an online portal. The project, which involved 97 schools, trained teachers to make their own digital content and helped the schools develop support materials for their curriculum in the form of “e-units”. The project also supported a team, composed of 90 teachers, to develop a more sophisticated programme, “Learning Objects”, to support the learning of specific concepts in the curriculum. The programme is currently in a digital repository in Belgium and is available to others to use and adapt without charge. In addition, a national web portal for teachers (www.elearn.edu.ps) was developed. Through this portal, teachers can upload and download teaching materials or provide and receive feedback on how to improve student-centred teaching methods. Meanwhile, the portal has more than 7000 users and contains more than 1600 learning objects. But strangely enough, teachers rarely used the portal to interact with each other; they prefer to use Facebook groups. Furthermore, 22 teachers were trained to train teachers and students to programme mobile applications. Moreover, in 2016 a set of policy papers were developed by the BCT team project: Information and Communication Technology in Education (ICTE), Digital Educational Resources (DER), School-led Initiatives (SLI), Teacher Professional Learning (TPL), mobile Learning (m-L) and 21st Century Skills (21CS) (BTC 2016).
- Science Education Enhancement and Development project (SEED) is supported by JICA (Japan International Cooperation Agency) and is an ongoing collaboration between the Palestinian Ministry of Education and the Jordanian Ministry of Education by Queen Rania for Information and Communication Technology Center. SEED focuses on training teachers to use ICT to support science teaching. SEED progressed in two phases. In the first phase (June 2012–May 2013), a total of 39 Palestinian core training groups, which include teachers, supervisors and IT professionals, made study trips to Jordan. The training in Jordan was then followed by three trainers of trainers (ToT) training sessions in Palestine. In the second phase (May 2013–July 2014), 25 core trainers, who had been trained in the first phase, were selected to participate in two training sessions in Palestine and start the implementation of cascade training in their own district. Another 24 teachers participated in four ToT training sessions in Palestine to prepare for cascade training in the following year.
- Tafkeer, meaning “Thinking-Technology”, Program developed and implemented in cooperation with the Welfare Association and Al Nayzak Association. The main aim of this programme is to develop an effective Palestinian model on how to integrate and use technology in the educational process in schools. The programme focuses on four main areas: advancing the teaching-learning physical environment at selected schools, establishing technology laboratories equipped with the necessary tools and teaching equipment, developing students’ critical thinking skills and teacher training in producing e-content and providing the appropriate resources for advanced technological knowledge that is properly integrated with the learning and teaching process. Since 2012, 260 teachers and

180 students were trained, and 26 robotics clubs were established. The teachers have successfully developed 55 mobile educational games in Arabic. These apps were published in the Apple Store to be downloaded on iPad under the name Tafkeer. They were also published on Google Store to be used on tablets working with the Android system.

- Science and Technology Entrepreneurship Program (STEP) was launched in 2013, in cooperation with the Al Nayzak Association. STEP supports Palestinian students in grades 9–11 who have innovative project and research ideas in the fields of applied science, engineering and technology. The programme aims to spread the culture of science and technology research and innovation through developing capacities that enable students to implement original projects. Applicants to STEP receive intensive training in various topics such as scientific research methodologies and writing professional scientific papers. The first round was very successful, with more than 450 projects submitted by 650 students from various schools in the West Bank and Jerusalem, and 46 projects, by 73 students, qualified for the finals. The final exhibition and ceremony was attended by 3000 visitors. The creators of the seven winning projects were invited to take part in an intensive training programme at the Smithsonian National Air and Space Museum and NASA. Training was in the areas of engineering, science and physics. Furthermore, the winning projects were displayed in the Air and Space Museum in front of thousands of visitors.
- AbjadNet project and NETKETABi project are supported by the Palestinian Telecommunication Group (Paltel 2016). They are good examples of successful partnerships between the public and private sectors. The AbjadNet project aims to provide necessary infrastructure such as free Internet connection to all public schools (2200 schools in the WB and GS). Furthermore, schools that lack appropriate IT equipment will be supplied with computers. In the first phase of the project, Paltel connected 1000 schools to the Internet, targeting around 400,000 students and 15,000 teachers. In its second phase, AbjadNet is working to activate the use of the Internet in schools and connect the remaining 1200 public schools to the Internet. The NETKETABi project, meaning "My Netbook", provides school-aged youth with customized laptops containing interactive educational content along with services that promote intellectual stimulation in and out of the classroom (PSD 2016). This project is converting textbooks for grades 1–4 into e-books for use on tablet devices.

The introduction of e-learning into primary and secondary education is still in the planning process. More recently, the PMEHE announced the launch of the "digitizing education system program 2017–2020 for grade 6–3", in collaboration with a number of national and international organizations. The implementation of this programme will start in 2017 for grade six in all public schools at a cost ranging between 5 and 6 million USD. In this respect, in February 2016, the Ministry signed an agreement with the Republic of Turkey to consolidate efforts to deploy the Turkish "FATIH Project" in the West Bank. The Turkish government donated approximately 200,000 digital devices, which will be distributed to students for free. The objective of the programme is to activate the concept of the "Smart Class" in order to shift the focus from memorizing to creative and analytical thinking. In addition to connecting all schools to the Internet in partnership with the Paltel, the programme focuses on teacher training and the development of educational e-content in accordance with the Palestinian curriculum. Furthermore, a number of municipality councils, including Ramallah, Beitunia and Tulkarem, announced the allocation of educational taxes levied for the digitizing education system programme.

With regard to online educational portals, the PMEHE has, in cooperation with ULTIMIT Company, recently developed an eSchool portal (https://www.eschool.edu.ps/). eSchool will provide each school with a website in order to develop the most effective means for direct communications between the school and all stakeholders in the educational process. This website ensures more direct communications with the school as well as keeping up to date with its news and activities. The website has been tested in a number of schools and will expand to include another 100 schools this year, before its extension to all schools. The PMEHE also supports access to e-services through electronic forums such as the Palestinian Schools Network – Zajel (http://www.zajel.edu.ps/). E-Learning forums often contain students' activities, educational materials, worksheets and test models. However, they are not activated as required due to the lack of a unified forum and comprehensive IT strategy for educational use.

In Gaza Strip, the Ministry of Education developed an online educational portal called Rawafed (http://rawafed.edu.ps/portal/elearning/). This site contains e-book versions of all Palestinian curriculum textbooks, interactive educational materials and exam models and communication platforms. Another educational portal developed by UNRWA is the interactive learning programme (http://ilp.unrwa.ps/), which is designed by its teachers to meet special educational needs and provide alternative ways for students to learn. The programme uses computer games to teach mathematics and Arabic, with an average of two lessons per day. Academic performance has improved among students, as well as attitudes towards learning. With support from the Republic of Korea, many schools that lacked appropriate IT equipment are fully supplied with computers, giving all their students the chance to access interactive education opportunities.

To sum up, much progress has been achieved in integrating new technologies to enhance the accessibility and quality of the teaching-learning process through several projects; however, these projects lack integration with each other and lack a sustainable alternative once they are finished. Although e-learning is widely recognized as an important means for educational reform, the e-learning concept is still in its early stages of development involving the different stakeholders in the education sector. Moreover, at public schools, there are many motivated and capable teachers, who are implementing a wide variety of e-practices, from PowerPoint presentations in class to animated video presentations, but these practices support e-teaching rather than e-learning. Learner-centred education is not yet well known and understood by most educators in Palestine. Several workshops and national conferences have been conducted to raise awareness of the importance of introducing an e-learning approach (Shraim and Khlaif 2010).

ICT and E-Learning in Higher Education

In recent years, e-learning has grown rapidly across the higher education sector in Palestine, where, today, almost all universities are offering different forms of online activities in learning, teaching and administrative affairs (Mikki and Jondi 2010; Shraim 2012). Every Palestinian university has developed its academic portal, which serves as a gateway to a range of academic and administrative services. For example, in 2002, Birzeit University developed a portal called Ritaj (meaning "the great portal" in Arabic), and in 2004, An-Najah National University developed its portal called Zajel (meaning "homing pigeons were used to carry messages" in Arabic). Through these portals, students can search the course catalogue, register for their classes, search the library for books, access assessment results and stay updated on their academic and financial records. On the other hand, instructors can post lecture notes and communicate with students via bulletin boards. Recently, four Palestinian universities (Al-Quds Open University, Al-Quds University, Birzeit University and Islamic University of Gaza) have launched Android mobile apps to enable their students to interact with peers and access all university services via their mobiles.

All Palestinian universities have introduced blended e-learning into their courses either independently or with support of international organizations. International support certainly helps HEIs to share knowledge and good practices, build infrastructure, create e-learning materials and develop joint programmes.

> Since 2005, a large number of e-learning donor-funded projects have been launched. One important project was the Mediterranean Virtual University (MVU), a two-year EU-initiative, launched in 2005 by the Danish Aalborg University. The project was a collaborative effort of eleven Mediterranean and northern European universities aiming to design online engineering and information technology degree courses, pilot them locally and internationally, and then enable learners globally to study online. The Unit for Learning Innovation (ULI) team at Birzeit University developed four courses: Introduction to the World Wide Web, Software Development and System Programming, Programming for the World Wide Web, and Coding and Information Theory. BIZREH is another example in which the ULI team developed a number of e-enabled courses such as: chemistry and Math for 9th grade, two undergraduate courses, English for Journalists and English Communications, and one post-graduate course, Computer Modeling of Water Distribution Systems. MedForist (EUMEDIS Program) was also a donor-based project to develop a number of e-business programs including e-Commerce, Enterprise Resource Planning, Customer Relations Management, and Supply Chain Management. Another unit at Birzeit University involved in developing online courses is the Ibn Rushd Unit. This unit has developed many courses including: Psychological Foundations of Education, Introduction to University Teaching, Palestinian Labor Law, the Political System in Palestine; Principles of Palestinian Commercial Law, and Coronary Heart Disease (Shraim 2012)

Another important early project was the 2005–2008 RUFO project, which aimed to develop an interuniversity network in Palestine in order to strengthen knowledge and skills in open and distance learning, in collaboration with European networks. Again, the Palestinian partners were QOU, Al-Quds University, An-Najah National University, Birzeit University and Palestine Polytechnic University.

> The European partners were the Basque University, the French Conservatoire National des Arts et Métiers (CNAM), Université Lille 1-Sciences et Technologies, and the Belgian Université Libre de Bruxelles. Workshops, study visits, training and project proposals were developed, but political events in Palestine made it difficult for the Palestinian Ministry for Higher Education to take charge of the contract and the completion date was revised to early 2009 rather than September 2008 (Wakim & Hodali 2006)

A more recent project is the Serious Games: Pathway Within the Undergraduate IT Programs (SAGE) project, co-funded by the Erasmus+ programme of the European Union (http://www.sage.ps). The project runs for 36 months (December 2013–November 2016), has a budget of 1 million Euros and is coordinated by Birzeit University. Al-Quds University-Jerusalem is also partner in this project. The main aim of SAGE is to enhance cooperation between EU universities and Palestinian and Tunisian universities in developing sustainable curricula in "serious games". The specific objectives of the project are to develop eight courses in serious games that can be taught as a pathway within current IT programmes, using e-learning in teaching. The project also aims to develop serious game case studies for student training in areas like education, business, politics, social, engineering and health.

The recently launched Erasmus+ project, METHODS (modernization of teaching methodologies in higher education: EU experience for Jordan and Palestine) is a 3-year project that involves 14 international partners, including four Palestinian universities, namely, An-Najah National University, Birzeit University, Palestine Polytechnic University and Bethlehem University and a number of Jordanian and European universities (http://methods.ju.edu.jo/Home.aspx). The project aims at improving the quality of teaching and learning at universities through incorporating technological tools consistent with pedagogical best practices and building the universities' capacities to evaluate, develop and design e-curricula to be available on an open access portal. To achieve these objectives, the project will support the establishment of national centres in Jordan and Palestine to serve as hubs for utilizing best practices in ICT in education.

> These centres will facilitate the establishment of diverse clusters (pool of staff members from target disciplines in engineering, science faculty with multimedia, and educational specialists interested in a certain discipline) at universities, where educational specialists will review the proposed learning materials in order to ensure compatibility with the standards, and multimedia designers will design the interfaces, activities, presentation, layout and animation included in the e-curricula (METHODS 2016)

OpenMed is another Erasmus+ programme project (2016–2018) in which two Palestinian universities, An-Najah National University and Birzeit University, are partners (http://openmedproject.eu/home/). The main goal of OpenMed is to raise awareness and facilitate the adoption of open educational resources (OER) and open educational practices (OEP) in the South Mediterranean region, with a particular focus on Egypt, Jordan, Morocco and Palestine. OpenMed seeks to foster the role of universities as knowledge providers, not only to their own students but also to the wider public, especially disadvantaged groups (e.g. low-income peoples, disabled students, people living in rural areas, learners at risk of low achievement and refugees).

In addition, most Palestinian universities have established the teaching and learning centres, ICT excellence centres and e-learning centres/units to develop and sustain teaching effectiveness and more importantly to create an institutional culture of excellence and innovation in teaching and learning (e.g. asserting the value of student-centred, problem-based, interactive approaches through more technology-enhanced teaching and learning practices). Several workshops and national and international conferences have been conducted through these centres to raise awareness of the importance of introducing an e-learning approach into teaching and learning. These e-learning centres/units aim to support their faculty's efforts to deliver blended learning mode courses. However, the services they provide vary from one university to another and are often based on the decision makers' interests in providing institutional support for implementing e-learning. Common services include electronic exams, multimedia production, video streaming, learning management systems (Web CT, Moodle), e-registration systems and Web 2 tools (e.g. Wikis, blogs, podcasts). In addition, the e-learning centres/units provide short training programmes, seminars, workshops and presentations by peers. To encourage faculty members to use an e-learning approach in their teaching, many of these centres announced an annual Excellence in E-Learning Award. The award aims to spur innovation and stimulate creativity in integrating emerging technologies in teaching.

Almost all universities are recording many of their live lectures and then uploading them to their websites as a way to support both on and off campus students. The material is often presented in a traditional linear format. There is a need to move from passive recording methods to a focus on "social video" linked to participative and student-centred models through utilizing emerging technologies to explore new ways in which recording lecture practice might become more pedagogically rich.

Although there has been a growing interest in the concept of massive open online courses (MOOCs) and the transformative impact it may have on education around the world, its development in Palestine is still in its infancy. The E-Learning Center at An-Najah National University developed the first English language open-source course entitled "Discover Palestine". "Discover Palestine", which runs for 9 weeks, is a weekly 4-h course that focuses on Palestinian history, archaeology, culture and heritage. A total of 274 participants, from all over the world, registered for the course, but the majority of them failed to finish it due to the heavy reading demands of the course. In addition, there was a lack of appropriate and efficient processes to develop high quality online learning materials due to a lack of instructional designers. Al-Quds Open University also developed an Arabic language MOOC entitled "Math and Life", hosted on the Edraak platform (https://www.edraak.org/en/). The recent emergence of smart mobile devices, especially smartphones and tablets among educators and learners in Palestine over the last few years, has led many universities to give further consideration to mobile learning (Shraim and Crompton 2015). Al-Quds Open University, for example, recently won the Alecso Apps Award for developing a mobile app for teaching the "Strategic Management" course.

The provision of full online learning at campus-based institutions will, in the short and medium term, remain scarce. Islamic University of Gaza, for example, offers two mandatory courses as online courses (via virtual mode): a first aid course and Holy Quran course (Mikki and Jondi 2010). Nevertheless, Palestinian policy-makers are very sceptical about the values of providing full online courses. This is mainly due to a lack of understanding of the concept of e-learning. Most policy-makers presuppose that e-learning is simply being used by students as a replacement for face-to-face teaching methods, which is not in line with the general philosophy of university education (Shraim 2012).

There is growing literature surrounding e-learning in Palestine. A number of studies (e.g. Shraim 2012; Al-Sayyed and Abdalhaq 2016) have investigated factors that affect the attitude of instructors or students towards the adoption of e-learning. Arman et al. (2009) found that an e-learning approach has good efficiency in learning and improves the students' achievement and attitudes. Said (2013) also emphasized the importance of cultural norms to be taken into account when e-learning materials are designed and presented to learners with various settings. In addition, Odeh and Ketaneh (2007) highlighted the importance of providing the students with an automated help service at any time, putting students in a real environment lab and targeting the system at a real interaction between students and tutor and accessing the lab from any place and at any time through designing of and innovations in web-based collaborative working for online engineering education. Salameh et al. (2012) assessed the effect of an e-learning programme on the quality of life of patients with coronary heart disease (CHD). The findings demonstrate that an e-learning programme does have a positive effect on patients with CHD and the significant role nurses can play in patient education, including their contributions to promoting the recovery and preventive process of CHD patients. Other studies have explored individual initiatives in integrating different technologies in teaching such as AlAyyouby and Farrah (2014) who reported on the importance of computer-assisted language learning (CALL) in improving the learners' language skills and learners' anxiety towards using computers and the Internet. Shraim (2014) researched the potential of mobile technologies to create a positive attitude towards learning English and to improve vocabulary and pronunciation. While individual faculty initiatives provide important experimental knowledge of e-learning, they are too often scattered within and across institutions, so that even successful practices have limited impact and visibility. Therefore, the scaling up of successful experiments and the sharing and mainstreaming of good practices remain the real challenges.

Most Palestinian universities have incorporated e-learning to supplement face-to-face instruction by using the LMS Moodle that focuses mainly on content delivery rather than educational techniques, thereby reinforcing teacher-centred approaches to teaching and learning and limiting Moodle's impact on pedagogy. Therefore, it is necessary to move e-learning beyond learning management systems, to engage learners in the active use of emerging technologies for their self-governed, problem-based and collaborative activities (Shraim 2012). While e-learning is considered not to be a mature pedagogy, it has substantially improved the overall student experience (first and foremost through administrative rather than pedagogic changes). However, technology integration in higher education entails more than just providing technological tools and infrastructure to allow administrative tasks to be carried out online. Instead, it involves a complete re-engineering of the various educational processes from designing curricula, teaching and learning to providing students support and assessing their learning experiences, in addition to developing an effective culture of online learning among teachers.

E-Learning Education Programmes, Degrees, Associations, Certifications and Accreditation

So far, the Ministry of Education has not recognized the online and distance education degrees awarded from accredited foreign universities. The national e-learning committee has recently created a pool of experts from all the Palestinian HEIs to outline regulations and standards for recognition of online programmes, which is currently being considered by the PMEHE. Furthermore, no Palestinian university has been granted a licence to offer degrees composed of full distance and online programmes. For example, Al-Quds Open University (QOU) is the first open and distance university in the Arab World. However, QOU has implemented various blended learning models, using Moodle, video streaming technology and virtual class technology (Elluminate Live). The Institute for Community Partnership (ICP) at Bethlehem University provides an Online Professional Diploma Program as the first diploma in Palestine to offer courses using blended learning: “Small-Scale Business Administration”, “E-Business” and “Project Management”. It is worth mentioning that these programmes are nonacademic programmes (Mikki and Jondi 2010).

One-shot training in e-learning given to instructors by their institutions is not sufficient. The sustainability of staff development through continuous training is essential to keeping them up to date with how to integrate new technologies into the learning and teaching process. Providing ongoing and recurring workshops and building a community for e-learning “adopters” within and across institutions are important for the effective implementation of e-learning.

Future Development

In recent years, significant efforts have been made to improve teaching and learning through integrating technology. To this effect, institutions have used various programmes and procedures, ranging from faculty training, building a robust high bandwidth communication network and distributing high performance computing capacity to establishing reward schemes for teaching effectiveness. Some institutions have also set up centres of excellence and e-learning to support faculty and teaching staff. However, in many instances, these efforts are scattered and have minimal impact that cannot be meaningfully assessed. Indeed, the effective integration of technology requires a clear strategy and a revolution in thinking about how learning and teaching must be delivered and how the institution must overall adapt to change. The link between institutional vision and strategy and the integration of technology should be made clearly visible. Therefore, developing national e-learning strategic plans, for both general and higher education sectors, requires addressing policy, curriculum integration, professional development, community engagement, infrastructure and access.

While infrastructure and funding are among the most important challenges facing the implementation of e-learning in Palestine, it is policy-makers' scepticism about the pedagogic value of e-learning and staff development that are probably the most challenging. Political support is needed in order to provide a solid, enforceable and accountable framework for the implementation of the e-learning approach (Shraim 2012). To redress the doubt surrounding online learning programmes, great efforts have to be made to ensure the quality of such programmes (Mohamed 2005). Hence, developing quality assurance frameworks and accreditation policies for online programmes that would be offered by HEIs constitutes a major step towards gaining accreditation by internationally recognized organizations.

For the successful, large-scale implementation of e-learning in Palestine, a centralized model provides more efficiency and seamless integration of e-learning services and is characteristic of more mature institutions. It is, therefore, important to establish a national e-learning centre to oversee the design of materials that are innovative and meet international standards, provide training, attain cost effectiveness, avoid wasteful duplication of efforts and scale up successful experiments. Online learning should focus on empowering technology entrepreneurship through engaging students, professionals, PMEHE and industry experts. This will help the development of a sustainable knowledge-based economy in Palestinian communities. If adopted effectively, e-learning will enhance the quality of education through moving towards student-centred learning and promoting opportunities for creativity, entrepreneurship and developing the twenty-first century skills. These factors in turn have significant impact on employability, lifelong learning, and well-being.

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Chapter 15
Qatar

Alan S. Weber

Abstract This chapter surveys the development and current state of e-learning in the State of Qatar. The author surveys the general social, economic, historical, and demographic background of Qatar and provides a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Qatar. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Qatar · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov.

Country Profile

The State of Qatar is a small peninsula surrounded by the Persian Gulf with its only land border shared with Saudi Arabia. Qatar is a member of the Gulf Cooperation Council (GCC) along with neighboring Bahrain, Kuwait, Oman, Saudi Arabia, and the UAE. A British protectorate since 1916, the country became fully independent in 1971 when the British Empire withdrew its Political Residency system on December 16, 1971, ending its military operations in the Gulf. The country is run by a hereditary Emir from the Al Thani tribe, and the current ruler is Sheikh Tamim bin Hamad Al Thani – he is assisted by an appointed Majlis al-Shura (advisory council). Although some seats in the Majlis were designated as elected positions in the 2004 Constitution, elections have been postponed until 2019, and the Emir currently has final authority on all state matters.

The local population of Qatari citizens has been estimated at only 250,000–300,000, and the country has experienced rapid immigration from expatriate workers in the last decade; the population in 2017 stood at 2.6 million (Qatar Statistics Authority, personal communication, October 2, 2017). Thus Qatar along with the UAE has one of the world's highest percentages of noncitizen expatriates at 86–89% of the total population, and English has become a lingua franca since many non-Arab expatriates originate from former British or American colonies such as India, Nepal, the Philippines, and Pakistan. The ethnic makeup of Qatar includes Arab 40%, Indian 18%, Pakistani 18%, Iranian 10%, and others 14%. Muslims form 77.5% of the population and Christians 8.5%, and 14% profess other religions such as Hinduism and Buddhism (CIA 2016). Qataris are primarily Sunni Muslims influenced by regional Wahhabism and Salafism movements, and Qataris follow the Hanbali madhhab (school) of sharia law along with a civil code of Emiri decrees. Due to severe water scarcity, Qatar was only ephemerally settled by Bedouin tribes in the past, although several semi-permanent towns such as Fuwayrit, Al Bidda (Doha), and Zubarah grew up around the pearl trade and fisheries. The population dropped in the 1920s and 1930s due to the collapse of the pearl industry and the Great Depression, but population growth increased after the beginning of oil production in 1949 when local labor supply could not meet the needs of the new industry, which now dominates Qatar's economic landscape.

Qatar's economic production revolves almost entirely around natural gas and petroleum extraction and export: Qatar is the world's 14th largest oil producer (2055 thousand bpd) and reports the third largest proven natural gas reserves (24.7 trillion cubic meters), primarily located in the North Field/South Pars gas field in Gulf waters shared with Iran (U.S. EIA 2014; BP 2014). Price fluctuations in hydrocarbons severely impact government planning, policies, and state benefits to citizens since the bulk of Qatar's government revenue derives from oil and gas production and export (taxes are nonexistent) along with subsidiary industries such as petrochemicals, cement, and fertilizers. During the previous two decades of high oil prices, the state sovereign wealth fund Qatar Investment Authority (QIA) had accumulated 335 billion USD in assets by 2017 (Sergie 2017). The fund has made major investments in land and businesses in Europe and the USA including Barclays Plc, Credit Suisse Group AG, and Deutsche Bank AG. QIA has major property holdings in London and France and purchased the Paris Saint-Germain Football Club in 2011.

Qatar is ranked 32nd in the Human Development Index (0.856 in 2016); however, modern infrastructure is not yet available uniformly throughout the country (UNDP 2016, p. 212). The recent rapid expansion of the economy due to development of its enormous natural gas reserves has placed strains on transportation, education, telecommunications, waste disposal, construction, and freshwater provision – most of Qatar's domestic water derives from gas-fired desalination plants. A rapid modernization program is proceeding with a new international airport and seaport expansion, underground rail system, and national highway system.

Due to the recent population explosion, Qatar is facing several critical developmental and environmental concerns. The peninsula of Qatar, only 11,437 square km in size, consists of limestone gravel desert and barchan sand dunes with limited rainfall of about 80–200 mm per year and extremely hot summers in excess of 50 degrees Celsius (Batanouny 1981). There are no natural standing freshwater or streams, and the freshwater table is declining due to over withdrawals and saltwater intrusion from drilling. Air pollution, which is naturally high due to airborne dust from the Sahara and Rub' al Khali deserts, is exacerbated by oil well flaring, construction, and heavy vehicle traffic. Human activity (recreational driving in the desert) and overgrazing by camels and domestic livestock have caused extensive environmental degradation of the landscape, and only an estimated 2.5% of the land is suitable for agriculture (Weber 2014a, p. 65).

In order to diversify and modernize the economy, and to plan for the inevitable decline in its nonrenewable hydrocarbon resources, Qatar has embarked on a series of initiatives to develop a knowledge economy that would generate income from knowledge activities such as education, research, media, ICT, and biotechnology. Thus government-supported development of ICT, e-government, e-business, and e-learning is expected to drive future economic and social growth and modernization. According to Hessa Al-Jaber, the former head of ictQatar (now the Ministry of Transport and Communications) which develops and regulates the Internet and electronic services in Qatar, "the aim is, through ICT, to create a core engine for a competitive economy, universalize access to social services, and create a knowledge-based online society. There are also hopes that ICT will have a technology multiplier effect in all sectors, extend the reach of political reforms, and help Qatar become a fully developed nation" (2008, p. 133). According to the World Economic Forum's Networked Readiness Index (based on ten pillars including individual, business, and government usage, political and regulatory environment, and social impacts, etc.), Qatar ranked 27th out of 139 in 2016, which is the second highest ranking in the Arab world after the UAE (26th) (WEC 2016, p. xiii).

Education System in QATAR

A modern system of education did not develop in Qatar until the 1950s since there was little need for written literacy or mathematics due to the traditional lifestyles which mainly involved animal husbandry, date farming, pearl fishing, and trading. A small number of *kuttabs*, or traditional Quranic schools, provided most of the learning opportunities. Ten *kuttabs* were offering instruction in the Quran, Arabic literature, and mathematics in Qatar by 1890, and only 20 kuttabs and 30 madrasah (adult schools) were operational in the entire eastern Arabian area of Al Ahsa during the period from 1878 to 1913 (Kobaisi 1979, p. 31). After large amounts of oil wealth became available to the local rulers in Qatar in the 1950s, a public school system was built using British and Egyptian educational models.

During the 1990s and early 2000s, a number of international development agencies including the World Bank issued a series of reports pointing to the lack of knowledge production – including book publication, processes and patents, software, and education and training – in the Arab-speaking world. Significant studies included *Knowledge Economies in the Middle East and North Africa* (2003) and *The Road Not Traveled: Education Reform in the Middle East and North Africa* (2008). Concerned with uneven performance of Qatari students in the traditional school system, in 2001 Qatar Foundation commissioned the RAND Corporation, a US think tank and consultant, to create the Education for a New Era (EFNE) program for K-12 education that established national curricula standards, assessment criteria, and professional teaching standards including continuing professional development. E-learning became integrated into this restructuring beginning with pilot programs in 2006. The Supreme Education Council (SEC) was established in 2002 in place of the former Ministry of Education, and in 2009, the SEC completely took over the responsibilities of the MOE.

Qatar University is Qatar's national public university, and tuition is free for citizens. The University was founded in 1977 as an expansion of the College of Education established in 1973 and has slowly added degree programs over the years. A College of Medicine was added in 2014, but there are still only a few advanced degree programs at the Masters and Doctoral level at QU. A small number of private internationally affiliated universities exist in Qatar, such as Stenden University of Applied Sciences in Qatar (business), College of the North Atlantic (technical programs and allied health), University of Calgary in Qatar (nursing), and Community College of Qatar (2- and 4-year degree programs) as well as local technical colleges in aviation and military sciences.

Education City, a consortia of mostly American international campuses, was established in 1998 with its first institution Virginia Commonwealth University offering programs in arts and design. Planned as an education hub for the region, Education City also provided opportunities for female students whose parents would not allow them to travel abroad to study at a high-quality institution. Female enrollment at the Education City campuses stands at between 60 and 70%. Table 15.1 lists the Education City campuses, their programs and degrees, and founding date.

Table 15.1 Branch campuses in Education City

University	Programs	Est.	Degrees
Virginia Commonwealth University in Qatar	Design, painting, printmaking	1998	B.F.A., M.F.A.
Weill Cornell Medical College in Qatar	Medicine	2001	M.D.
Texas A&M University at Qatar	Engineering	2003	B.S., M.S.
Carnegie Mellon University in Qatar	Business, computer science, biological sciences	2004	B.S., B.A.
Georgetown School of Foreign Service in Qatar	Foreign service	2005	B.S., M.A.
Northwestern University in Qatar	Communication, journalism	2008	B.S.
Qatar Faculty of Islamic Studies	Islamic studies	2007	M.A.
HEC Paris	Business, management	2011	M.B.A.
University College London in Qatar	Archaeology/conservation, museums, library studies	2011	M.A., MSc

Source: HBKU University, author.

E-Learning in QATAR

E-learning development has been uneven in Qatar, partly due to infrastructural and cultural issues. The country only fully came online in the early 2000s as modern Internet infrastructure was not available, the government telecommunications company Q-tel maintained strict censorship and a centralized server system, and public attitudes did not completely endorse this western technology as there were fears of the dissemination of pornography and anti-Islamic and anti-government views. By the social media era, however, circa 2006 to the present, Qatari youth had enthusiastically embraced Facebook, Twitter, and Google +, and learning management systems became ubiquitous in both secondary and tertiary education. High levels of income contributed to widespread personal ownership of laptops, tablets, and smartphones.

Both mobile and broadband service rates are higher than in many developed areas of the world since the country continues to build infrastructure including high-speed optical fiber networks. In addition, although Vodafone broke Q-tel's (rebranded to Ooredoo) state-owned monopoly on telecommunications in 2009, Ooredoo retains approximately 67% of the mobile phone, Internet, and television markets. Monopolistic practices and lack of competition in the MENA region have consistently been cited as sources of high service fees. High Internet costs obviously place limits on individuals pursuing e-learning and lifelong learning, especially outside of an educational or workplace context where Internet is provided.

However, due to high incomes in Qatar, 100% of Qatari youth have access to the Internet and 93% live in a home with at least one broadband-connected device. An astounding 13.9 h per day is spent on average by youths in Qatar on Internet-enabled devices, primarily in the home and on the go using smartphones (MTC 2016, p. 2). The majority of youth online activity appears to be not education related but involves social media use, entertainment, and surfing the net since students report only using the Internet at school for 1–2.5 h per day (MTC 2016, p. 10). The potential to harness this ubiquitous access to the Internet and digital fluency for educational purposes is enormous if proper guidance from parents and educators can be exerted. Thus some of the great challenges to e-learning development in Qatar are attitudinal and behavioral and not necessarily technology related.

Qatar's national development is governed by the Qatar National Vision 2030, and specific goals and targets are spelled out in more detail in the *The Qatar National Development Strategy 2011–2016* (*QNDS*) issued in 2011. Each national ministry is expected to develop its own plan in order to meet the mandated government goals. Throughout these planning documents, both e-learning and ICT are given special prominence in service of the overall goal of creating a knowledge economy to replace the current hydrocarbon-dominated economy and to transform Qatar into a modernized, technology-driven society. The QNDS explains that "Information and communication technology (ICT) is a key enabler of successful education and training. Mastery of technology is required to participate in and contribute more effectively to the knowledge economy. Using ICT in teaching can improve learning outcomes and increase effectiveness in administrative functions" (2011, p. 130).

IctQatar was established in 2004 to carry out the detailed planning to develop, regulate, and promote all aspects of computers, telecommunications, and the Internet and mobile computing in the State of Qatar. In 2013, ictQatar was reorganized under the Ministry of Transport and Communications as the Ministry of Information and Communications Technology and then in 2016 was split into undersecretaries for various communication sectors. The original QNDS provided only a general blueprint for ictQatar to implement e-learning in education, to:

- Develop an integrated ICT strategy for all education sectors in Qatar based on international ICT best practices to improve management, administrative processes, learning environments, teaching methods, and education outcomes.
- Prepare a detailed implementation plan for increased ICT use in school administration and in education services delivery, along with a set of ICT standards that are mandatory for public education institutions and strongly recommended for private institutions (*QNDS*, pp. 130–1).

E-learning on a large scale in Qatar probably first began in Education City at the American branch campuses. Online and blended-learning capacity was integrated into the curricular design at Weill Cornell Medicine – Qatar (formerly Weill Cornell Medical College in Qatar) when it opened in 2002 (Weber 2010a, b). The post-graduate medical program at WCM-Q requires instruction from a wide range of highly specialized instructors, often in a short-course or modular format. Instead of basing highly paid American medical instructors in Qatar, both pre-recorded lectures and streaming video provided a cost-effective and practical solution to provide special topics instruction. In the required premedical course Psychology 101 offered in Ithaca, New York, recorded lectures are provided to the Doha campus and a specialist teaching assistant in Doha proctors the classroom in Qatar, answers follow-up questions, maintains office hours, and administers exams. This blended approach has been highly successful, since this class is consistently ranked in end-of-semester evaluations as one of the favorite courses of premedical students. Since free and low-cost cloud-based VoIP suites and videoconferencing software such as Skype or Facetime are now ubiquitous, most of the Education City campuses have developed dedicated facilities and protocols for using this form of communication. WCM-Q, Georgetown SFS, Qatar; Northwestern University, Qatar; and Texas A&M, Qatar, all maintain fully equipped state-of-the art teleconferencing facilities. In addition to education, VoIP has become critical for administrative functions and facilitating smooth relations between main campuses in the USA, UK, and France and the Qatar branch campuses. Texas A&M University in Qatar (TAMUQ) has issued students tablet PCs with Notebook and SynchronEyes software packages since at least 2005, and each lecture hall is equipped with the Sympodium interactive pen display allowing students and professors to project and annotate course materials with an electronic pen. Texas A&M in Qatar as an engineering school has incorporated e-learning technologies since its inauguration in 2003 – "most courses use an internet based system called Blackboard Vista to share course material, assign homework, maintain a grade book, and receive homework solutions" (Masad and Griffin 2010, p. 850). At about the same time as the Education City developments, El-Khouly and El-Seoud began experimenting with web-based courses in 2003–2004 at Qatar University (El-Khouly 2004; El-Khouly and El Seoud, 2005). Qatar University has employed Echo360 for lecture capture since 2010, and the College of Pharmacy was one of the early adopters.

One of the earliest national e-learning projects in K-12 education was K[nowledge]-Net, and the related e-schoolbag (ESCWA 2009, p. 15). The projects were jointly developed by ictQatar and the Infocomm Development Authority (IDA) of Singapore. As a small formerly impoverished state that propelled itself into the forefront of technology and education in the modern world, Singapore and the "Singapore Model" have often served as a blueprint for Qatar's planning and development agencies in the areas of knowledge economics and ICT. Qatar and the members of the Asia Cooperation Dialogue (ACD) endorsed the Doha Declaration in 2006, to "support the successful implementation of the Asia e-University as an instrument of human capacity building" (Doha Declaration 2006). However, no further developments with Asia e-University in Qatar appear to have taken place, although an AeU Bahrain branch campus cooperates with Arab Open University.

E-schoolbag was piloted in 2006 among seventh graders at Al Wakra Independent Secondary School for Girls. 200 students were issued Microsoft Tablet PCs with "e-contents on science, maths, and English, which will be used by teachers as ready-to-use materials mapped to the Qatari curriculum standards and allow them to customise and add their own materials to fit their students' needs" (*Gulf Times* 2006). Robinson and Ally carried out a small-scale qualitative study of 12 grade 8 girls using e-schoolbag. Some of the recommendations from the study included: "the two critical skills of technology and English language are not equally distributed among the population....Introduction to e-learning strategies and skills in the school beginning in the primary grades might help students gain greater skill, confidence, and self-discipline with technology…. Policies, procedures, and course design that are equitable for all and do not penalize those students who do not have computer or internet access and support at home would promote a positive view of e-learning…. The female preference for communicative, collaborative, and supportive interaction needs to be addressed in the design to avoid isolation" (2010, pp. 6–7). The authors also reported on the cultural conservativeness of some parents who have not embraced technological change and who may not allow Internet access to children; hence, the home environment may not be conducive to e-learning for some parents and students in Qatar.

K-Net, designed and implemented by Egyptian IT company ITWorx in 2008, has been described as "a three-way educational portal that connects students, parents, and teachers any time, day or night. Utilizing a unique Learning Management System, Knowledge NET provides teachers with instructional tools and resources; parents with instant access to teachers, coursework and upcoming tests; and students with the ability to communicate with peers and submit homework assignments. Knowledge Net improves content delivery, facilitates accessibility, enhances communication and expedites administrative tasks" (ictQatar 2011a). Nasser, Cherif, and Romanowski used interviews and questionnaires from 1376 respondents in 27 Qatari schools to assess K-Net 1 year after its implementation. Descriptive results indicated that although there were few technical barriers to usage of the LMS, students reported that "they argued that there was little time at school to use the LMS. In addition, there was an equal number of respondents who felt that the LMS was overly difficult to use or who did not know how to use it" (2011, p. 47). The study indicated that the main barriers to usage were that K-Net was not fully integrated into the curriculum and often was not required by teachers; there was no reward system for teachers or students for using it, and some users were experiencing slow server response times.

These early efforts at national e-learning implementation evolved into the nationwide learning management system called Connected Learning Gateway (CLG) also designed by ITWorx. A March 2014 outcomes assessment survey of 40 schools in Qatar indicated positive results for the ongoing project, sometimes called simply "the LMS." In 2014, functionality was added so that parents could monitor their child's academic progress via the LMS by viewing grades and test scores (SEC 2014). According to a report in the *Qatar Tribune*, "the results were extremely positive showing that 55 percent of the users felt e-learning fully helped them to reach learning content anytime, anywhere, while a further 38 percent said that it helped them to some extent (with a total positive rating of 93 percent)….and further showed that 66 percent agreed that e-learning helped track students' attendance while 50 percent of the students stated that e-learning helped them in completing homework. It also showed that 38 percent stated e-learning definitely increased students' creativity, plus a further 40 percent stated it was only to a certain extent (total positive rating of 78 percent)" (*Qatar Tribune* 2015). All Qatari schools were targeted for connection to the national LMS in the 2014–2015 school year with training courses provided to 600 primary and secondary school teachers. In 2012, the Supreme Education Council was developing e-content for schools in Arabic and English, a digital e-library, and pilot programs to supply all Qatari students with Windows-based devices (Robinson et al. 2015, p. 183; SEC 2012a, b, c). In 2013, the first phase of the "e-bag" project to provide all students with a computer began (SEC 2013).

Thus all independent (government-supported) schools in Qatar are now provided with e-services and training for administrators, teachers, students, and parents through onsite platforms and the gateways (portals) of the Supreme Education Council (SEC). Table 15.2 below describes the services provided by the SEC; however, the extent of usage of these services throughout Qatar is not known. From extensive anecdotal evidence, the author believes that these government e-learning services although available are highly underutilized in K-12 education, primarily due to teacher resistance to new pedagogies or lack of training and the use of LMS more as management rather than teaching tools.

Many private schools in Qatar are fully equipped for e-learning, particularly those with international affiliations; for example, MES Indian School in Doha "provides E-learning for all classes from KG I to XII with projectors, smart boards, Wi-Fi connectivity, computers etc." and was the first Indian school in Doha to launch e-learning (MES 2017). In 2016, Doha College launched a parents' portal with access to student reports, attendance registers, student timetables, awards and achievements, contact information, and all of Doha College's school policies. The American School of Doha has implemented a number of e-learning initiatives at all levels involving iPads, interactive whiteboards, and videos (ACS 2017).

Indicators for both Internet usage and development and ICT in education are collected by the Ministry of Transport and Communications (formerly ictQatar). The National Observatory ICTQatar developed by MTC provides publically accessible statistics on ICT metrics and indicators (https://ictobservatory.gov.qa/). This agency also developed an e-Maturity Diagnostic and Self-Assessment Tool for schools to "evaluate their current e-maturity level, compare themselves to other schools, and develop targeted action plans to update and improve their technology" (ictQatar 2011c). In one of the most comprehensive annual assessments of Qatar's "ICT landscape," ictQatar reported that "by 2011, Qatar had made impressive gains in ICT implementation in education, with the following milestones: 93% of primary and secondary schools in Qatar had broadband Internet access, with 98% of schools with some form of Internet access; 100% of all educators in Qatar and 96% of students could access a PC for personal or educational purposes; and 71% of K-12 teachers had received general ICT training" (ictQatar 2011d, p. 39).

The State of Qatar, Malomatia (a private-public partnership), and ictQatar have additionally launched the Qatar National e-Learning Portal (www.elearning.ictqatar.qa) first announced by the Institute of Administration Development (IAD) and ictQatar in 2007. The portal offers courses in nursing, business, ICT security, and management – some of the courses are accredited by the Association for Operations Management, The Six Sigma program, the National Association of State Boards of Accountancy, and the Board of Registered Nurses. The Portal partnered with PMI-AGC Qatar, an affiliate of the Project Management Institute (PMI), Arabian Gulf

Table 15.2 E-learning services provided to all independent (government, non-private) schools by the Supreme Education Council

Services for principals	***Services for academic vice principal and subject coordinators***
Manage school's website	Interact and communicate on subject and grade webpage
Interact and communicate on subject and grade webpage	Review student portfolio
Track lesson plans published on the subject webpage	Classroom performance tracker "attendance-grades-standards covered"
Classroom performance tracker "attendance-grades-standards covered"	Track lesson plans published on the subject webpage
Student performance tracker	E-mail accessibility
Teacher performance tracker	
Student behavior tracker	Tracking lesson plans published on the subject webpage
Students attendance tracker	Reporting tool
E-mail accessibility	In addition to services provided for teachers at the portal
Services for teachers	***Services for students***
Notifications	Personal portfolio
E-mail accessibility	Tasks
Timetable	Exams
Tasks and exams	Grades
Tracking students	Lesson plans
Content inventory	Calendar
Personal conversations with students and parents	Personal discussions
Discussions with students and department teachers	E-mail
Calendar	Notifications
Lesson planner	School announcements
Author kit	***Tools for parents***
Questions Bank	Reports
Subject discussions	Notifications
Classroom discussions	Attendance record
Meetings	Behavior record
Useful links	School announcements
School announcements	
Classroom corners	
Behavior management	
Attendance	

Source: Supreme Council of Education, E-learning Services, https://www.education.qa/en/about-theprogram/Pages/ElearningServices.aspx.

Chapter, to provide project management online training. Currently only registered organizations in Qatar may log into the portal, but access is planned for all residents of Qatar holding a residence permit (RP) which will essentially provide universal access in the country to a wide range of learning opportunities, most importantly for private lifelong learners and for organizational continuing professional development programs. In addition, the Qatar National Library, a combined brick-and-mortar and digital repository, has started to offer a wide range of electronic book, article, and news databases free of charge to all residents of Qatar which will facilitate electronic self-instruction (MICT 2014c, p. 7).

Cultural Factors in E-Learning in Qatar

Qatar has been and remains a traditionally gender-segregated culture – Qatar University maintains a male and female campus and library, and boys and girls attend same-sex public schools (international schools are mixed, as are the Education City branch campuses). E-learning possesses the potential to “flatten the classroom” and create gender-neutral educational spaces; however, local gender norms often reassert themselves in online chat, such as males dominating discussions and females deferring to male authority (Weber 2014b, p. 254; Weber 2010a, b, pp. 4–6). High-quality Arabic-language e-learning objects are in short supply, and many modules are purchased by GCC and Qatari institutions in English format from established vendors such as Microsoft, especially technical materials for business and vocational training. This creates a barrier to older Qataris past the age of 65 who may not have studied English in school. Some learning objects may not be sensitive to the Islamic cultural sensibilities, i.e., may depict alcohol consumption, forbidden relationships, inappropriate attire, etc. Also, Arabic and Asian societies score high on power differential scales, and “many virtual learning environments employing synchronous chat flatten the classroom and reduce power differentials among students and instructors. This may not be a comfortable transition for students who are not accustomed to learning from their peers” (Weber 2014b, p. 254; Weber 2017, p. 912).

Although social media has been enthusiastically embraced in the last decade in Qatar, anecdotally the author’s medical students have reported shutting down their accounts due to distraction to their medical studies and concerns about privacy and damage to reputation (gossip or revelation of inappropriate behaviors). In the Gulf region, personal ethical behavior is closely tied to family and tribal honor as individual autonomy does not carry the same weight as in Western countries. Dahdal and Kisswani confirmed similar issues at QU’s College of Law in incorporating Twitter and Facebook into instruction: “students were unaware how pervasive their social media presence was and sometimes used the medium in an unprofessional or questionable manner” (2015, p. 302). Security, privacy and trust issues need to be further studied and resolved in social media use in education in Qatar.

The State of Qatar is developing extensive e-content in local and regional cultural heritage to address the small amount of high-quality learning content in Arabic on the Internet. The MICT developed the Media, Culture and Heritage (MCH) National Digitization Plan which "seeks to contribute to the creation of quality digital Arabic content that taps into Qatar's rich Arabic and Islamic heritage and its unique history in the Arab Gulf region" (2014b, p. 6). In association with the British Library, thousands of paper documents, maps, diaries, and drawings from the India Office records related to Qatar and Gulf history have been digitized, annotated, and placed online free of charge at the Qatar Digital Library (https://www.qdl.qa/en).

Research and Specific E-Learning Projects in Qatar

Ahmed, Aljaani, and Yousuf in the Electrical and Computer Engineering Program at Texas A&M University at Qatar in 2016 experimented with the use of e-learning modules in a flipped classroom modality followed by a mediated in-class discussion session with targeted feedback from instructors. The results indicated that the flipped classroom was an effective means of instruction with high student adaptability to this novel mode of instruction (Ahmed et al. 2016). Flipped classrooms incorporating pre-class online instructional videos were also used experimentally in the Library and Information Studies Program at University College London in Qatar, demonstrating how technology is shaping actual classroom practice in Qatar (Johnston and Karafotias 2016). Kakosimos at Texas A&M in Qatar's Department of Chemical Engineering also implemented an adaptive learning system (using Storyline, integrated into the university's eCAMPUS LMS based on Microsoft Blackboard Learn) in a flipped classroom modality that captured student responses before in-class lectures and used responses to modify the course content (2015).

Manochehri et al. carried out a small study of classroom technology adoption and student learning behavior in Qatar and concluded "it seems that previous experience with general ICTs does not impact uptake and utilization of classroom technologies for educational purposes," and the authors speculate that "interest and motivation are more important factors in new technology adoption among students rather than previous experience with technology" (2009, p. 203). Alhazbi in the Department of Computer Science and Engineering, Qatar University, also reported success in adopting a blended e-learning approach to overcome student difficulties with thinking abstractly and developing algorithms to solve specific problems in computer programming (2016; Alhazbi and Ismail 2010). Ali and Samaka in the same department at QU designed an online learning environment for computer science problem-solving called ePBL. Although student feedback on the system was positive, the authors report that "although many attempts achieved attractive results, they either ended up unused or unsupported by the institution," emphasizing the importance of institutional and student buy-in (Ali and Samaka 2013, p. 1209; Ali et al. 2015; Samaka et al. 2016). Samaka and Ally believe that e-learning is critical to MENA and Qatar engineering and computer engineering education since these regions are modernizing rapidly and the need for high-quality engineering graduates is outstripping supply, leading to the hiring of foreign expatriate expertise: "engineering programs have to make use of emerging learning technologies to enhance the learning process to reach students in different locations and to prepare engineers to work in a globalized twenty-first-century economy" (2016, p. 17).

The Foundation Program, Math and Computer Department at Qatar University, which provides college preparation courses for underprepared students matriculating at QU, has experimented with a number of Content Management Systems (CMS) and Learning Management Systems (LMS) including Joomla (https://www.qdl.qa/en) for distributing learning objects and student assessment (Aw et al. 2010) and Blackboard and MML (MyMathLab) for developing critical/analytical skills and problem-solving (Jamil and Chabi 2015). Ayari et al. in this department developed computer-based testing software with the ability to display and print production-quality graphs for rendering complex equations on-screen in high-quality readable formats using only Latex, JavaScript, and Adobe authoring products (2010).

El-Sofany et al. implemented a flexible question bank system for quizzes and exams in Qatari primary, preparatory, and secondary schools (2009). El-Seoud et al. tested a semantic-Web mobile-automated quiz system and found that students trusted the system more than paper-based methods and found the quizzes easier to take electronically (2015, p. 278; see also El-Sofany et al. 2009). Hassan and Fook at QU examined the effect of "e-learning supported by collaborative learning" versus "e-learning not using collaborative learning" using a 2 × 2 quasi-experimental factorial design. Students engaged in collaborative learning achieved significantly higher mean scores on Arabic-language achievement tests (2012, p. 2). This important finding correlates with other educational research and anecdotal evidence suggesting that students in Qatar, due to their Bedouin tribal heritage, are group oriented and cooperate instead of compete in educational settings. Students at Texas A&M Qatar in Samia L. Jones' class created avatars in the Second Life virtual world and engaged in computer science educational activities – in a deeply gender-segregated society, where clothing is a strong marker of social status and citizenship, the results were interesting: given the freedom to choose their own avatar's appearance, students reported more confidence in discussing topics such as mathematics without anxiety and those students "using good-looking avatars tended to display more confidence, friendliness and extroversion" (Jones 2009, p. 63).

The Al Noor Institute for the Blind uses assistive technologies to enable and enhance learning such as Ibsar, Virgo, and Cobra (computer screen reader technology), Pronto and BrailleNote, and computer screen magnifiers and screen readers for mobile devices (Heji and Al-Attiyah 2010). Mada, the center for assistive technology in Qatar, has been providing technology assistance including learning tools to disabled individuals since 2010. A study in 2010 by Mada indicated that awareness of assistive technologies was almost nonexistent among the learning disabled in Qatar and that the "number of available Assistive Technology solutions in Arabic for people with learning disabilities is also low" (Zetterström 2012, p. 240). Saleh, Al Jaam, and El Saddik at QU and the University of Ottawa proposed an Arabic language fully accessible e-learning system for children with moderate intellectual disability (MID) and moderate learning disability (MLD) at the Shafallah Center in Doha (2013).

Silatech, a youth employment initiative founded in Qatar that serves Arab youth internationally, partnered with Microsoft Corporation in 2013 to form the Employability Resources for All Digital Alliance (eRADA) collaboration, to provide e-learning, career counseling, and other digital services to decrease widespread Arab youth unemployment in the MENA region. E-learning as well as ICT accessibility is additionally being provided to migrant workers in Qatar as part of the Ministry of Transport and Communications' Better Connections Program, inaugurated in 2016 with the completion of Internet kiosks at a worker compound. A special Hukoomi portal will provide legal and financial information for workers, and such online training programs as "Virtual ATM" will train laborers in the use of cash machines and how to receive their pay electronically. Withholding pay, underpayment, and accounting fraud have been serious issues in Qatar.

Ghaderi et al. at the University of Dallas and Texas A&M University in Qatar trialed an m-health mobile application-based platform for breast cancer assessment (2015). Al-Khayarin et al. at the Department of Computer Science and Engineering at Qatar University designed and implemented "a novel, streamlined, asynchronous, incrementally allowable, real-time, fully native and most importantly portable m-Learning object and Multimedia-authoring tool" (2014, p. 246). In order to close the gap in Arabic-language e-learning applications, Karkar et al. developed a "mobile-based system that automatically generates illustrations for Arabic stories through text processing, Arabic educational ontology, knowledge and relationship extraction, and illustration generation using online search engines" (2016). The system could be valuable in teaching children knowledge in Arabic using a combined visual/textual narrative approach.

E-Learning in the Workplace, Government, and Continuing Education

E-learning is now becoming commonplace in the workplace for worker training and skills upgrading. Many government services, including access to e-learning modules, are now online through the Hukoomi national portal, and the MTC signed an agreement with Microsoft in 2016 to develop Sadeem, an e-services platform: Qatar plans to have all government services online by 2020. The Hukoomi government e-portal provides a range of government services online for residents, including motor vehicles, social services, and information services. This portal, however, does not yet provide e-learning resources. In 2014, Qatar rose from the rank of 62 in 2010 to 44th in the United Nation's e-governance maturity and readiness survey (U.N. 2014). According to the United Nations, Qatar ranked among the top 10 Asian economies on the Online Service Index of the biannual E-Government Development Index (EGDI) as measured by the UN Department of Economic and Social Affairs (UNDESA). “Qatar ranked third among GCC states scoring 0.67391. On the e-participation index, Qatar ranked third along with Kuwait, among Gulf countries and 55th globally with a score of 0.6441” (UNDESA 2016).

In 2015, employees of the Qatar Islamic Bank (QIB) all took an online risk course and were required to pass a final online test on the course concepts. According to QIB managers, the programs were designed to “train its employees to develop a sound risk-management culture. Qatar Islamic Bank (QIB) has introduced a bank-wide e-learning programme to increase awareness about operational risks” (*Gulf Times* “QIB” 2015a). In 2015, Malomatia invited the International Human Resources Development Corporation (IHRDC) to provide specialized online training in Qatar’s oil and gas sectors and access to IHRDC’s e-learning libraries in addition to Internet-based tools for assessment and competency management. IHRDC is a training and consultancy company for the international petroleum industry.

E-learning, through ictQatar resources, is also provided to Hamad Medical Corporation (Qatar’s public hospital system) employees, and although self-reports by participants indicate that it positively contributes to continuing professional development, “e-learning as an educational tool still remains comparatively low in usage compared to other tools” (Dalhem and Saleh 2014). This is confirmed by the 2015 report that “the vast majority of [government] employees (73%) are not aware of the Qatar National e-Learning Portal, and 62 percent of government organizations do not offer Web-based training” (MICT 2015, p. 10).

In the continuing education programs in QU’s Computer Science Department programs, El-Khouly and El-Seoud found that 84–100% of 135 subjects divided into subgroups used various online tools and found them useful, and students reported “reading material before the lecture helps to build an idea about the lecture topic…. During lecture, the student can concentrate only for understanding rather for writing what the instructor speaks about” (2005, p. 5). In 2015, the Qatar University Continuing Education Office (CEO) signed a memorandum of understanding to investigate the continuing education needs for the country and develop programs at Qatar University to fulfill these needs, since QU is the national public university and thus is the logical institution to address CE needs on a national scale. As part of the MOU agreement, Malomatia “will provide the CEO with e-learning solutions such as products and services, as well as training courses and programmes in various areas related to e-learning solutions” (*Gulf Times* “QU” 2015b).

Qatar University’s College of Pharmacy offers the Doctor of Pharmacy (PharmD) on a part-time basis to working pharmacists who cannot leave their employment by enrolling them in 2–3 years of bridging courses taught in a blended format. Part-time students may access course materials and lectures in off hours since “lecture-capture is in place across all pharmacy courses employing Echo360® media platform (Echo360®, Dulles, VA) to record audio, video, and computer/data camera images. Links to these archived undergraduate recorded lectures are uploaded to the PharmD Blackboard® (course management) website to accompany posted handouts” (Wilbur 2016).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

Regulation of the Internet and telecommunications in Qatar is the responsibility of the Ministry of Transport and Communications (MTC), which reorganized the former ictQatar in 2016 and placed it under its organizational structure. E-learning strategies and initiatives are additionally coordinated with the Supreme Education Council. Qatar is a signatory to the United Nations Convention on the Rights of Persons with Disabilities (2008), and ictQatar instituted e-accessibility policies in 2011 including websites, content, and accessibility technologies in the workplace (ictQatar 2011b). The *Qatar National Development Strategy* and *Qatar General Family Strategy* also encourage the use of ICT and e-learning to improve the lives of the elderly and disabled. The MTC established a public-private partnership (PPP) with Microsoft, Ooredoo, Vodafone Qatar, and Qatar National Bank called Mada (Qatar Assistive Technology Centre) as part of the Inclusion Through Technology Program (Mada 2014). None of the 15 higher education institutes in Qatar offer completely online degrees that are approved by the State of Qatar. No higher education institutes in Qatar offer any degree, certificate, or formalized training program to become an e-learning instructor or instructional designer.

Future Development

The State of Qatar, including both its education and government sectors, has embraced e-learning enthusiastically as judged by recent nationwide platforms and programs and publically accessible portals for electronic services access. Although Qatar has made advancements in networked readiness and other indicators, the serious barrier of "the lack of advanced ICT skills and knowledge among the population," i.e., the transition from simple access to services to advanced usage, will prevent widespread use of e-learning for both education and training (MICT 2014a, p. 6). To address these issues, the Ministry of Transport and Communications has developed four national Digital Society programs: (1) digital inclusion, (2) digital literacy, (3) ICT skills, and (4) digital impact and emerging technologies (Rassed Research Program).

The small size of Qatar and the centralized nature of government services (there are almost no governing bodies at the regional or city level, except for the Central Municipal Council of Doha, where 90% of the population lives) including education and ICT provision provide unparalleled opportunities for national solutions in e-learning and technology education in schools and government. Benefits of centralization include the adoption of nationwide, interoperable platforms that can communicate and share data with one another, as well as leveraging cloud computing with customized solutions – as a large customer, the State of Qatar can negotiate customized contracts with international cloud vendors such as Microsoft Azure, Amazon Web Services, Google for Education, Salesforce, etc. for special provisions. Cloud computing benefits are particularly relevant for Qatar, which is struggling to attract a highly qualified ITC workforce: scalability, availability, and reduction of in-house IT costs can be achieved without importing further technical workers into Qatar (Weber 2012a, 2016). Qatar cloud computing vendor Meeza has been partnering with a variety of institutions in Qatar to provide cloud services to education markets while attempting to resolve the known issues of security and reliability (Weber 2012b).

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Chapter 16
Saudi Arabia

Alan S. Weber

Abstract This chapter surveys the development and current state of e-learning in the Kingdom of Saudi Arabia. The author surveys the general social, economic, historical, and demographic background of Saudi Arabia and provides a review of its educational system. Analysis and statistics on the information and communications technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Saudi Arabia. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Saudi Arabia · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Saudi Arabia (Kingdom of Saudi Arabia – KSA) occupies most of the Arabian Peninsula and is the largest (est. population 28 million in 2016, with 30% immigrants) and most powerful member of the Gulf Cooperation Council (CIA 2017). The United States is the major ally of KSA and its largest trading partner, due to billions of USD in arms sales since the 1950s – 14% of all defense imports internationally are purchased by Saudi (Janes 2015). The modern Saudi state arose in 1932 after Ibn Saud unified the peninsula, creating another Saudi kingdom after the defeat of the House of Saud at Riyadh in 1818 by Egypt's Mohammed Ali, backed by Ottoman forces. The rivalry of the House of Saud and the Sharif of Mecca led to complicated political maneuverings during WWI, in which Ibn Saud rose to power after the failure of Hussein bin Ali's British-backed Pan Arab Revolt against the Ottomans, and Saud's subsequent suppression of his Bedouin allies the Ikhwan. The

Ottomans were permanently expelled from the Gulf in 1918, and the British became the dominant ruling power in the region. Despite the key role that the United States played in developing Saudi Arabia's vast oil resources by forming the Arabian-American Oil Company (now Saudi Aramco) circa 1938–1944, Saudi has remained more independent from British and American cultural and political influence than the other Gulf states, many of whom were part of a nineteenth-century British security network based on the "maritime truces" and later the Political Residency system of the Persian Gulf. KSA is ruled by a direct descendent of Abd al-Aziz ibn Saud in consultation with the Al ash-Sheikh dynasty, descendants of Muhammad ibn Abd al-Wahhab, the founder of the conservative Wahhabist (Salafist) sect of Islam, who form part of the ulema or Islamic religious scholars who exert strong control over education and social and religious affairs. The Quran and Sunnah (traditions of the Prophet Muhammad) are the basis of law, and the Basic Law of 1992 places some restrictions on the monarch and functions as a constitution as well. Sharia law following the Hanbali school is enforced, and legal cases are decided individually by qadis (judges).

Saudi Arabia has been accused by critics of spreading the intolerant Wahhabist strain of Islam – which declares different sects of Islam heretical – by funding mosques, publications, and schools throughout the Muslim world; Saudi was urged to review its educational curricula and textbooks by the US government after the 9/11 attacks since the majority of the attackers were Saudi nationals. Although Saudi Ambassador Turki bin Faisal stated that disparaging references to *kuffar* (non-believers) were purged from educational materials, a 2006 Freedom House report uncovered passages in textbooks urging disassociation from and ostracization of Jews and Christians, despite their special Quranic status as Ahl al-kitab or people of the book (Freedom House 2006). Salafist views dominate cultural and religious life, and strict public morality is enforced by the Mutawwi'un or religious police. The country is the birthplace of Islam where the Prophet Muhammad first received the revelation of the divine Quran from the angel Jibreel, and KSA contains the two holy cities of Medina and Mecca and the Ka'aba, the destination for the annual Hajj pilgrimage required of all Muslims. Women face legal and cultural restrictions and limited opportunities in government, and control by their male guardian, the *wali*.

Oil production and export dominates the economy since Saudi possesses the world's second largest proven oil reserves. Saudi is also the world's largest oil exporter at 10.4 million barrels per day and is also one of the most influential OPEC members (EIA 2017). Like other hydrocarbon-rich GCC nations, Saudi nationals enjoy many state benefits including education and high-paying government jobs, although the large population, in contrast to the similar oil-based economies of Kuwait, Qatar, and UAE, dilutes the extent of benefits and billions of dollars of state oil revenue funds (exposed by secret US cables on Wikileaks in 2011) provide direct stipends for thousands of royal princes and princesses of the House of Saud. Like most of the GCC nations, Saudi supports a national priority hiring program called Saudization, to replace foreign expatriate workers (who make up about 80% of the private workforce) with Saudi nationals. The low-productivity public sector and entitlement culture similar to the other oil-rich Gulf nations is a constant economic problem, contributing to high youth un- and underemployment.

Most of the country's interior consists of arid and hyperarid sand and rock desert with summer temperatures reaching 45–52 °C Celsius. Much of the Arabian Desert is uninhabitable due to lack of water and infrastructure, particularly the southern Rub' al Khali Desert, known as the Empty Quarter. The country contains large underground water reserves which have been seriously depleted by widespread irrigated grain and livestock production beginning in the 1980s – the country now employs seawater desalination plants to meet domestic water demands (Elhadj 2004).

Most Saudis are Sunni Muslims speaking the Najdi, Hejazi, or Khaliji Arabic dialects. Between 10% and 25% of the population are Shiite, concentrated in the Eastern Province of KSA – the site of the world's largest oil field, the Ghawar Field. Saudi Shias claim they are persecuted in their country and the execution of Saudi Shia cleric Nimr al-Nimr in 2016 caused international concern. Islam is the official state religion and the only one that can be publically practiced – proselytizing for other religions is punished harshly as is theft and sorcery.

Education System in Saudi Arabia

The Saudi government spent 5.14% of GDP and 19.26% of total government revenues on education in 2008 (UNESCO 2017). However, serious challenges in education which impact the economy as well as the wider society are the lack of STEM graduates and the misalignment of education and the labor markets. The Technical and Vocational Training Corporation (TVTC) (formerly the General Organization for Technical Education and Vocational Training or GOTEVOT) was formed in 1980 to establish and govern technical colleges, technical colleges for girls, secondary industrial institutes, and technical education programs in Saudi. TVTC implemented online training courses in 2014, and by 2015, there were 47,711 technical students enrolled in 1191 virtual courses (Tago 2015). Thus e-learning has been proven successful and economically viable for technical training of national students.

Before unification of the Saudi peninsula in 1932 and the discovery of oil by the predecessor of Aramco in 1938, education consisted of the traditional kuttab or maktab attached to mosques for basic education, with a few advanced madrasahs, as a substantial percentage of the population were nomadic Bedouins or oasis dwellers without a pressing need for education. Now education is available free of charge to all citizens and includes overseas government-supported scholarships. In 2004, the first 6 years of compulsory education was enforced on citizens to encourage school attendance (Alfar 2013, p. 670). The Ministry of Education (MOE) administers male education, and the Presidency General for Girls' Education oversees female education. The Ministry of Higher Education administers higher education institutes in KSA, except for KAUST.

Primary (elementary) school education lasts from age 6–12 years and is compulsory and then intermediate education (not required) from 12–15 years after completing the general elementary education certificate, and finally secondary education extends from ages 15–18. At the secondary level, students may choose the general education track or specialized tracks in business, technology, agriculture, health sciences, etc. Holders of the General Secondary Education Certificate (GSEC) or a specialized Diploma may proceed to a higher education institute. Elementary school teachers are licensed after a 2-year program of junior college following their GSEC, and at the intermediate and secondary levels, instructors may teach with a B.Ed degree or a specialized bachelor's degree plus 1 year of additional teacher training. A separate Philippine school system exists in Saudi due the large number of foreign workers from that country, and many international schools are licensed as well in which some of the MOE's rules are relaxed.

Religious conservatives protested when the first girls' private schools opened in Jeddah in the 1950s, arguing that education beyond basic religious training was inappropriate and unnecessary for girls, but in 1960 the General Presidency for Girls' Education was established to develop state-supported schools for females. Ironically, female enrollment at Saudi universities is now much higher than males, a trend seen in other Gulf nations as males opt for high-paying jobs in the military or government immediately upon graduation from high school. Princess Nourah Bint Abdulrahman University (PNU) was opened in 1970 solely for women and is one of the world's largest female-only universities. In the last two decades, Saudi has experienced rapid growth in all-female higher education programs. As in other Gulf nations, educational disparity and consequent perceived incompatibility between spouses are cited as a cause of recently rising divorce rates.

Religious curricula are integral to the Saudi system as compulsory subjects and 25% of students were enrolled in religious institutions in the 1990s (Prokop 2003, p. 78). The Basic Law of 1992 states "education will aim at instilling the Islamic faith in the younger generation, providing its members with knowledge and skills and preparing them to become useful members in the building of their society, members who love their homeland and are proud of its history" (ICLP 2010). At the elementary level, in addition to standard topics such as basic sciences and math, civics, art, and physical education, the curricula emphasize moral education and ethics centered on the Quran, ahadith (sayings of the Prophet), Arabic culture, and Islamic theology. At the intermediate level, more advanced Quranic topics such as intonation (*tajwid*) and interpretation (*tafsir*) and sharia law and advanced Arabic language studies are included; English is also introduced as well along with history and geography. In 2017, the MOE agreed to gradually introduce sports and physical education into girls' schools, but women participating in sports in Saudi Arabia is controversial, with some conservatives arguing that it interferes with femininity and religiously sanctioned fixed gender roles.

The King Abdullah bin Abdulaziz Project for Public Education Development or the Tatweer ("Development") Project was inaugurated in 2007 in part to create more autonomous and technology-based pilot schools (Tatweer 2017). In addition, after the 9/11 attacks on the United States, educators and government leaders both within

KSA and internationally called on King Abdullah to coordinate efforts to reduce extremist views within the educational system. One of the goals of the project was to harness ICT to help students learn and develop a national identity and forge community social relations and transition the educational environment from traditional memorization-based instruction to an atmosphere of inquiry and discovery. For example, Internet-based courses could foster collaborative online learning, flipped classrooms, autonomous and lifelong learning, etc., and contribute to greater general digital literacy. However, Phase I of the program which supplied hardware and other e-learning resources including training to pilot schools was found to be too costly for nationwide adoption; thus ambitious plans for nationwide technology adoption in the classroom were abandoned: according to Alyami, "programme one was extremely costly; accordingly, programme two was established as an amendment of programme one. In the programme two, schools were not supplied with advanced technology as in programme one. Officials realized that applying ideal technology at schools would cost a huge amount of money, which was one target of programme one. Therefore, Tatweer Project modified programme two to be more pragmatic. Namely, programme two has focus on internal capacity where schools will be able to manage itself" (Alyami 2014, p. 1520).

The first university in Saudi, and the first among the Gulf nations, was Riyadh University (now King Saud University) founded in 1957; there are 26 state universities in Saudi, many established since 2000, and a marked proliferation of private and for-profit institutions has occurred in the past two decades (MOE 2017b). Schools are segregated by gender at all levels in the country including universities, except for KAUST, which was a revolutionary departure from customary practice. The King Abdullah University of Science and Technology (KAUST) was built in 2009 at Thuwal on the Red Sea and was the first coeducational government school in Saudi and is supported by a 20 billion USD endowment (*waqf*). The university was designed as a top tier graduate research institution of science and technology, specializing in materials science, engineering, environmental technologies, modeling, and supercomputing – KAUST runs the Shaheen II, a Cray XC40 supercomputer, the fastest in the Middle East (KAUST 2017). Numerous opportunities for nonformal and informal learning are available from a wide range of institutions in Saudi, ranging from clubs, associations, and private charitable institutions.

E-Learning in Saudi Arabia

Saudi Arabia was a late adopter of the Internet due to lack of infrastructure as well as religious, political, and cultural concerns about content, which also arose in the 1950s and 60s with the introduction of cinema and television. Public access to the Internet was allowed by the government in 1997 after research and medical institutions were first connected. However, infrastructural issues do not completely explain the slow adoption of e-learning and technology in the classroom in KSA. According to Xanthidis and Nikolaidis, "in Saudi Arabia for example there are no visible reasons for the slow progress of eLearning performance. No serious weaknesses in established procedures or facilities have been detected. Also, no financial shortcomings seem to be the problem. Saudis believe that problems exist mostly in the relatively slow improvement of local telecommunications and other infrastructure operations" (2014, p. 2). By 2008, however, an estimated 125 million USD was invested in the Saudi e-learning industry (MENAFN 2008).

Al-Asmari and Khan provide a brief summary of the origins of e-learning in Saudi: "the use of computers in teaching and learning in schools in KSA began in the 1990s. In 1996, the Ministry of Higher Education (MOHE) established the Computer and Information Centre (CIC) that provides a range of ICT services to schools and educational centres. In order to design new curricula and develop the capabilities of both teachers and students, MOHE launched an ambitious computer project in 2000 that aimed to cover all schools in KSA. It was followed by the WATANI Schools' Net project that was launched in 2001, to connect schools and educational directorates by means of a wide area network (WAN) covering the entire country. Semanoor, a local software company specializing in education, in collaboration with Intel, produced an electronic version of curricula of all official government K-12 public and private schools" (2014, p. 2). Semanoor also developed interactive online tools and platforms to facilitate the building of e-learning courses for teachers who were not specially trained in electronic pedagogy.

The Saudi Arabia government Ministry of Communications and Information Technology initiated the Home Computer Initiative (SaCHI) or "Tawasul" project (http: www.tawasul.com.sa) in 2005 with the goal of providing a high-quality PC to 1 million Saudi citizens and services to access the Internet in order to create an information society. However, according to Dr. Al Turki, the project closed 1 year later, with none of its goals completed and no government official has been able to explain the circumstances of the program's closure (Al Turki 2017). Thus in general, the development of e-learning in Saudi has been uneven, with some schools struggling to provide basic ICT infrastructure, while other universities are beginning to experiment with advanced m-learning technologies and virtual reality learning environments, such as Second Life (Alenezi and Shahi 2015).

To facilitate e-learning, the KAU Deanship of Distance Learning was established in 2007: "establishment of the Deanship and Faculty of Distance Learning at King AbdulAziz University in Jeddah (http://elearning.kau.edu.sa/), [was] designed to provide distance learning in the western region of the country. Its first academic year of operation was 2007–2008 and its programs are offered by the Faculty of Arts and Humanities and Faculty of Economics and Administration. These programs involve blended learning, the Virtual Class Room System (CENTRA)" (Al-Khalifa 2010c, p. 751).

The Strategic Plan for E-learning Project began in 2009 at Al-Imam Muhammad ibn Saud Islamic University (IMAMU), and according to the development plan "in light of the inputs of the first phase, the Executive Strategic Plan of the e-learning will be built within 5 Georgian [calendar] Years besides a comprehensive learning model to explain how learning and education in e-learning at the university might be; in addition to its psychological and educational basics and moreover the regulations and structure charts that organizes E-learning at the university, (Second Phase). In the third phase the Request bid documentation will be formulated and announced in a general bid of invitation of e-learning project for the companies in the coming years, which will be divided into two stages the first one lasting Three years, and then the other stage would be Two years" (IMSIU 2017). E-learning and electronic media are particularly important to this institution (which offers degrees in media studies, computer science, information science, and translation) since the university translates and publishes Arabic language materials in its goal to disseminate Islamic knowledge. The university houses its own publishing press and is affiliated with the UNESCO/US Library of Congress' World Digital Library.

The virtual institution Arab Open University (AOU), a branch of the UK Open University, is a project of Saudi Prince Talal bin Abdulaziz Al Saud – he is the twentieth son of the founder of the modern Saudi state and serves as AOU's Chairman of the Board. The UK's Open University started as a traditional distance education institution and has evolved along with technology in education, originally employing techniques such as television broadcasts, radio, recorded lectures on CD-ROM and DVD, snail mail correspondence, and telephone tutoring. Now the institution additionally employs online resources with a mixture of blended (physical residency required for some programs or face-face meetings by videoconferencing) and purely online courses. Both OU and AOU endorse the same goals that generally underlie e-learning pedagogical philosophies – for example, providing greater educational access to a wider range of learners for lower cost not only to promote national economic goals (more highly skilled workforces) but also for personal satisfaction and well-being. In addition, the AOU and OU promote the lifelong learning paradigm, which many professional organizations, specifically medicine, are embracing throughout the Gulf region. Saudi has a large continuing medical education industry which employs e-learning and e-training for medical and health professional licensure.

AOU opened in 2002, with its headquarters in Kuwait instead of Saudi Arabia, partly to emphasize its intended role as a pan-Arab institution. The KSA branch of AOU reports 15,455 current students, and 14,590 graduate students, studying in 130 courses in 2017 (AOU). The AOU Saudi branch offers courses in Business Studies, Computer Studies, Language Studies, and Education Studies. The AOU has established branches in Saudi Arabia, Jordan, Kuwait, Egypt, Oman, Bahrain, Lebanon, and Sudan.

The King Abdulaziz City for Science and Technology (http://www.kacst.edu.sa), a science and technology consortia established in 1977, provides information technology research essential to e-learning, such as the Center of Excellence for Wireless Applications (CEWA) and Center of Excellence for Software Development, as well as the Information Technology Program. KACST reports directly to the prime minister of KSA and "operates the internet backbone in Saudi Arabia as well as the local registry address space, and through its BADIR-ICT project, provides a national ICT technology incubator" (Al-Khalifa 2010c, 758–59). The King Abdullah Initiative for Arabic Content originated at KACST and was designed to produce Arabic language publically-available online educational resources. The lack of high-quality

Arabic language learning objects, particularly in advanced subjects, has been frequently noted in MENA e-learning research and government reports. The initiative successfully launched an online Arabic version of the widely read science journal *Nature* (http://www.kacst.edu.sa), with a free online version and a paid paper version. KACST also coordinated the Arabic language instance of Wikipedia, also freely available online, by sponsoring and encouraging the translation of important Wikipedia articles originally written in other languages (http://www.kacst.edu.sa).

The gender-segregated nature of Saudi education at all levels underscores the need for further development of distance education, virtual education, and e-learning. A shortage of qualified female faculty means that some women will need to be taught by male professors for the foreseeable future, but new technologies can maintain the desired gender separation while still allowing equitable access to content and instruction (Mirza 2008). According to Al-Khalifa, "distance education is primarily applied where gender segregation is required in the various levels of public and higher education. Male instructors are only authorized to teach female students through distance learning technologies such as closed-circuit television, one-way video and two-way audio and broadcast" (2010c, p. 751). Female instructors, however, seem to favor online pedagogies and technologies more than male faculty. A study by Al Ghamdi and Samarji reported that "female faculty members perceived less e-learning barriers than their male counterparts" (p. 27) and also identified lack of resources as a significant barrier to e-learning adoption in general. Alodail at the Albaha University confirmed these results with a survey of 45 instructors, indicating that females had more positive attitudes to e-learning than males (2016, p. 126).

The National Center for e-Learning and Distance Learning (NCeDL, also called NCeL) accessible at http://www.elc.edu.sa/ was established by the late King Abdullah. According to the Ministry of Education, "establishment [of the NCeL] also came due to overpopulation, lack of quantity and quality faculty, and to reduce wastage of funding (in the areas of accredited programs coordination, training methods, and production of educational aids etc.) and to satisfy the need to enhance the progress of education and learning, and to move these from outdated/traditional styles that fits in with some learners but not for others into a multitude of delivery options and aid resources facilitating learner comprehension whereas the learner is to choose his or her suitable learning style and immerse in it" (MOE 2017a). The goals of NCeL are listed as:

1. The promotion of e-learning and distance education applications in compliance with quality standards
2. Raising awareness of proper e-learning culture and understanding
3. Quality assurance of projects and programs for e-learning and distance education
4. Support for research in the fields of e-learning and distance education
5. The creation of national quality standards for the design, production, and publication of e-learning practices
6. The provision of consultancies to other partners relevant to NCeL's areas of specialization

7. The launch of national e-learning initiatives
8. Encouragement and coordination of distinguished projects in e-learning and distance education
9. The organization of meetings, conferences, and workshops that contribute to the development of e-learning and distance education
10. International cooperation with similar global organizations and bodies (2017).

NCeL supports its own LMS called *Jusur*. Although new e-learning initiatives and research have now largely shifted to universities and individual schools themselves, NCeL can serve as a clearinghouse and information resource for digital content, technical content, training services, and advisory services. Jusur has also been adopted as the LMS at some Saudi schools and universities instead of options such as Moodle and Blackboard. Several studies on this LMS have been carried out, with Al-Khalifa (2010b) reporting high student satisfaction with ease of use, access, and user-friendliness. Al-Salum (2009) reported on language deficiencies (only Arabic and English support), and a study by Al-Judi (2011) found that faculty were not using it to design interactive online courses. Asiri et al. found that Jusur was technologically viable and had experienced moderate usage rates in Saudi universities by 2011 and that the use of Jusur was strongly correlated with acceptance of new technology by faculty members (2011, p. 532). Albarrak et al. rated Jusur high in localization features, but Moodle and Sakai ranked higher in content creation and other features; the authors recommended the use of open source LMSs for Saudi education (2010, p. 672).

The Saudi Electronic University was established in 2011 in collaboration with one of the earliest virtual universities in the United States, the University of Phoenix, along with universities in Minnesota and Ohio. SEU, operating on a blended model, offers bachelor's degrees (and one MBA) in Computing and Informatics, Administrative and Financial Sciences, Health Sciences, and Science and theoretical studies. According to its website, "the SEU is the only specialized university in distance education in the Kingdom of Saudi Arabia that offers both graduate and undergraduate degree programs along with life-long education [with an] environment based on information and communications technology, e-learning, and distance education. It will award academic degrees in programs and specializations compatible with the needs of the labor market and the requirements of development and lifelong learning, and will participate in building a knowledge-based economy in the Kingdom of Saudi Arabia and assist in conveying the Kingdom's cultural message worldwide" (SEU 2017).

Another entirely electronic university, Knowledge International University, was founded in 2007 by Sheikh Dr. Saad bin Nasr Ash-Shethry (former member of the Council of Senior Scholars, KSA). With programs in English and Arabic, the university offers a 4-year bachelor's degree in Islamic Studies (English) and bachelor's degrees in Sharee'ah and Quranic Studies (Arabic) (KIU 2017). The university does not accept students residing in KSA since it is not accredited by the Saudi Ministry of Education and students may take up to 12 years to complete the degree through part-time study. The course of study involves watching online videos, completing reading material, and then passing online multiple-choice tests. No information on enrollment figures or number of graduates could be found on the Internet. Although a nonprofit university, KIU charges 975 USD per semester. Both religious scholars and researchers have demonstrated considerable interest in using e-learning for spreading knowledge of the Quran and Islam in the form of international electronic proselytizing and as an effective means to train students in religious studies (Elhadj 2010; AlZoubi 2013; Basuhail 2013; Nada et al. 2013).

Geographic disparities between modern urbanized cities such as Riyadh and Jeddah and rural desert areas, some of which are still close to the original Bedouin lifestyles, create opportunities for e-learning to provide equity in educational resources, as long as the government is willing to support broadband or mobile Internet access to remote areas, subsidize telecommunications charges, and help school students buy the necessary hardware such as basic tablets or laptops. The Kingdom of Saudi Arabia occupies most of the Arabian Peninsula, and it ranks as the second largest country in the Arab world after Algeria. The large geographical area of KSA and large population, therefore, make national e-learning provision and support an extremely expensive proposition.

E-Learning in Primary and Secondary Education

Educational websites for prekindergarten children (edutainment) are available worldwide, but "Arabic websites designed and aimed to educate and entertain [Arab] children are still in their infancy" (Alhussayen et al. 2015, p. 2319). Thus development in this area could be promising, a growth area for the ICT sector in KSA, and provide employment for youth programmers. According to Alabdulkareem, social media use among middle school students in KSA is high, with WhatsApp widely used; however, "there are agreements that the use of social media is for socialisation only. The infrastructure is available, but the comprehensive educational view is absent; the researcher suggests that there is a need for training to evaluate [students'] own use of social media, and to enhance the abilities to use available properties" (2014, p. 213).

The early development of e-learning at Al-Bayan Girls' School (http://www.albayan.edu.sa/), in Jeddah, illustrates some of the challenges, specifically gender and ethics based, in e-learning adoption. This school was chosen by the government as a model school for introducing technology into middle and high schools in KSA. The first step in the project to introduce educational technology was the digitization of the curricula. According to Mohamed et al., "because education in KSA is gender-segregated, the e-learning solution adopted by Al-Bayan prevents students from accessing the Internet. This restriction is made because of the fear that students would be able to communicate with the opposite gender. The same restriction is also meant to prevent students from accessing sites which are deemed by the authorities as immoral and incompatible with its cultural values. Though these cultural precautions represent a great challenge, even restricted versions of e-learning settings are expected to provide greater learning opportunities for the citizens in developing countries. This includes providing education to socially and culturally excluded communities" (2008, p. 6).

Interest in MOOCs at all levels of education, including higher education, high school, and informal learning, is growing not only in Saudi Arabia but also across the Arab-speaking world. However, MOOCs rely heavily on learner self-motivation and autonomous learning, and much of the pedagogy in KSA has traditionally been oriented toward teacher-centered learning, and concerns obviously arise about students who may not be able to learn independently of a teacher or mentor or who are not able to accept peer critique, which is a common feature of MOOCs. Thus with respect to MOOCs, "one of the biggest concerns of [the] education community is the limited interaction between teachers and students" (Brahmi and Sarirete 2015, p. 608).

E-Learning in Higher Education in Saudi Arabia

A growing number of universities in KSA are establishing dedicated e-learning administrative units and programs. For example, "the E- learning Centre in the Deanship of Academic Development at King Fahad University of Petroleum and Minerals … was established in 2003, (http://www.kfupm.edu.sa/dad/elearn/about/elearn.home.htm)" (Al-Asmari and Rabb Khan 2014). Additionally, according to Al-Asmari and Rabb Khan (2014), "the Deanship of Distance Learning, which was established at KAU in 2005, has embarked on online course delivery on print/correspondence-basis. KAU uses language management system (LMS) and virtual classrooms to provide extra learning support for students enrolled in the first and second year of the basic science courses. It also contains a digital library of 16,000 e-books. KKU [King Khalid University] at Abha established its Deanship for e-Learning and Distance Learning in 2006, which focuses on facilitating all courses online by 2012". Other e-learning centers and administrative units include the Deanship for e-Learning and Distance Learning, founded at KSU in 2007, and the e-Learning Unit at King Faisal University inaugurated in 2008. E-learning centers can also be found at Effat University (Jeddah) and Prince Mohammad bin Fahd University (Dammam).

Early experiments with online learning in higher education, such as those carried out by Dr. Al-Jarf circa 2005, revealed serious concerns obviously related to students' complete unfamiliarity with online modes of learning. In an online EFL instruction course involving collaboration between King Saud University (KSU) in Riyadh and Umm Al-Qura University (UQU) in Makkah, Al-Jarf reported "the interaction between the two groups was lacking. The students reported that they were inhibited and unfamiliar with online instruction. They had negative attitudes towards online instruction and collaboration with students from another university" (2005, p. 8). The evolution of e-learning capacity and use as well as student and instructor acceptance of this form of learning has been considerable in the past decade in KSA, although the situations and negative attitudes reported in the early e-learning scholarship still surface in recent research studies. Several universities have joined the OpenCourseWare Consortium, and universities such as Al Faisal University and King Fahd University of Petroleum and Minerals share their courses online. King Abdulaziz University (KAU) (http://elearning.kau.edu.sa) has additionally developed online courses for students.

In medical education, specifically at King Saud University, College of Medicine, a survey by Al-Drees et al. of 341 medical students revealed poor utilization of features in the Blackboard LMS used at the school, and students faced difficulties in its use, prompting the authors to recommend mandatory training sessions (2015, p. 17). Additional concerns arose in a 2010 qualitative study of blended e-learning in Saudi universities by Alebaikan and Troudi, specifically the lack of teacher training in e-pedagogies and e-plagiarism (2010). Plagiarism was visible in student online discussions in the form of "cut and paste" from the Internet. Fachartz et al. in a randomized controlled trial found that a blended-learning clinical course in family medicine at Taibah University medical school was more effective than the traditional course (2013, p. 12).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

The Saudi MOHE does not accredit international e-learning higher education degrees in KSA, and students cannot use these degrees for employment or application to graduate programs in KSA. However, online degrees from three Saudi universities – King Faisal University in Al-Ahsa, King Abdulaziz University in Jeddah, and King Saud University in Riyadh – are approved as legitimate degrees for all legal and employment purposes. As a conservative and traditional country in which all forms of change are a slow and deliberate process, KSA will undoubtedly fully adopt e-learning as a international education best practice, but regulatory frameworks, educational administration, and teacher training programs will need to be further developed. A Saudi Distance Learning Society (http://ssdl.kau.edu.sa) is headquartered at King Abdulaziz University in Jeddah, Saudi Arabia, but the society does not appear to have been active recently.

Future Development

Since many Saudis are sensitive about non-Muslim foreign nationals on their soil, e-learning potentially could upgrade their education systems to the standards of more developed nations while precluding the necessity of hiring highly trained foreign teachers from abroad; however, e-learning is not a panacea for this issue, which additionally involves national development issues, negative attitudinal barriers to the teaching profession in Saudi, and the lower status of non-Quranic (secular) knowledge among the general population (Weber 2010, p. 19). Online degrees are not readily accepted by students and employers in KSA as they are most often not officially accredited; thus questions about their quality and value naturally arise. The autonomous learning paradigm required for self-motivation and success in purely online environments, especially MOOCs, was not a common educational philosophy in the pre-oil era in KSA as there were few books or libraries except for the Quran, and most Saudis were illiterate. With the advent of the oil era, however, the lack of technical skills among Saudis was apparent, and the government of KSA responded by building a public education system from the ground up and a technical training regime including specialized scientific universities, culminating in the world-class research institution KAUST.

Al-Asmari and Rabb Khan in their comprehensive overview of e-learning in KSA (2014) identified the following primary challenges to future development of e-learning in KSA:

- Lack of a unified national e-learning strategy for the deployment of e-learning at schools, colleges, and vocational training centers
- Lack of e-learning value and benefits of new technologies in the minds of the older generation
- Lack of high-speed broadband access for Saudi learners makes e-learning an irritating learning experience
- Unfair disadvantage to the students living in remote areas compared to those living in cities
- Lack of sufficient e-learning resources to meet the diverse needs of the students and access to materials developed overseas
- Need to find a balance between quantity and quality of e-learning resources to be distributed to e-learners in all regions (p. 9).

The large body of research literature on e-learning in KSA provided below indicates increasing interest in integrating electronic pedagogies into the KSA. M-learning and the potential for cloud-based services to solve some of the recurrent problems of Saudi education (such as geographical remoteness, maintaining gender norms, student motivation, and high costs of equipping all schools with hardware and broadband connections) are receiving attention among educational researchers (Alshwaier et al. 2012; Weber 2012). For example, low-cost dumb clients, such as inexpensive terminals and tablets, could link to cloud-based educational resources and server-side processing provided by centralized government server farms.

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Chapter 17
Syria

Hala Dalbani

Abstract This chapter surveys the development and current state of e-learning in the Syrian Arab Republic. The author surveys the general social, economic, historical, and demographic background of Syria and provides a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Syria. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Syria • E-learning • Web-based learning • ICT • Internet • Education • Distance learning

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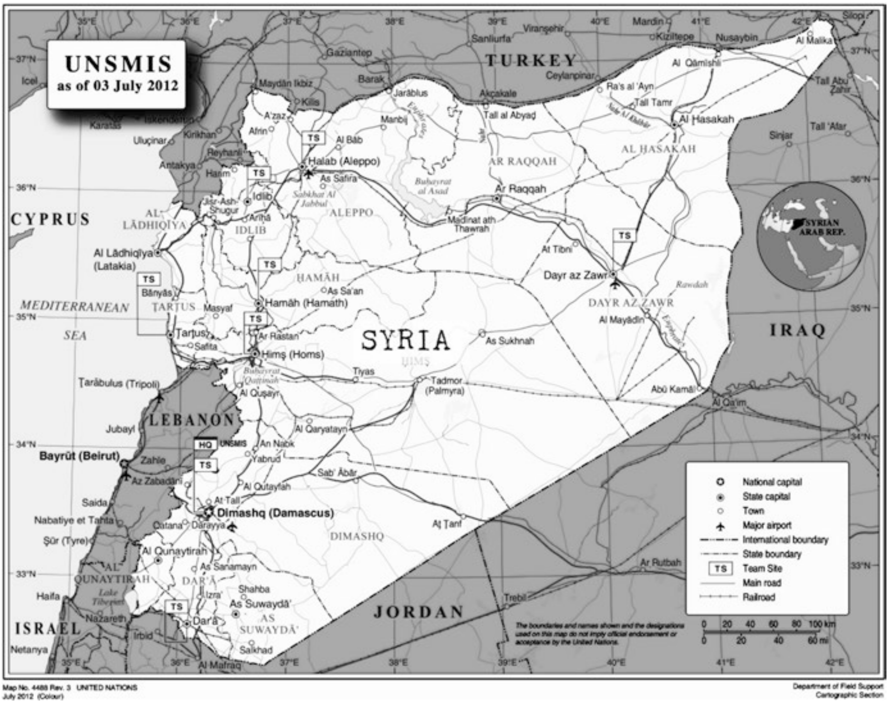

Source: United Nations (Map No.4488, Rev 3. 2017)

Country Profile

According to the population clock of the Syrian Central Bureau for Statistics (CBSS), the population of Syria on November 26, 2016, was 23,497,401 (CBSS 2016). However, since the beginning of the Syrian crises in March 2011, many Syrians have left as refugees, migrants, or visitors to other countries like Turkey, Lebanon, Jordan, Kingdom of Saudi Arabia, Iraq, and Egypt. UNICEF estimates that the number of refugees in the subregion countries will reach 4.69 million by the end of 2016 (Syrian Refugees 2016; World Population Prospects 2016). Syria (see map above) is situated in Southwest Asia in the Middle East at the eastern end of the Mediterranean Sea north of the Arabian Peninsula, with a total area of 185,180 sq. km (The World Fact book 2016).

The Syrian economy is officially based on the socialist ideology that was defined back in 1958; nonetheless some economic activities in certain areas allow for private businesses (Kjeilen 2016). The GDP stood at US$ 60.2 billion in 2010. The cumulative losses between 2011 and 2015 were estimated at US$ 259.6 billion: US$

169.7 billion in GDP and US$ 89.9 billion in capital stock. Between March 2011 and the end of 2015, the official nominal exchange rate weakened (increased) by 647% and the unofficial rate by 714% (Abu-Ismail et al. 2016). According to the CBSS, at the end of 2015 the inflation rate in consumer prices stood at 448.8% (using 2010 as the base year). In March 2015, the Syrian Center for Policy Research reported that nearly 3 million Syrians have lost their jobs causing the loss of the primary source of income of more than 12 million people. The unemployment rate "surged" from 14.9% in 2011 to 57.7% at the end of 2014. As a result, four out of five Syrians at that point were living in poverty, with 30% of the population living in abject poverty and frequently unable to meet basic household food needs (Economy of Syria 2016). The social, political, and economic developments that took place before the crises precipitated profound changes and realignments in the social structure (Syria 2016) leading after the onset of the crises to much deeper class divisions (Mackinnon 2015).

Arabic is the official language of Syria. Other spoken languages include Kurdish, Armenian, Aramaic, Circassian, French, English, and Turkman (The World Fact book 2016; Kjeilen 2016). The main religious groups in Syria include Sunnis, Alawites, Christians, Druzes, Ismailis, and Shi'as (Kjeilen 2016).

Education in Syria

According to the Syrian constitution (Constitution 2012), education at all levels is free and is a right guaranteed by the state. The law also regulates the cases where higher education (HE) may not be free.

General education is divided into three stages:

1. Basic education: it is compulsory and is divided into two cycles:
   - Basic education - Cycle 1 (K1–K4 elementary)
   - Basic education - Cycle 2 (K5–K9 intermediate).
2. Secondary education: students are admitted into one of the following tracks depending on the grades they attain in their Basic Education Official Exam:
   - General secondary education (scientific or literary track)
   - Vocational secondary education (industrial, agricultural, veterinary, commercial, informatics, and feminine arts) (Ministry Structure 2016).
3. University education (University Regulation Law 2006): students are admitted into one of the following institutions depending on the grades they attain in their Secondary Education Official Exam (Baccalaureate Exam):
   - Universities (public/private)
   - Institutes affiliated to governmental ministries.

To shed light on the size of the Syrian educational system, statistics available in 2010 for pre-university education and between 2010 and 2015 for university education are shown below:

Pre-university education (Education Statistics 2010):

- Basic education: the total number of pupils in (K1–K9) stood at 4,661,872. The pupils who were successful in the Basic Education Official Exam were 255,346.
- Secondary education: the total number of students in (K10–K12) stood at 392,960. The students who succeeded in their Secondary Education Official Exam (Baccalaureate Exam) were 176,666.

University education: Two sets of data are available, one taken in 2010 and another in 2015.

1. 2010 Higher Education Data (Education Statistics 2010):

    - Public universities: students are admitted to different programs depending on the grades attained in their Secondary Education Official Exam. The Ministry of Higher Education (MOHE) announces every year the marks required to enter each program. Students whose grades do not entitle them to go for the major of their choice can opt for another scheme called "Parallel Education," whereby the grade entry requirements are slightly lower but they have to pay tuition fees. When compared with the fees paid at private universities, students enrolled under this scheme pay similar tuition fees. In 2010, the number of students enrolled under this scheme stood at 50,320. The total number of students enrolled in public universities was 338,667, out of which 71,717 were new enrollees. The number of students who graduated with a first degree (bachelor) was 38,555. The number of students who received HE degrees was 3776 (diploma (1380), masters (2084), PhD (312)). The number of academic staff was 10,202.
    - The open learning center (state owned): the total number of students enrolled in this mode of distance education was 147,575. The number of graduates stood at 8950.
    - The Syrian Virtual University (SVU): the total number of students enrolled in virtual learning in 2010 was 8103. The total number of graduates (diploma, bachelor's, and master's degree) was 1580, and the number of academic staff was 420.
    - Private universities: the total number of students enrolled in private universities was 24,573 out of which 6180 were fresh enrollees. The number of graduates with a bachelor's degree was 2025.
    - Higher institutes: The total number of higher institutes was 17 with a total number of 3019 students and 607 graduates (diploma, bachelor's, and master's degree).

Table 17.1 Higher education students (2014–2015)

Description		Student		
		Male	Female	Total
Undergraduate students	Public universities	207,166	255,772	462,938
	Nursing school	–	868	868
	SVU	1055	597	1652
	Higher institutes	574	199	773
	Sum of undergraduate students	208,795	257,436	466,231
Postgraduate students	Public universities	13,107	10,175	23,282
	SVU	965	54	1019
	Higher institutes	331	192	34,824
Open learning students		122,491	98,424	220,915
Private university students		20,719		20,719
Technical intermediate institutes of MHE		17,345	11,912	29,257
Sum of higher education students		338,758	378,193	761,946

- Intermediate institutes: They are two kinds. The first is affiliated to the MOHE (53 institutes) with a total number of 36,636 students and 9708 graduates. The second is affiliated to other ministries (130 institutes) with a total number of 89,024 students and 22,167 graduates.

2. 2015 Higher Education Data: the latest statistics issued by the MOHE (Statistics 2014–2015, 2015) is summarized in Table 17.1 below.

   In view of the above data, four important observations can be made:

- The spread of the e-learning culture is very slow. After 13 years of its initiation, the number of SVU students represented only 1.3/1000 of HE students.
- Over 1/3 of students are paying for their university education, and the trend is rising.
- Private education is declining.
- The number of graduates in relation to the total number of students suggests that the graduation rates (Fast Facts 2016) in all universities and institutes in Syria are generally low especially in open/distance learning.

According to Abu-Ismail et al. (2016) and after 5 years of conflict, the portion of the population with access to education fell from 95% to less than 75% in 2015. This was mainly the result of the loss of the infrastructure and the shortage of teachers. In 2015, more than 27% of schools reported staff shortages as opposed to 0.3% in 2010. According to the Syrian Ministry of Education (MOE), in 2015, 5800 schools (26% of the national total) were out of service due to either destruction, inaccessibility (5200), or because they were transformed into shelters for internally displaced people (600). All this led to a tragic increase in the number of out-of-school children. By 2015, many children had been out of school for several years. In Syria, around two million school-aged children were not attending schools, and another 446,000 were at risk of dropping out.

At the same time, 713,000 refugee children in neighboring countries (53% of all school-aged refugee children) were not enrolled in schools. One fifth of those who did attend school were in unofficial schools. Similarly, the national ratio of enrolment in primary education fell from 98% in 2010 to 70% in 2013 and to a further 61.5% in 2015. In 2015, a growing number of college-aged males, compared with 2013, were either caught up in the fighting or had fled the country. The conflict has also had its impact on the rate of literacy. Between 2010 and 2013, the national literacy rate of persons aged 15–24 years fell slightly from 94.9% to 94.6%. Since then, it has dropped to 91.2%, which means that around 360,000 of young Syrians are illiterate. In addition to that, Warden (2016) reported that enrolment as a proportion of 18–22 years old has dropped from 25% pre-conflict to 10% today, and more than 40% of faculty members have left the country, so universities have lost some of their best academic capital.

Administration and Financing

The administration of the educational system tends to be decentralized. However, centralized management assisted by local authorities is still prevalent with regard to planning and general orientation. The MOE is responsible for pre-university education. In the context of extending decentralization, some authority has been delegated to the directorates of education in the governorates – or provinces – and to governorate councils who with the help of their executive bureaus, for example, are authorized to open new primary/secondary schools. The MOHE is responsible for universities and some intermediate and HE institutes. The process of planning and definition of academic programs is centralized, while its implementation is decentralized. Coordination is ensured through the Higher Education Council (HEC) which is headed by the minister of HE. The Ministry of Culture is responsible for promoting literacy initiatives/activities. The Ministry of Social Affairs and Labor is in charge of the disabled and oversees day-care centers (World Data on Education-Syria 2010/2011).

The Syrian government plays a major role in the supervision and control of HE. In terms of paperwork, the system is highly centralized with no significant role delegated at the departmental level; all academic staff appointments and promotions are issued by ministerial decrees. All curricula developments have to be approved by the HEC. A government committee called the “University Admissions Committee,” headed by the Prime Minister and in consultation with universities and the MOHE determines the distribution and number of students to be admitted to HE each year. The government also plays a regulatory role for the newly established private universities. Licenses for these universities are issued provided that certain guidelines and rules set by the HEC are met (Higher Education in Syria 2012). Alyan and Rohde (2012) pointed out that until 2001, the educational system in Syria was strongly centralized, bureaucratic, and subject to direct governmental supervision.

The government expenditure on education in 2009 was 5.13% of GDP and 19.18% of total government expenditure (Country Profile, SYR 2016). Since 2011, the government expenditure on education has fallen from an average of 5% of the GDP in 2000–2010 to 3%. It is worth mentioning that the GDP shrank considerably between the two periods. In actual fact, the GDP dropped from US$ 60.2 billion in 2010 to US$ 27.2 in 2015 (Abu-Ismail et al. 2016).

Policies

Free education, books at affordable prices, and giving every student the opportunity to pursue HE are some of the popular policies that have been implemented for a long time but not without some shortcomings. It has been frequently argued that these policies have led to a dramatic increase in enrollment at the expense of quality. Acknowledging this problem, Dalbani (2013, p. 61) proposed the use of technology-mediated learning environments to resolve the quantity versus quality dilemma in the department of English at Damascus University.

The 2005 National Human Development Report which was launched by the State Planning Commission and the United Nations Development Program (UNDP) identifies the clear malfunctions in the internal and external efficiency in the Syrian education system and the weak relationship with labor market requirements. Thus, it calls for education within a broader perspective for economic, social, and political reform (National Human Development Report 2005 2016). The report concluded that the Syrian investments in achieving “education for all” were countered by a high level of waste, resulting in a low quality of educational output (Alyan and Rohde 2012).

Curricula

In Syria, the curricula for all stages of education are the responsibility of the state. However, there is no continuous process of curricular development, and hence any curricular change or development will take time and will require major changes.

The National Center for Curriculum Development is responsible for curricular changes in the pre-university educational stage (NCCD 2016). All books needed for this stage can be bought at affordable prices and/or can be freely downloaded from the Ministry's website. As for the HE curricula, the HEC is the body that approves the syllabi for all universities and institutes.

Reforms and Development

In 2010 and with the support of UNICEF, a major reform of the primary and secondary educational system was implemented. This system replaced the old outdated one and included the introduction of new UNICEF-supported curricula accompanied by relevant teacher training to enable teachers to adjust to the teaching of the new syllabi. The model was tailored specifically to enhance active learning in as many as 5000 schools over the subsequent 5 years (UNICEF 2010).

As regards to HE reform, the hurdles were more challenging. In a presentation entitled "ICT Strategy in HE in Syria," Abdul-Wahed and Al-Awa (2006) pinpointed the current challenges to Syrian HE:

- Huge number of students
- Low enrolment rate (relatively)
- Insufficient infrastructure
- Information, textbook unavailability
- Traditional teaching styles
- Incompatibility with market needs.

Thus, the introduction of reform to HE was much more complex and difficult as evidenced in the extensive studies and strategy reviews that were carried out since the beginning of the new millennium:

- *The Framework for a HE Strategy in Syria* – by Quentin Thompson and Sachi Hatakenaka (2001)
- *Towards a Reform Strategy for the Syrian HE System* – by the MOHE (2004)
- *The National Human Development Report* – by the UNDP and the Prime Minister's Office (2005)
- *The 10th 5 Year Plan* – chapter on HE and scientific research (2006)
- *The Analysis of the Syrian Strategy for the Reform of the HE System* – EU (2006)
- *HE in Syria* – Strategy Implementation Report by Bahram Bekhradnia, HEPI (2009).

In the *Global Post*, Birke wrote in 2010 that "Syria is facing an education crises: A rising - and young - population is stretching the facilities, while rapidly changing demands of the domestic job market, notably English and IT skills, are outpacing university reforms" (2010). All this reaffirms the need for reform in HE in Syria, yet it is still not clear how this can be best implemented. China, for example, which has a similar state system, employed extensive reforms with Chinese characteristics between 1982 and 2008. The process of development included the Communist Party of China and reinvented the government (Evans 2011). Today, China has seven universities in the world top 100 (World Rank 2016).

Development in Syria is carried out according to successive five-year plans. In the eleventh five-year plan (2011–2015), the annual investment allocated for the development of HE was around US$ 265 million on average (The Eleventh 5 Years Plan for Higher Education 2010). This demonstrates the limited resources allocated for the development of HE.

International Outcome Indicators and Rankings

Useful education outcome indicators in the Middle East and North Africa (MENA) region – which includes Syria – can be found in the World Bank report, *The Education Reform in the Middle East and Africa* (2008). In Chap. 6, the analysis carried on the MENA countries between 1970 and 2003 reveals a number of notable observations:

- There are significant variations in outcomes among MENA countries.
- The more successful countries seem to have education systems that exhibit a good mix of engineering, incentives, and public accountability.
- For the provision of education at all levels, more countries are increasingly relying on the private sector.

In Syria, there are 7 public universities, 20 private universities, with 1 new university – Almanara University – recently added to the list, and 15 higher institutes (MOHE 2016) in addition to 2 more, namely, the “Planning Institute for Economic and Social Development” (PIESD 2016) and the “Higher Institute for Applied Sciences and Technology” (HIAST 2016). Table 17.2 displays the Syrian universities and institutes that have been ranked by Webometrics (World Rank 2016). The figures indicate that 45% of Syrian universities and institutes have no ranking.

E-Learning in SYRIA

Introduction

Through launching of the Syrian Virtual University (SVU) in 2002, which is the first for-profit public university in the country, Syria became a pioneer in introducing e-learning to the Arab world. However, this endeavor was very modest. In 2004,

Table 17.2 Webometrics ranking of Syrian public and private universities and higher institutes

Ranking	World rank	University	Presence rank	Impact rank	Openness rank	Excellence rank
1	3547	Institut Supérieur des Sciences Appliquées et de Technologie Damascus	7703	772	4121	5269
2	4245	Damascus University	5124	9603	4121	3008
3	7136	Tishreen University	4888	13,747	4121	3887
4	8286	A1 Baath University	4938	12,185	4121	4706
5	8693	Institut français du Proche-Orient Damas	9434	7196	4121	5824
6	10,455	Syrian Virtual University	3762	10,971	4121	5824
7	11,846	University of Kalamoon	11,186	13,325	4121	5269
8	14,207	(3) University of Aleppo College of Pharmacy	21,874	20,438	4121	3360
9	14,985	International University for Science and Technology	15,704	14,509	4121	5824
10	15,487	Arab International University Damascus	12,330	15,727	4121	5824
11	16,571	Wadi International University	3147	18,688	4121	5824
12	18,702	Higher Institute of Business Administration	18,900	18,437	4121	5824
13	19,432	Syrian International Academy	19,919	19,112	4121	5824
14	19800	Al-Furat University	26,220	19,939	4121	4706
15	19,994	A1 Hawash Private University for Pharmacy and Cosmetology	15,086	20,422	4121	5824
16	20,291	Al Jazeera University	22,030	19,811	4121	5824
17	20,578	Yarmouk Private University	21,739	20,173	4121	5824
18	20,773	Syrian Private University (International Private University for Science and Technology)	15,354	21,129	4121	5824
19	21,167	A1 Andalus university	13,544	21,673	4121	5824
20	21,324	Ittihad Private University	21,057	21,080	4121	5824

(continued)

Table 17.2 (continued)

Ranking	World rank	University	Presence rank	Impact rank	Openness rank	Excellence rank
21	22,445	Al-Wataniya Private University	17,290	22,549	4121	5824
22	22,500	Mamoun Private University of Science and Technology	26,220	20,723	4121	5824
23	24,121	Institut National D'Administration	15,601	23,700	4121	5824
24	25,619	Al-Shahbaa University	24,748	23,700	4121	5824

Bender (2004) quoted Milad Fares Sebaaly – who was then the university's provost – as saying that the university now serves more than 1000 students, but around 135,000 students graduate from Syrian high schools every year and existing colleges can only handle 80,000 students. Bender further reported that "one of the biggest obstacles to distance education in developing nations is acquiring the technology to make it accessible. Although many universities have well-developed internal computer networks, some have yet to acquire high-speed internet access." "A true revolution in e-learning requires high-speed access and high Internet penetration rates to the World Wide Web, and the flexibility to offer a variety of media" (Machado and Demiray 2012). Gong et al. (2007) and Lee-Kelley and James (2005) suggest that an increase in the Internet penetration rate is also influenced by non-income factors like culture and the government's attitude toward new technologies. Machado and Demiray (2012) classify Syria among the countries that are hard to be optimistic about. Their findings indicate that Syria is a country that has strict state control over the IT sector and that it is classified among those countries that have few universities that provide e-learning/blended learning.

History of E-Learning

The pioneer ICT specialists in Syria were able to convince the country's leadership about the power and impact of ICT and succeeded in gaining support. This led to the formulation of the Syrian Computer Society (SCS) in 1989. The goals of the SCS are to disseminate the IT culture in the Syrian society and to help encourage and organize the country's information technology and communications market (Syrian Computer Society (SCS) 2016). The SCS acts as Syria's domain name registration authority and has been reported to be closely associated with the Syrian state (Syrian Computer Society 2016). The society paved the way to the introduction of several important initiatives including the private mobile telecommunication providers

(2000), the establishment of colleges and intermediate institutes in informatics (2000), the establishment of departments and intermediate institutes in computer and automation engineering (2001), and the launching of the SVU (2002).

In April 2014, Dr. Riyadh Al Dawoodi, the president of the SVU, announced that at the end of 2013, the number of registered students exceeded 17,000, the number of the bachelor's degree graduates reached 5165, and the number of master's degree graduates reached 516 (Ministry of Higher Education (MOHE) 2016). In 2014, the government announced the establishment of "the Syrian Electronic School."

Specific Projects and Initiatives

The following are two good examples of e-learning initiatives inside Syria:

- *Utilization of Cloud Technologies*

  A summary of the initiative of Wannous et al. (2014) is presented in the abstract of their article which reports that due to the crises in Syria, most of the private universities around Damascus had to abandon their campuses and move to safer locations inside the city. But these locations were not equipped with any system for enabling the delivery of course material over the Internet. Also, investing in a new system was not feasible. So, the teaching staff thought of using the free storage service offered by a number of providers on the Internet for hosting course contents as a start. This worked well, but it did not fulfill all necessary functions. Therefore, they started working on a new system utilizing cloud computing for managing courses. The new system utilizes a "platform as a service" model offered for free on the web to enable distributing course materials electronically as a first step and is intended to gradually perform more functions.

  This confirms an earlier finding by Weber who contends that cloud computing holds many benefits for the MENA region and the Arabic-speaking countries in which e-learning systems are coming to maturity (2011).

- *Digital Lectures*

  The other initiative was a case study that utilized digital lectures in post-graduate programs at the Faculty of Tourism at Damascus University as a solution to Syrian HE brain drain. Results indicated that personal innovativeness and satisfaction with the quality of services have a significant effect on students' behavioral intention of accepting digital lectures. Moreover, students regarded the use of digital lectures as an alternative to continuing their post-graduate studies abroad given the current restrictions on the mobility of Syrians today. For future successful implementation of e-learning modules, the researcher asserts the need to take into account the infrastructure-related issues (Ramadan 2016, p. 9).

International Collaborations

Most international collaborations today concentrate on providing Syrians with urgent humanitarian aid. After the crises began and in their efforts to help the refugees, many attempted to establish virtual and conventional schools and universities, but not without challenges. The main obstacles that had to be dealt with in Turkey, for example, were recognition and financing (Kudhur 2016). Listed below are some examples of the educational projects that were initiated before the crises:

- *Syrian Higher Education and Research Network (SHERN)*
  With the cooperation of the UNDP, the MOHE launched the project SHERN which aspired to electronically link via the Internet Syrian universities and HE institutes. The project was implemented in 2004 (The Syrian Report 2016).

- *The Network: EUMEDCONNECT*
  The EUMEDCONNECT project is a pioneering initiative to establish an IP-based network that serves the research and education communities of the Mediterranean region and is linked to the pan-European GÉANT network (GÉANT 2016).

More recently, "digital humanitarianism" initiatives such as the "ReDI School of Digital Integration" and the blended learning programs named "Kiron" were directed to the educated and highly motivated refugees (Benton 2016). Two of the current significant initiatives that were able to offer e-learning to Syrians are:

- *Kiron.ngo* (https://kiron.ngo/): Kiron is a nongovernmental organization funded by donations. It is based in Berlin and has offices in Jordan, Turkey, and France. It uses blended learning and offers free world-class university education to refugees from any country including Syria. Participants take 2 years of online classes, which can be followed by 1 year of study at a partner university that recognizes Kiron's credits. To date, it has over 1500 full-time students and 22 partner universities.
- *The University of the People* (http://www.uopeople.edu/): offers tuition-free accredited online degrees to Syrian refugees in computer science and business administration. Starting fall 2015, and in response to the crisis in Syria, the university committed itself to accepting at least 500 refugees – mainly from Syria – with scholarships to pursue associate's and bachelor's degrees.

Curricula

In their study on a large number of virtual and virtual/traditional universities, Ajami and Kasmieh (2013) found that the programs offered most online/blended are in the fields of information technology and business administration, followed by programs in humanities, arts, and public health. Most SVU programs and curricula are designed in line with similar international or Syrian programs. Some courses are delivered in English, but the majority are delivered in Arabic. In another study on e-learning English at the SVU and to maximize learner autonomy, Dalbani (2010) recommended the teaching of learning skills alongside the teaching of language skills. In short, the outdated LMS at the SVU, Internet speeds and service interruptions, the power outages, and the political crises in Syria have hindered efforts to develop the curricula or make the courses more interactive or enable instructors to fully exploit e-learning tools like text and video files and simulation programs.

Case Studies of Specific Programs

Two case studies are described below. The first was completed before the beginning of the crises, and the second was completed during the crises:

- E-Learning system (http://mars.wiwi.hu-berlin.de/mediawiki/mmstat_ar) in statistics in the Arabic language
  - This case study describes how an Arabic e-learning course in statistics was developed. The study discussed problems concerning learning in Arab countries while highlighting the difficulties of applying e-learning in the Arabic world as well as designing an Arabic platform with its linguistic and technical challenges (Ahmad et al. 2012, pp. 481–491).
- Gherbetna (http://8rbtna.com/) platform
  - A young Syrian computer science student who sought refuge in Turkey developed a free smartphone app and website for Syrians living in Turkey which he called Gherbetna. This platform offers information – for example, job listings – and connections through allowing users to ask for help from the app's community of contributors. It is estimated that since its launch in 2014, Gherbetna has been downloaded by more than 50,000 people (Benton 2016).

Projects and Programs

In 2003, the government approved a new technological requirements strategy for e-administration and e-government. The projects and programs related to the achievement of this strategy were (Hassan 2009):

- Strengthening the Institutional Capacity of the Peoples' Assembly in Syria.
- E-Strategy for Syria: this project aims at creating a platform for analyzing national needs.
- The strategic ICT program for socioeconomic development in Syria.

- Support for administrative development.
- The electronic library.
- The Syrian Virtual University.
- The E-Village: aims to act as an incubator for small ICT companies and small businesses.
- The Syrian HE and Research Network (SHERN).

Another important project concerned with e-archaeology was developed. This project known as E-Archaeology + is described by its team (Abajian et al. 2008) as concerned with the management of documents on antiquities and monuments. Globally, E-Archaeology + appears as an expert system of archaeology data capture, storage, and analysis. The plus sign added to its name (E-Archaeology +) indicates that the project is intended to be used as an international tool.

After the onset of the crises in March 2011, many officials, scholars, and volunteers believed that e-learning holds the answer to many problems, and hence several initiatives were proposed. Listed below are some of the most important initiatives:

- *Digital School* (https://digitalschoolsy.com/) is a comprehensive initiative that is promising education to K1–K12 Syrian students inside and outside the country. First stage launched 31/10/2016.
- *Tamkeen* (http://tamkeen-edu.org/index.php) is the website of Tamkeen training establishment that aims at offering professional training virtually and on the ground (in Syria).
- *Syrian Electronic School* (http://www.eschoolsy.net/) aims at educating all Syrians from K1–K12 using the Syrian curricula. It also provides a platform for students to download textbooks and exercises along with their solutions.
- *3lom4all.com* (https://www.3lom4all.com/vb/) is a website similar to the Syrian Electronic School.
- *Orient Establishment for Humanitarian Work* (http://www.orienths.net/) is an NGO which offers medical, educational, and aid activities for refugees in Turkey. It also seeks to offer e-learning from K1–K12. It releases YouTube videos containing a series of lectures in Math, Physics, English, and other subjects.
- *Alzahraa University* (http://alzahraa-university.com/en) is located in Gaziantep in Turkey. One of its objectives is to make an agreement with the International University of Africa in Sudan in order to establish programs and achieve accreditation.
- *Jamiya Project* (http://jamiya.org/) is an initiative which aims at providing HE to Syrian refugees through pursuing improved education opportunities for asylum seekers, refugees, and conflict-affected communities.
- *Homs Center for Virtual Education* (Homs Center for Virtual Learning 2016) is located in Syria and aims at providing e-learning to people in its area. The center also tries to secure grants for students to study in accredited universities outside Syria.

Ranking Internet and Telecommunications Capabilities

Internet services became available in Syria in 1999. In 2003, the Ministry of Communications and Technology was established. A "national ICT strategy for socioeconomic development in Syria" was prepared with the assistance of the United Nations Development Program (UNDP) and was adopted by the government in 2004. According to recent statistics (Internet World Stats 2016), updated June 30, 2016, there are about 5.5 million Internet users in Syria, as opposed to 3.6 million in 2010 and 30,000 in 2000. The number of users in Lebanon is about 4.5 million and in Jordan about 5.6 million. The penetration rate (number of users/population) is 29.6% in Syria, 75.9% in Lebanon, and 73.6% in Jordan, which shows that Syria is far behind its neighboring countries. Overall and according to "Statistics and Analyses" (2016), the telecoms sector in Syria is growing, albeit slowly and in varying degrees depending on the geographic area. In general, Syria has a reasonably high mobile penetration of over 60%.

National ICT and E-Learning Goals

The ICT strategy for economic and social development adopted by the Ministry of Communication and Technology acknowledges the contribution of the young Syrian Virtual University in establishing connections with worldwide international universities and in facilitating on-the-job training. They highlight the value of developing the SVU in order to contribute more to rehabilitation and ongoing training (MOCT 2003). However, Hamdan (2010) listed numerous obstacles (reported by a Syrian ICT professional) that hinder the integration of ICT in education:

- Diffused responsibility for policy implementation of ICT
- Lack of information on needs and requirements of schools and pupils upon which to base policy initiatives
- Limited finances supporting different aspects of provision or funding
- Lack of specialist teacher training and limited options available for training
- Limited availability of specialists in hardware and software resources
- Lack of formal national support infrastructure for ICT
- Insufficient number of qualified specialists at the regional level
- Limited availability of information specialist (particularly online) resources
- Lack of communication facilities in some areas
- Poor spending, which stands below world average (2007)
- Unemployment of university graduates which reached 27% for males and 30% for females
- Irrelevant training for ICT literacy and skills.

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

E-Learning Education Programs

The SVU offers 18 academic programs, the most popular of which are postgraduate diploma in Education, Bachelor in Information Technology, and Higher National Diploma SVU (Syrian Virtual University 2016a). Kiron uses blended learning and has four tracks leading to bachelor degrees in Business and Economics, Computer Science, Engineering, and Social Sciences. The University of the people offers the Syrian refugees associate and bachelor degrees in Computer Science and Business Administration.

Teacher Training Programs

The SVU dedicates one of its programs to teacher training. This popular program leads to a Postgraduate Diploma in Education and has attracted many students over the years. It targets university graduates who are not qualified in teaching (Program of Education Habilitation Diploma 2016). Still, Machado and Demiray (2012) classify Syria among countries that lack adequate teacher training. With respect to technology integration, Albirini (2004) in his PhD thesis found that teachers have a positive attitude toward ICT training, and he recommended offering them more training opportunities. Another study (Albirini 2006a, p. 395) highlighted the importance of the teachers' vision of technology, their experiences, and the cultural conditions that surround its introduction into schools in shaping their attitudes toward technology and its subsequent diffusion into their educational practice.

Granted Degrees

The degrees awarded through online and/or blended learning in Syria are:

- The SVU awards diplomas, bachelor degrees, HE diplomas, and master degrees.
- Kiron grants bachelor degree only.
- The University of the people grants associate and bachelor degrees to Syrian refugees.

Training of E- Learning Instructors and Professional Associations

There is no formal IT training for SVU instructors; however, the SVU IT support team provides necessary help and support for SVU students and instructors when faced with any technical issues SVU (Syrian Virtual University 2016b). In contrast, Tunis Virtual University overcame this issue by providing training to e-learning instructors from inside and outside the university (Tunis Virtual University 2016). In a research on the quality system of the SVU, Alaseel (2011, p. 95) suggested that both faculty members and administration staff should undertake training courses to qualify them in IT. Mirza and Al-Abdulkareem (2011, p. 92) emphasized the need to give training and workshops more attention to increase the faculty perception of the importance of e-learning. Many of the e-learning specialists and instructors in Syria are members in the Syrian Computer Society (SCS).

Regulation of E-Learning

E-learning is not yet regulated in Syria and that is why the establishment of the SVU required a presidential decree. Starting a private e-learning facility is not possible either. Mirza and Al-Abdulkareem (2011) pointed out that the availability of by-laws that govern e-learning will help encourage more students to join e-learning programs.

Accreditation of Programs

The SVU programs are not accredited by any regional or international accreditation body. But since it is a state university, the degrees awarded by the university are generally recognized inside Syria. It is worth mentioning that the SVU has quality assurance measures that apply quality control procedures through effective work measures (Quality Assurance 2016).

In a study by two SVU faculty members, Ajami and Kasmieh (2013) reported a drop in the ratio of graduate/registered students from 61% in 2004 to 25% in 2010. In their interpretation of the continued drop in the ratio, they listed reasons like the Syrian crises and the lack of students' seriousness. They added that the high drop-out rate affirms the fact that SVU does not allow, under any circumstances, substandard students to graduate without achieving all university requisites. These practices, they believe, reaffirm the strict quality assurance measures that are implemented by the SVU. Another study by Ajami and Mazloum (2014) on the SVU's Bachelor Program in Information Technology (BIT) revealed a significant drop in the number of graduates between 2011 and 2013 and that result again, they believe, could have been caused by the Syrian crises.

It is worth noting here that the SVU provides its officially registered male students with the necessary documents that enable them to defer their military service. It is also a well-known fact in Syria that some male students register in HE mainly to defer their military service. Therefore, the possibility that this phenomenon has intensified during the crises cannot be eliminated. In an investigation of the SVU quality system, Alaseel (2011, pp. 94–95) found that the extent of total quality management (TQM) application at SVU is moderate. To enhance quality, she suggested that the SVU needs to follow up on its graduates and contribute more to securing job opportunities.

There is also a deep and growing concern among scholars regarding the possibility of increased plagiarism especially in higher degree research projects. This is due to the inadequacy of deterrent measures and the limited research resources (e.g., financing and access to e-libraries). Colareza et al. (2016) touched briefly on this point when they indicated that when an e-learning phase was applied in HE in Syria and Turkey, some of the limitations that emerged were increased plagiarism, long time spent in front of computers, and impersonal relations with universities.

Future Development and E-Learning Prospects

Planned investments and development include:

- *No Syrian child left behind* is an e-learning initiative announced on March 23, 2016, and is expected to reach nearly 2 million Syrian students wherever they are, in regular classrooms or displaced with no access to teachers and text books. The initiative is funded by the Islamic Development Bank (IDB) in collaboration with Qatar Charity and the Syrian Scientific Society. The educational materials meet the highest professional and educational standards (Educational Initiative for Syrian Students 2016).
- *The Syrian Electronic School*: In 2014, the Syrian government announced the establishment of "the Syrian Electronic School" (Ministry of Education 2016). The school aims at making distance learning available to classes K1–K12.
- *Sendian* is an initiative based on the success of RWAQ (https://www.rwaq.org/) which is a platform for open learning in Arabic. In this initiative three volunteers are trying to bring three parties together: RWAQ and RAF Foundation for humanitarian services (RAF 2016) and some Arab Universities who will be the providers of programs, assessment, and accredited certificates (Sendian 2016). Its objective is to make e-learning available and accessible to refugees to study online in specially equipped centers that will be made available in refugee camps.
- *The UNESCO Response*: Bokova in the *Regional Education Response Strategy for the Syrian Crises* (2016) reports that today 4,320,000 Syrians need education. The UNESCO Regional Education Response Strategy addresses the learning gaps of youth in Syria and other countries in the region. The total cost of the program is estimated at 80 million, of which US$20 million have been secured.

To date, the crises have caused a destructive effect on the Syrian education system including e-learning. The existing infrastructure has been severely damaged, and a significant proportion of Syrian children and youth have been left without education. If the crises continue, its impact will be far more devastating considering that the international humanitarian aid has been unable to face the magnitude of the crises. Many around the world are confident that e-learning has a promising future globally and for the Syrians in particular. However, it is widely believed that the reasons which are hindering a political settlement to the Syrian crises today are themselves the reasons that are impeding the e-learning projects. Even so, all e-learning initiatives at this stage are urged to overcome all the hurdles, for they are the only hope for a better future for e-learning in Syria.

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Chapter 18
Tunisia

Hamlaoui Sihem

Abstract This chapter surveys the development and current state of e-learning in the Republic of Tunisia. The author surveys the general social, economic, historical, and demographic background of Tunisia and provides a review of its educational system. Analysis and statistics on the Information and Communication Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the author speculates on the future development of e-learning in Tunisia. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Tunisia • E-learning • Web-based learning • ICT • Internet • Education • Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

Tunisia is a small country situated at a strategic location on the tip of North Africa. It is a country with a varied geography, bordering the Mediterranean Sea, with mountains in the north and the Sahara Desert in the south. Neighboring countries include Algeria and Libya. Although Tunisia is considered relatively small (164,150 sq. km), the country is accessible from the Mediterranean Sea coastline. In this regard, the country has attracted conquerors and visitors throughout the ages. Numerous civilizations have invaded or migrated to Tunisia. Thus, modern Tunisians are descendants of these different outsiders and also of the indigenous Berber. A major sea and economic power during antiquity under the Phoenician colony of Carthage, Tunisia was invaded by the Romans in 146 BC. It was under Roman dominion up until the fifth century. After the fall of the Roman Empire, Tunisia was invaded by the Vandals and other European tribes. All of these historical developments shaped the cultural aspects of the country. Its population consists of a Muslim majority living among Jews and Christians. Since the 2011 revolution, Tunisia has faced many transformations and transitions, which have led to social and economic challenges and instability. Problems like unemployment and reduced investment and growth are critical, and consequently, the country is undertaking several serious measures to improve local and foreign investment. In some regard, these measures can be considered successful as the country was ranked 46th in the 2012 business report of the World Bank and 40th in the Global Competitiveness Report 2011–2012 of the World Economic Forum (OECD 2012, p. 97). Table 18.1 provides an overview of education in the country.

The Education System in Tunisia

In Tunisia, primary and secondary education is free and compulsory, with a 99% rate of enrollment and a 95% completion rate. “In the field of human resources, Tunisia has without any doubt the best graduates in the technical field of the area” (Infotica Report 2009, p. 15). The country devotes nearly 7% of the state budget to education, and the Tunisian system ranked 12th in the world in 2007 according to the World Economic Forum (Rose 2015, p. 3) and is broadly considered exemplary. However, the actual visible results of education are inconclusive and the system has many shortcomings. According to the 2014 British Council report, the Tunisian education system has one of “the widest uses of private lessons in the world (70% of all 15-year-olds), massive redoublement (43% of all students report having repeated a year at some point in their education), low PISA scores (significantly below the international average in all subjects) and fast-rising graduate unemployment (42.5% of Tunisia’s unemployed were graduates in 2008)” (Rose 2015, p. 42).

Table 18.1 Basic demographic and educational statistics for Tunisia (Source: Personal collection)

Country name	Republic of Tunisia
Region	Africa
Population	10.9 million
Language(s)	Arabic, French, English
Literacy rate	66.7%
Academic year	September–June
Primary schools	4428
Compulsory schooling	9 years
Public expenditure on education	7.7%
Libraries	340
Educational enrollment	Primary: 1,450,916 Secondary: 882,730 Higher: 121,787
Educational enrollment rate	Primary: 118% Secondary: 65% Higher: 14%
Teachers	Primary: 60,101
Higher	6641
Female enrollment rate	Primary: 114% Secondary: 63% Higher: 13%

The large predominance of private lessons is considered a negative feature of the educational system, especially in secondary schools, where students enroll in private lessons given by their classroom teachers. These teachers often abuse their role as educators by pressuring students into paying for private lessons and privileging those enrolled in said classes. And since the teacher is the one responsible for preparing and assessing all the exams in school, unfair treatment during evaluations of students is a problem. According to the OECD, "the effectiveness of classroom teaching seems to be very low" (2013), and the reason behind that is the trend of teachers using private lessons to their advantage.

Public Education

Approximately 2.5 million Tunisians are enrolled in public primary, secondary, and university institutions out of a total population of 11 million. Enrollment in the first nine grades of school is compulsory; all students ages 6–15 are required to attend school, and so the enrollment rate is at 99%. The system of education in Tunisia is structured into four consecutive cycles. The first 2 cycles are considered basic education. The first cycle is the primary cycle, which begins at age 6 and lasts 6 full years. The second cycle covers 3 more years and is called the preparatory cycle. In the past, students were required to pass the "sixième" national exam before moving on to the preparatory cycle. Now, this exam has been annulled and replaced by another national exam, the "neuvième," which is taken after the preparatory cycle before "collègue." The third and fourth cycles are secondary education and upper secondary education, which last 4 years total. In "lycée secondaire," students can choose one field of study based on their grades and their interests. Fields include experimental science, math, letters, economics, business management, and technical studies.

Private Education

Although experiencing a period of growth (see Fig. 18.1), the private education sector in Tunisia is not very big compared to the neighboring countries of Egypt, Algeria, and Morocco. "In Tunisia, despite a very liberal economic policy supported by the World Bank and the International Monetary Fund, private provision and financing of formal education is very limited. The private sector represents only 0.6 per cent of enrolment in primary education and 10 per cent in secondary education" (Akkari 2004, p. 150). Furthermore, "for secondary education where it is considered as a stopgap system for dropout students, the private sector share is about 3 per cent of enrolment in higher education" (Gharbi 1998, p. 36). These statistics illustrate that there is more confidence in public than private education.

In 2000, Tunisia established a legal framework for regulating the private higher education sector. This legislation created a minimum standard for study programs, structure, teacher-to-student ratios, and exams at private higher education institutions. The legislation led to an improved quality of education, but the sector still faces some limitations (e.g., the high tuition at 3000–15,000 TD compared to free public education). Methnani states that, while there were 360,000 students enrolled in higher education in 2009, a mere 3% of them were enrolled in private institutions (2009).

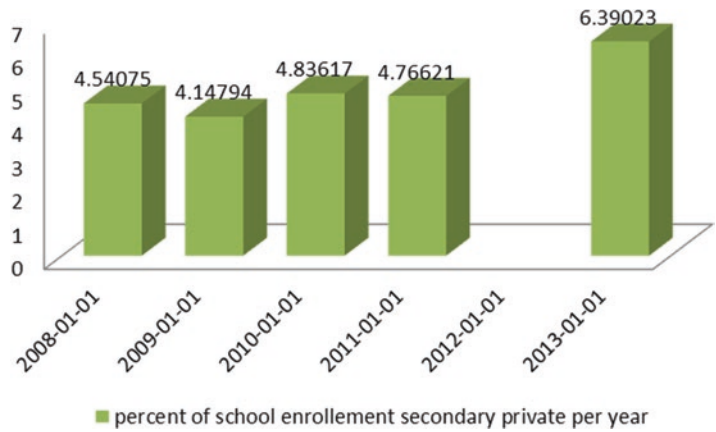

Fig. 18.1 Percentage of enrollement in private secondary school per year. (Source: personal collection)

Basic Education

According to the 2014 UNICEF report *Rapport National sur les Enfants non Scolarisé* for the year 2013, the rate of 6-year-old children enrolled in schools was 99.4%, and the rate of children aged 6–11 years was 98.9%. Thus, full enrollment is guaranteed for 10 years. Primary education is divided into three stages of 2 years each, and preparatory education provides 3 years of preparation for college. At the end of the ninth year, students take the "concours neuvième" national exam and receive their graduation diploma (DBE) upon successful completion.

Between the years 2007 and 2008, Tunisian education decision-makers established technical preparatory schools for students who have completed the seventh year of basic education and have scientific and technical skills. Students attend these schools for a duration of 2 years before receiving a diploma of completion, the "diplôme de fin etudes de l'enseignement de base technique DFEBT." According to Article 22 of the Framework Act amended in 2008, primary school is meant to equip the learner with knowledge acquisition skills, basic mechanisms of speaking and writing, skills in reading and arithmetic, and communication proficiency in Arabic and at least two foreign languages. It also aims to help the learner develop artistic sensibilities, citizenship values, and social skills. The preparatory cycle aims to provide the learner with more advanced communication skills in Arabic and in at least two foreign languages. It also aims to provide more advanced knowledge in science, technical fields, and the arts. And finally, it is intended to help prepare students for secondary education, vocational training, and later integration into the job market.

Secondary Education

Secondary education takes 4 years and is divided in two stages; the first stage consists of general studies and the second of specialized studies divided into four branches: literature, sciences, economics, and management. Only students who pass the "neuvième" national exam and who receive their basic education diploma (DBE) are allowed to enroll in secondary schools. In these final 2 cycles, most subjects, especially the sciences (Mathematics, Physics, Chemistry, Informatics, etc.), are taught in French. All topics related to social sciences are taught in Arabic (Literature, History, Geography, Islamic Education, etc.). Students are required to learn two to three foreign languages. English is compulsory as a third language, and one other language should be taken (German, Spanish, Italian, etc.). Computer Science "informatique" is an obligatory subject in secondary school (1–2 h per week). Each school has a computer-equipped room where these courses normally take place. At the end of the secondary cycle, students take the "baccalaureate" national exam, and only those who pass are granted access to postsecondary education or higher education. The rate of success on this exam in Tunisia is approximately 50%.

Vocational Training Qualification/Certificat D'Aptitude Professionnelle

Vocational education and training (VET) is a program run under the supervision of the Ministry of Employment. After the second year of secondary education, students can enroll in these two-year vocational programs. At the end of the program, a "Certificat d'Aptitude Professionnelle" is presented to students, and they are offered the possibility to complete two more advanced vocational programs, which lead to the "Brevet de Technicien Professionnel." This certificate allows them to access the market and find a job.

Postsecondary Educational Systems in Tunisia

Institutions

In Tunisia, there are 198 state institutions of higher education: 13 universities, 24 higher institutes of technological studies for training mid-level technicians, and 6 higher institutes of teacher training. These institutions also include virtual universities providing remote training and institutes under the sponsorship of one of the country's universities. In 1970, the number of students enrolled at universities reached 10,000; this number continued to rise and reached 69,000 by 1990 and 327,000 by 2005. Today, state institutions have more than 370,000 students; 130,000 students attend private universities, and a large proportion of them are students from neighboring countries.

A national university orientation system selects students based on their scores, performance, and preference for the appropriate field of study. The system does not offer much flexibility to students who want to negotiate or change their discipline. As mentioned earlier, public higher education is tuition free. Furthermore, according to a study done by the Education, Audiovisual and Culture Executive Agency (EACEA) and TEMPUS in 2010, "more than 102,000 students receive government grants, and more than 55,000 benefit from university accommodation at reduced rates" (TEMPUS, EACEA 2010, p. 5).

In order to progress from one class to the next, students must average 10 out of 20 based on a 20-point grading scale. Students are pushed to repeat a class if they score less than 10 points. The university failure rate is high and the dropout rate is even higher; approximately 45% of all students enrolled in their first university program fail to graduate. The grading scale is borrowed from the French educational and administrative system, which structured the Tunisian system when Tunisia was a French protectorate. Even the system of programs and degrees follows the French 4-year model system with 2 cycles; in the first 2-year cycle, students acquire a diploma "diplôme d'études universitaire du premier cycle," and, in the second 2-year cycle, students (except those in engineering fields) take a national examination. Upon completion of the second cycle, students receive the “maîtrise” which ends the second stage of studies after the “baccalauréat.” Other fields of studies like engineering, architecture, and medicine require 6 years of study (4 years of study beyond the 2-year first cycle program).

The 2008 LMD Reform

The higher education system has recently been reformed and restructured by the Act of 25 February 2008. The reforms are based on the international and European LMD model (license, master, and doctorate or bachelor, master, and PhD). The aim of this reform project was to offer students more flexibility by making degrees internationally compatible. The LMD system is professional and clear-cut and based on the newly introduced “Bologna” model. The “license” degree program consists of 2 years of general studies and 1 year of specialization. The master degree program consists of 1 year of general study and 1 year of specialization. The most advanced degree program is the doctorate, which consists of 3 years of research. The LMD reform offers a new credit system which allows students to easily transfer their credits between institutions, both domestically and internationally.

The Geographical Dispersal of Universities

One major aspect of Tunisian higher education, for which the system has been heavily criticized, is the geographical dispersal of universities and higher education institutions in the country. “A critical challenge for Tunisian leaders will be to bolster the interior provinces, where economic progress is stymied by a paucity of educational resources compared to the wealthier coastal provinces” (Brisson and Krontiris 2012). Uneven geographic dispersal has created inequalities in performance and educational opportunities, particularly between the coastal and interior regions. These regional disparities affect the choice and flexibility for the students from the interior regions; most of them have to move to the coastal and northern region to complete their postsecondary education. Indeed, universities have long been concentrated along Tunisia’s coast and the capital, while the interior regions have fewer institutions, isolated by distance and lacking in infrastructure, transport accommodation, and information networks. The map at the beginning of the chapter shows the distribution of higher education resources (schools, technical parks, and research centers) and reveals larger patterns of national resource allocation. The majority of leading universities are found along the coast and in the wealthy cities such as Tunis, Sousse, and Sfax.

Large Classes and Lecture Methods

Tunisia has 22,000 teaching staff and 370,000 students, distributed among 13 universities encompassing 194 institutions of higher education (TEMPUS, EACEA 2010, p. 3). Although there is a serious shortage of jobs for students after graduation, the number of students is getting bigger every year, and the classes are getting larger. Over-enrollment has made large classes an endemic issue. The Tunisian university system is basically relying on lecture methods rather than small group discussion and analysis. Most lectures are delivered in big halls (capacity 150–200 students). This system affects the teachers' time for the researcher to learn new online or blended pedagogies or acquire technical skills to use e-learning effectively. Most teachers have no time left for research or training since they have a full-time table of lectures.

E-Learning in Tunisia

Tunisia occupies a position of regional leadership in the ICT sector and was ranked first in Africa and third in the Arab world in 2008 on the international classification network index of the World Economic Forum for ICT in Davos (WEF 2009). During the last two decades, Tunisia's government has chosen the path toward becoming more open and creating good contacts locally and globally through the Internet and computer technology. Therefore, Tunisia has made progress in adopting e-governance. In 2010, the country won a United Nations E-Government Survey special award, thanks to its outstanding achievements and excellence in serving the public interest (UN 2010). The Internet has become affordable for everyone in Tunisia, especially in big cities, and the youth have begun to use it extensively on a daily basis. The most popular uses of the Internet in Tunisia are to access emails, websites, and social networking, namely, Twitter and Facebook. According to BuddeComm's 2011 report, Tunisia's international bandwidth reached 37.5 Gbit/s in 2010, up from 1.3 Gbit/s in 2006 (Lancaster 2016).

Infrastructure Connectivity and Access

Internet use has also increased dramatically; in June 2016, the number of Internet users in Tunisia was 5,800,000, almost 52.1% of the population (IWS 2016). According to the Internet World Stats (IWS), the number of Facebook subscribers in Tunisia reached 5,400,000 in June 2016, with a 50.2% penetration rate. In 1998, the number of personal computers in Tunisia more than doubled from 6.7/1000 in 1995 to 14.7/1000 (Fig. 18.2). From 1990 to 2000, the government launched an

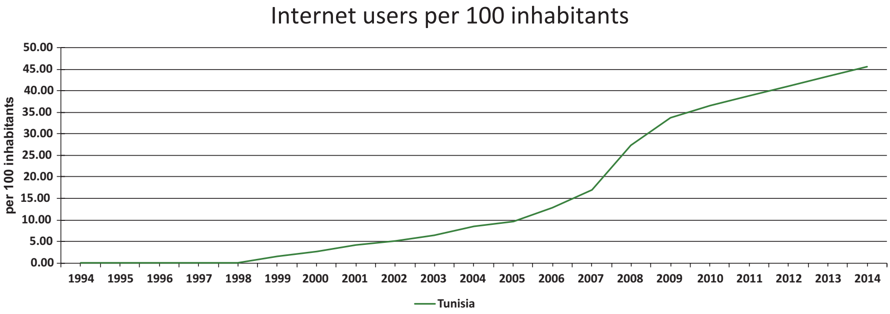

Fig. 18.2 Individuals using the Internet in Tunisia (% of population). Source: https://data.worldbank.org

intensive program to add computers to all secondary schools in the country. This project aimed at giving significant attention to the issue of ICT expansion in education and offering access to students of all levels of schooling, especially upper secondary schools. Figures retrieved from the project show a steady increase in the number of Internet users in Tunisia (per 100 people) from 1990 to 2013.

After the launch of the presidential "family computer program" in 2001, computer ownership grew across the country. The program allowed Tunisian families to get soft bank loans to buy computers. In the past few years, e-learning is becoming increasingly viable and accessible. Internet connection speeds are increasing, and with that, opportunities for more multimedia training methods arise. There has been immense improvement of mobile networks and an increase in telecommuting.

Telecommunication Infrastructure and Operators

Tunisia's telecom infrastructure is well advanced; with a high bandwidth and coverage and network reliability, it holds a leading position in North Africa. In 2015, Tunisia launched MVNO, a mobile virtual network operator, and in 2014, a new undersea cable. In 2016, the country launched and activated a 4G network only 6 years after launching the 3G network. However, the cost of international calls remains high because of the lack of competition in terms of international network traffic. Ooredoo Tunisie, Tunisie Télécom (TT), and Orange Tunisie are the three active mobile and fixed voice network operators in the country, which are also the only providers of international voice communication and Internet services. Before the sector liberalization in 2002, Tunisie Télécom was a monopoly in the sector of telecommunications. Now, the government owns a 65% stake of TT, and the Dubai-based Emirates International Telecommunications owns the remaining 35%. In 2002, the Tunisian government opened the sector to private entrants nationally and internationally, and "Tunisiana" was the first firm launched after the government's program of privatization was launched. In 2014, the firm was rebranded by a Qatari firm named Ooredoo; Ooredoo currently has a 90% and the Tunisian government a 10% share in Ooredoo Tunisie. The second operator was established by the French telecom firm "Orange Tunisie," offering both fixed and mobile services including 3G data services. The three operators hold the majority of the market share in the mobile segment but in late 2015 saw the arrival of Tunisia's new company MVNO, in cooperation with the UK-based Lycamobile and using TT's infrastructure.

Technological and Cyber Parks

Eleven operational technoparks are spread over several regions. Elgazala was set up on August 1997 and was the first technopark in Information and Communication Technologies (ICTs) in Tunisia and North Africa to support the development of businesses and the economic sector. It hosted innovative enterprises in the ICT sector and developed collaborations between industry, research, and higher education to promote innovative ideas. The technopark offers a favorable environment for development in the sector of communication technologies in collaboration with higher education, research, business, and industry based on high-tech scientific creativity and intelligence. Fifteen cyber parks representing various fields also exist in Tunisia. The role of cyber parks is to develop software and websites and to offer services related to ICT and call centers.

The 10th Development Plan

After the creation and success of Elgazala Technopark, ranked #100 in the world, the plan was to create more techno and cyber parks all over the country, especially in big cities in the north: Bizerte, Borj Cedria, Sidi Thabit, Sousse, and Monastir. In the south, parks in Sfax, Gafsa, and Medenine are already functional, and others are under construction. The aim is mainly to support scientific research, innovation, and ICT integration, as well as stimulate employment market and job creation. According to Mhenni et al., "while Tunisia has decided to set up nine Technoparks, only one (El Ghazela) seems to fulfil the prerequisites and is performing well" (2013, p. 7). The reason behind this success is the good collaboration and interaction between postsecondary institutions and international organizations, in addition to the diaspora of Tunisian scholars; all these factors played a vital role in inviting multinationals.

Tunisia has been fully involved in ICT sector development policy since the 1980s and is therefore considered to be the first African country to implement an ICT-based national strategy. Tunisia has an infrastructure of international significance: Tunisia is 50 according to The WEF Global Information Technology Report 2011–2012.

Starting in 1956, after gaining independence, Tunisia put education at the forefront of its priorities; the country has placed great value on education, which is free and accessible to everyone. The first major reform was enacted in 1958, followed by other key reforms. Moreover, the country has committed itself to the advancement of ICT and, in the mid-1990s, was fully involved in setting up “ex nihilo” ten technology parks—largely through a political decision. In 1970, the country’s infrastructure underwent considerable change. The creation of the national ICT center was a major step toward realizing a world of information technology. In 1975, the center organized the ICT sector, monitored the national ICT plan called PNI “plans nationaux informatiques,” and purchased ICT equipment and services.

Two educational institutions have been involved in the integration of ICT since 1984: Centre Bourguiba de Micro Informatique (CBMI) and Bourguiba Microcomputing Center. The Bourguiba Microcomputing Center was transformed into the National Institute for Office Software and Microcomputing (Institut National de la Bureautique et de la Micro Informatique—INBMI). The same center has been further developed with new responsibilities to promote ICT in education and was renamed the National Centre for Education Technology (Centre National des Technologies de l’éducation—CNTE). In cooperation with the Ministry of Education, the INBMI has developed programs and web educational portals like the multilingual web portal EduNet, which provides access to administrative and educational services: web services, downloading, database services, and email and group work services.

Another important system created to manage and evaluate the schools’ internal resources is EduServ, which “makes it possible to improve and automate the management systems of Tunisian schools. It allows pupils to consult their grades, days of absence, sanctions, examination results, etc.” (ADEA 2014). In 2005, Tunisia hosted the world summit on information technology. This was a great step for the world of information technology in Tunisia; hereafter, numerous research and projects studied this sector both within and from outside the country. “It should be mentioned that since 2002, Tunisia has moved towards the liberalization of the communication sector” (Kamoun et al. 2009–2010, p. 2). This liberalization reached the telecommunication sector after the signing of agreements with the WTO in 1997.

E-Learning Projects

The decision to integrate ICT in higher education was taken in the year 2000 following the spread of the Internet in several social and economic sectors in the late 1990s. Decision-makers in postsecondary education started exploring ways to introduce ICT in university programs, practices, and administrations. These were leading initiatives in Africa and in developing countries. With support from the government, several universities launched projects, especially for the institutions of computer science. Most of these projects were supervised by the Virtual University of Tunis.

Education Quality Improvement Project

The Education Quality Improvement Program (EQIP) aims at promoting excellence in teaching and learning in secondary education, "while continuing the push for equity by ensuring the inclusion of all children at all levels of the basic education system" (Word Bank 2016). While the first component of the project aimed at improving teaching quality in the classroom through the introduction of new skills-based teaching methodologies, the second component target is improving language teaching and science and the integration of vulnerable children and disabled children into regular schools. The last three components of the program focused on ICT integration to expand education and evaluation of the use of technology materials, establish an information guide center, and develop a management ICT system. Another component of the program is to strengthen the core system in schools by creating training programs for the instructors and to integrate ICT into the learning experience. The project was closed on September 2010 with a total cost of 290.92 million US$. The outcome, according to World Bank, was as follows: "the project objectives were highly relevant…The objective of promoting excellence in teaching and learning and ensuring equitable access was substantially achieved, as reflected by gains in enrollment and learning outcomes", however, the efficiency of the whole project was rated modest (World Bank 2012).

The Virtual University of Tunis

The Virtual University of Tunis (VUT) is a public institution created in January 2002. Affiliated with the Ministry of Higher Education and Scientific Research, the VUT offers quality online training and courses, access centers, video-conferencing centers and laboratories for digital production, and technical and pedagogic support. It was the first step in the project of ICT introduction in higher education in Tunisia and North Africa. The VUT was established in 2002 as a government initiative. Jemni and Houcine reported that "since its creation in 2002, the Virtual University of Tunis (VUT) devotes a particular attention to research and innovation in both pedagogy and technology and promotes the national research teams working in this field" (Chebli and Jemni 2004, p. 1). The creation of VUT according to the United Nations "World Summit on the Information Society" in Geneva in 2005 was one part of the policy framework of modernization of higher education and its accessibility to all Tunisians. According to the UN, "the creation of VUT witnesses the development of ITT in Tunisia and the evolution of higher education to make effective use of digital multimedia technologies contribute to a stronger knowledge economy, and a better trained learning society" (UN WSIS 2005). Although the VUT does not offer courses in all specialties, graduated students receive awards, diplomas, and certificates. The VUT had 520 students enrolled in the integral formation at the VUT (2014–2015 academic year), 188 students enrolled in the masters, 332 students enrolled in the license, and 46,084 students enrolled on the platform of integrated training (academic year 2014–2015), and 1168 teachers are using the platform of integrated training at ent.uvt.rnu.tn (academic year 2014–2015).

ICT Competitiveness Project June 2012–June 2013

The ICT Competitiveness Project funded by USAID aims to endorse the development of the ICT entrepreneurship/SME sector through three approaches intended to increase employment and raise international market opportunities through competitive advantages. The project aims also to improve ICT skills for employers through skills-based training programs, to reduce legal/regulatory constraints in ICT sectors, and to develop ICT policy and regulatory reform. This task is meant to control the major laws and regulations affecting the ICT sector including telecommunication, e-commerce governance, mobile banking, and investor protection.

Smart Tunisia Project

This is a program for offshoring ICT sector companies; the aim of this project is the creation of 50,000 job opportunities in offshoring, near shoring, and allocation areas during the next 5 years. The Tunisian government has allotted a budget of almost €500 million (5 years) as a funding for the international and local operators for the development and progress of their strategies.

The government has reserved exclusively initiatives and projects associated with infrastructures for foreign companies wishing to develop offshoring activities in Tunisia.

Tunisia Information and Communication Technologies Sector Development Project

The project was set up in order to assist borrowers in promoting the development of its ICT sector by (a) supporting ICT institutional and sector reforms, (b) improving its e-security mechanisms, (c) developing e-government applications, and (d) promoting the participation of the private sector in the ICT sector (World Bank 2011).

The objectives were in line with Tunisia's 10th Development Plan 2002–2006 (the central objective of which was to foster the emergence of a knowledge-based economy). One of the goals of the 10th Plan was to increase ICT revenues from 3.3% of GDP in 2001 to 7% in 2006 and to generate one out of every four jobs in the ICT sector by the end of 2006. The project's objectives were consistent with the World Bank's 2009–2012 Country Assistance Strategy (CAS) for Tunisia, which has been concluded. The CAS emphasizes support for the development of Tunisia's knowledge economy, focusing on the further expansion of the ICT sector as part of a strategy to make the services sector more competitive overall. The objectives were also relevant to the 2005–2008 CAS, which identified modernization of infrastructure services as a priority to increase quality and efficiency and the opening of investment to the private sector. The project's activities contributed to the upgrade of Tunisia's telecommunications sector, though the magnitude of the contribution in relation to other causal factors cannot be gauged.

Convention Between the Ministry of Education and Tunisie Telecom

On April 6, 2012, a convention between the Ministry of Education and Tunisie Telecom (TT) was signed. The components of this agreement are as follows: first, to provide schools with a fiber optic communication network, and second, to provide network operations in Internet services and value-added services for the benefit of administrative work, education, and research in schools in the 3 cycles in all jurisdictions. These agreements are part of the strategy of the Ministry of Education for the integration of ICT in education to get up to speed in scientific and educational progress. The signing of the convention was chaired by the Minister of Education, in the presence of the CEO of TT and the Department of Information and Communication Technology.

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

Tunisian Virtual School (TVS)

Tunisia was a pioneer in the field of online education and e-learning through the launch of the Tunisian Virtual School in 2002. TVS was created within the INBMI as the first initiative in North Africa and one of the very early projects in Arab countries. Although the TVS provides fee-based interactive courses, revision modules, assistance, and ICT training, it does not award certificates.

Virtual University of Tunis (VUT)

The main mission of the VUT is the development of online courses and programs for higher education institutions. The VUT provides 20% of the courses through e-learning and awards diplomas and certificates. UVT offers several training programs:

Masters degrees:

Professional Masters in New Technologies and Telecommunications Networks "N2TR"

Professional Master in Integrated Management: Quality - Safety - Environment "MPQSE"
Professional Masters in Enterprise Optimization and Modernization "MOME"
Professional Master in Free Software "MP2L"
Professional Master in Physical Preparation "MP3"
Professional Masters in Mental Preparation "M2P2"
Professional Master in Neuro-Radiology and Neuroimaging Diagnosis "MP2ND"
Professional Master in Ecotourism "MODECO"
Master of Research in Sustainable Management and Development of Animal Resources "VAGDRA".

Training in licenses:

Degree in Applied Management "LAM" (L1, L2, L3)
Degree in Applied Sciences and Technologies of Information and Communications "LASTIC" (L3)
Degree in Applied Electronics Marketing and Digital Strategies "LAMESN" (L3)
Fundamental License in Management Accounting "LGC" (L3)
Fundamental Degree in Electronics and Optics e-Learning for Embedded Systems "EOLES" (L3) (taught in English).

Continuous training:

Computer and Internet (preparation of training certification C2i)
English (Ongoing Training in English "OTE")
Computer Technology (Business Analytics and Big Data, Mobile Computing, Cyber Security, Cloud Computing, Web 2.0, etc.).

Qualifications:

Computer and Internet Certificate C2i.

Virtual University of Tunis is responsible for coordinating activities relating to non-face-to-face training provided in Tunisian universities by offering transverse teaching units, IT, English and entrepreneurship (in various university courses) training of trainers for the use of ICTs, digital pedagogy and screenwriting courses, teaching spaces online (provided on the platform "Moodle" access centers), video conferencing centers, and digital production laboratories (Ministry of Higher Education and Scientific Research 2017).

There are many other new e-learning programs, projects, and accreditation schemes which are in the test phases and are progressing in many Tunisian primary, secondary, and postsecondary educational institutions. The Tunisian digital school site "El-madrasa erlarkmia" is one of these major projects, launched in 2016 by the Ministry of Education, issued as a digital school site under the supervision of the National Center for Technologies of Education. This space offers a range of facilities for the benefit of students, teachers, and parents.

Tunisian Association for Digital Innovation in Education

The Tunisian Association for Digital Innovation in Education is a non-governmental association founded on September 2013 by a group of primary school teachers. Composed also of secondary school teachers and education inspectors, the main goals of the association are:

- To empower the ICT use in primary and secondary education in the country.
- To organize training sessions, for both students and teachers, on the use of ICT tools. The associations managed to organize successful training courses in many interior areas in the country.
- To produce a digital library that matches the official programs for primary and secondary schools.
- To equip the educators with digital tools that help them to develop their professional skills.
- To teach students how to be active self-learners.
- To teach the students' parents to take part in the process of learning through the use of ICT (Association Tunisienne pour l'innovation numérique 2017).

Future Development

E-learning in Tunisia is in an active developing and constructive process. Many factors will help the successful ICT integration into education projects such as modernized technopolises and infrastructure in new technology reinforced by strong executive commitment and support from the government. The government has made initial steps toward empowering the use of ICT in schools and higher education. As part of this process, the government has clearly set and communicated its vision and goals. The "5 A strategy plan," which means "Accessible and Affordable ICTs, for Anyone, Anywhere, and Anytime," was implemented by the government as a part of the Tunisia project, which basically aims to develop and modernize ICT use and to improve the infrastructure through modern technologies and the extension of fixed and mobile telephone and network connections. This project was part of the Tunisian ICT agenda 2005 proposed during the World Summit on the Information Society. The article 28 from the country commitment document stated "*We reaffirm our desire* to build ICT networks and develop applications, in partnership with the private sector, based on open or interoperable standards that are affordable and accessible to all, available anywhere and anytime, to anyone and on any device, leading to a ubiquitous network" (WSIS-05).

This project aims also to build human capacities through academic and technical training. One of the major initiatives was the generalization of education in computer science in the 2 final years of secondary education. According to the government, plans and projects started in the 1980s have overall been very successful.

Digital Tunisia 2018

The most recent and largest project was launched in 2015: “Digital Tunisia 2018.” The first meeting of the Strategic Council for Digital Economy (CSEN) was held on May 22, 2015. The council was submitted by the Minister of Higher Education and Scientific Research and signed by the Prime Minister. The role of the council is to deploy projects associated with the National Strategic Plan (PNS) for digital development in Tunisia “Digital Tunisia 2018”, a mega plan to which the government has offered a budget of 5.522 million dinars. Launched in 2014, it is one of largest e-learning projects in Tunisia. The goal is to enhance the network communication technology infrastructure and aid all Tunisian families to have access to Internet services. The plan is that by 2018, the network will reach 80% of all Tunisian families. The project will offer computer tablets to students in order to replace textbooks and school supplies and help with the improvement of technological management and ICT services for all inhabitants, specifically at post offices. According to the Minister of Communication Technologies Noman Elfehri, “through the implementation of this project, Tunisia will be ranked the 40th in the field of digital economy worldwide and the first in Africa” (American Chamber of Commerce in Tunisia 2015). In other words, Tunisia will be able to progressively reduce the digital gap and catch up with world communication technology standards.

The Tunisian Digital School Site

In 2016, the Ministry of Education issued a Tunisian digital school site under the supervision of the National Center for Technologies of Education (previously the National Institute of Office and Media) at the address “www.ecolenumerique.tn.” The site offers a range of services for the benefit of students, educators, and parents, most notably the possibility of browsing and downloading copies of entire digital textbooks. In addition, the site offers access to the contents of CDs attached to these textbooks. These CDs offer interactive activities for learning different materials at all levels. The site provides visitors the ability to watch video recordings of more than 200 episodes of the school television broadcasts from previous years. In addition, it provides exercises and tests accompanying reform for all levels collected from teachers, which lends itself to enriching the site. The digital school site in its current form, despite the richness of what is provided by the content, depends on the socialization of educators and specialists in order to reach its full potential. It depends on educators providing good resources and putting them at the disposal of learners. The cost of project is estimated at 242 million Euro/604 MDT, and the project has started at 52 primary schools in the following governorates: Ariana, Beja, Ben Arous, Bizerte, Gabes, Gafsa, Jendouba, Kairouan, Kasserine, Kebili, Le Kef, Mahdia, Manouba, Medenine, Monastir, Nabeul, Sfax, Sidi Bouzid, Siliana, Sousse, Tataouine, Tozeur, Tunis, and Zaghouan.

ICT Integration: One Strategic Goal in the Policy of Education Reform 2016–2020

The "White Paper on Education Reform" of May 2016, an education reform published by the Ministry of Education (ME) in May 2016, sets out policy priorities to address gaps in teacher training, programs, and infrastructure. The paper consists of eight chapters discussing the restructuring of the education system and presents the future projects and strategic goals. ICT integration in education is one major strategic goal cited in the book. The book proposes to:

- Develop employment information technology and communication in education
- Develop a complete plan for the development of the digital school
- Develop organizational reform of the institutions and departments supporting the project on the central, regional and local level, and define their roles in order to ensure a successful implementation of the 2016 digital school project
- Ensure the involvement of all parties in the project by establishing an integrated system of internal and external evaluation to evaluate cooperation and progress
- Include ICT in the official program and curriculum according to a referential framework
- Develop teaching informatics programs in secondary education
- Create a new section in secondary school "digital technology" to guide the students toward professions related to the digital economy and to prepare them for the creation of digital projects
- Train teachers and education instructors in the use and practice of ICT at schools
- Develop online training programs for teachers and instructors
- Establish a network of trainers and escort for the integration of ICT in schools all over the country, affording them with good materials (1000 trainers in 2016–2017)
- Create innovation spaces and pedagogical practices for advanced digital technology STIC (National Centre for Technology in Education), in collaboration with partners from public and private sectors in 2016–2017 (White Paper on Education Reform 2016, pp. 147–148).

Although it is too early to evaluate how successful this plan will be, we can see that the Ministry of Education has taken big steps toward the realization of this agenda. According to the media, the project is facing some obstacles related to e-readiness for both students and teachers in some regions. Some institutions still lack the basic materials and infrastructure to be involved in the project of ICT integration and practice in schools. However some practical actions were applied in some schools, according to the *Elchourouk* newspaper in 2014: "for the first time in Tunisia the students in the international school of Carthage (ISC) are using tablets in class sessions…." The project was launched by Samsung as the "Samsung smart school" with the aim to spread these experiences in other schools (public and private) and other territories. This project aims also at introducing smartboards to the schools (full interaction and LED screen) (Elchourouk, 15 May, 2014).

The ministry has already launched a virtual space at the beginning of the school year 2016, a digital space for students to help them revise and prepare their lessons through interactive exercises and audio resources for language and music education. According to the Ministry of Education's official website on Facebook, this space also includes free applications for teaching children. The Ministry of Education invited students and parents to visit the site at the following address: http://ecole.edunet.tn/.

During the opening of the Technology City 3S exhibition, which was held on February 1 and 2, 2017, the Minister of Communication and Digital Economy, Mohammed el-Anouar Maarouf, stated that "a diagnosis of the situation, carried out by the ministry, enabled to stand on the slow completion of projects related to the digital field." Maarouf added that "although Tunisia has significant potential qualified human resources, technology, the will to change and experience in the field, is still facing some obstacles which we must overcome." In this context, the Minister said that there is a great difference between the objectives of the ambitious strategy for the digital transition in 2020 (mainly related to linking all Tunisian families to the Internet, creating 100,000 jobs, establishing the digital school, and investing in electronic health) and the completion of projects. He pointed to the problem of governance and the absence of a clear and specific leadership at the digital level in Tunisia, stressing the inability to use the available funds and putting them on the projects and lack of qualified administrative competencies directed to the implementation of projects (Ministry of Communication and Digital Economy 2016).

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Chapter 19
United Arab Emirates

Jennie Lavine and Richard Croome

Abstract This chapter surveys the development and current state of e-learning in the United Arab Emirates (UAE). The authors survey the general social, economic, historical, and demographic background of the UAE and provide a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the authors speculate on the future development of e-learning in the UAE. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords United Arab Emirates (UAE) · E-learning · Web-based learning · ICT · Internet · Education · Distance learning

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Source: CIA World factbook, https://www.cia.gov

Country Profile

The United Arab Emirates (UAE) is a country situated in the southeast of the Arabian Peninsula in Western Asia on the Arabian (Persian) Gulf, bordering Saudi Arabia to the south and Oman to the east. The UAE is a member of the Organization of the Petroleum Exporting Countries (OPEC) and exports 2.4 million barrels of oil a day (OPEC 2016). The UAE is a federation of seven emirates including Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Fujairah, Ajman, and Um al Quwain. Each emirate has its own ruler or sheikh. The emirate of Abu Dhabi is the largest of the seven emirates, occupying around 86.7% of the total land area, and contains the capital city of Abu Dhabi. Dubai is the second largest emirate covering almost 5% of the total area.

The UAE has the highest standard of living in the Gulf region, which can be attributed to the oil wealth of the capital, Abu Dhabi. The UAE has a population of 9.157 million people (World Bank 2016) and is the second largest economy in the Arab world after Saudi Arabia. Currently, the UAE's GDP per capita is ranked 26th in the world at US$39,543 growing by 3.9% for the 2015 fiscal year (Trading Economics 2016). Gross domestic product (GDP) in 2014 was US$520 billion. Oil and gas revenues contributed 34%, wholesale and retail trade and repair services activities contributed 11.3%, real estate and business services contributed 10.3% each, and construction activities and manufacturing activities amounted to almost 9% each to the total GDP (UAE Ministry of Economy 2015).

Since the 1990s, the UAE, and more specifically Dubai, has emerged as one of the most sought-after destinations for multinationals to headquarter their offices in the region. As a consequence, the UAE has the seventh highest migration rate in the world, as expatriates are widely employed to help develop the country (CIA 2016).

Additionally, foreign direct investment (FDI) in the UAE is the second largest in the West Asia region at USD 13 billion in 2015, an increase of 25% from 2014 (Santander 2016). This has led to the development of a truly modern and cosmopolitan country, with a diverse economy that enjoys steady growth.

The UAE is not a large country, and UAE nationals are less than a million. The discovery of oil created a diverse population of job seekers mainly from Asia. The religious demographic is a large mix of Muslim, Hindu, and other Asian religious minorities. The religion of the country is Islam, but other religions are able to practice their religion, and there are many churches throughout the country.

The culture is strongly influenced by Arab and, more accurately, Bedouin culture. The youth are taught the old traditions on falconry, camel breeding, Islamic values, language, poetry, food, etc. This is alongside Emirati students/youth who hold general affinity for Western culture including food and music, clothing, and travel. Acknowledging the increased Western influence in the country and also to empower the tiny number of UAE nationals in governmental and private companies, the UAE government created a program called "Emiratization." This gave a quota for all companies to have an increased presence of nationals in the workforce. Upon graduation, Emirati nationals are almost guaranteed a job in the government sector. In August 2016, *Gulfnews* reported how the UAE has one of the lowest unemployment rates in the world. The survey which was conducted by Dubai Statistics Center (DSC) reported that unemployment rates in Dubai increased by *0.1%* – from 0.3% in 2014 to 0.4% in 2015 (*Gulfnews* 2016).

The World Economic Forum has stipulated that there is a potential the GCC in general is going to enter a very important phase of their development – especially with respect to matching higher educational needs coupled with employment opportunities which match both accordingly. The youth bulge in the GCC has many facets and the UAE currently has a percentage of 34% of their youth under the age of 25.

Education System in the United Arab Emirates

The UAE Vision 2021, the national development plan of the UAE, sets out six national priorities. Two of the six priorities include creating a first-rate education system and the development of a knowledge-based economy (United Arab Emirates National Agenda). To achieve these goals, primary and secondary school education is free and compulsory for all Emirati nationals. Undergraduate degrees are also free to Emirati students. The literacy rate in the country is 90% (IndexMundi 2015), and smartphone penetration is on the rise with 57% of the population in the Middle East owning a smartphone. The PEW report (who conducted the research) however does not separate the GCC states from other regions of the Middle East. To achieve the national priorities outlined in the UAE Vision 2021, all educational institutions in the country are to be equipped with smart systems and devices, and these are to form the basis for all teaching practice in the future (UAE Vision 2021 n.d.).

Educational institutions in the UAE are either private or government run. In 2006–2007, approximately 650,000 students were enrolled at 1256 public and private schools (Embassy UAE 2011). About 60% of all Emirati students attend public schools, while the rest attend private schools (alongside expatriate children), of which there were 511 in 2015 (Young Vision 2016). For the 2015/2016 school year, there were at least 503,931 students in private school education in the UAE. Approximately 24% of those students were Emirati. The dominant curricula within the private schools are American and British with each curriculum accounting for approximately 25% of the total nationally. Emirati schools, where the Ministry of Education (MOE) curriculum is taught, account for 23% of schools (Khamis 2016; United Arab Emirates – Education 2016). There are 71 institutions in the UAE offering higher education to over 128,000 students, of which 80% are studying for a bachelor's degree or higher (MOHESR 2015, pp. 10 and 46).

The MOE, which governs both the government and private schools in the UAE, has adopted "Education 2021," a series of two 5-year plans designed to implement advanced educational techniques in schools to improve creative and innovative skills and allow the students to focus more on self-learning. The 10-year strategy includes the adoption of modern technology in the classroom and enhancing training programs to reduce the need for a foundation year for students entering higher education in the country (Ministry of Education in UAE 2012).

In the higher education sector, there are a range of Arab and Western universities throughout the country. The dominant government universities include the United Arab Emirates University, the Zayed University, and the Higher Colleges of Technology (HCT). HCT is the largest higher education provider in the country. HCT has 17 campuses across all the emirates offering higher educational programs up to the master's level. HCT uses the Blackboard Learn Learning Management System, and all lecture rooms contain smartboards and computers. In 2017, the Khalifa University, the Masdar Institute of Science and Technology and the Petroleum Institute will merge to become a major research university to promote consistency (The National Staff 2016).

The UAE has the highest number of university branch campuses in the world (Wilkins 2010). The interest in higher education in the country can be attributed to the increase in population size, to the improved standards in the higher education system in the UAE, and to the close proximity of the UAE to other Middle Eastern states and Asia, which attracts students who are seeking quality education that requires minimal travel, and because Dubai, in particular, is associated with luxury and innovation (Lefrere 2007).

In Abu Dhabi, the notable large-scale private universities include Abu Dhabi University and Masdar Institute of Science and Technology (affiliated with the Massachusetts Institute of Technology). There are also satellite campuses of the New York University, Paris-Sorbonne University, Abu Dhabi Strathclyde Business School, and UAE INSEAD (Krol 2016). Private universities in Dubai, which are mainly located within the "Knowledge Village," include the American University of Dubai, British University in Dubai, Canadian University of Dubai, Harvard Medical School Center for Global Health Delivery of Dubai, Heriot-Watt University, Hult

International Business School, Institute of Management Technology, Alliance Manchester Business School Worldwide, Michigan State University, Middlesex University, Murdoch University, Rochester Institute of Technology, Royal College of Surgeons in Ireland, S P Jain School of Global Management, Strathclyde Business School UAE, University of Atlanta, University of Phoenix, and University of Wollongong (Krol 2016). There are also a range of language schools and training institutes who focus on providing the IELTS certification required to access these higher educational institutions.

E-Learning in the UAE

The concept of smart education is a key priority in the UAE and represents the cornerstone of the government's mission to develop an advanced infrastructure that will play a central role in achieving the country's e-learning platform (Ministry of Education in UAE 2012). Free high-speed accessibility to the Internet via an extensive network of hotspots is available to everyone in the UAE with a computer or handheld device (WiFi UAE n.d.). The WiFi UAE initiative is part of the plan to develop a truly world-class educational infrastructure and workforce. E-learning courses can now be found in schools, most of the public and private universities, liberal arts colleges, and regional community colleges within the country. In addition, the Dubai Internet City (DIC) contains the MENA region's largest ICT hub focused on developing the next wave of ICT innovation worldwide. DIC, with a strong encouragement from the government, encourages entrepreneurs and intends to attract global ICT leaders to the UAE – more specifically Dubai. Due to the wide gathering of new technological advances across the world, a company who sets up their business – whether it be small, medium, or large – can actively learn from one another.

In the UAE, education continues to receive increased national priority. Figures show that Dhs 9.8 billion (21%) of the 2014 national budget was allocated to the general and higher education sectors to support and improve general education (Dhs 6 billion) and academic excellence programs in local universities (Dhs 3.8 billion) (UAEInteract n.d.). The aim is for all educational institutions in the country to be equipped with smart systems and devices, and these are to form the basis for all teaching practice in the future (UAE Vision 2021 n.d.). As such, e-learning is now moving to the point where it is synonymous with "learning." Below is a list of the more prominent programs recently implemented in the UAE as it strives to become the most innovative country in the world and a leader of the Internet of Things (IoT) (Rizvi 2015).

The first e-learning platform in the UAE was the Hamdan Bin Mohammed e-University (HBMeU), which opened in Dubai in 2002, and now named Hamdan Bin Mohammed Smart University (HBMSU). The university was the brainchild of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and ruler of Dubai. HBMSU is committed to developing a culture of quality, innovation, and research through smart learning. The academic disciplines taught include business, quality management, education, healthcare, and environment at the undergraduate, master's, and doctoral level. HBMSU is accredited by MOHESR. Central to the learning process is the use of technologies in the form of mobile learning, discussion blogs, online classrooms, educational gaming, and social networking (HBMSU 2016).

In 2011, the E-Learning Gateway initiative was launched by the MOE with the aim of transforming learning into a collaborative and interactive Internet-based process. The e-learning platform, which is available in Arabic and English, is now available to all students in all federally funded schools (Ahmed 2011). The e-learning platform includes interactive learning objects for the subjects of Math, Biology, Physics, Chemistry, Geography, Arabic, and UAE Social Studies. The objective is to allow students to use e-learning techniques to research topics related to their curriculum (Absal 2011).

In 2012, the Mohammed bin Rashid Smart Learning Program (MBRSLP) was launched by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and ruler of Dubai, with the objective of integrating technology in education. In September 2012, iPads were distributed to all faculty and students in the Foundation programs of the three federal institutions including the HCT, the Zayed University, and the United Arab Emirates University (Gitsaki et al. 2013). As yet the impact of the initiative has not been reported. The iPad initiative was in support of the Education 2020 plan by the MOE for students to efficiently and effectively analyze information using technology and innovation collaboratively. The initiative was guided by the MOE and the Prime Minister's Office and was funded through the Telecommunications Regulatory Authority's Information and Communication Technology Fund (Mohammed bin Rashid Smart Learning Program 2016).

To support the MBRSLP program, the MOE in 2012 provided federally funded teachers' training in advanced education techniques in accordance with best e-learning practices to develop innovation skills and create lifelong learners (HCT n.d.). The goal was to produce the best education system in the world. In Abu Dhabi emirate, the Abu Dhabi Education Council, through its Tamkeen Empowering Educators program, provided all school principals, vice principals, and heads of the faculty at the 253 schools in the Abu Dhabi region with training on Teaching and Learning: Leading Learning in the Twenty-First Century, which had an ICT focus (ADEC 2013).

In October 2013, the Ministry of Education, in partnership with Etisalat (one of the two major phone companies in the UAE) and Google, launched an online education platform to develop hundreds of tutorials on YouTube aimed at alleviating the burden of private tuition costs and increasing access via e-learning. The result is "Duroosi," which translates as "My Studies" in English, which is a YouTube channel with 600+ tutorials covering a variety of subjects. It is intended to help families cut back on the high cost of private tuition and create a solid foundation of mobile learning.

In 2014, the Etisalat Educational Technological Center was established as a hub for smart education, research and development, and experiential educational tools. The hub, located within the MOE, is a partnership between Etisalat (telecommunications company), MOE, and Microsoft. The Center makes it easier to create online tutorials and videos and contains a production room where teachers can create lesson and tutorial videos which can be sent to students to complement existing lesson material. Strategic partnerships and unique talent development tools are seen as critical by the MOE for establishing a knowledge-based and sustainable UAE (Sinclair 2014).

In October 2014, the UAE announced the National Innovation Strategy with the aim of making the UAE one of the most innovative nations in the world within 7 years (UAE Cabinet 2016). National training and education programs on innovation have been launched along with innovation labs in schools and universities. This innovation drive complements the e-learning strategy within the Education 2020 plan to equip students with targeted skills such as critical thinking, problem-solving, creativity, perseverance, and adaptability. Currently, the UAE is ranked 41st in the Global Innovation Index (GII 2016). To achieve the goal of becoming the most innovative nation, all government departments have been advised to reduce expenditure by 1% and use the saving to conduct research. The UAE's total investment in innovation is estimated at AED 14 billion yearly of which AED 7 billion is allocated to research and development (UAE Cabinet 2016).

As part of the National Innovation Strategy, the UAE government has introduced a smart sustainable city initiative. Within this initiative are the smart government and e-participation initiatives which have been enacted to ensure the UAE is at the cutting edge of technology enabled developments and the Internet of Things (IoT). The e-participation initiative focuses on how to enhance the interaction between government departments and their customers using Web 2.0 applications. As part of the initiative, each government entity in the UAE now deploys electronic sharing information and communication technologies to enable citizens to connect with the government departments and each other through the government e-portal (MOE 2013). The Ministry of Interior in 2015 launched an App available on the iPad and Samsung that offers provisions for customers to be able to access their services around the clock, including traffic fines, visa applications, etc. In addition, there is an online chat.

As part of the smart government initiative, Dubai has set itself the goal of becoming the smartest city in the world by 2017. The philosophy behind the smart government initiative is that innovation in the public and private sectors should lead to increased citizen happiness and that all of this is underpinned by ICT innovation, particularly the IoT made possible through the e-learning enabling initiatives of the UAE Vision 2021. To this end, Du, a telecommunications company, has tested its new low power consumption, long-range network to establish the IoT within the smart city ecosystem in the country starting with smart street lighting, waste management, and parking (Rizvi 2015).

E-Learning Education Programs, Degrees, Associations, Certifications, and Accreditation

All the federally funded higher education institutions in the UAE offer undergraduate teacher training programs. Zayed University offers a Master of Education program, and UAE University (UAEU) offers PhD programs. Since these institutions are fully subsidized, the majority of UAE nationals undertake their undergraduate degrees at one of them. UAE University offers the following undergraduate program specializations in education – Elementary Education, Early Childhood Education, Art Education, Health and Physical Education, and Special Education. UAEU also offers a Master of Education and the following PhD concentrations, Curriculum and Instruction, Science Education, Mathematics Education, Language and Literacy Education, Leadership and Policy Studies in Education, and Special Education. The curriculum at UAEU "places a strong emphasis on student-centered learning; understanding educational research and the transformation of research to effective and successful educational practices" (UAEU n.d.). All of its education degrees are accredited with MOHESR.

Zayed University offers the following undergraduate specilizations within their Bachelor of Education (B.Ed.) programs – Early Childhood Education, Upper Primary Preparatory, and Social School Work. The University also offers a Master of Education degree with specializations in Educational Leadership and Administration, Special Education, and Teaching and Learning. The College of Education at Zayed University is accredited by the National Council for Accreditation of Teacher Education (NCATE) (ZU. n.d.). HCT offers four Bachelor of Education degree specializations including Early Childhood Education, English Language Teaching in Schools, Educational Technology, and Primary Education. The B.Ed. English Language Teaching in Schools and Early Childhood Education programs are benchmarked with the highly respected Graduate School of Education at the University of Melbourne, Australia (HCT n.d.).

In addition to the above, there are numerous for-profit e-learning training providers in the UAE with 23 listed in the Dubai Yellow Pages directory alone (2016). Practitioners and persons interested in e-learning in the UAE can join the International E-Learning Association (IELA). The IELA is dedicated to advancing the knowledge and practice of e-learning in the classroom and the workplace, and members can join online (IELA 2014).

For those in the UAE who want to take an e-learning degree, MOHESR has released a list of 105 accredited foreign online universities recommended for UAE students. Forty-six of the universities are in the United Kingdom, 34 are located in the United States, while in Australia 20 are recommended as well as 5 in New Zealand (Staff 2014). E-learning degrees from any other institution worldwide will not be provided with equivalency status (MOE 2016). Therefore, expatriates, who have online degrees and want to work in the UAE, should check to see if their degree will be recognized before making any plans to move to the UAE.

Future Development

Expo 2020, which will open in Dubai in October 2020, has chosen as its theme "connecting minds, creating the future," with the subthemes of sustainability, mobility, and opportunity (Expo 2020 2016). Furthermore, the UAE government has recently launched a happiness and positivity initiative, which in the UAE is taken to mean a lifestyle, a government commitment, and a spirit uniting the UAE community (WAM 2016). All of this could not be possible without technology underpinned by e-learning. E-learning is already the foundation of education in the UAE and in the years to come will propel the nation forward in the following ways discussed below.

In a matter of years, the UAE will become a world leader in innovation. Dubai Internet City is already the largest information technology hub in the MENA region, and it is being expanded and groomed to produce the next wave of IT companies to rival Silicon Valley. The next IT wave is expected to center on the IoT, and the Government of Dubai is partnering with Du, a telecommunications firm to be the world's first smart city incorporating IoT and thereby positioning itself as a leader in the implementation and development of the technology. Dubai already has the world's tallest building and is soon to have the world's fastest train (Fortune 2015), transporting passengers from Abu Dhabi to Dubai (145 km), in under 15 min. In addition to these headline investments, a number of major theme parks are due to open in Dubai this year in support of Dubai's tourism vision of attracting 20 million tourists per year by 2020. Abu Dhabi, which has one of the largest reserves of oil and gas in the world, is actively diversifying its economy to provide opportunity for all. However, at the same time, the emirate is continuing to invest in oil and gas infrastructure so as to position itself as the lowest cost producer of the commodity in the future. By 2020 the UAE will be one of the few countries globally able to profit from low oil prices should they continue to remain depressed.

With respect to innovation and sustainability, Masdar has partnered with the UAE government to develop Carbon Capture, Utilization, and Storage (CCUS) projects. Masdar is also investing heavily in solar energy projects. In 2015–2016, Solar Impulse 2, a solar flight project, successfully circumnavigated the globe beginning and ending in Abu Dhabi. Masdar has also built several other ground-based solar projects in the country, one of which is the largest concentrated solar power array in the Middle East, generating 100 MW of electricity. One of the latest projects is the development of "a renewable energy desalination pilot program to research and develop energy-efficient, cost-competitive desalination technologies that are suitable to be powered by renewable energy" (Masdar 2016).

While all of this is impressive, probably the most impressive will be the future developments in e-learning powered by the IoT. Within a generation the IoT will collect and monitor information on every animate and inanimate object on the planet. Computers will process and analyze every change in state of everything, every millisecond, and systems will develop, learn, inform, and teach in real time. The world will become the classroom; learning will be continuous, all-day every-day; and instruction will be tailored to suit every individual based on the instant recording of demonstrated knowledge and behaviors relative to what is required. George Orwell foresaw this development negatively; however, the positives are immense. In the future, the IoT will mean that future generations will not have to endure one-size-fits-all lessons and teachers will no longer be the sage on the stage. In the future, curriculum will largely give way to skills-based learning, teachers will be mentors, and learning will be automatically individualized.

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Chapter 20
Yemen

Mohammed Q. Shormani and Yehia A. AlSohbani

Abstract This chapter surveys the development and current state of e-learning in The Republic of Yemen. The authors survey the general social, economic, historical and demographic background of Yemen and provide a review of its educational system. Analysis and statistics on the Information and Communications Technology (ICT) infrastructure, usage of ICT in the country, and challenges and barriers to ICT implementation in education, business, and government are also provided. The chapter further explores in detail the major e-learning platforms, initiatives, and projects throughout the country. Information is additionally provided on accreditation, teacher training programs, and the regulatory framework of e-learning. Finally, the authors speculate on the future development of e-learning in Yemen. A comprehensive bibliography on e-learning scholarship related to the country, including government reports and websites, appears at the end of the chapter.

Keywords Yemen • E-learning • Web-based learning • ICT • Internet • Education • Distance learning

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Source: *CIA World factbook*, https://www.cia.gov

Country Profile

History

In its modern history, Yemen was divided into two parts: North Yemen and South Yemen. Both areas were colonized by different peoples, and each received its independence in a different period of time. For example, North Yemen was colonized by the Ottoman Empire, and only in 1918 it got its independence. After independence, North Yemen was ruled by the Imamate Regime, whose era extended up to 1962, and ended in what is known as the September 26, 1962 Revolution. After the revolution, the ruling system changed from an Imamate Regime into a Republican government in what is known as the Yemen Arab Republic (NEW 2017).

As for South Yemen, however, it was colonized in this period by the British, and only in 1967 it got its independence. After 1967, the government in South Yemen adopted a socialist orientation (CIA 2017; see also Walker 2014). As a result of the adopted regime, hundreds of thousands of Yemenis from the South immigrated to the North of Yemen. This gave rise to “two decades of hostility between the states”; there were several wars held between the two countries in this period (CIA 2017). Each war was followed by a period of peace, which in turn ended by another war, and so on (Walker 2014). However, during these war-peace periods, there were some elites from both parts of Yemen who worked for permanent peace among “the brothers.” All their good will and human trials resulted in a union between the two parts in 1990. As a result of unification, there have been several changes in all aspects of the country including the ruling system, education, borders, economics, politics, etc. (NEW 2017). These among other related issues will be the concern of the following sections.

Location

Yemen is located in the southwest of the Arabian Peninsula in Asia. As noted above, before unification, both parts of Yemen each had their own borders. However, after unification, both parts became one, viz., the Republic of Yemen. It is bordered by Saudi Arabia to the north. To the west sits the Red Sea, to the south, the Gulf of Aden and Arabian Sea, and Oman, to the east. Yemen is believed to be the ancient center of civilization in the Near East and Arabian Peninsula. The capital is Sana’a, which is the largest city in Yemen. Yemen’s territory includes more than 200 islands, the largest of which is Socotra, about 354 km (220 mi) to the south of the mainland (CIA 2017). In this very strategic position, Yemen was considered an important Arab state on the old world trade route; it was a “transit” point of trade from Europe and America to South Asia and India and vice versa. Yemen oversees one of the most important water straits, viz., Bab Almandab, which links the Arabian Sea with the Red Sea and the White Sea. Bab Almandab’s importance arises from its being one of the major routes through which most of the world’s petrol passes to Europe and America. This makes Yemen one of the most important countries not only in ancient but also in modern, and contemporary, times.

Economy

According to the Yemen Central Statistics Office, “Yemen is one of the poorest countries in the Middle East and North Africa (MENA) region. The gross domestic product (GDP) per capita was estimated to be US$1,343 in 2013” (CSO 2013). In addition, according to the Human Development Index (HDI), it is ranked 154 among medium human development countries. Yemen’s economy depends mainly on agriculture and agricultural industries. There are also some traditional professions like animal grazing and cottage industries. However, recently, a new trend of industry, which depends on oil and gas production, has started to emerge, but it is very limited. Yemen's economy also depends on immigration, specifically immigration to Gulf countries, and the USA. In these places Yemeni immigrants work, earn, and send money to their families in Yemen. These immigrants also contribute to the total country developmental strategies through establishing a number of projects like private hospitals, private schools, private universities, and so on.

Population

Yemen's population is increasing dramatically. "According to the first Population Census conducted in 1994 under the Republic of Yemen, the population was 15,831,757 persons. It has increased by 58% in the last 20 years to reach about 25 million in 2013" (CSO 2013). According to Countrymeters, Yemen's population was about 28 million in 2017. The growing population puts more pressure on the Yemeni government. To meet this growth, the Yemeni government needs to provide social services and public infrastructure such as schools, universities, institutes, hospitals, health centers, etc. among many other necessities and facilities. The Yemeni government also needs to expand the labor market. It should be noted here that the Yemeni government has endorsed many treaties and agreements needed in a number of social and educational fields. For example, after the unification of Yemen in 1990, the first Yemen Demographic and Maternal and Child Health Survey (YDMCHS) was implemented in 1991. In addition, a number of educational declarations and strategies have been endorsed by the Yemeni government, as we will see later on in this paper (CSO 2013).

Religions and Languages

As for religion, most Yemenis believe in Islam. However, there is a second religion, namely, Judaism, in which another minority believes, though a large number of Jewish people have recently left Yemen for Israel. As for languages spoken in Yemen, there are in fact four languages. The first and most widely spoken language is Arabic. Arabic is considered the official language, i.e., the language of the press and court, and is the medium of instruction in all Yemeni schools and universities. There are also some other (spoken, not written) languages like Socotri, spoken in Socotra Island; Mehri, which is spoken in Mahara province; and Razhi. Razhi is spoken in Sada'a district (see, e.g., Watson et al. 2006; Shormani in press; see also Simeone-Senelle 1997 and Lewis 2009, who add two other languages spoken in both Yemen and Oman, namely, Hobyot and Bathari). Though these languages are spoken in their respective territories, in fact, Arabic is also spoken by the speakers of these languages. These languages (other than Arabic) are endangered, specifically Razhi. They are mainly confined to the territories they are spoken in. They are neither spoken nor taught in other parts of the country.

Politics

As noted above, both parts of Yemen passed through different periods of political instability. However, we will just concern ourselves briefly with the political state after 1990, viz., after unification. As noted above, Yemeni unification took place on May 22, 1990, when North Yemen united with South Yemen, to form the Republic of Yemen, after a series of wars and conflict. Yemen is a republican country, and in fact, the only Arab country in the Arabian Peninsula to have such a republican system of government (UNDP in Yemen). It is a democratic country, and it allows for political variation: there are more than 40 parties in Yemen. According to the Yemeni Constitution, every Yemeni (man or woman) has the right to vote and stand for election. It should also be noted that Yemen is the first (and indeed the only) country in the Arabian Peninsula to give women the right to vote in presidential and parliamentary elections. Since 1990, several elections (presidential and parliamentary) have taken place.

Education System in Yemen

In North Yemen and prior to the 1962 Revolution, the educational system was represented by Alkuttab, which is a room mostly attached to mosques, and mostly concerned with the study of Qur'an and Hadith (The Prophet Mohammed's Sayings). These Alkuttabs were, in fact, confined to big cities (and some small towns). It was also limited to rich and elite people (Walker 2014).

As for South Yemen, specifically before 1967, education, in its modern technical sense, was present but with limited access. According to the World Bank (2010), there were about 3000 students enrolled in public and private educational sectors in the early 1940s. However, in the 1970s, i.e., after the revolution in the North and independence of the South, education in Yemen changed into the regular system of education, i.e., "schools" in the technical sense or in Western terminology. Schooling became a government priority and free for all the citizens and for both genders, though girls are much less likely to attend schools than boys, for several social, cultural, and other reasons (World Bank 2010).

As noted above, Arabic is the medium of instruction not only in Yemen but also in the entire Arab world. As far as public school education is concerned, English is introduced in the seventh grade in almost all Arab countries. Some technical and scientific courses are offered in English at the secondary level. Instruction by native speakers of English is rare. No other foreign languages are taught in the public educational institutions. Some private schools, however, offer instruction in certain European languages such as French and Russian (Walker 2014, p. 232). The academic year starts in September and ends in early June. The numbers of students, teachers, and staff have steadily increased in the public educational sector, in addition to considerable growth in the private sector as well. There are four types of education in Yemen, i.e., general education, technical (vocational) education, special education, and higher education. These are briefly discussed in the sections to follow.

General Education

General education in Yemen starts with kindergarten and extends to secondary education in a K-12 system (Al-Joufi 2008). As for kindergarten education, a child joins kindergarten at the age of 3 years and remains there for 3–4 years; he or she joins basic education at the age of 6–7 years. Kindergarten is not widespread in all Yemeni schools; it is rather present in private schools (UNESCO 2006; World Bank 2010). General education in Yemen comprises basic education and secondary education. Basic education spans over 9 years. It is completed with a republic exam, which is sponsored and supervised by the Ministry of Education (MOE) for all schools in the country. As a result of this exam, the MOE awards a certificate, referred to as a basic school certificate. This certificate does not qualify the students to join university. It allows only for joining secondary education.

As for secondary education, it lasts for 3 years, i.e., a student extends his/her basic education and completes 12 total years. There are two tracks in this program, viz., literary and scientific. Either track is chosen in the second year of secondary education. Secondary education ends with a republic exam sponsored by the MOE for all schools in the country. As a result of this exam, the MOE awards a general secondary certificate, which qualifies the school graduates to join university.

To conclude this section, general education, be it public or private, is sponsored by the Yemeni government, but public education is financed by the Yemeni government, i.e., it is free for all Yemenis. Public education is, in fact, compulsory, although there are still some children who do not join or drop out of this type of education. General education is also called formal education. However, there is another type of general education in Yemen called nonformal education. This type of education is also financed by the Yemeni government. This type of education could be called "compensatory." It services those who drop out of the regular school system, either adults or children. This is, in fact, a consequence of the Yemeni endorsement of the World Declaration on Education for All, issued in Jomtien, Thailand in 1990 (Al-Joufi 2008; World Bank 2010).

Technical Education and Special Education

Technical/vocational education is technical secondary school education. It is considered an alternative program to the secondary one. In other words, those who complete basic education may join this type of education. The aim of this type of education is to equip students with technical knowledge and provide the society with young qualified people in different spheres like mechanics, electricians, etc. The Yemeni government pays considerable attention to this type of education and opens schools/institutes throughout the country. This type of education was perhaps launched to suit those who cannot continue secondary or university education, possibly for financial reasons.

Special education is the third type of public education in Yemen. This type of education is provided for those who are dumb, deaf, blind, etc. In accordance with the Yemeni declaration of education for all, the Yemeni government pays great attention to educating those who are not able to be enrolled in public schools. Therefore, it has established several special schools for these people. These schools are spread throughout the country, specifically in big cities like Sana'a, Aden, Taiz, Ibb, Thamar, Hodaida, Mukalla, etc. These schools are equipped with all the devices necessary for all kinds of disability. Such specialized schools provide general education, viz., basic and secondary education, and when these students, specifically the blind, complete their education in these schools, they may then join Yemeni universities.

At the universities, special needs students are provided with all kinds of help. For example, in exam halls, they are provided with people who write for them (i.e., they dictate to these people). In addition to the schools mentioned above, there are also some specialized schools for disabled people, viz., those who are physically disabled or otherwise physically handicapped. There are several schools for these people spread throughout the country. Colleges of education in almost all public universities have established and opened special departments like special education, kindergarten, etc. where specialist teachers are prepared.

Higher Education

According to the Yemeni Ministry of Higher Education and Scientific Research (MHESR), all secondary school graduates can join Yemeni universities. However, which college/department a secondary graduate can join depends on the Ministry's regulations concerning grades, section (i.e., scientific or literary), entrance exams, etc. In fact, Western style tertiary education only emerged in Yemen in the 1970s with the establishment of Sana'a University. Today, there are 12 public universities spread through most of the Yemeni provinces, like Sana'a, Aden, Taiz, Ibb, Hadhramaut, Thamar, Hajja, etc. Those provinces (and even remote districts) that have no universities have attached colleges to these universities. There are also a number of private universities and colleges, spread throughout the country. Yemeni universities, either public or private, provide all kinds of education and specializations like medicine, dentistry, computer sciences, engineering, languages, etc. They also provide all Western programs, such as bachelor's, master's, and doctorate degrees, and different types of diplomas.

The number of students increases every year in all the above types of education in Yemen. Table 20.1 summarizes the gross enrollment ratios between 1998–1999 and 2007–2008.

In addition, the Yemeni government, through the MHESR, has initiated a scholarship system and higher education delegations which travel to other countries via several policies such as governmental expenses, university-based scholarships, and cultural exchange with the countries worldwide. There are also a number of inter-

Table 20.1 Gross enrollment ratios between 1998–1999 and 2007–2008

	Males		Females		Total	
	1998–1999	2007–2008	1998–1999	2007–2008	1998–1999	2007–2008
Early childhood education	0.8	1.2	0.7	1.0	0.7	1.1
Basic education (grades 1–9)	80.4	84.5	42.2	63.7	61.8	74.3
Secondary education (grades 10–12)	45.7	43.3	16.2	22.9	31.4	33.8
University	14.6	18.0	3.8	7.5	9.4	13.2

Source: MOE data; UN population data, May 2009
Note: University data is for 2006–2007 (quoted from World Bank 2010, p. 12)

national programs and grants sponsored by several organizations and programs such as ICCR, sponsored by India, Erasmus Mundus (SALAM Program), sponsored by European organizations, and the Fulbright Program sponsored by the USA. In 2012, based on UNSECO data, there were about 15,000 Yemeni students studying abroad in all disciplines and specializations. This scholarship system is called the "external" scholarship system. It concerns delegations or individuals who travel and study abroad. There is also a national scholarship system established and sponsored by the MHESR, called the "internal" scholarship system. This system targets top graduates of secondary school or even university who cannot travel and study abroad, specifically girls. Like the external scholarship system, the "internal" scholarship system allows students to study bachelor's, master's, or doctorate degrees in different specializations in Yemeni universities. In both systems, the MHESR provides students with all necessary expenses like tuition fees, monthly grants, tickets, etc. It should also be noted that both systems include students from other ministries and offices, not necessarily MOE and MHESR, such as health, defense, agriculture, tourism, etc.

Development and Reform

Developing education in Yemen and reforming it could be considered among the most dire priorities of the Yemeni government, on the one hand, and meeting the concerns of Yemeni educationists and educators, on the other hand. This situation is actually due to the educational philosophy and policies that the Yemeni government has been adopting. This has also been acknowledged by several organizations. For example, in 2004, the World Bank listed Yemen within the fast-track initiative for the development of education (CIA 2017; ESCWA 2009; Al-Joufi 2008). Education in Yemen, especially after unification, has rapidly and significantly witnessed substantial development based on well-established constitutional and legal bases. According to the Yemeni Constitution, citizens have equal opportunities in education whatever political, economic, social and/or cultural backgrounds they belong to. To achieve this constitutional goal, the Yemeni government has constructed different schools and cultural and educational institutes to the extent that basic education can be compulsory. In fact, this goal has been set by the Yemeni government to reduce illiteracy, although the goal of eradicating it completely is still under consideration by the Yemeni government. The Yemeni government has also set an aim of expanding other types of education like vocational and technical education. This is due to the fact that it seeks other alternatives for those who cannot continue their studies and must look for jobs, mainly for economic reasons. This aim is also an important step toward protecting the youth from deviating from a moral pathway in life.

The Yemeni government has done a lot in expanding educational opportunity even with its available limited budget. For example, according to the General Law of Education 1992, the Yemeni Constitution has identified the general principles and foundations for education in Yemen at the religious, national, cultural and educational levels. The law sees education as a human right, and the government should secure and facilitate it for all its citizens. In fact, the Yemeni Constitution sees education as a human investment factor for the long-term developmental strategy of the country (Al-Joufi 2008).

As noted earlier, in Jomtien, Thailand, in 1990, the Yemeni government made a declaration on education for all, aiming at achieving social equality in all its aspects. It also took the responsibility of building schools equipped with all the adequate infrastructure required for appropriate education. It has also set a strategy called Yemen Strategic Vision 2025, which is described in the next section.

Yemen Strategic Vision 2025

In this section, we analyze the Yemen Strategic Vision 2025 set by the Yemeni government. This strategy was established in 2000, for 25 years. It aims to improve the education opportunities for all Yemenis and reduce illiteracy among Yemenis, as a strategy of human development to reach the level of, at least, medium development countries. Some of the important goals the strategic vision aims to achieve are summarized below (cf. Al-Joufi 2008, pp. 2–11):

1. Illiteracy combating, to be reduced to less than 10% by 2025.
2. Achieving education for all and universalizing and guaranteeing girl's education, especially in rural areas, and narrowing in the gap between female and male through applying the principles of obligatory basic education and raising the awareness on the importance of girls' education and raising the capacity of girls' schools and preventing dropouts.
3. Making a whole alteration in the education system in terms of structure and curriculum to be able to be in line with science and technology and development of need. It may be useful to mention the strategic vision trends and goals in the science and domain of technology which have been identified, transferring the

basics of the Yemeni technology and scientific set into a national system for creativity according to the following:

(a) Set a national strategy for science and technology.
(b) Give special importance for raising training and education and expanding its basis.
(c) Raise the response of university education for the requirements of the society, and be in line with development in the fields of human and practical science, and the era change challenges.

4. Guaranteeing the linkage of higher education with the society. Therefore, the newly graduated person changes from someone who is looking for a job into someone creating a job opportunity.
5. Increasing the number of centers and institutions of scientific research and development.

There are also other programmatic strategies (within this 2000–2025 strategy) for developing education in all its forms. The most important strategies are listed as follows (cf. Al-Joufi 2008, pp. 2–11):

1. National Higher Education Strategy (2006)
2. The National Strategy of General Secondary Education (2006)
3. The National Strategy of Basic Education Development (2003).

Education and Training Sector Strategies

To conclude this section, we believe that education is an essential factor in a country's total development. It has to be rethought to undergo constant reform and development. However, such a process, we believe, is not the responsibility of the MOE per se but rather a matter of strong coordination of the MOE with several bodies such as the Ministry of Finance, Civil Service and Insurance, Local Administration (MOLA), Higher Education and Scientific Research, and Technical Education and Vocational Training (see also World Bank 2010). According to the World Bank, coordination among these bodies could result in five benefits that could directly address education quality challenges:

1. Enhance the quality of current and future teachers.
2. Align incentives for civil service employment.
3. Provide concerted efforts to increase and sustain the provision of teachers to rural areas.
4. Reduce the incentives for teachers to migrate from rural to urban areas.
5. Better match the preservice training of teachers in universities to what is required in schools (World Bank 2010, p. 6).

E-Learning in Yemen

The term "e-learning" is expansive, viz., it has no specific definition; it has rather a broader interpretation. E-learning is seen as any kind of ICT application in education (see, e.g., Parks 2015; Aldowah et al. 2015; Yordzhev and Peneva 2012; Kumbhar 2009; Jeevan 2006; Shormani & AlSohbani in progress). The concept of e-learning has recently been considered a broader field of study which encompasses a wide range of information technology use in education and other various fields. It is a new and promising aspect of using information technology and communication to enhance the teaching process and enduring and powerful learning by using new technological techniques and strategies (Aldowah et al. 2015). According to Aldowah et al. (2015, p. 1), e-learning includes the use of "computers, Internet, mobile phones, Learning Management Systems (LMS), Televisions, Radios and any other technological tools that can [be] use[d] to improve and increase teaching and training activities and develop the learning processes." It also refers to web-based learning and teaching processes, where a learner can learn and a teacher can teach anytime and anywhere.

Thus, following the work of Yordzhev and Peneva (2012), Parks (2015), Kumbhar (2009), and Jeevan (2006), we define e-learning in this study as a type of learning that involves any use of technology in education. It is in other words, an umbrella term covering education, communication and training, computer-assisted teaching, computer-based training, education, web-based training, telecommunication, web-based networks, storage technology, etc. (see also Cross 2004).

Role of Information Communication Technology (ICT)

Needless to say, technology has a significant role to play in almost every aspect of our life. This role is manifested in learning and teaching perhaps more than any other field. There are currently several attempts to employ technology in education in what is now known as e-learning, our main concern in this study, in the sense that technology should be integrated in the classroom.

There are, however, several technological concepts and notions a student should be familiar with, and it is the teachers' duty to introduce these concepts and notions to their students before commencing using ICT in their teaching tasks. Teachers have a prominent role in teaching and guiding students on how to use technology in their studies in and out of the classroom. This role lies in equipping students with knowledge of how to exploit technology as an instrument to help them in their learning tasks (Vahideh & Mohammad 2011; Alawi 2005; Lawless & Pellegrino 2007; Shormani and AlSohbani in progress, among other related works). In general, ICT provides major opportunities and several ways to access information and in different environments. It can facilitate complex processes not only in education, but also in all fields of life such as the banking industry, Internet commerce, mobile banking, etc.

As far as education is concerned, ICT removes barriers that hinder people from getting education in any location. It plays the role of a facilitator of higher-order thinking and active learning (see, e.g., Jonassen 1999; Alexander 1999; Khan 2001, 2005; Alawi 2005; Lawless and Pellegrino 2007). The use of ICT may support reflection about, and cooperative learning of, the educational content (Susman 1998). Furthermore, ICT may serve as a tool for curriculum differentiation, providing opportunities to adapt the learning content, tasks, and capabilities of each student by providing tailored feedback (Khan 2005; Mooij 1999; Smeets and Mooij 2001; Alawi 2005). In learning, tasks are presented to students; active and cooperative learning is stimulated, and the curriculum is adapted to the needs and capabilities of students. Therefore, teachers should apply various ICT elements to enhance powerful and enduring learning in their classrooms (Smeets 2005; Alawi 2005; Khan 2001, 2005).

Historical Background of the Internet in Yemen

The Internet

In Yemen, the Internet was launched in 1996, via an undersea fiber optic cable. In the beginning, this essential service was very limited, but it has developed since then, through several treaties and agreements with world Internet service companies. In 2005, for instance, TeleYemen, the only official Internet provider (see below), "announced it would invest in the FALCON high-capacity loop cable system." This system was expected to "improve Internet access, including broadband capability, and also expand international call accessibility" (Wikipedia). However, compared to other countries in the region, Internet service in Yemen is still not satisfactory or up-to-date. Table 20.2 summarizes the number of Yemeni Internet users between 2000 and 2016 (as of June 30, 2016).

As Table 20.2 shows, Yemeni Internet users increased dramatically from 2000 to 2016. They were only 15,000 in 2000, but they were about 6,773,228 users in 2016, i.e., 24.7% of the Yemeni population. In Yemen, Internet users can now access the Internet via a number of ways including computers, mobiles, iPads, etc. in several and different places: home, cafés, work, universities, schools, etc. There are two main routes of access, namely, wired and wireless connections. Wi-Fi broadcasting is fast and widely available in cities, towns, and even villages as provided by the private sector. Wired access is provided by the government through YemenNet Corporation for Internet and Telecommunications.

Internet Providers

As stated above, Yemen started using Internet service in 1996. The only Internet provider is TeleYemen, the National Internet Corporation. When the Internet was first launched in Yemen, the Yemeni government owned 49% of TeleYemen and

Table 20.2 Internet users in Yemen between 2000 and 2016

Year	Users	Population	Penetration%	Usage source
2000	15,000	17,900,000	0.1	ITU
2001	100,000	19,600,009	0.5	ITU
2005	220,000	20,764,630	1.1	MOTIT
2009	370,000	22,858,238	1.6	ITU
2010	420,000	23,495,361	1.8	ITU
2012	3,691,000	24,771,809	14.9	IWS
2016	6,773,228	27,392,779	24.7	IWS

Source: Slightly modified from Internet World Stats (IWS 2016)

British Cable and Wireless Company 51%. However, in 2003, the Yemeni government represented by the Public Telecommunications Corporation became the sole owner of TeleYemen. Furthermore, since April 2002 the provision of Internet service was monopolized by the Yemeni government directly, and the TeleYemen Corporation started to work as a second provider (ESCWA 2009). Currently the Yemeni government is trying not to monopolize Internet provision by "preparing new terms and conditions to promote license granting for Internet service providers, in order to create a space for new providers to enter the service" (ESCWA 2009, p. 6).

In fact, the Internet and telecommunications in general have witnessed considerable developments in various aspects in the last two decades or so. The Yemeni government represented by MOTIT has paid much attention to this essential service. The developments are manifested through the rapid spread of Internet and telecommunication services, specifically infrastructure, the number of subscribers, and connectivity. Table 20.3 below summarizes the total number of Internet and mobile users and subscribers as of 2016.

Yemeni Government Efforts in ICT

E-Learning Projects

In 1995, the Yemeni government established the National Information Center (NIC) as an institution to take a leading role in proposing and implementing development policies in the field of information. However, the NIC as a project has only been adopted and approved by the government since approximately the year 2000, under the five-year plan for economic and social development. The NIC took actual steps to facilitate the establishment of an information infrastructure society. The NIC also adopted several projects in informatics infrastructure. These include the national strategy for information, the national information network, and the informatics institute. Sometime later, the NIC initiated other projects such as "community service centers, the Yemeni e-library, etc." (ESCWA 2009, p. 2). The NIC also carried out a number of tasks and activities. These include publishing data and

Table 20.3 Internet and mobile users and subscribers as of 2016

Category	Percentage (%)
Fixed telephone subscriptions per 100 inhabitants	4.7
Mobile cellular subscriptions per 100 inhabitants	68
Fixed (wired) broadband subscriptions per 100 inhabitants	1.4
Mobile broadband subscriptions per 100 inhabitants	5.8
Households with a computer	6.5
Households with Internet access at home	5.5
Individuals using the Internet	25.1

Source: International Telecommunication Union (ITU 2017)

information and making it accessible to all citizens and institutions. It also took the help of a number of public and private sector institutions and adopted a national initiative related to the information national policy and strategy. It also took the help of some organizations from outside Yemen like the United Nations Economic and Social Commission for Western Asia (ESCWA) with headquarters in Beirut. Thus, with the help of ESCWA, NIC completed the documentation of policies and strategies; however, the project was not approved officially (ESCWA 2009; Nasr et al. 2015).

However, NIC achieved "a number of steps which aimed at creating an effective information system to facilitate the preparation and exchange of data and information between different government institutions, business sector, citizens, and beneficiaries" (ESCWA 2009, p. 2). However, the results that were achieved were not matching the objectives of the project, simply because annual financial allocations were not sufficient. According to ESCWA (2009), it was also difficult to find an external financing source, and hence, the project started its first steps of networking applications with a number of government institutes and academies.

Another project that was launched in Yemen in 2008 was called Innovations Technology-Assisted Learning for Educational Quality (INTALEQ) for teaching mathematics and science online to first secondary year students. This project was, in fact, "implemented as an act of an integrated approach under the leadership of the MOE and Teaching and funded by the Ministry, by donors, and the private sector" (ESCWA 2009, p. 4). According to ESCWA (2009), the project targeted four provinces, and the cost was 1442 US million dollars (see Seeger & Sula 2013, for more information on this issue).

Another project is the third 5-year plan (2006–2010). This project has played a number of roles in ICT projects and initiatives. It also proposed to restructure the Ministry of Telecommunications and Information Technology (MOTIT). A list of services to regulate the remuneration of the use of frequencies and radio equipment was also prepared. A national plan was prepared for the allocation of frequencies according to international regulations with the aim of investment in Yemen and managing their use throughout the country (ESCWA 2009).

There were also a number of national programs that have been established to enhance ICT use and services. For instance, a "national program to provide comprehensive communication services was also prepared, including the provision of community ICT centers in all residential areas in Yemen, giving incentives for investment in the development of new services. As concerns the ICT Infrastructure, next generation networks were installed and operated experimentally in Aden and Mukalla" (ESCWA 2009, p. 6; see also Seeger & Sula 2013).

There are also other programs launched throughout the country, in urban as well as rural areas. According to ESCWA (2009), a number of programs were implemented and installed throughout the country. For example, a fiber optic cable system 1187 km long was implemented, and messaging stations were installed. A ring (SUB-RING3 DWDM3) program was developed and expanded to connect six provinces (ESCWA 2009; Seeger & Sula 2013). An expansion policy of telephony to remote areas including islands has also been a major concern of the Yemeni government represented by MOTIT. For example, the telephone capacity of Yemen (fixed + mobile) was expanded, increasing from 685,000 subscribers in 2003 to 1,022,000 in 2007. The telephone network reaches and covers many areas in Socotra Island. The sea cable (Hodaida-Ghayda) was also completed. A project of Internet network and telecommunication service (dial-up) was drastically expanded. For example, the number of (dial-up) subscribers increased from 109,127 subscribers in 2005 to 224,310 in 2008. Super YemenNet services (ADSL) were also expanded, though they are not spreading rapidly compared to dial-up. In 2006, ADSL subscribers were about 2781, but they reached 13,512 in 2008. There are also several other projects (and plans) related to infrastructure development via the National Development Plan. These include, but are not limited to, the national information network project and other information infrastructure projects (ESCWA 2009; Seeger & Sula 2013).

Training Programs

There are a number of training programs that have been established throughout the country. In addition, there are several Yemeni institutions and centers that contribute to the development of human resources to support the spread of ICT. For example, the MOTIT has long established a center for the development of innovators. This center supports the development of ICT innovators in several industrial projects and ICT industries. In 2007, the General Telecommunications Institute (GTI) initiated a program which trained about 1300 people in ICDL and other related programs (ESCWA 2009).

Current Status of E-Learning in Yemen: Projects, Initiatives, and Programs

Several researchers believe that the status of e-learning in Yemen is not satisfactory (see, e.g., Alawi 2005; Aldowah et al. 2015). E-learning in Yemen, though a necessity, is not supported by sufficient infrastructure. As stated earlier (see above), Yemen established a number of national strategies for all stages in education: basic education (2003–2015), the national strategy for higher education development (2006–2010), and the national strategy for technical education and vocational training (2005–2014). Most of these strategies aim at achieving the main objectives of incorporating ICT into all these types of education (Alawi 2005; Aldowah et al. 2015).

In 2002, with the help of Jordan Telecom, the GTI provided services in distance education/learning. Since 2003, a branch of the CISCO Academy operates in Yemen. As noted earlier, Yemen was listed within the fast-track initiative for the development of education, which was provided by the World Bank in 2004. Since 2005, a number of educational institutions also conduct ICDL examinations over the Internet, and many other ICT applications in education have appeared. These among other related issues are discussed in the subsections to follow (see, e.g., ESCWA 2009; Alawi 2005; Aldowah et al. 2015).

K-12 School Education

According to ESCWA, there were 605 schools, i.e., about 55% of the Yemeni's schools of all grades, equipped with all e-learning infrastructure (e.g., computers and Internet service were introduced in these schools) up to 2009. In 2007, only 500 secondary schools were provided with computer labs and Internet. In these 500 secondary schools, a computer course was introduced, and 200,000 copies of the computer course book were distributed. In addition, 233 television sets, receivers, and projectors were distributed to schools for learning resources, and 3000 copies of the technical manual for learning resources centers were printed and distributed (Seeger & Sula 2013).

There are also other projects at the school level. For example, the project Innovations Technology-Assisted Learning for Educational Quality (INTALEQ) was initiated in 2008. This project aimed at teaching science and math online to first grade secondary school students in 20 schools; it was implemented starting from February 2009. There are also a number of ICT colleges, either in public universities or in private universities and colleges, that provide students with Internet and web-based materials, specifically for distance learning (ESCWA 2009; Alawi 2005; AlHarthi 2010). Furthermore, more than 732 teachers were trained in the computer field in 2009 (Alawi 2005; ESCWA 2009).

Recently, the MOE has established a department of e-learning. In 2012, this department took over some responsibilities of the Information System and Telecommunication Department (ISTD) as well as staff. ISTD played an important "role in implementing the ICT component of BEDP 2 [Basic Education Development Project] and the GPE [Global Partnership for Education] funded programs…and computer provisions for advanced schools" (Seeger & Sula 2013, p. 24; see also World Bank 2013).

The important point to be noted here is that the e-learning department calls for awareness among teachers "on the various ICT related learning projects and activities all over Yemen, and on the immediate need to coordinate those efforts, learn from them, explore potentials to scale up, and promote for partnership arrangements within and beyond the [educational] sector" (Seeger & Sula 2013, p. 25). The problem as noted by Seeger & Sula (2013) is that most of the staff members were not familiar with how e-learning is best managed. Managing e-learning, Seeger and Sula argue, is very technically demanding, and it is necessary that the MOE employs competent and professional people. The e-learning department has established training programs to spread ICT awareness and familiarity among ICT users. According to Seeger & Sula (2013), these programs have covered 3000 trainers and 1500 supervisors. As for infrastructure, it is estimated that about 7000 computers were given to schools of Sana'a, Aden, Hadhramaut, and Mukalla, though "[c]onnectivity is typically missing and the plans to finance connectivity." Overall, about 3000 out of 16,000 schools throughout the country were covered by these programs.

Higher Education

In higher education, there are some projects for implementing e-learning in Yemen. For example, despite all the obstacles faced by e-learning in Yemen, the MHESR has laid the basis for e-learning projects through the development of ICT infrastructure, information technology systems, and information services in the public universities. Recently, the Yemeni government has paid a great deal of attention to ICT. Higher education has witnessed "a sequence of developmental and transformational phases aimed at creating an information-rich society. Yemen is competent to achieve a number of accomplishments in the infrastructure part, developing projects, improving opportunities for the flow of information, electronic applications, etc." (Aldowah et al. 2015; see also ESCWA 2009; Alawi 2005; Seeger & Sula 2013).

A good example of an e-learning project is the one initiated by Sana'a University. Sana'a University has signed an agreement with Microsoft to provide over 70,000 staff and students throughout Yemen with Microsoft's leading e-learning solutions ("Sana'a University's" 2004). It is hoped that this project connects the students and provides them with a powerful integrated learning environment, including course content, online examinations, and course work submission. It is also hoped to provide them with communication and collaboration tools. This project is considered one of the largest projects of its kind in the world. It is expected to provide students, educators, and staff with innovative learning solutions.

Although distance (or open) education in Yemen is a possibility, it is actually not spreading rapidly. Some higher education institutions allow for or offer distance education by means of e-learning. But most of these institutions are private universities, colleges, and institutes such as the University of Science and Technology, Lebanese International University, etc. These are, in fact, the first institutions to make use of e-learning in distance education. There are also some public universities in Yemen that have adopted e-learning in distance education. Recently, Sana'a University, for instance, has tested e-learning feasibility in its distance learning programs. In addition, ICT specializations including information technology, computer science, engineering, network programing, etc. are paid much attention to in all public and private universities (see, e.g., Alawi 2005; ESCWA 2009; Seeger & Sula 2013).

A very important improvement to the application of ICT and e-learning in Yemen that can be noted here concerns the e-gate registration policy, a project currently initiated by Yemeni MHESR. The Ministry makes this e-gate service available on the web. This e-gate project is the only window to join university education, i.e., all Yemeni freshman students who want to join any university, public or private, must register using this e-gate. It should also be noted that this e-gate project is generalized for the academic year 2016–2017. There are also some efforts to join all Yemeni universities through ICT projects to exchange experiences, references, researchers, e-libraries, etc.

E-Learning Programs

There are also several programs of training and teaching e-learning sponsored by the Yemeni government throughout the country. In these programs, a number of trainees are qualified, and different training cards and certificates are issued. For example, the GTI with the help of some other organizations has issued 508 distance learning cards for its e-learning system. Through these cards, subscribers can access education in more than 400 specialty areas, at low cost, at any time, and from any place they want (with small fees, i.e., about 1800 YR for a three-month program). A recognized electronic certificate is awarded to each trainee after completing the course (ESCWA 2009; Seeger & Sula 2013; Alawi 2005; Qasim 2015, 2016). Another training program launched by GTI concerns developing and equipping Microsoft, Oracle, and CISCO modern labs in five provinces including Mukalla City. In this program, the institute branches were equipped with computers and CISCO components. For example, 14,469 trainees from government and private sectors were trained in technical, administrative, and commercial computer and ICDL areas in a 2-year period, i.e., between October 2006 and June 2008 (ESCWA 2009). Furthermore, computer and Internet network science has also been taught by a number of institutes and academies, public and private, throughout the country, graduating a number of well-trained students. For example, in 2007, 547 trained students graduated from the CISCO Academy. About 2014 trainees were trained and graduated from the National Information Center and the Institute of Informatics in the 2006–2007 period of study (ESCWA 2009).

Another institute that can be noted here is the National Institute of Administrative Sciences which organizes, with the help of the GTI, the ICT training programs for staff in provincial agencies. The development covers a number of universities, such as in Sana'a and Aden, and some private universities, contributing to human resource development efforts. According to ESCWA (2009), in 2007 there were 187 private training institutions and centers, and the number of certificates issued was 14,739.

Case Study of E-Learning in Yemen

Due to the paucity of studies on e-learning in Yemen in general and in universities in particular, it was difficult for the authors to answer such questions as to what extent Yemeni university faculty members use ICT in their personal and academic life, what effectiveness e-learning has, what is its actual status, what are the barriers that hinder e-learning in Yemen, and most importantly, how Yemeni university faculty members foresee the future of e-learning in Yemen? To answer these questions, among many others, we conducted an empirical study.

Participants

The participants of this study are 48 university faculty members, holding different degrees, viz., BA, MA, and PhD. They are male and female (though gender is not considered in this study). They are from different Yemeni universities, public and private. Thirty-seven participants are from public universities and 11 from private ones.

The Questionnaire

The researchers faced considerable difficulties in contacting the participants of this study. This is because the study was conducted in a vacation time, in addition to the war going on in the country. To overcome this difficulty, the researchers prepared an online questionnaire on Google Forms as an open instrument starting from July 5, 2016 at 3:21 a.m. and ending on August 5, 2016 at 11:44 p.m. To announce and invite people to participate in this questionnaire, it was posted on some social networks, mainly on Facebook and WhatsApp. It was also sent via email to some colleagues in different universities.

The questionnaire starts with an item concerning which university the participant belongs to, i.e., either public or private. The questionnaire consists of five sections. Each section consists of five items and is introduced to the participants with an introductory statement, showing them what to do and how to do it. The participants participated in this questionnaire online by “clicking” to choose one of the answers provided under each item, in a multiple-choice form. The first section concerns the participant’s use of social networks in personal communication with his/her students and teaching tasks. It also concerns his/her perspective/attitude toward e-learning. Section 2 concerns the participant’s view regarding the efficiency of using e-learning. Section 3 deals with the reality of e-learning in Yemen from the participant’s point of view. Section 4 presents items concerning the difficulties encountered in e-learning in Yemen. Section 5 involves items concerning the future of e-learning in Yemen. It should be noted here that the questionnaire and its items were constructed in Arabic and then translated into English by the researchers.

Results and Discussion

In reference to the questions stated at the beginning of this section, the first question concerns the extent to which Yemeni university faculty members use ICT. As Table 20.4 shows, there is great awareness of using ICT and social networks for personal and education purposes among Yemeni university faculty members. Almost all the participants use ICT and social networks, although with a varying degree as shown in the scores of “Always,” “Often,” “Sometimes,” and “No.” The selection “No” scores the least responses at 0.0%. The use of ICT devices in classroom is also significant. All the participants use them, though with some sort of variation; 58% of the participants always use them, 27.2% often use them, and 14.8% sometimes use them. Likewise, all the participants encourage their students to use the web for academic purposes. The fact that 62% of the participants “Always” encourage their students to use the web for extra references and materials indicates that e-learning becomes an indispensable factor in Yemeni university faculty members’ academic life. Finally, all the participants see that the use of ICT saves time and efforts, again, however, to a varying degree.

The second question concerns the effectiveness of e-learning from the point of view of Yemeni university faculty members. As is clear in Table 20.4, the results obtained are not systematic. Most Yemeni university faculty members see e-learning as an appropriate (but not necessary) ingredient in university education. The item concerned with its necessity scores 21% as “Disagree,” which is significant. However, faculty are fully aware that e-learning facilitates distance education as is clear from the “Agree” item response as 92%. Furthermore, while 64% of the participants agree that e-learning helps student to self-learn, only 13.4% disagree. A very significant point that can be noted is that only 18% of the participants agree that e-learning helps in motivating critical thinking and 23% do not agree that it does so. In fact, this result is striking to us, and we do not have a plausible explanation for it, and so we leave it for future research.

Regarding the real/actual status of e-learning, the present study provides support to the previous studies on this aspect. In other words, there is e-learning going on in Yemeni universities but in a limited amount. This is clear from the “Agree” response concerning the limited existence of e-learning, which scores the highest rank among the five items, viz., 74%. It is also clear that private universities use e-learning more than public ones. It also apparently indicates that Yemeni universities seem not to be aware of the importance of using e-learning. These two items are perhaps a consequence of the fact that Yemeni universities do not provide (or are not equipped with) e-learning infrastructure.

As for the barriers of e-learning, it is clear that the first barrier is lack of electricity in Yemen, specifically, nowadays; it has not been available for about 2 years because of the war going on in the country. It scores the highest rank among the items of this category, viz., 94% as “Agree.” Lack of e-learning infrastructure is also a considerable barrier. It scores the second highest rank of the “Agree” responses. The actual state of Internet service provided is also another considerable

Table 20.4 Questionnaire section, item, responses, and percentages ($N = 48$)

Section	Item	Always	Often	Sometimes	No
Use of ICT and social networks	Contacting students and colleagues	23%	46.%	31%	0%
	Announcing for class purposes	5.4%	33%	55.6%	6%
	Using devices: computer and optical blackboard	58.%	27.2%	14.8%	0%
	Encouraging for using the web	62%	31%	7%	0%
	Saving time and effort	71%	22%	7%	0%
			Agree	To some extent	Disagree
Effectiveness of e-learning	It should be used		56.4%	36%	7.6%
	It must be used		34%	45%	21%
	It helps in self-learning		64.4%	22.2%	13.4%
	It helps in thinking critically		18%	55%	27%
	It facilitates distance education		92%	8%	0%
			Agree	To some extent	Disagree
Status of e-learning	No e-learning in Yemen		12%	24%	64%
	There is but limited		74%	13%	13%
	Public universities use e-learning more than private ones		8%	6%	86%
	Universities are aware of the value of e-learning		12%	33%	55%
	Yemeni universities provide e-learning infrastructure		9%	23%	68%
			Agree	To some extent	Disagree
Barriers of e-learning	Lack of e-learning infrastructure		82%	12%	6%
	Lack of e-library		58%	39%	3%
	Instability of politics		74%	15%	11%
	Lack of fast Internet		76%	13%	11%
	Lack of electricity		94%	6%	0%

(continued)

Table 20.4 (continued)

Section	Item	Always	Often	Sometimes	No
			Agree	To some extent	Disagree
Future of e-learning	E-learning has a promising future		71%	20%	9%
	Considered while ranking of universities		64%	25%	11%
	Raises the academic effectiveness		55%	32%	13%
	Awareness of e-learning is increased		81.4%	12.6%	6%
	Universities develop e-learning future plans		54%	5%	41%

barrier. Though Yemen is connected to the world through the Internet by means of a fiber optic network and through an undersea cable, as noted earlier, Internet service is perhaps the worst in MENA, specifically nowadays. The lack of e-libraries constitutes another barrier to some extent. Since this study is conducted in the current situation (i.e., state of instability and war), it is possible to argue that e-learning is hindered by the current status of politics in the country. This is also clear from the "Agree" scores, i.e., 74%, for the item "Instability of politics" as a barrier, which is significant.

Regarding the expected future of e-learning in Yemen, it is clear that it has a brilliant future, as shown by the percentages of each item score of the "Agree" responses. As shown in Table 20.4, no item scores less than 50%. The first result that is significant is the awareness of e-learning among Yemeni university faculty members, scoring 81.4%, viz., the highest one of the "Agree" responses. This is likewise indicated by the "Agree" responses to the item concerning e-learning having a promising future, viz., 71%. Yemeni universities need e-learning for academic rankings on both national and international levels, because e-learning increases the academic effectiveness of universities. E-learning could provide universities with the resources to allow their journals, researches, projects, etc. to be indexed for higher impact.

Overall, it is worth mentioning that although Yemeni university faculty members are aware of the importance of employing e-learning in Yemeni universities, it seems that Yemeni universities are not to a great extent aware of this importance, at least from the points of view of the participants involved in this study. To us, however, we think that Yemeni universities are fully aware of the importance of e-learning, but there are some barriers that hinder establishing or generalizing e-learning as it should be. As the section concerning barriers presented in Table 20.4 above shows, it is clear that Yemeni universities are suffering from the lack of sufficient e-learning infrastructure as well as electricity shortages at the present time. E-learning infrastructure requires very large budgets, which are not easy to maintain by such universities. This is due to economic problems, which the Yemeni government cannot solve, though there are efforts observed to resolve this aspect. In fact, Yemen does not have the available sources compared to, for instance, the Gulf or other MENA countries. Apart from the problems Yemen is suffering these days like political instability, war, etc., we believe also that there are higher priorities for the Yemeni government, viz., more urgent developmental requirements rather than employing e-learning.

To conclude this section, it should be noted that the constructed questionnaire also contains a section called “Other.” The researchers’ aim to include this section was to collect “free responses” (in writing) and to get to know what the participants thought appropriate to add. We collected 17 responses, 2 of which were in English and 15 in Arabic, which were translated by the researchers. In what follows, we present a sample of these written responses (five responses). We will also briefly comment on these responses underneath.

Response 1
E-learning in Yemen is very important, but it is ignored by researchers, because there are no studies on this aspect. Studies on e-learning in Yemen are very rare, if any at all. As a researcher, I think researchers should involve themselves in this aspect to diagnose the real requirements e-learning needs and the salient problems hindering it in Yemeni universities and even schools. Based on these studies, we can then provide solutions to these problems.

Response 2
First, e-learning covers a wide range of applications. It is important to define what e-learning is. Second, e-learning requires not only materialistic infrastructure but also “human infrastructure.” Teachers should be competent in using e-learning devices. Third, students should be prepared to engage in e-learning tasks, which require them to be able to use e-learning devices.

Response 3
Public universities suffer from overcrowded classes more than private ones, and I think e-learning is hindered by the huge number of students in classroom. Because of the small number of students in private universities, the latter use e-learning more than public universities.

Response 4
The use of e-learning depends on several factors, most importantly the nature of the subject matter to be taught and the level of the students. For example, in teaching listening in overcrowded classes, e-learning is so important…more important than when teaching writing. The same thing is true in the case of dentistry students, but not Islamic studies, for example.

Response 5
I think that e-learning is sought for better education and how much we are in need of this in our universities and schools…but e-learning in Yemeni universities is unfortunately not called for by universities nor encouraged by faculty members.

Regarding Response 1, we totally agree with this participant that no real diagnosis can be made and no solution can be provided unless further studies tackle and investigate e-learning in Yemen. As is clear in this paper, four or five studies on e-learning are not enough to deeply probe the phenomena. E-learning in its broad sense is used in Yemeni universities; the problem could be that university faculty members may not be aware of what they are doing. As Table 20.4 shows, almost all the participants make use of e-learning in their classes, but this use may be under other names or concepts.

As for Response 2, it is true that e-learning should first be defined appropriately so that we know what and what is not e-learning. It is also true that e-learning is not only about physical infrastructure but also “human infrastructure” should be given attention, and this is what has been emphasized in this study.

Regarding Response 3, it is true that public universities suffer from overcrowded classrooms; a class may contain 120–200 students. However, we believe that e-learning in Yemen is an appropriate solution to such a problem, and not a hindrance. A university faculty member can use the overhead projector/data show, and student understanding will be much better. He/she can also refer them to a website where every student could make use of the information and learn. As clearly stated above, public universities face economic problems, which are not the case in private universities. This is, we think, why private universities use e-learning more than public ones.

As for Response 4, we think that e-learning has substantial potential for improving all disciplines and all specializations. If a video is important in teaching listening skills, an optic blackboard is important in teaching writing skills; an overhead projector/data show is also important to display a written sample of a student to all the class and involve them in pair/self-correction. Likewise, speakers are also as important in Islamic Studies class as a video is in a dentistry or spoken class (see also Shormani & AlSohbani in progress).

Finally, we agree with the first part of Response 5 that e-learning is meant for better education, but we do not agree with regard to the second part of the response, specifically the idea that Yemeni universities do not call for using e-learning. The study at hand (see Table 20.4) indicates that Yemeni universities do not only call for e-learning but also encourage using it. This study also shows that most university faculty members encourage their students to use e-learning through inviting them to use the web, e-references, etc.

Future of E-Learning in Yemen: Needs and Consequences

As discussed so far (see Table 20.4, specifically regarding the future of e-learning), it could be expected that the future of e-learning in Yemen is promising. In this section, we present some of the dire needs of e-learning in Yemen and provide some recommendations for employing e-learning and its consequences in Yemen. The reality of e-learning and the available ingredients, though simple, indicate that employing e-learning in Yemen is promising, on the one hand, and may have a vital role socially, culturally, scientifically, and most importantly economically on the other hand. Thus, we present our own perspectives based on empirical evidence that employing e-learning in Yemen is an indispensable factor, not only for developing education in general but also to achieve our own learning objectives, and our graduate outcomes are well qualified, a qualification that enables our graduates to participate in a competitive world for the "better." This is one of the sought-for goals in the world of today. We are living in a world demanding the best and the highest qualified human resources in all disciplines. These among other related issues are discussed in the sections to follow.

Availability of the Most Basic Ingredients

The Internet and computers are the most important elements of e-learning (at least in its narrow sense) to get connected to web-based materials and to surf the web (thanks to technology!). In Yemen, the Internet is now available via LAN lines for all, and for those who cannot afford the charges of subscription, Wi-Fi networks are spread in almost every zone in cities and even in some villages. As for computers (thanks also to technology!), there are now Internet-enabled phone models like LG, which are available for all, given their low prices. Our youth spend most of their time on Facebook, Twitter, WhatsApp, etc., wasting their time and money. The question then is what if these two available elements are appropriately exploited, viz., made use of in the right perspective? We think that we need just to have trust in what we are doing as educators. Software like Ustad Mobile (mobile teacher) could be used for e-learning on mobile phones (see also Seeger & Sula 2013; Roopanarine 2012; UNESCO 2012, for more educational software programs and their applications in Afghanistan, Ghana, Morocco, etc.).

Economic and Geographical Concerns

Recall that e-learning saves time and effort. We believe also that e-learning saves "money" as well. Therefore, instead of establishing new schools, colleges, and/or universities in rural areas, which need large budgets for physical infrastructure and human resources like faculty members, staff, etc., it could be argued that these rural areas can be connected to universities in cities via e-learning facilities. This is specifically important due to the fact that the Yemeni government suffers a lot from economic problems. Furthermore, and as noted so far, Yemeni universities are located in big cities. Some (low income) families living in rural areas cannot send their children (girls and boys) to universities due to the fact that they cannot secure their university needs and expenses. Therefore, we see that e-learning may solve this geographical-economic problem.

Computer and Internet Illiteracy Concerns

It is a fact that computer illiteracy is among the problems that the Yemeni government seeks to reduce, if not to eradicate. For this very reason, MHESR advocates and applies a policy of requiring a course in computers in all majors in universities. However, this is not enough to reduce computer illiteracy among Yemeni students at the university level. We, therefore, see that the spread of e-learning in universities may reduce not only computer illiteracy but also internet illiteracy. The fact that e-learning depends heavily on ICT devices and web-based materials will force students to learn to use computers and the Internet. In this way, e-learning could contribute to reducing computer and Internet illiteracy among Yemeni students.

Lack of Sufficient Up-to-Date Library Materials and References

Not only Yemeni students but also Yemeni researchers suffer a lot from the paucity of library reference material in all fields. As far as Yemeni university students are concerned, there are insufficient reference resources in the university library, and if there are, they are almost outdated, and they cannot meet the fast and vast development and research in all fields. Thus, e-learning, specifically web-based, provides students with access to tremendous sources of references and materials from all over the globe. It also links students to a variety of web-based sites; this enhances and consolidates their knowledge and practice.

Religious Concerns

Yemen is known as a "conservative Islamic country," where coeducation specifically in schools is not "welcomed" by all families. Girls in most rural areas in Yemen drop out from their schools at the age of 14, simply because there are no girl schools in these areas. The same problem, but to a lesser extent, does exist in Yemeni universities. A huge number of girls are not allowed to join universities by their families for the same reasons. A considerable number of families do not allow their daughters to join university due to the only possibility of study for them, i.e., coeducation since there are no female universities in Yemen. Even those girls who join university wear hijab. We believe that e-learning could be used as a solution to this problem, i.e., it will secure "separate" education for females (see also Azaiza 2012; Weber 2010; AlHarthi 2010, for more on MENA countries like Jordan, Qatar, Oman, and the UAE).

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Erratum to: Morocco

Rachida Ajhoun and Najima Daoudi

Erratum to:
Chapter 12 in: A. S. Weber, S. Hamlaoui (eds.), *E-Learning in the Middle East and North Africa (MENA) Region*, https://doi.org/10.1007/978-3-319-68999-9_12

The map of Morocco from the *CIA World Factbook* which appeared in an earlier printing of this book has been replaced with the map of Morocco officially endorsed by the Kingdom of Morocco.

The updated online version of this chapter can be found at
https://doi.org/10.1007/978-3-319-68999-9_12

A. S. Weber, S. Hamlaoui (eds.), *E-Learning in the Middle East and North Africa (MENA) Region*, https://doi.org/10.1007/978-3-319-68999-9_21

Source: Kingdom of Morocco, http://www.maroc.ma/en/content/map-morocco

Appendix: MENA ICT Indicators

The ICT Development Index (IDI) is a global, weighted value of 11 separate ICT indicators developed by the International Telecommunications Union and designed to measure the level and evolution over time of ICT, the progress in ICT development, the digital divide, and the development potential of ICTs in each country of the world. Three subindices are also calculated annually: ICT access, ICT use, and ICT skills. The indicators are:

ICT Access

1. Fixed-telephone subscriptions per 100 inhabitants
2. Mobile-cellular telephone subscriptions per 100 inhabitants
3. International Internet bandwidth (bit/s) per Internet user
4. Percentage of households with a computer
5. Percentage of households with Internet access

ICT Use

6. Percentage of individuals using the Internet
7. Fixed-broadband subscriptions per 100 inhabitants
8. Active mobile-broadband subscriptions per 100 inhabitants

ICT Skills

9. Mean years of schooling
10. Secondary gross enrolment ratio
11. Tertiary gross enrolment ratio

For a complete description of the IDI methodology, see *Measuring the Information Society Report 2016* (Geneva, Switzerland: ITU), pp. 7–11.

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Table A.1 ICT development index 2016. IDI rank

IDI 2016 rank	Economy	IDI 2016 value	IDI 2015 rank	IDI 2015 value	Rank change
1	Korea (Rep.)	8.84	1	8.78	–
2	Iceland	8.83	3	8.66	Up Λ
3	Denmark	8.74	2	8.77	Down V
.					
.					
	Middle East and North Africa region				
29	Bahrain	7.46	28	7.42	Down V
30	Israel	7.40	30	7.25	–
38	United Arab Emirates	7.11	35	6.96	Down V
45	Saudi Arabia	6.90	38	6.88	Down V
46	Qatar	6.90	43	6.78	Down V
53	Kuwait	6.54	48	6.45	Down V
59	Oman	6.27	58	6.04	Down V
66	Lebanon	5.93	61	5.91	Down V
85	Jordan	5.06	89	4.67	Up Λ
89	Iran (I.R.)	4.99	90	4.66	Up Λ
95	Tunisia	4.83	95	4.49	–
96	Morocco	4.60	98	4.26	Up Λ
100	Egypt	4.44	97	4.26	Down V
103	Algeria	4.40	112	3.74	Up Λ
106	Palestine	4.28	103	4.12	Down V
122	Syria	3.32	120	3.21	Down V
155	Yemen	2.02	151	1.96	Down V
161	Djibouti	1.82	160	1.73	Down V
.					
.					
173	Guinea-Bissau	1.38	171	1.34	Down V
174	Chad	1.09	175	1.00	Up Λ
175	Niger	1.07	174	1.03	Down V

Source: International Telecommunications Union, http://www.itu.int/net4/ITU-D/idi/2016/. Data not available for Iraq or Libya. All data used by permission of the International Telecommunications Union.

Table A.2 Core household ICT indicators, MENA region, as of July, 2017

		Proportion of households with						Percentage of individuals using a		
		(HH1)	(HH2)	(HH3f)	(HH3m)	(HH4)	(HH6)	(HH5)	(HH7)	(HH10)
		Radio	TV	Fixed line telephone	Mobile-cellular telephone	Computer	Internet access at home	Computer	Internet	Mobile
1	Algeria	...	...	...	...	37.0	31.9	...	...	...
2	Bahrain	31.8	99.2	12.0	99.2	94.8	98.0	71.3	98.0	100.0
3	Djibouti	...	...	...	...	...	...	...	...	...
4	Egypt	19.5	97.6	21.8	97.4	50.9	42.3	45.6	37.8	86.7
5	Iran (I.R.)	88.2	99.3	92.0	94.9	61.4	62.2	41.2	53.2	77.9
6	Iraq	...	...	...	...	...	...	...	...	...
7	Israel	...	87.5	69.2	96.9	80.3	74.3	72.0	77.4	...
8	Jordan	...	...	...	98.8	47.0	69.0	...	...	...
9	Kuwait	...	99.4	61.0	99.4	80.7	59.1	...	...	...
10	Lebanon	...	...	...	...	...	...	...	...	...
11	Libya	...	...	...	...	...	...	...	...	...
12	Morocco	…	…	22.3	99.6	54.9	68.5	46.6	58.3	91.9
13	Oman	...	...	24.6	99.3	58.7	86.1	79.0	69.8	83.9
14	Qatar	38.4	78.3	67.5	99.7	88.3	95.8	87.5	92.9	100.0
15	Saudi Arabia	...	...	...	...	69.0	94.6	...	73.8	...
16	Syria	...	...	...	...	...	...	...	...	...
17	Tunisia	49.1	98.7	13.2	94.4	39.3	30.7	31.3	49.6	83.5
18	United Arab Emirates	29.9	83.7	59.0	100.0	91.0	94.3	90.4	90.6	99.8
19	Yemen	...	...	...	...	...	...	...	...	...

Source: ITU World Telecommunication/ICT Indicators Database, http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx. All data used by permission of the International Telecommunications Union.

Note: Figures in italics are ITU estimates. No disaggregated data for Palestine (West Bank/Gaza Strip).

...Data not available

Table A.3 Percentage of individuals using the internet 2000–2016 in MENA region

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria	0.49	0.65	1.59	2.20	4.63	5.84	7.38	9.45	10.18	11.23	12.50	14.90	18.20	22.50	29.50	38.20	42.95
Bahrain	6.15	15.04	18.05	21.55	21.46	21.30	28.24	32.91	51.95	53.00	55.00	77.00	88.00	90.00	90.50	93.48	98.00
Djibouti	0.19	0.34	0.49	0.63	0.78	0.95	1.27	1.62	2.26	4.00	6.50	7.00	8.27	9.50	10.71	11.92	13.13
Egypt	0.64	0.84	2.72	4.04	11.92	12.75	13.66	16.03	18.01	20.00	21.60	25.60	26.40	29.40	33.89	37.82	39.21
Iran (I.R.)	0.93	1.48	4.63	6.93	7.49	8.10	8.76	9.47	12.02	13.80	15.90	19.00	22.73	29.95	39.35	45.33	53.23
Iraq		0.10	0.50	0.60	0.90	0.90	0.95	0.93	1.00	1.06	2.50	5.00	7.10	9.20	13.21	17.22	21.23
Israel	20.87	17.38	17.76	19.59	22.77	25.19	27.88	48.13	59.39	63.12	67.50	68.87	70.80	70.25	75.02	77.35	79.78
Jordan	2.62	4.71	6.03	8.47	11.66	12.93	13.87	20.00	23.00	26.00	27.20	34.90	37.00	41.40	46.20	60.11	62.30
Kuwait	6.73	8.55	10.25	22.40	22.93	25.93	28.79	34.80	42.00	50.80	61.40	65.77	70.45	75.46	78.70	77.52	78.37
Lebanon	7.95	6.78	7.00	8.00	9.00	10.14	15.00	18.74	22.53	30.14	43.68	52.00	61.25	70.50	73.00	74.00	76.11
Libya	0.19	0.37	2.24	2.81	3.53	3.92	4.30	4.72	9.00	10.80	14.00	14.00		16.50	17.76	19.02	20.27
Morocco	0.69	1.37	2.37	3.35	11.61	15.08	19.77	21.50	33.10	41.30	52.00	46.11	55.42	56.00	56.80	57.08	58.27
Oman	3.52	5.89	6.87	7.26	6.76	6.68	8.30	16.68	20.00	26.80	35.83	48.00	60.00	66.45	70.22	66.13	69.82
Palestine	1.11	1.84	3.10	4.13	4.40	16.01	18.41	21.18	24.36	32.23	37.40	41.08	43.40	46.60	53.67	57.42	61.18
Qatar	4.86	6.17	10.23	19.24	20.70	24.73	28.97	37.00	44.30	53.10	69.00	69.00	69.30	85.30	91.49	92.88	94.29
Saudi Arabia	2.21	4.68	6.38	8.00	10.23	12.71	19.46	30.00	36.00	38.00	41.00	47.50	54.00	60.50	64.71	69.62	73.75
Syria	0.18	0.35	2.09	3.40	4.32	5.65	7.83	11.50	14.00	17.30	20.70	22.50	24.30	26.20	28.09	29.98	31.87
Tunisia	2.75	4.30	5.25	6.49	8.53	9.66	12.99	17.10	27.53	34.07	36.80	39.10	41.44	43.80	46.16	48.52	50.88
United Arab Emirates	23.63	26.27	28.32	29.48	30.13	40.00	52.00	61.00	63.00	64.00	68.00	78.00	85.00	88.00	90.40	90.50	90.60
Yemen	0.08	0.09	0.52	0.60	0.88	1.05	1.25	5.01	6.89	9.96	12.35	14.91	17.45	20.00	22.55	24.09	24.58

Source: International Telecommunications Union, *ICT Facts and Figures 2016*, http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx. All data used by permission of the International Telecommunications Union.

Table A.4 Gender gap in internet usage and mobile phone usage by region, 2016 Source: *The State of Broadband 2016: Broadband Catalyzing Sustainable Development*. UNESCO: Broadband Commission for Sustainable Development, 2016, p. 47

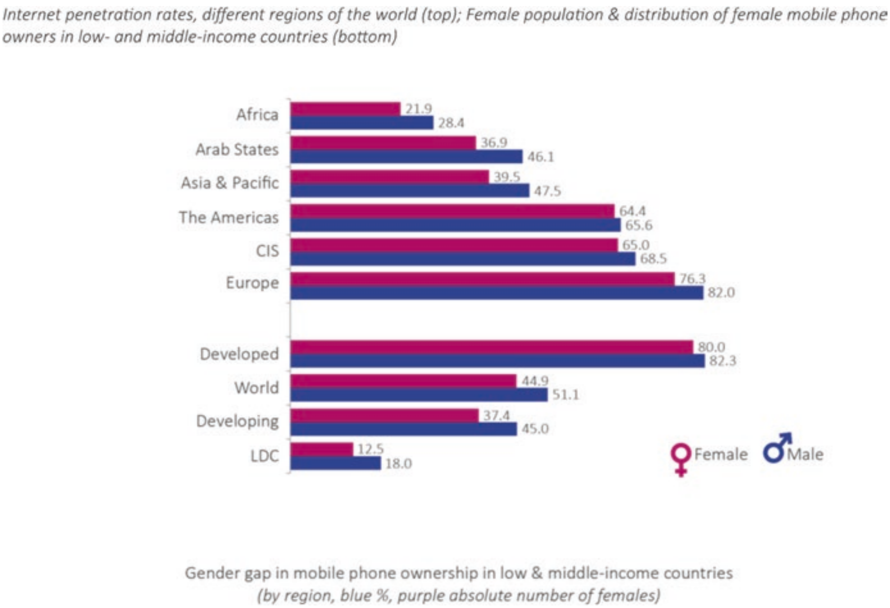

Table A.5 World Economic Forum (WEF) networked readiness index 2016, MENA countries[a]

Rank	Country	Value 2016	2015 rank (out of 143)
21	Israel	5.4	21
26	United Arab Emirates	5.3	23
27	Qatar	5.2	27
28	Bahrain	5.1	30
33	Saudi Arabia	4.8	35
52	Oman	4.3	42
60	Jordan	4.2	52
61	Kuwait	4.2	72
78	Morocco	3.9	78
81	Tunisia	3.9	81
88	Lebanon	3.8	99
92	Iran	3.7	96
96	Egypt	3.7	94
117	Algeria	3.2	120

The World Economic Forum began calculating the Networked Readiness Index (NRI) in 2001 to "make conceptual sense of the complex information and communication technologies (ICT) reality, identifying the common factors that enable countries to use technology effectively…..The networked readiness framework translates into the NRI, a composite index made up of four main categories (subindexes), 10 subcategories (pillars), and 53 individual indicators distributed across the different pillars" (Source of data: Baller, S., Dutta, S., & Lanvin, B. (Eds.), *The Global Information Technology Report 2016*. Geneva: World Economic Forum, pp. 16, 33).

[a]No data for Djibouti, Iraq, Libya, Palestine (West Bank/Gaza Strip), Syria, and Yemen.

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Dr. Mofeed Abumosa is an Assistant Professor at Arab Open University-Jordan (AOU). He has taught at AOU since 2006 and serves as the general course coordinator for math and math education courses. He also teaches many graduate courses (Multimedia and Designing and Producing Educational Software). In 2016 he developed a MOOC course in Calculus with Edraak.org. Before working with AOU, he worked (2003–2006) with Rubicon and Cisco Learning Institute (CLI) as a Subject Matter Expert (SME) to develop emath curriculum for The Ministry of Education-Jordan. He previously worked with MoE-Jordan for 14 years as a math teacher and supervisor and ICDL trainer. He has published widely on the use of dynamic applications in developing math education and has participated in many regional conferences related to technology and math.

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Dr. Ahmed Sameer Alnuaimi is a researcher, professor, physician (MBChB) and epidemiologist (MSc and PhD), passionate for the task of expanding the role of computers in teaching and upgrading the Iraqi health system. As the Head of the IT Department, he led the team that established the first official Moodle-based website for the electronic education of medical students in the Baghdad College of Medicine. With over 20 years of experience with national scale studies about health in Iraq and Jordan, he is currently the CEO of a private research and e-learning organization "Top Med Research" (website: http://company.topmedresearch.com). The organization provides expert advice to graduate medical students, medical professors and NGOs with expert advice in research and managing official e-learning websites for medical colleges. He is recognized as a regional consultant for USAID, UNFPA, UNICEF, and MoH (Ministry of Health-Iraq). The EmONC needs assessment study in Iraq in 2014 is one of the landmark achievements in this respect.

Yehia A. AlSohbani works as a Professor of Applied Linguistics at Ibb University, Yemen. He received his PhD degree (Pune University) in English in 1997. He also attended Manchester University in the UK where he was awarded advanced Diploma and MEd degrees in TESOL in 1989/1990. Yehia worked as a teacher educator at the Department of English, Faculty of Education, Sana'a University from 1991 to 1993. He was the Head of the Department of English and the Deputy Dean of the Faculty of Arts, Ibb University (1998–2000). He worked as a visiting Assistant Professor and Head of the TEFL department at Ajman University of Science and Technology in the UAE (2000–2008). He has published a number of papers on reading strategies, teaching reading, teaching listening, translation, attitudes and motivation in learning English as a foreign language and other factors affecting learning and teaching English.

Prof. Ali Sharaf Al Musawi obtained his PhD on learning resources and technology centers in 1995 from Southampton University, UK. He works for the Sultan Qaboos University since 1985. At present, he is a Professor at the Instructional and Learning Technologies Department at the College of Education. He has published several journal research articles, chapters in reviewed books, and papers; and contributed to many conferences, symposia, and workshops. He conducted and compiled several national, regional, and Arab studies and reports. He wrote a book on cooperative learning in 1992, contributed to writing another book in 2003 and an educational lexicon in 2014; he also published a book on learning resources and technology centers in 2004. He also translated, with others, two books on e-learning strategies and instructional multimedia to Arabic in 2005 and 2010. Professor Al Musawi has several activities in the fields of instructional skills development, study skills, instructional design, and web-based design. His interests include Arabic poetry; he has published two anthologies in addition to other hand-written ones.

Dr. Salah Al-Sharhan, PhD, is the Vice President for Academic Affairs at the Gulf University for Science and Technology (GUST), Kuwait, and an Associate Professor in the Computer Science Department. He earned his PhD in Systems Design Engineering with an emphasis on Computational Intelligence from the University of Waterloo in 2002. Dr. Al-Sharhan's research interests span different areas such as intelligent systems, data clustering, and classifications using soft computing algorithms, and the application of computational intelligence techniques to a variety of real-life problems. In addition, Dr. Al-Sharhan developed several e-learning and e-health models and participated in developing strategic plans for different sectors in Kuwait such as the e-learning strategy of the Ministry of Education. Furthermore, Dr. Al-Sharhan has extensive teaching experience in the field of computer science/engineering, MIS, and intelligence system areas. He taught in several institutions on the undergraduate and graduate levels. In addition, at the professional training level, Dr. Al-Sharhan's experience spans a wide range of areas through his distinguished courses in IT/engineering training programs, E-learning: strategy development, implementation and teacher readiness, project management, and soft skills training.

Dr. Fawzi Baroud has been engaged in promoting technology as a pedagogical tool tied to meeting educational objectives and assessment of learning outcomes in higher education for over 25 years. Specialized in e-learning, systems management, mathematics, and electrical engineering, he combines numerous areas of academic expertise for advancing the use of technology in different curricular content areas. As the Assistant Vice President for Information Technology at Notre Dame University – Louaize (NDU) in Lebanon, Dr. Baroud leads the campus-wide planning and implementation of information technologies that support teaching and learning, including training faculty members to integrate educational technology in their teaching. Dr. Baroud has published several studies on e-learning and information and communication technologies (ICT) use in education, participated in conferences, coauthored the informatics national curriculum for Lebanon, and offered consultancy to academic institutions. His research centers on the use, integration, and evaluation of ICT, OER, and e-learning implementation in higher educational contexts.

Richard Croome obtained his bachelor's degree, MBA, and PhD in Australia. Since completing his PhD, Richard has devoted his career to teaching in classrooms where the majority of students are English as an additional language learners (EAL). He has been living in the UAE since 2010. He is committed to improving learning outcomes in classrooms via e-learning. His other research interests are in the areas of leadership and innovation to determine if certain leadership styles promote innovation more than others.

Hala Dalbani is an Associate Professor at the Linguistics Department at Prince Sultan University and a former Professor at Damascus University, Syria. She has served as a Tempus Higher Education Reform Expert, a former UNDP National Project Director, and an expert on QA and program accreditation. She contributed to the establishment of the Damascus University Open Learning Centre by authoring several university textbooks. She has published scholarly articles mainly on quality education and integrating technology and pedagogy and has participated in international collaborations that led to launching several MA programs. Her leadership positions include: Chairperson of the Linguistics Department at Prince Sultan University; Program Director of the English Language Department at the Syrian Virtual University; and Dean of the Higher Institute of Translation and Interpretation at Damascus University. An academic with extensive teaching experience in different Arab universities in conventional/distance/virtual teaching/learning environments, she has insights into the challenges pertaining to tertiary education in the Arab World and a deep understanding of how quality can be maintained.

Najima Daoudi was born in 1976 in Morocco and received her PhD at ENSIAS, Rabat, Morocco. Her 2009 thesis was entitled *MADAR Learning: Interoperable Environment between E-learning and M-learning*. She received the Diploma of Higher Studies at EMI, Rabat, Morocco in 2004, her Engineer Degree at INSEA, Rabat, Morocco in 1999, and she has been Assistant Professor in ESI since December, 2000. She has written about 20 scientific articles and papers on e-learning. Also, she participated in several conferences around this theme as a member of the organizing and scientific committees. As a Professor of Higher Education at the ESI, she was actively involved in the implementation of the E-learning FORCIIR Project. Also, she produced two online courses since 2003/2004. She has been teaching for several years an E-services course focusing on setting up, among other things, a platform for distance learning. She has supervised several student final projects at the bachelor and master's levels since 2007. She has also participated in the supervision of theses dealing with MOOCs, tutorial engineering, smart cities, and analysis of feelings in the ENSIAS.

Mahieddine Djoudi received a PhD in Computer Science from the University of Nancy, France, in 1991. He is currently an Associate Professor in the department of Computer Science, Faculty of Fundamental and Applied Sciences at the University of Poitiers, France, and member of TechNE technology enhanced learning research laboratory. His main scientific interests are: e-learning systems architecture; mobile learning, computer supported collaborative work, information literacy, and web usage. He has published over 50 scientific papers, as well as chapters in books which deal with technology enhanced learning. He is also a member of program committees, and an editor or reviewer for international journals or conference proceedings. His teaching interests include programming, data bases, artificial intelligence, and web technology. He started and is involved in many research projects which include many researchers from different Algerian universities.

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Jennie Lavine completed her bachelor's and master's degree in the United Kingdom. She first came to the United Arab Emirates in 1998 after completing her A-levels. Upon completion of her MBA at Warwick University in the UK, she embarked on researching higher education in the Middle East with a strong focus on the UAE. Her first publication was a book on *Philanthropy and Fundraising in Higher Education*, which was published in 2015. Her second publication was with Dr. Richard Croome on "Gender in Higher Education in the Middle East and North African area (MENA)." Currently Jennie is researching for a PhD in Management in Higher Education with a university in the UK.

Ms. Sawsan Mashal is an English-speaking graduate student who completed her BA in English Language and Literature from the University of Jordan in 1987. She is currently completing her MA on Technology in Education at Arab Open University–Jordan. She additionally holds a postgraduate diploma in Education from the University of Jordan. She also taught English at several international schools in Jordan and elementary schools in the USA.

Adem Salhi is an experienced German teacher with a demonstrated history of working in the e-learning industry. He taught German as foreign language, linguistics, and translation in Tunisian schools and at the University of Carthage in Tunisia. Since 2011 he has been a PhD student in the department of German as a foreign language at Philipps-University of Marburg in Germany. In his dissertation he demonstrates how ICT can be used and integrated in a multilingual classroom. In July 2013 he received the E-Learning Certificate from the Goethe-University of Frankfurt. Since 2014 he has been teaching German as second language for refugees in Germany. Adem Salhi is also a Tunisian blogger and social media activist and has written many blog-articles about the political role of social media in Tunisia and the MENA region.

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