Chapter 18
Tunisia

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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.
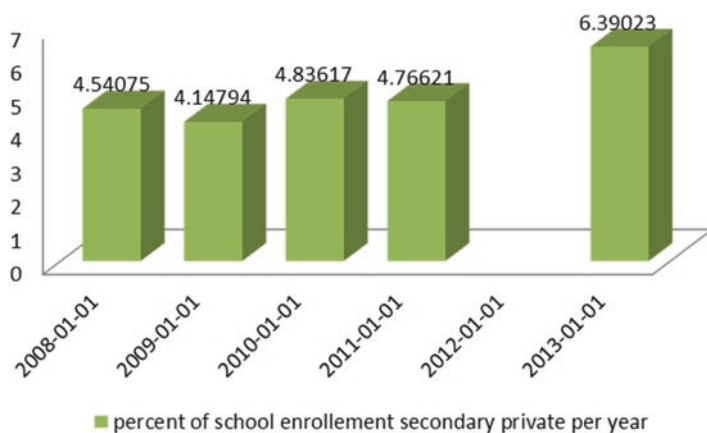
Public Education

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

Internet users per 100 inhabitants
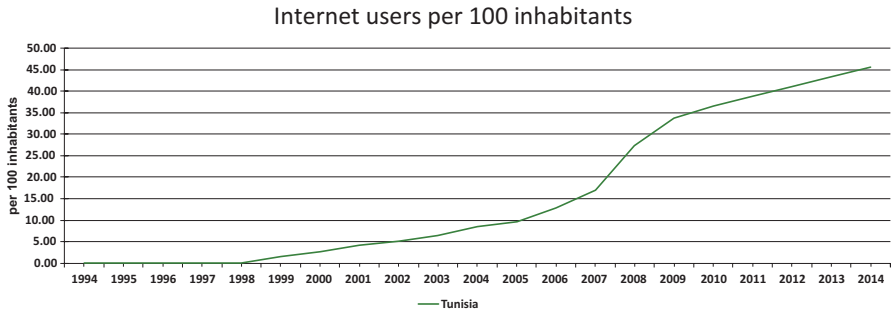
Fig. 18.2 Individuals using the Internet in Tunisia (% of population). Source: https://data.world-bank.org

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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