



CHAPTER 5

THE MIDDLE EAST

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INTRODUCTION: INFORMATION TECHNOLOGY IN THE MIDDLE EAST

The Internet as an innovation has emerged as one of the most profound social, technical and business phenomena in the history of humankind. It has changed how people work, study and communicate with each other. Electronic learning, as a new way of delivering education and knowledge, is a growing trend which is leading to improved ways of investing in larger numbers of people and of leveraging their capacities with fewer resources while maintaining a high level of good quality deliverables and promising diversified venues for knowledge dissemination. The impact of this trend will be felt by all and will be reflected in individuals and organisations throughout society, from schools to industries to professions.

The diffusion of information and communications technology (ICT) in the Middle East has increased remarkably over the last two decades, although there is a wide gap from both Europe and the United States which contributes to an ever-increasing digital divide. It is estimated that the Middle East is three to four years behind the United States in terms of ICT deployment and about two years behind Europe (American Chamber of Commerce in Egypt 2002).

The use of the Internet throughout the region has been increasing, but not enough to create a major impact. According to a survey conducted in 2001, there were 3.54 million users in the Middle East, and that number was expected to grow to an estimated 10 million by the end of 2002 (see www.ajeeb.com). The number of Internet account holders in the Middle East reached over one million in 2001 based on the assumption that 2.5 users is the rate per subscriber across the region (except in some countries such as Egypt which ranges between four and eight users per subscriber account). However, such numbers constitute only 0.7 per cent of the population of the Middle East which stands at 280 million (American Chamber of Commerce in Egypt 2002). Table 5.1 ranks the countries in the Middle East in terms of Internet subscribers.

During the past few years, countries in the Middle East have made significant progress in expanding access to and improving the quality and equitable distribution of education

Table 5.1: Internet penetration in the Middle East

Rank	Country	Number of subscribers	Number of users per account	Number of users	Per cent of population (%)
3	Egypt	70,000*	8	560,000	0.82
5	Lebanon	75,000	3.5	262,500	6.56
7	Jordan	35,000	6	210,000	4.57

*Reflects the number of individual subscribers excluding businesses. In 2003, the Minister of Communications and Information Technology noted that the number of Internet users in May reached 2.1 million.

Source: www.ajceb.com

resources. Diversified efforts have been exerted to integrate nations in the Middle East with the newly developing global knowledge society. It is now widely held that a country's investments in human capital are at least as important as its stock of physical capital and its natural resource endowments, although the links between education, technology and other education inputs to a country's competitiveness ranking have yet to be fully understood. In that respect, nations that will not take the necessary actions to improve the efficiency and quality of the education offered in their K–12 institutions, and to better align the knowledge and skill outputs of their education systems with the changing and evolving needs of the global economy, will not become or remain competitive players in the developing global marketplace. The United Nations Arab Human Development Report 2002 concludes that a mismatch between educational output, on the one hand, and labour-market and development needs, on the other, could lead nations in the Middle East to isolation from global knowledge, information and technology at a time when accelerated acquisition of knowledge and formation of human skills are becoming prerequisites for progress (UN 2002a).

THE REGION: AN OVERVIEW

The 22 countries that constitute the Arab region account for 5 per cent of the world population totalling 280 million (UN 2002b). Population varies dramatically among different countries. Egypt has the largest population with over 71 million, followed by Sudan, Algeria and Qatar (see Table 5.2).

The age structure of the population is significantly younger than the global average, reflecting the large proportion of children aged 0 to 14 (38 per cent) and of those aged 60 or older (6 per cent). The population growth ranges widely among different countries in the region, from as low as 1.1 per cent in Tunisia to as high as 4.1 per cent in Yemen. By 2020, the population of the Arab region is expected to reach 459 million.

This demographic represents a set of challenges and opportunities for the Arab region. The population growth could represent an engine of material development and human welfare when other vital factors conducive of economic growth, including high levels of investment and appropriate types of technological know-how, are present (UN 2000b).

Language and culture also play a part. Arabic is one of the top 10 languages spoken in the world, yet the Arab-speaking region is one of the least connected to the Internet, with only around 1 per cent online. Those who are connected are mostly young, well paid, highly educated and English-speaking. Therefore, if the region is to get more people

Table 5.2: Population of the Arab world

Country	Total (thousands)	Age group 15–59 (% year 2000)
Algeria	31,800	58.8
Bahrain	724	66.3
Comoros	768	52.9
Djibouti	703	51.9
Egypt	71,931	56.9
Iraq	25,175	53.4
Jordan	5473	56.5
Kuwait	2521	70.9
Lebanon	3653	60.7
Libya	5551	61.4
Mauritania	2893	51.4
Morocco	30,566	60.5
Oman	2851	59.1
Palestine	3557	48.7
Qatar	610	70.3
Saudi Arabia	24,217	56.2
Somalia	9890	48.3
Sudan	33,611	54.4
Syria	17,800	55.6
Tunisia	9832	61.4
United Arab Emirates	2995	71.0
Yemen	20,010	47.2

Source: United Nations Population Division

online, it must attract them to the Internet through awareness, skills development and content creation, and that should start from the school level (Internet for the Arab World 2000).

THE EDUCATION SECTOR

Achievements in the education sector are modest when compared to other regions, even in the developing world. This is especially true among adults, where the overall educational achievements remain low on average. However, the collective effort of the Arab region is considered tangible and headed in the right direction as it moves forward in the quest to improve literacy rates. In fact, illiteracy has effectively dropped from 60 per cent in 1980 to 43 per cent in the mid-1990s (UNESCO 1998). However, illiteracy in the Arab region is still higher than the international average as well as being higher than the average in other developing regions. One man in three and one woman in two in the Arab countries is illiterate (UNESCO 2002). Table 5.3 shows the statistics on illiteracy rates in the Arab region.

Over the last few decades, the number of children who were enrolled in preschool education specifically during the period 1980–1995 doubled. The data on enrolment in the three levels of formal education showed a steady quantitative increase moving from 31 million in 1980 to 56 million in 1995. Moreover, education expenditure on education

Table 5.3: Illiteracy rate relative to population

Country	Illiteracy rate (%)	Illiterate population (000)	Total population (000)
Algeria	11.5	758	6585
Bahrain	1.6	2	100
Djibouti	16.0	20	123
Egypt	30.3	4178	13,799
Iraq	55.4	2554	4610
Jordan	0.8	8	1032
Kuwait	7.6	34	445
Lebanon	4.8	32	654
Libya	3.5	44	1252
Mauritania	51.1	268	524
Morocco	32.7	2015	6158
Oman	2.1	10	491
Qatar	5.2	4	71
Saudi Arabia	7.3	287	3925
Sudan	22.8	1400	6138
Syria	12.8	461	3591
Tunisia	6.7	133	1994
United Arab Emirates	9.4	37	400
Yemen	35.0	1165	3332

Notes: No information was available for Palestine, Comoros and Somalia.

Source: UNESCO Institute of Statistics

has risen substantially since 1985. Education spending increased from USD18 billion in 1980 to USD28 billion in 1995 (UN 2002b). However, during the same period, per capita expenditure on education in the Arab countries dropped from 20 per cent of that in industrialised countries in 1980 to 10 per cent in the mid-1990s.

Education and human resources development in the information age and within the knowledge-based societies are becoming invaluable. It is essential for economies to develop and grow to create synergies between education and the socio-economic system. In that respect, the main challenge facing the Arab countries is the formulation of a model that will help enable quality education at the right cost. During the school year 1999–2000, over 2.4 million children were enrolled in the region in preschool education (UNESCO 2002). This represents about 16 per cent of all children of preschool age. In that domain, private schools play a fundamental role in pre-primary education with over 79 per cent of those enrolled attending private schools (with wide variations among different countries).

Primary education is important with an official age of entry being six and with a duration of six years (with a few variations). In 1999–2000, over five million children entered primary school for the first time (UNESCO 2002). Two indicators are used to measure the extent of participation in primary education: the gross enrolment ratio, or GER, which is the number of children enrolled as a percentage of the total population of primary school age; and the net enrolment ratio, or NER, which is the percentage of the official primary school age group that attends primary school. In 1999–2000, over 35 million pupils were enrolled in primary education in the Arab region; of these 94 per cent were enrolled in public schools (with some exceptions such as Lebanon, the United Arab Emirates and Jordan where 66 per cent, 45 per cent and 30 per cent respectively of all pupils were enrolled in the well-established private primary education) (UNESCO 2002).

In 1999–2000, over 22.5 million pupils of all ages were enrolled in secondary education (UNESCO 2002). This number represented 60 per cent of the population of the official age for this group. Of all these pupils, 93 per cent were enrolled in public schools.

THE ROLE OF ICT IN THE LEARNING PROCESS

Students are heavy users of the Internet compared to the general population of the Arab Region, in part because they have grown up with computers, according to findings from the Pew Research Center for the People and the Press (see <http://people-press.org>). However, that degree of usage differs from one community to another based on connectivity and accessibility to infrastructure platforms. The Internet has become so integrated into students' lives that it has become a technology as ordinary as the telephone or television, and students more than anyone else look like a generation comfortable with online research and online learning.

Statistics show that in the United States, 20 per cent of today's students begin using computers between the ages of five and eight, and by the time they are 18, computers and the Internet are commonplace in their world. However, it is important to study how such percentages differ in the context of developing nations and how wide the gap is in the context of electronic readiness of students at schools. The same report also indicated that 85 per cent of students own a personal computer and 66 per cent use e-mail, but these percentages are far lower in developing nations based on a per capita scale.

The introduction of ICT in the education sector in the Arab nation, as elsewhere in the world, will help improve the quality of education through the use of interactive computer-based systems and enable the possibility of individualising the educational process to accommodate the needs, interests, knowledge and learning styles of students (Kehoe and Mixon 1997). Increasingly, the Internet will play an important role in improving and developing a country's educational system (Bernt and Bugbee 1993). Recently, researchers have begun to focus on the potential of information technology to support certain fundamental changes to the traditional approaches to the educational process (Ehrmann 1995). Information technology is serving as a powerful tool for teachers to monitor and assess students' progress and maintain portfolios of student work. It can help prepare coursework, communicate with students, parents and administrators, exchange ideas and experiences, access remote databases, acquire educational software and expand knowledge and professional capabilities (Williams 1999; Bunderson and Inouye 1987). At school, while the role of the teacher is likely to change within a technology-rich classroom, it is perceived that the potential benefits will decline as class size increases (Porter 1997). Teachers will be required to play an important role in helping students to assimilate abstract concepts and develop higher-order thinking skills. Therefore, school

administrators need to invest not only in hardware, but also in adequate professional development plans for teachers (Threlkeld and Brzoska 1994).

CASE STUDY: EGYPT

Egypt is the cradle of an ancient civilisation dating back to 3000 BC. It has a population of more than 68 million with an average growth rate of 1.9 per cent. Over 16 million Egyptians, 65 per cent of whom are under the age of 25, are in different education stages (IFC 2001). About 49 per cent are at school level. In 2002, 1.1 million university students graduated; 1.2 million students were enrolled at the university level with 225,000 students at the post-graduate level (Kamel 2002).

Public expenditure on education represents 4.1 per cent of GDP (UNESCO 2002). Egypt has the second largest economy in the Middle East and has successfully implemented its economic reform programme, which has enabled its current annual economic growth rate to stand at 3.1 per cent and its inflation rate at 3.6 per cent (as of March 2003; see www.economic.idsc.gov.eg).

Like many other developing countries, Egypt is trying to modernise technologically, and one of the main sectors the government is focusing on is education (Kamel 2002). The ratio of personal computers per capita is low at 1.12 per 100 inhabitants (American Chamber of Commerce in Egypt 2002). While this low ratio makes the diffusion of the Internet relatively difficult, the situation is likely to change in the near future as such a large percentage of the population is made of young people who are exposed to media and technology (see Table 5.4).

Table 5.4: Population demographics in Egypt

Age	Population	Cumulative population	Per cent of population (%)
Under 5 years	7,505,200	7,505,200	11.6
5–10 years	8,346,300	15,851,500	12.9
10–15 years	8,605,100	24,456,600	13.3
15–20 years	7,505,200	31,961,800	11.6

Source: CAPMAS 2001

Recent studies by UNICEF show that 47 per cent of the population of Egypt is illiterate, and this percentage is increasing due to a high birth rate, a deteriorating school sector and poor literacy retention (see www.unicef.org/infobycountry/egypt.html). The Egyptian government recognises that to move the country forward and build an information-based society that can compete on a global scale, it needs to mobilise and co-ordinate its leadership, government and people and develop “learning bridges,” which are the mechanisms that can help diffuse learning and education in society. It is the platform through which knowledge will be acquired from different sources and channels and dissemination across the different levels and areas in the society.

Egypt has acknowledged the importance of ICT for growth since the mid-1980s, and it has launched several initiatives aimed at establishing a national ICT industry through capacity-building such as setting up government information and training centres and

introducing ICT in schools and establishing ICT faculties at universities (ESCWA 2003). Other projects have included establishing the Pyramids Smart Village, ICT incubators, ICT community telecentres and, more importantly, increasing allocation of funds for research and development.

In 1985 the Cabinet of Egypt Information and Decision Support Center (IDSC) was established (see www.idsc.gov.eg) along with its various related programmes and projects. A large number of achievements and objectives have been realised since then, but it was only in 1999 that the Egyptian government announced that development of the ICT industry was a national priority (American Chamber of Commerce in Egypt 2002). This was followed by the creation of the Ministry of Communications and Information Technology, which showed that the government acknowledged that the ICT sector could contribute to high and sustainable economic growth for the Egyptian economy (see www.mcit.gov.eg). The ministry developed a national plan focusing on infrastructure development, training, education and human resource development such as upgrading the ICT infrastructure, investment in training, developing a new generation of graduates capable of dealing with ICT, establishing technology clubs and establishing technology awareness centres.

Education is the mainstay of progress and development. It is an integral part for societal development, especially in a world led by information and knowledge-based societies. In Egypt, the extent and quality of its workforce, human and intellectual capital will determine its social and economic future development (Kamel 2000). Therefore, investment in human resources is a prerequisite for preparing for the new century. Also required is an investment in the diffusion of information technology in various sectors of the economy with a vision of building an information society that can compete in the global marketplace. An integral part of such a society is an educated labour force with learning facilities and resources available that allow them to master the use of ICT. According to the World Bank's world development indicators, the percentages of gross (i.e., those who are enrolled) and net (i.e., those who complete or graduate) primary school enrolment ratios in Egypt in 1998 were 100 per cent and 92 per cent respectively.

Thus, the challenge in the current educational system in Egypt is to prepare students more effectively through the use of state-of-the-art ICT. The institutionalisation of computer-based education programmes in the different phases of the learning process is essential in order to meet the continuous innovations of the 21st century. It has become increasingly important to dramatically transform the way that the learning process is being designed, developed and delivered.

Therefore, Egypt has formulated a massive plan to revolutionise the educational system using ICT through a number of large projects. Examples of these projects are described below:

- **Educational Software for Children** targets computer literacy among children. The objective is to prepare new generations to be leaders in the information age, to learn and think using interactive learning media, to enhance their skills at young age and to evaluate their learning ability using systematic computing methods. The project is to be implemented in 200 schools with an estimated cost based on 15 packages per year of USD1.8 million (Kamel 2000).
- The **Educational Software for Students** project includes the development of courseware covering topics such as science and technology, languages, history and geography for students currently enrolled in schools (Kamel 2001). The objectives include enhancing the effectiveness of students' basic skills, encouraging them to learn about different subjects by introducing computer-based competitions,

motivating them to search and acquire information and encouraging them to communicate through electronic media. The project is based on the collaboration of various educational institutions including private sector software firms to develop the educational packages. The project is expected to produce 30 packages per year with an estimated cost of USD4.5 million.

- The initiative **Investing in Egypt's Future** is meant to prepare the kids of the nation for the new millennium. The initiative was developed primarily to help kids talk about tomorrow's language, communicate with their peer group in different parts of the world and allow them to compete and work in a global environment regardless of time and distance barriers. This initiative mainly targets disadvantaged children and includes a number of activities among which is the establishment of **The 21st Century Kids Clubs**, the development of a Web site and supporting the development of a software industry for kids in Arabic. The objectives are creating a better learning environment for kids with state-of-the-art practices, exposing kids to new ways of thinking to be able to compete globally, promoting collaboration among kids worldwide, and improving the quality and methodology used in the learning process (VITA 1995). The 21st Century Kids Clubs project was first launched in Cairo in June 1997 with 26 personal computers, 300 software packages and full Internet connectivity. The clubs allow kids to learn about computers and the importance of information technology and the Internet, as well as to use the facility for both training and enjoyment. The success of the pilot of the Cairo Kids Club encouraged the project team to establish 12 additional clubs throughout Egypt in those remote areas considered the least privileged. The technology investment was an attempt to minimise the gap between the "haves" and the "have-nots." By December 1998, there was at least one club in every one of Egypt's 26 provinces. More clubs are expected to be established in the years to come. The growth rate in the establishment of the clubs was mainly due to a collaborative effort by the private sector, the government and non-governmental organisations (NGOs). The clubs have proven to be appealing not only to the kids, who represent 33 per cent of the population, but also to youths and families (American Chamber of Commerce in Egypt 2002).
- The **Technology Access Community Center Project (TACC)** project demonstrates the potential waste of children in low-income communities being denied access to ICTs (see www.undp.org/info21/pilot/pi-egprog.html). The project aims at promoting the theme "Internet is for everyone." However, realising that this theme will not occur until the Internet is available in every home, business and school, TACC offers a unique platform for providing community access to the Internet and disseminating electronic information and knowledge using ICT. In 1998, a pilot project was initiated to establish three TACCs in the province of Sharkeya (70 kilometres northeast of Cairo). The province comprises 15 cities, 82 villages and 4492 sub-villages and has a population of some 4.2 million. The project was funded by the United Nations Development Programme (UNDP) through Information Technology for Development in co-operation with the United Nations Volunteers programme (UNV). The Egyptian partners were the province of Sharkeya, Sharkeya Chamber of Commerce, the Cabinet of Egypt Information and Decision Support Center and the Investors Association of the 10th of Ramadan City (located in the province of Sharkeya). In 1999, the Chamber of Commerce of Sharkeya and the trade point division of the Ministry of Trade joined the project (see www.undp.org). The diversity of the project partnership scheme reflects the interest of the Egyptian government, private sector and NGOs in the TACC concept (Hashem 1999). The number of TACC users is continuously increasing; after just one year of operation, TACCs had attracted some 3000 people to receive information technology training

with a view to supporting development activities in the community. These users have developed and posted over 1000 Web pages, most of them in Arabic, offering applications in health, agriculture and e-commerce, and they have also generated Web sites that carry information ranging from culture and history to the promotion of local innovations and expertise. The government, in collaboration with the private sector, is currently formulating a plan to diffuse the TACCs concept in Egypt's 26 provinces to replicate the successful experience.

- In June 2003, the United States and Egypt launched a major computer education initiative, **IT in Schools**, worth USD10 million that will reach 23,000 students in a pilot programme in an attempt to bring information technology to schools in Egypt using modern instructional methods. The project will work directly with 14 schools in seven governorates over the coming three years, installing 7700 computers and power supplies as well as connecting them with local networks and the Internet. At the same time, the project will create a model that can be replicated in many more schools throughout Egypt in the future, including an online version of the Egyptian national curriculum. The project beneficiaries will be the 23,000 students in kindergarten through grade 12 and their 2100 educators and administrators. The United States, through its Agency for International Development, will provide equipment and technical assistance to the project. The Minister of Education, Dr Hussein Kamel Bahaa El Din, announced the public launch of the project during the ceremony held in Cairo on June 25, 2003, marking the completion of training for a group of school administrators. It is important to note that the United States has invested USD65 million in improving education and training opportunities in Egypt since 1975 (see www.usaid-eg.org).
- In an effort to accelerate the adoption of the Internet as well as raise technology awareness among private and public school students, the Ministry of Communications and Information Technology is implementing the **Smart Schools Network Project**, a three-year project that started in 2000 with a number of key objectives, including raising student awareness of modern technological tools and resources, introducing a three- to five-hour per week ICT syllabus into the education system with an emphasis in the primary stages of education and introducing computer-aided education to the school system. The project is to be implemented in a number of private and public schools with the Ministry of Communications and Information Technology supplying the schools with a sufficient number of computers and accessories to allow a one-to-one student-computer ratio; providing the required software tools as well as the education solutions necessary for the project; establishing a network to interconnect schools, teachers, parents and students; and developing, evaluating, and following up on training programmes for teachers in technology and computer-aided education (American Chamber of Commerce in Egypt 2002).
- There are 10 **Internet learning centres** (ILCs) that have been established in public schools in five different regions of Egypt (see Table 5.5) as part of the Schools Online project. A number of partners are working together to ensure the success of the project: the Ministry of Communications and Information Technology is providing leased lines, the Ministry of Education is providing the basic training for the teachers, Hewlett-Packard is donating equipment and the Regional Information Technology and Software Engineering Centre is handling the management of the operational plan. ILCs are open after school hours to the community to maximise the resources, which contribute to the ICT literacy of the whole community.
- Other initiatives have been developed by a collaborative effort between the government, NGOs, the private sector and individuals: **Little Horus**

(www.horus.ics.org.eg) and **Aftal.org** (www.afal.org) are multilingual knowledge repositories addressing issues of concern to children; First Lady Mrs Susan Mubarak runs an annual contest that encourages students of all ages to innovate, develop and design local content and ideas which are backed up, supported and sponsored by different companies in the ICT sector, mainly software companies. Running parallel to this contest are other competitions arranged by the Ministry of Education in collaboration with organisations such as ThinkQuest and ThinkQuest Africa.) In 2003, the Government of Egypt, in collaboration with the private sector, launched a project to introduce computers to every household. The programme is led by the Ministry of Communications and Information Technology.

Table 5.5: Schools Online in Egypt

City/Town	School
Cairo	Hafez Ibrahim Experimental School
Cairo	Tarek Ibn Ziad Experimental School
Cairo	El Geel Al Gadeed Experimental School
Giza	Gamal Abdel Naser Experimental School
Giza	Abu Bakr El Sedeek Experimental School
Alexandria	Talat Harb Experimental School
Alexandria	Samy El baroudy Experimental School
Gharbia	El Hadisa School
Hurgada	El Shahed Waleed El Ghafari Schools
Sharm El Sheick	El Fayrouz Experimental School

Source: www.schoolsonline.org

CASE STUDY: LEBANON

Lebanon has a population of about 3.5 million with a 2.7 per cent growth rate (UNESCO 2002). The nation covers 10,400 square kilometres.

The education system in Lebanon is one of the most advanced of the Arab nations in terms of quality and deliverables. Expenditure on education as a percentage of GDP is 2 per cent and as a percentage of total government percentage is 9.2 per cent (UNESCO 2002). The illiteracy rate is the lowest in the region, and enrolment is rising in different educational levels due to a successful partnership between the public and private sectors. However, there are still some problems that relate to low compatibility with the requirements of the labour markets.

Due to the high level of private universities and schools in Lebanon, ICT capacity-building is gaining ground in the education sector; however, more is needed to realise an impact that can help transform positively the society from an ICT perspective (ESCWA 2003). One of the important initiatives is the establishment of BERYTECH, which is a private “technology park” focusing on activities related to information technology and multimedia training among other things (see www.escwa.org.lb/nmpi/members/

lebanon.html). A study that was conducted in 2001 on 206 of the 411 private schools located in the greater Beirut area, which represents 50 per cent of the schools showed some important aspects such as the need of funding for hardware purchases, lack of enough qualified teachers, consensus that computers have positive implications on student motivation, importance of the role of the school principal as a decision-maker and as a champion in introducing schools to computers (Kibbi 2001).

Lebanon is gradually giving more attention to ICT. A national ICT strategy has been drafted and awaits adoption by the Council of Ministries. Currently, the country exhibits an average penetration of personal computers compared to regional levels (5.6 per cent). Further, except for the Gulf Cooperation Council, Lebanon has the highest Internet penetration rate in the Arab world (8.6 per cent). However, broadband per account is low (0.4 kbps), and this affects speed of access. Usage is expected to grow, as the country boasts a relatively well-educated population with an inclination to adopt technologies rapidly. According to the World Bank's world development indicators, the percentage of gross and net primary school enrolment ratios in Lebanon in 1998 was 110 per cent and 78 per cent respectively.

In 1998, the National Authority for Public Schools was established with the objective of developing state-of-the-art schools that would match innovative tools and applications related to knowledge dissemination and management. One of the main outcomes of this effort was the registration at the World Bank of Lebanon's request to introduce the Internet to all private and public schools to support the development of the education sector.

The efforts of the Government of Lebanon date back to the early 1990s when they first thought of introducing information technology into the education sector with its different phases. Since 1991, the Ministry of Education, in collaboration with the UNESCO regional office (Arab countries), started to put together the framework to improve the information technology infrastructure related to the education sector. Additionally, in 1997 the Ministry of Education started a comprehensive project that included an effort to establish an information system for the education sector as well as a plan to train 600 instructors on the use of computers in education. The programme had as its objectives automating units and upgrading the information units in the public schools that could lead to better accumulation of information and standardisation of procedures and policies related to school administration. The programme also promoted collaboration between different schools to promote the exchange of experiences and knowledge. Moreover, the accumulation and proper recording of information could lead to a more comprehensive understanding of the sector at large and, therefore, more analysis of the information that could help in future directions and improvement of the services offered.

The programme will also help the diffusion of the information technology culture among all public school students in Lebanon and help develop a new generation that is technology literate and that can compete globally. Technology is therefore being integrated as a means to an end and as an integral element in organisational development and societal growth rather than an end in itself. However, this trend is sometimes hampered by the lack of resources required to establish information units in public schools and the unavailability of the authority ready to introduce and implement training on computer usage. The literacy programme will energise and activate the role of public schools as the focal organisation for reducing computing illiteracy. There is remarkable potential impact for the society at large in terms of development and knowledge dissemination where the schools can work as the bridge between the society and information for all sectors.

A number of other government initiatives are either under study or already being implemented:

- Of the 8,000 schools in Lebanon, 12 are participating in the **Schools Online** programme (see Table 5.6), for which the Ministry of Telecommunication will ensure Internet connectivity.
- The **Internet learning centres** (ILCs) opened in October 2001 to create a network linking the selected schools in different regions of Lebanon. Teachers and students from the 12 participating schools and five other local schools learn how to take advantage of the Internet to engage in learning programmes with peers around the world. Optimising the use of resources is crucial, and each ILC opens its doors after school hours to surrounding schools and the community at large. This effort is implemented with full collaboration and support from the Ministry of Education.
- The **Technology Literacy Program**, a project sponsored by the World Bank, the National Authority for Schools and Al-Hariri Foundation has led to upgrading of the technological infrastructure in 456 schools spread across Lebanon's six provinces (see Table 5.7). The project's objective is to leverage the computing and technology capacities of Lebanese younger generations. A total of 1224 schools have been upgraded and work is still underway to leverage their capacities to more advanced levels (El-Hariri Foundation 2000).

Table 5.6: Schools Online in Lebanon

City/Town	School
Beirut	Gameel Rawasy
Beirut	El Ghebairy
Mount Lebanon	Bekfayya
Mount Lebanon	Jbeil
Halba	Halba
Zogharta	Zogharta
Bekaa	El Manara
Bekaa	Hermel
Saida	Saida
Abbasiyye	Abbasiyye
Nabatiyah	Hasan Kamel El Sabah
Nabatiyah	Mariayoun

Source: www.schoolsonline.org

CASE STUDY: JORDAN

Jordan has a population of 5.2 million (Jordan Department of Statistics 2002) with an annual growth rate of 4.4 per cent and a land area of 89,210 square kilometres (UNESCO 2002). Public expenditure on education is 5 per cent of GDP. The total number of schools in Jordan is 6500. In 1999/2000, there were 80,257 children enrolled in pre-primary education, 723,508 in primary education and 583,535 in secondary education (UNESCO 2000). According to the World Bank's world development indicators, the percentage of

Table 5.7: Upgraded schools

Province	Number of schools
Beirut	61
South	153
Nabatiyah	128
Bekaa	260
Jabal Lebanon	193
North	429

Source: El-Hariri Foundation 2000

gross and net primary school enrolment ratios in Jordan in 1998 were 69 per cent and 64 per cent respectively.

Jordan recognised some time ago the role ICT capacity-building can play in developing a wealthy socio-economic environment and, accordingly, it has have embarked on a number of initiatives including the development of a national strategy where six ministries have been selected in an ICT fast-track programme. Within the education sector, a nationwide integrated distributed database management system aims at connecting 28 Ministry of Education directorates to the ministry headquarters. Moreover, ICT community centres have been established in rural areas to provide access and training to local communities. Further, there are plans to establish CyberCity, an information technology park, in the north of the capital Amman (ESCWA 2003).

Jordan has a strong ICT agenda that focuses on human resources development. However, the cost of access remains relatively high in comparison to annual per capita income. Personal computer prices remain unaffordable for most of the population, but the proliferation of Internet cafés has helped improve Jordan's ICT readiness. Amman (the capital) remains the regional hub in portals development (e.g., Maktoob, Arabia Online and Al Bawaba).

Generally, Internet penetration is gradually increasing, and was 4 per cent in 2001 (see www.ajeel.com), due to the various initiatives taken by the government:

- The **Schools Online** initiative started in October 2001 and includes 10 schools, each having an Internet learning centre (ILC) (see Table 5.8). Global Telecommunications Engineering (GTE), the national managing partner of schools online, managing the programme in Jordan, and the National Science Institute and Fast Link Company provides the Internet connectivity. This connectivity allows students to work and get information from the Internet as well as engage in online collaborative projects. Each school opens its ILC after school hours and during the holidays to allow the students to maximise its use.
- The **Electronic Learning Initiative** is a national plan instigated by a royal decree. The initiative constitutes a support element for the king's declared objective of transforming Jordan into the region's centre for information technology. However, there are a number of challenges that exist, the biggest being the preparation of the required human resources necessary to achieve this ambitious goal. Jordan's 1.5 million school students, which represent around 33 per cent of the population, are vital to this aspiration. Therefore, the government has formulated a gateway for

electronic learning to serve as a consulting and training body to all of Jordanian society. The common roles played by schoolnets include networking the schools, providing training and purchasing hardware. The Ministry of Education, playing the pivotal role in the initiative, is working on fundamentally changing some policies to avoid centralisation of the decision-making process in order to ease the swift introduction of ICT into the system and into management. The objective is for all of Jordan's schools to have access to the Internet. Moreover, a national information centre for education technology will be established, coupled with a programme to leverage the knowledge of teachers and their ability to employ technology in education reflecting training of the teachers. For this purpose 30 learning resource centres will be established to educate the public at large, but more importantly to train the teachers specifically on the uses and application of technology in education. The ministry is to build the Jordan Learning Network as an initial technological infrastructure to pave the way for further networking and sharing of information between schools with a goal of creating valuable content accessible to the society. Moreover, the Ministry of Education will establish the National Information Center for Education Technology with an objective of constantly developing and advance the use of ICT in education.

Table 5.8: *Schools Online in Jordan*

City/Town	School
Irbid	Al Hussein
Irbid	Aisha Bent Abu Baker
Amman	Al Qusour
Karak	King Abdullah II
Tafilah	Al Ein Al Baida'a
Madaba	Madaba
Amman	Al Ashrafiah
Zarqa	King Abdulallah II for Excellence
Amman	Kamal Borhan Al deen
Zarqa	Rukhaiah Bint Rasoul

Source: www.schoolsonline.org

CONCLUSION

The Internet can play a major role in education reform with students taking more responsibility for their own learning. However, teachers need to adapt themselves to a changing technological society to prepare productive citizens adapted to ICT. Traditional methods of teaching will no longer be valid, and there will be a major transformation in the role of teachers, becoming facilitators and co-learners and providing richer learning environments, experiences and activities, and creating opportunities for students to collaborate to solve problems and share knowledge and responsibility. Students will switch from passive to active learners, becoming more of explorers of the universe of learning. Such exploration will provide students with opportunities to make decisions, while figuring out the attributes of events, objects, people and concepts. Both teachers and students will excel in their learning of using the Internet in a variety of ways to enhance their teaching and learning experiences.

The Internet has the potential to drastically change the way students learn by controlling their learning process. As the global society enters the 21st century, innovative ICTs will create many great challenges and opportunities for growth and the development of smarter communities, smarter societies and a smarter world. The community and the education sector should be prepared to adapt to such change and transform it to handle all the needs and requirements that will come along with it. This will include changes in the design, development, implementation and institutionalisation of many aspects that relate to the education sector at large and its different building blocks.

The challenges of preparing education systems and institutions in the Arab region will become increasingly important. Some of these challenges will include declining financial resources, increasing population growth and the complexity of the reforms required. There are so many efforts already underway in many countries of the region (Cassidy 2003). However, addressing these challenges fully will take time because experience and research documented in the literature demonstrates that changing people's behaviour is a slow process requiring sustained effort and much support. One of the vital steps is establishing significant, substantive and ongoing professional development activities for educators working at different levels of the educational system.

The importance of securing an adequate education for children worldwide has acquired a sense of urgency over the past 15 years, with the increase in the diversity of information dissemination channels (Bossert 1999). Moreover, the expanded global competition and corporate restructuring have drawn attention to the importance of preparing the next generation of children to add value within an increasingly integrated world economy. However, the challenges and the requirements to meet the growing needs of education are diverse. While a number of different approaches have been suggested for improving K–12 education in various countries, one common element has been the more extensive and effective use of ICTs through partnerships involving governments, local communities, schools and the private sector (Moore et al. 1990).

Education must be the key driving force in the development and growth of the strategy of the countries in the Arab region. Failure to improve and expand the impact and effectiveness of education will have serious negative consequences on the development of the nations in the region. Reforming curricula and systems will be the critical success factor in rendering the future generations of the region more competitive in the global marketplace.

REFERENCES

- American Chamber of Commerce in Egypt. 2002. "Information Technology in Egypt," www.amcham.org/eg/BSAC/StudiesSeries/ReportsStudies.as.
- Berenfeld, B. 1996. "Linking Students to the Infosphere." *The Journal*, www.thejournal.com.
- Bernt, F. L. and A. Bugbee. 1993. "Study Practices and Attitudes Related to Academic Success in a Distance Learning Program." *Distance Education* 4 (1): 97-112.
- Bossert, P. 1999. "Educating Children in the Next Decades: Problems and possibilities with a strategic vision." Proceedings of the Cairo Internet Conference and Exhibition, www.ise.org.eg.
- Bunderson, V.C. and D.K. Inouye. 1987. "The Evolution of Computer-Aided Education Delivery Systems." In *Instructional Technology Foundations*. Hillsdale, New Jersey, USA: Erlbaum.
- Cassidy, T.J. 2003. *Education in the Arab States: Preparing to Compete in the Global Economy, The Arab World Competitiveness Report*. New York: Oxford University Press.
- CAPMAS. 2001. "Annual Statistical Report." Central Agency for Public Mobilization and Statistics.
- Ehrmann, S.C. 1995. "The Bad Option and the Good Option." *Educom Review* 30 (5).
- El-Hariri Foundation and National Authority for Public Schools. 2000. *Report on Technology Literacy Program*. Lebanon.
- EWCWA. 2003. "ICT Capacity-Building in ESCWA Member Countries Conference Report." Western Asia Preparatory Conference for the World Summit on the Information Society Economic and Social Commission for Western Asia (WSIS) Beirut, Lebanon, 4-6 February.
- Hashem, S. 1999. Technology Access Community Centers in Egypt – A Mission for Community Empowerment," www.itu.int.
- Hoffman, D. and T. Novak. 1994. "How Big is the Internet?" *Internet Society News* 3 (2).
- IFC. 2001. "Learning for the Future – Egypt, Technical Assistance Report." Multi Serve Education Trust. International Finance Corporation.
- "Internet for the Arab World." 2000. Editorial, Preparatory Meeting of the Arab Region for the World Telecommunication Development Conference, Alexandria, Egypt, 17-19 October.
- Jordan Department of Statistics. 2002. "Country Profile."
- Kamel, S. 1998. "IT and Trends in Global Education in the 21st Century." *Information Management Journal* 11 (3-4): 9-12.
- Kamel, S. 2000. "Web Technology an Enabling Learning Environment for Kids." In *Distance Learning Technologies: Issues, Trends and Opportunities*. Hershey: Idea Group Publishing.

- Kamel, S. 2001. "Virtual Learning Networks in Higher Education: The Case of Egypt's Regional IT Institute." *Journal of Global Information Management* 8 (3): 34–41.
- Kamel, S. 2002. "The Role of Virtual Organizations in Post-Graduate Education." In *Egypt — The Case of the Regional IT Institute in Cases on Global IT Applications and Management: Successes and Pitfalls*. Hershey: Idea Group Publishing.
- Kehoe, B. P. and V. Mixon. 1997. *Children and the Internet: A Zen Guide for Parents and Educators*. New Jersey, USA: Prentice Hall.
- Kibbi, I. 2001. "The Status of the Use of Computers in Education in the Beirut, Lebanon Private Schools." *Education* 116 (1): 80-82.
- MEED. 2001. Middle East Economic Digest "Weekly Special Report." 2 February: 2.
- Moore, M.G. et al. 1990. *The Effects of Distance Learning: A summary of the literature*. Research Monograph No. 2. University Park, Pennsylvania, USA: The Pennsylvania State University, American Center for the Study of Distance Education.
- Naisbitt, J. 1984. *Megatrends*. New York: Warner Books.
- Porter, L. R. 1997. *Virtual Classroom, Distance Learning with the Internet*. New York: John Wiley.
- Threlkeld, R. and K. Brzoska. 1994. "Research in Distance Education." In *Distance Education: Strategies and Tools*. Englewood Cliffs, New Jersey, USA: Educational Technology Publications, Inc.
- UN. 2002a. "Human Development Report 2002," <http://hdr.undp.org>.
- UN. 2002b. "Arab Human Development Report: Creating opportunities for future generations." United Nations Development Program and Arab Fund for Economic and Social Development.
- UNESCO, 1998. "United Nations Educational, Social and Economic Organization Report."
- UNESCO. 2002. "Arab States Regional Report." Institute for Statistics.
- Verduin, J.R. and T.A. Clark. 1991. *Distance Education: the Foundations of Effective Practice*. San Francisco: Jossey-Bass.
- VITA. 1995. "Community Information Centers." Unpublished topic paper. Arlington Virginia, USA: Volunteers in Technical Assistance.
- Williams, N. 1999. "The Child and the Internet: Opportunities and challenges in children's use of new communications technology." Proceedings of the Cairo Internet Conference and Exhibition, www.ise.org.eg.
- World Economic Forum. 2003. *The Arab World Competitiveness Report*. New York: Oxford University Press.

