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Examining the Factors Affecting ICT Use in Education in Morocco

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A research paper submitted in partial fulfilment of the requirements of the Master Degree Program

Submitted by: Abderrahim Amghar Supervised by: Dr. Mohamed Ouakrime

2009-2010

To my mother and father,

and

to my siblings.

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I would like to express my gratitude to my supervisor **Dr. Mohamed Ouakrime** for his enlightening feedback and incessant support. I would also like to thank all my professors.

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Introduction

Introduction

In the 21st century, there is wide agreement among researchers (see, for example, Bush, 2009; Molnar, 1997; Kennewell *et al*. 2000 and van Braak *et al*. 2004) that effective use of information and communication technology (ICT) is a must for education to achieve its objectives. Morocco, a nation with great human assets, has launched ambitious projects to foster the use of ICT in public administration, in general, and education, in particular. Hoping to live up to the increasing demands of the digital era, several projects, namely GENIE, NAFIDA, Maroc Numeric, INJAZ, and MARWAN were launched to increase ICT use in the educational practice.

The adage that "necessity is the mother of invention" has changed to "in a computer world, invention is the mother of necessity" (Molnar, 1997, para. 1). This implies that, with the rapid and constant advancements in ICT, the use of technology in education is no longer a luxury but rather a necessity. Nevertheless, ICT use in the classroom context is a complex process that cannot be reduced to merely a matter of adequate supply of equipment and access to the internet; it is paramount to study students' learning needs and understand prospective users' cultural, socio-economic, and psychological characteristics.

This study sets out to examine the extent to which schools use ICT in teaching disciplines across the curriculum: it explores the tools and methods being currently used in teaching and learning, and the extent to which such methods are aligned with the goals set by the government ICT initiatives. Similarly, the study aims to identify any particular organizational and individual features that may affect the level of ICT use in learning and teaching, and seeks to explore whether and how ICT is being implemented by schools and teachers. More specifically, the effects of variables such as attitudes, experience, and training on ICT use in teaching and learning will be investigated. With respect to the government ICT initiatives, GENIE, NAFIDA, Maroc Numeric, INJAZ, and MARWAN, the aim is to briefly

describe how their initiation and implementation are taking place, and how they have affected the educational practice thus far. It is not the aim of this study to assess these projects because they are still at the beginning phases of implementation.

The central question this study tries to answer is whether and how computers are being used in the classroom environment and why. Besides, there are other major questions to be addressed by the study, such as:

1. To what extent do the demographic and socio-economic factors affect access to computers and the internet?
2. How does access to computers and the internet affect ICT use in teaching and learning?
3. How do attitudes towards computers affect ICT use in education?
4. To what extent does school ICT infrastructure contribute to increased ICT use in education?
5. To what extent does ICT training contribute to increased ICT use in education?

The data collection instruments for this study consist of questionnaires, and interviews. The sample includes two major groups of participants: students and teachers. Each of these groups consists of different subgroups. The teacher group consists of teacher trainees, and experienced teachers. The teacher trainees are all pursuing a one-year training program at the Fes Teacher Training Center (*Centre Pédagogique Régional*) and will be teaching English at middle schools starting from the next academic year (2010-2011). The experienced teachers are all high school teachers of English working in different parts of the country, such as Taounate, Zagora, Errachidia, and Fes. The student group, on the other hand, includes students at high school, university, and *Les Classes Préparatoires aux Grandes Écoles* (CPGE). All high school students are studying at Sidi Salah High School, Tagounite, Zagora, whereas all university students are pursuing their undergraduate or graduate studies at SMBA

university in Fes. Students at the CPGE are all studying in Meknes, but they come from different parts of the country. The aim behind including both teacher trainees and experienced teachers is to examine what is being done with respect to ICT at the level of training and teaching. The same could be said about students. The aim is to include participants from different geographical regions, educational institutions, and socio-economic backgrounds.

The interviews were conducted at institutions representing top educational authorities in the country. These include, after the MNE: the academies, l*es Académies Régionales pour l'éducation et la formation* (AREF), the delegations, *les Délégations provinciales de l'enseignement* (DPE), and high schools. A representative of each of these institutions was interviewed to elicit the overall ICT policy of the country. The interviews sought to identify the central goal behind the introduction of technology at schools and what is being done with respect to infrastructure, training, and educational software to achieve the envisaged goal. Finally, it is important to note that ICT use in education is a relatively new field of research in Morocco. The study is meant to raise awareness about the various conditions that contribute to an effective ICT use in learning and teaching.

Chapter One:

Information and Communication Technology: Definitions of the Terminology

I. Information and Communication Technology: Definitions of the Terminology

I.1. Definitions of ICT

Kennewell, Parkinson, and Tanner (2000) define 'information and communications technology' generally as "the set of tools used to process and communicate information" (p. 1). With reference to the school curricula, the Qualifications and Curriculum Authority (1999) defines ICT as:

> The range of tools and techniques relating to computer-based hardware and software; to communications including both directed and broadcast; to information sources such as CDROM and the Internet; and to associated technologies such as robots, video-conferencing and digital TV. (qtd. in Kennewell et al., op. cit., p. 2)

Postholm (2006) states that "ICT can be perceived as a tool for finding information and communicating with others" (p. 156). While information is available on the web and in CD-ROM databases, communication takes place through emails, chatrooms, news groups, videoconferences, etc. Anderson (2007) describes ICT as "a group of technologies which have become deeply associated with the term: blogs, wikis, podcasts, RSS feeds, etc. which facilitate a more socially connected Web where everyone is able to add to and edit the information space" ('Web 2.0' or 'Web 1.0'? section, para. 2). ICT was formerly referred to as IT. The *C*, which stands for *communication*, was included to account for the remarkable advances in online networking and the internet.

I.2. Taxonomy of Internet-Based Technologies

In a taxonomy developed by Liu and Chen (2007), internet-based technologies (IBT) were classified into three types: Learning Management Systems (LMS), Computer-Assisted Language Learning (CALL), and Computer-Mediated Communication (CMC). Learning Management Systems (LMS) are "virtual classrooms" meant to improve student learning; they consist of synchronous and asynchronous CMC tools that facilitate access to learning materials, collaboration amongst students, and their interaction with the instructor. Examples

of LMS are the Blackboard and WebCT. Computer-assisted language learning (CALL) refers to computer programs comprising lessons aimed at developing proficiency in the target language. Examples of (CALL) are BBC Learning English and other language-learning websites, tutorials, and games. CMC tools help develop students' written and spoken skills and can be either asynchronous, such as emails, discussion boards, and forums, or synchronous such as chat, Messenger, and conferencing, etc. (Liu & Chen, 2007). Since this study is concerned with CALL and CMC, both terms will be further discussed in section 1.3. and 1.4.

There is also a distinction between instructional methods and learning technologies. Instructional methods are the techniques used in teaching; examples are lectures, games, demonstrations, exercises, group discussions, simulations, and role plays. Learning technologies consist of presentation methods, and distribution or delivery methods. The former refer to how information is presented to learners (e.g., electronic text, interactive TV, multimedia, teleconferencing, audio, video, etc). The latter denote the ways, such as satellite and cable TV, computer disks, and the Web, used to deliver information to learners (n.a., 1997, p. 48).

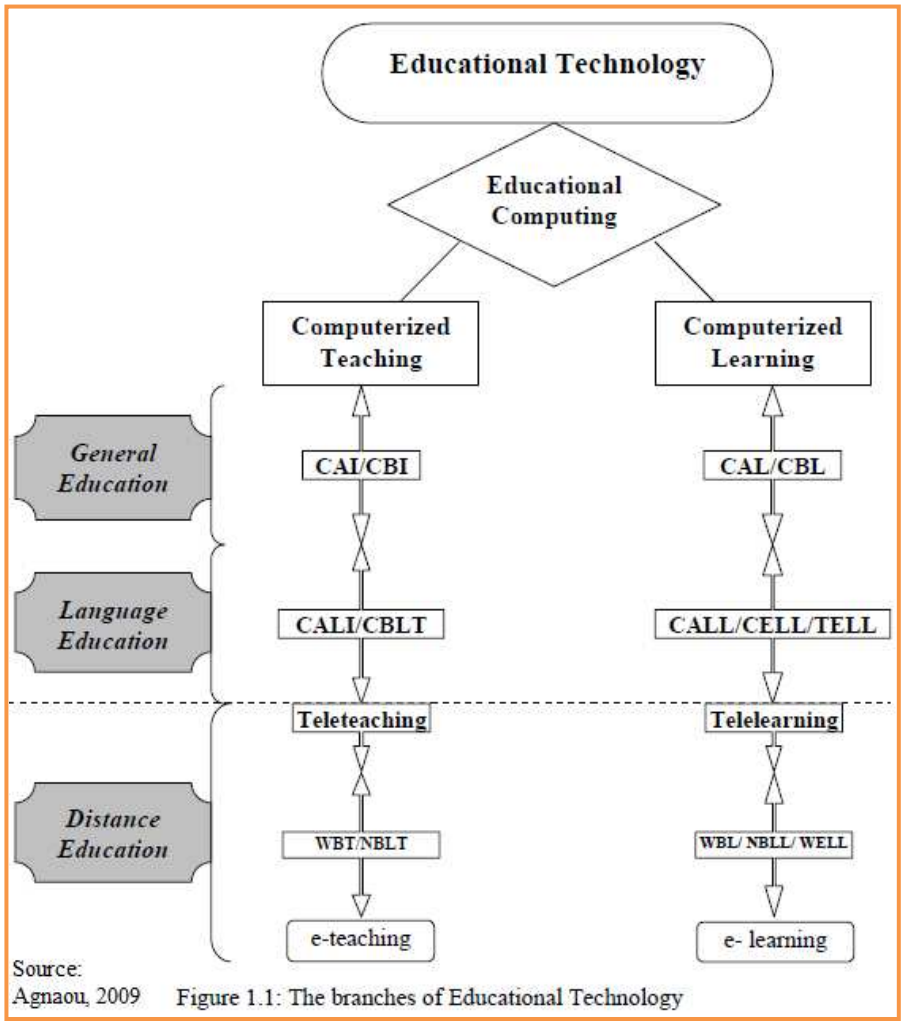
I.3. Educational Technology: Terms and Definitions

This section is meant to briefly introduce the varied terminology in the field for the purpose of specifying the aspects of ICT use concerned in this study. To avoid the overlap often caused by the rapid advances in the field and the versatile nature of technology, a holistic approach is necessary. To begin with, educational technology refers to the utilization of computers and all other electronic teaching and learning aids, such as tape recorders, overhead projectors, and VSR (Video Cassette Recorder), computers, and the internet; it includes methods of course delivery, research and development, and curricular management.

Educational technology is often viewed as similar to 'technology education, whereas, in fact, the two are distinct. Paul (2000) makes a clear distinction between the two terms:

> Technology education is a curriculum that involves more than just computers. It includes technology use in careers and society, safety and ethical issues, the design and engineering process, systems thinking, and information technologies (…)
>
> Educational technology consists of tools, such as computers, software, handheld or other devices, that support teaching and learning. Ideally, these tools are fully integrated into the curriculum and not taught as an isolated topic. Educational technology supports and improves the learning process. (qtd. in Agnou, 2009, p. 8)

As noted by Paul, even though 'technology education' refers to a curriculum and 'educational technology' to a tool, there is no clear-cut distinction between the two. To make the distinction clearer, Agnaou (2009) developed a general framework encompassing a wide range of terms pertaining to educational technology. Education technology, as illustrated in figure 1.1., can be divided into two major categories at three different levels. These categories are computerized teaching, and learning, which both permeate general education, language



Source: Agnaou, 2009 Figure 1.1: The branches of Educational Technology

education, and distance education. Each one of these consists of a set of terms that pertain either to the teaching or learning dimension of educational technology. Important to note is that there is no consensus among researchers (e.g., Wyatt, 1984; Levy, 1997; Higgins, 1986; and Underwood, 1984) as to how to define the terms falling under each category and level. Yet, an attempt is made to briefly introduce the terminology associated with general education and language education, with a special focus on Computer-Assisted Instruction (CAI) and Computer-Assisted Language Learning (CALL) both in their teaching and learning dimensions. No attempt will be made to examine the terms related to distance education, which is featured in figure 1.1. to put the terminology in a broader perspective and eventually make it easy to understand.

At the level of general education, there is Computer- Assisted (or Based) Instruction (CAI/CBI), and Computer- Assisted (or Based) Learning (CAL/CBL). The term 'aided' or 'assisted' is used to indicate the subsidiary role of the computer, which represents only a part in the entire learning process (Levy, 1997). According to the *Oxford Dictionary of Computing* (Pyne and Tuck, 1996), CAI is "the use of computers and programs for preparing lessons and other materials for students" (qtd. in Agnaou, 2009, p.11); it reflects, as Kaliski (1992) maintains, the teaching methodology centered on the teacher rather than the learner. Although used to refer to both learning and teaching, the term CAI, as noted by Underwood (1984), was widely associated with teaching only. With regards to CAL (Computer-Assisted/Based Learning), it came as an alternative to the out-dated and conceivably teacher-centered CAI, reflecting a tendency to attach more importance to the learner. The *Oxford Dictionary of Computing* defines CAL as "the use of computers and programs for testing practice and other ways of learning" (qtd. in Agnaou, 2009, p. 11).

In relation to language education, CALL is the most-frequently used term in the field. Levy (1997) defines CALL as "the search for and study of applications of the computer in

language teaching and learning" (p. 1). Wyatt (1984) uses CALL instead of CAI, which in his view makes reference only to one role of the computer. He states that:

> The term 'computer-assisted instruction' itself is suggestive of only one role for the computer, exemplified in drill-and-practice and tutorial materials. For this reason, it was generally agreed at the CAI symposium…to adopt the alternative designation CALL: computer assisted language learning. Throughout this book, therefore, the term CALL will be used to emphasize the whole range of possible roles that the computer can play. (p. 4)

In his turn, Levy (1997) adopts the term CALL, which for him includes the different roles a computer can play in language learning. Also, there is Computer-Enhanced Language Learning (CELL). Emphasizing the *enhancing* quality of the computer in learning languages, Hoven (1999) put forward CELL, which, according to Levy (op. cit.), was first introduced by Andrew Lian, a professor of foreign languages and literatures at Western Illinois University, in 1988. Alternatively, Ruschoff (1997) coined another term 'Technology Enhanced Learning' (TELL) to stress the learning benefits brought about by technology (cited in Agnaou, 2009).

From the teaching point of view, equivalents, such as Computer-Assisted Language Instruction (CALI) and Computer Based Language Teaching (CBLT) are used although practitioners in the field tend to use CALL, CELL, and TELL to refer to both language teaching and learning. In fact, each one of these terms stresses a particular dimension of ICT use in the educational practice. Sometimes, the innovative quality of technology itself is emphasized, as in TELL, and at other times the assisting role of the computer in the improvement of learning is stressed, as in CELL. Also, Levy (op. cit.) cites geographical factors for the varied terminology, noting the preference for CAI in the USA and CAL in the UK.

I.4. Computer-Mediated Communication (CMC)

CMC is generally any type of communication that occurs using a computer. Levy (op. cit.) maintains that:

> CMC is concerned with communication between two or more participants via a computer. It is used generally in the social sciences to cover email, bulletin boards, discussion lists, and computer conferencing, both text-based and video-based (p. 79).

For Kaye (1991, p. 5), CMC is:

> The use of computers and computer networks as communication tools by people who are collaborating with each other to achieve a shared goal, which does not require the physical presence or co-location of participants, and which can provide a forum for the continuous communication free of time constraints (qtd. in Agnaou, 2009, p. 55).

CMC can be divided into two types: Synchronous communication, and asynchronous communication. The former refers to the kind of communication that occurs instantaneously and allows for real-time interaction between the addresser and the addressee; it requires as a preliminary step a computer connected to the internet and is widely used in distance education and E-learning. Examples of synchronous communication include audio-conferencing, or live online conversation; videoconferencing, live audiovisual conversation, and Internet Relay Chat (IRC), or a chat program based on real-time exchange of text or written messages with other members of the chat room. On the other hand, asynchronous communication requires a time delay and usually allows participants to interact at their pace. There is no need for immediate response and engagement among participants. Asynchronous communication is widely used in learning and teaching in general and E-learning in particular; it allows for the exchange of course materials, such as digitized texts and all kinds of multimedia, defined as "the integrative use of multiple media such as text, graphics, animation, audio and video playback" (Agnaou, op. cit., p. 16). Examples of this type of communication include emails, listservs, and discussion boards.

I.5. The Internet and the World Wide Web

Anderson (2001) defines the internet as "a global network of computers interconnected so they can share data and resources" (p. 5). The development of this network started with a U.S. military project, known as ARPANET (Advanced Research Project Agency Network), launched by the U.S. Department of Defense during the Cold War to protect the country against any possible Soviet nuclear aggression. The network gradually expanded and became widely used by scientists, educators, public administrations, and commercial organizations. Concerning the World Wide Web, it is "a service that allows people to exchange electronic documents and data using the same graphical interface." "Much of the Internet's content ... is organized as pages on the World Wide Web" (Anderson, op. cit., p. 6). Web content is accessed through a Web browser, such as Microsoft Internet Explorer, Netscape Communicator, and Mozilla Firefox, and Web pages are located via the URL (Uniform Resource Locator), or their respective online addresses. The information available on the internet can be researched using search engines, such as Yahoo, Google, and Bing. To create a website, a simple computer language, known as the Hypertext Markup Language (HTML), is used (Anderson, op. cit.). To use resources on the Web, the Hypertext Transport Protocol (HTTP), a set of rules for exchanging files, is employed (n.a., 1997, p. 48).

I.6. The History and Roles of Computers in Education

Although this study is concerned with ICT in general, special emphasis is placed on the computer, which is, as mentioned by Kennewell et al. (2000), Postholm (2006), and Anderson (2007), the most important component of ICT. Therefore, a definition of the computer, its different roles, and a brief history of its use in education will be provided.

Herbert Simon (1971), a Nobel Laureate, defines the computer as "an information processing system of quite general capability. It can receive information, store it, operate on it

in a variety of ways, and transmit it to other systems" (p. 10). He notes that as a result of the remarkable advances in the information processing technology a new meaning of the verb "to know" has emerged. "To know" meant to *store* and *recall* information when needed, whereas the current meaning is to *access* information and have the *skill* to use it. The *storage*, or physical possession of information, does not warrant *access* to it; Simon (op. cit.) states that:

> It is possible to have information stored without having access to it (the name on the tip of the tongue, the lost letter in the file, the unindexed book, the uncatalogued library). It is possible to have access to information without having it stored (a computer program for calculating values of the sine function, a thermometer for taking a patient's temperature). (p. 15)

Regarding the roles of the computer, Taylor (1980) speaks of three major roles: the tutor, tool, and tutee. He describes these roles as follows:

> To function as a *tutor* in some subject, the computer must be programmed by "experts" in programming and in that subject… The computer presents some subject material, the student responds, the computer evaluates the response, and, from the results of the evaluation, determines what to present next. At its least, the computer keeps complete records of each student being tutored …
>
> To function as a *tool*, the computer need only have some useful capability programmed into it such as statistical analysis, super calculation, or word processing. The learner can then use it to help them in a variety of subjects …
>
> To use the computer as *tutee* is to tutor the computer; for that, the student or teacher doing the tutoring must learn to program, to talk to the computer in a language it understands (qtd. in Levy, 1997, p. 83).

The computer tutor and the computer tool are distinct in that the first "evaluates the student input," whereas the second does not. For the computer tutee, the user, a student or teacher, controls the computer to function either as a tutor or tool. The use of the computer as a tutor is originally associated with behaviorism and programmed instruction while the role of the computer as a tool is related to CALL.

It has been about 50 years since computers were introduced in education. In 1944, Harvard University introduced the MARK 1, the first computer to be used for educational purposes. The University of Pennsylvania followed suit and began using ENIAC computers in

1946. At this stage, computers were mainly used in mathematics, science, and engineering. In 1959, the University of Illinois launched a large-scale project, PLATO, to promote the use of computers in education, marking their utilization in other fields of study. Accompanying these technological advancements, pedagogical innovations began to emerge, giving rise to terms such as CAI. This latter came into play with Patrick Suppes and Richard Atkinson, who in 1963 developed computer programs that sought to improve instruction in mathematics and reading through self-paced learning, individualized instruction, immediate feedback, and engagement in active learning. These programs were based on drill-and- practice. Thus, in the United States, the number of students using computers in their classes was over two million by 1974, and 55% of secondary schools were using computers for instruction by 1975 (Molnar, 1997, para. 2-9).

I.7. The National Charter of Education and Training (NCET)

Fostering the use of ICT in education was among the major goals of the educational reform outlined by the National Charter of Education and Training (NCET). In 1999, the late king Hassan II set up a special committee, known as the Royal Commission for Education or *Commission Spéciale d'Education et Formation* (COSEF) to overhaul the whole educational system and formulate a new charter of education. COSEF, working under the royal patronage of HM Hassan II and later king Mohammed VI, was entrusted with the task of locating the most persistent issues impeding educational development. Among others, four major issues were identified by the committee: (1) gender, income, and rural-urban inequity, (2) a decrease in the quality of education, (3) a discrepancy between students' skills and the requirements of the job market, and (4) a centralized educational administration. To address these issues, the committee drafted a charter, which came to be known as the NCET, proposing several initiatives to reform the educational system. The Charter is in two parts: the first delineates the underlying principles of the new educational system, and the second pinpoints the major

areas that the reform aims to address. The first part of the NCET, in its turn, consists of two subparts: the first defines the underpinning national and global values under which the reform is premised, and the second specifies its principal goals. Values such as tolerance towards other cultures, respect of human rights and the political and cultural foundations of the country (e.g., constitutional monarchy, and Islam) are set to be the framing principles of the reform. With reference to the use of ICT in education, it is stated in article five of the first part of the Charter that:

> The system of education and training aspires to make the country move forward in the conquest of science and in the mastery of advanced technologies. It thus contributes to strengthening its competitiveness and its economic, social and human development, at a time characterized by openness to the world.
>
> (qtd. in Agnaou, op. cit., p. 91)

In the second part of the Charter, which comprises six major "areas of reform" and nineteen "pivots of change," there is special reference, particularly in articles 119, 120, and 121, to the importance of ICT use in schools. There is also an exclusive pivot, namely the tenth, entitled "using the new information and communications technologies," that outlines in general terms the aims of ICT use in education.

Based on articles 119, 120, and 121, there is no specific procedure explaining in clear terms how the educational use of ICT is going to be implemented and what competencies it is aimed to develop; rather, the stipulations of the NCET are general and meant to pave the way for future use of ICT by supplying the necessary hardware to be used for training and educational purposes. In article 119 of the second part of the Charter, emphasis is placed on in-service training even though the importance of ICT use in the educational practice is also recognized; it is stated in the article that:

> This objective should not be thought to mean that technological media will systematically supplant the real pedagogical relationship constituting the foundation of the educational process, *viz*. the vital master-discipline relationship, based on understanding and respect.
>
> (qtd. in Agnaou, op. cit., p. 94)

This same philosophy was echoed by Cameron (1994) who maintains that "computers alone will never replace the need for the human instructor. Only an actual instructor can teach students to utilize computer-based tools to further their educational goals" (qtd. in Agnaou, op.cit., p. 95).

In the integration of ICT in education, focus as specified in article 119 of the second part of the NCET is on addressing the issues in need of immediate action. These included resolving the issues associated with education and training by: (1) providing access to diverse and alternative means of education to the students living in remote areas, and (2) optimizing in-service teachers' training opportunities. Also among the issues emphasized is ensuring equality in access to educational resources, communication networks, and documentary references. However, these and other goals have not been achieved, and only the small-scale ICT projects, namely the CATT PILOTE carried out in cooperation with the USAID (United States Agency for International Development) seem to have met their objectives. Despite the top priority given to education and training and awareness of the potential benefits of ICT in education, the use of multimedia technology in the classroom environment has thus far gained little ground. The educational process is entirely dependent on textbooks and teachers, perpetuating ineffective teaching and learning practices, and subsequently undermining the development of problem-solving and analytical skills (Agnaou, op. cit., p. 94-7).

I.7. Morocco: The Socioeconomic Fabric

It is indisputable that education influences, and is influenced, by the prevailing social and economic variables in any given country. So that the reader does not lose the larger picture when approaching ICT in education, a snapshot of Morocco's social and economic characteristics is hereby provided.

According to the CIA World Factbook, Morocco has a population of 34 million (July 2009 est.). Illiteracy, which includes those age 15 and over who cannot read and write, is very

high, 48%. The proportion of the population below the poverty line (usually set by the government to determine those who live in poverty) is about 15%. Gross domestic product (GDP), "the value at current market prices of all final goods and services produced annually in a given country" (Dolan, 2006, p. 138), reached a total of $137.9 billion in 2008. GDP per capita (PPP) is $4,600 (2009 est.). The country's economic stability is largely dependent on the agricultural sector, which accounts for 15% percent of GDP and employs 44.6% of the 11 million labor force (2008 est.). In cases of drought, such as that of 2007, Morocco often resorts to importing wheat from major producers, mainly the United States, to supply the local demand.

To alleviate poverty, and reduce unemployment, estimated at 9.5% (2008 est.), Morocco launched, in 2005, the National Initiative for Human Development (INDH), a $2 billion project aimed at improving the social and economic wellbeing of the country's poor population, especially those living in rural areas and shanty towns. Meanwhile, Morocco has started to turn attention to other economic sectors aiming to diversify its economy. The first two major steps were the privatization of the telecommunication sector and the Vision 2010 project, also known as the Azur Plan, aimed at attracting 10 million tourists a year by 2010. Furthermore, partnerships for economic and scientific cooperation were forged with the European Union and the United States to increase foreign direct investment and improve education; the country entered an Association Agreement with the EU in 2000 and a Free Trade Agreement (FTA) with the U.S.A. in 2006.

Although at a slow pace, the service sector started to show signs of improvement, accounting for 54% of GDP (2008 est.) and employing 35% of the total labor force (2006 est.). Regarding the industry sector, it is largely based on phosphate rock mining and processing, textiles, construction, food processing, and leather goods; it accounts for 30% of GDP and employs 19% of the total labor force. It remains that the major challenge facing

Morocco is improving education to increase the employability of college graduates and close the income gap between the rich and the poor (CIA World Factbook, n. d.).

Chapter Two:

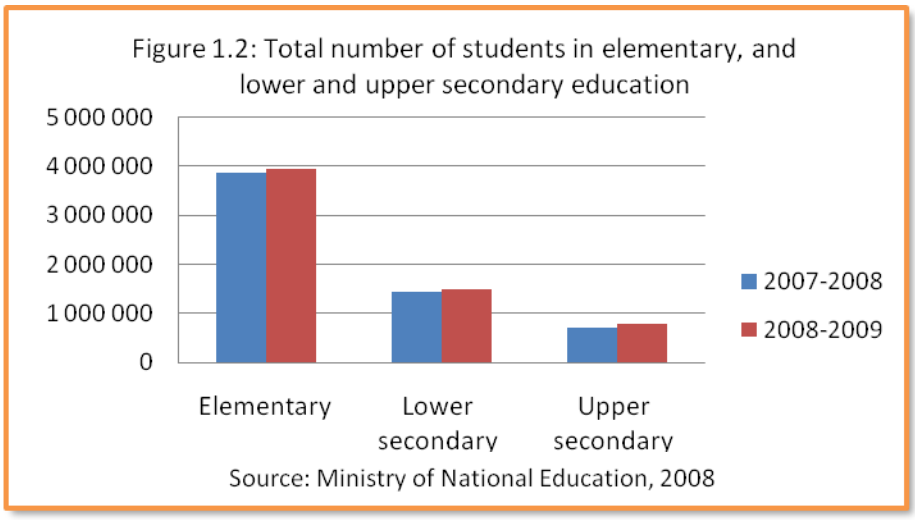
School Structural Characteristcs and National Educational Policies

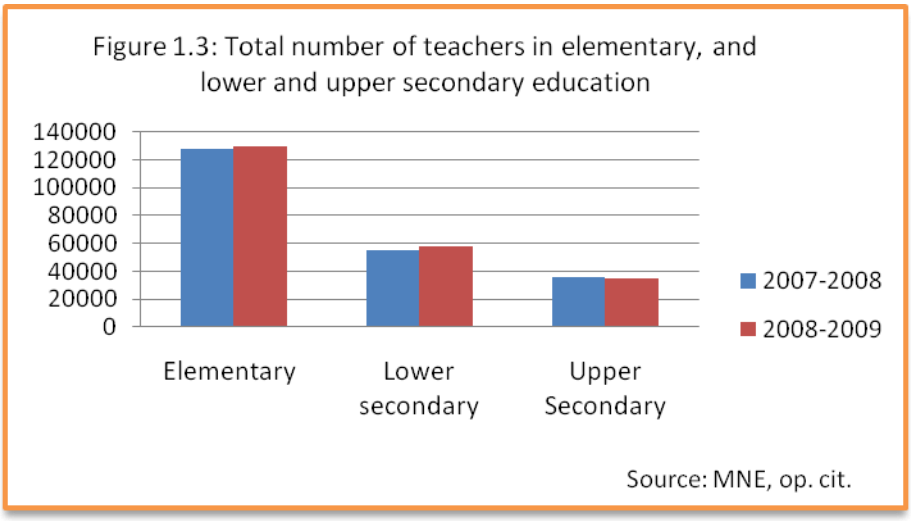
II. School Structural Characteristics and National Educational Policies

To investigate the factors affecting ICT educational use without probing the structural conditions, organizational, and managerial characteristics of schools and education in Morocco is likely to yield irrelevant and fallacious findings. In order to increase the reliability of the findings of this research, ICT educational use will be put in the framework of a broader perspective: the structural characteristics of schools at all levels of education, including elementary, lower secondary, secondary, and higher education. Taking into consideration official documents, experience, and discussions with teachers, the most persistent characteristics of schools and education in Morocco are: (1) inadequate staffing of schools especially in terms of teachers, (2) poor and underdeveloped infrastructure in terms of schools and classrooms, and (3) inefficient spending policy. Arguments supporting each of these issues will be provided based on both a quantitative and qualitative analysis of data gleaned from official documents. All figures cited in this chapter are based and/or adapted from online databases posted on the official websites of the Ministry of National Education, the Ministry of Economy and Finance, and the Ministry of Trade, Industry, and New Technologies. Also, it is important to note that the terms 'elementary' education/school, 'lower secondary/middle' school, and 'upper secondary/high' school will be used interchangeably in this research study.

II.1. Understaffing of Schools

As illustrated in figure 1.2, there are 6.2 million students in elementary, lower secondary, and upper secondary education combined. Elementary education takes the largest share with about 4 million students (64%), lower secondary comes second with almost 1.5 million (24%), and upper secondary is last with less than 1 million, 12%. On the other hand, the total number of teachers (see figure 1.3.) in elementary, lower secondary, and upper secondary education combined is estimated at 222,279. Elementary education accounts for 58% with 129,479 teachers, lower secondary makes up 26%, with 57,877, and upper secondary comprises 16%, with 34,923. The teacher-student ratio at each level of education is as follows: 1 teacher to 30 students in elementary education, 1 to 26 in lower secondary, and 1 to 23 in upper secondary. These ratios were obtained by dividing the total number of students by that of teachers at each level. According to Moroccan standards, the figures seem to reveal no shortages of teachers;





however, they do not provide an account of the teacher-student ratio by field of study, and the distribution of teachers by area-urban as opposed to rural-and region-West as opposed to East. Not to underestimate any school subject, shortages are usually observed in teachers of the subjects constituting the core of the curriculum, such as Mathematics, French, Philosophy, and Chemistry, whereas sometimes there are surpluses of teachers of other subjects. The same observation applies to areas and regions; some have a surplus of teachers, others have a shortage, although a study of the school infrastructure is necessary to determine whether schools are understaffed or not.

II.2. Poor and Underdeveloped Infrastructure

The analysis of the data gleaned from the 2009 Budget Bill of the MNE reveals a poor school infrastructure, especially in terms of classrooms, which explains in part the persistent problem of understaffing. As the figures in table 1.1 indicate, there are about 21,000 schools in elementary education, including principal schools and their branches, around 1,500 in lower secondary, and roughly 800 in upper secondary. The school-student ratio in each level is the following: 1 school to 192 students in elementary education, 1 to 1007 in lower secondary, and 1 to 1062 in upper secondary. These figures are general and do not account for the size and population of the school in terms of the total number of students and that of the rooms available for use; it is almost common knowledge that in some areas, the size of the class amounts to 50 students, which evidently suggests a lack of rooms. More importantly, the school-student ratios do not account for those not enrolled or dropping out as a result of isolation. Many school-age children, especially those living in mountainous and remote areas,

		2007-2008	2008-2009	Increase in %
Elementary school	Principal schools	6,939	6,995	0.8%
	Branches	13,555	13,607	0.4%
Middle school		1,389	1,481	6.6%
High school		719	748	4.0%

Table 1.1: Total number of schools in elementary, and lower and upper secondary education

Source: MNE, op.cit.

do not join school because it is far from home. Besides, many students drop out of school (see figure 1.6), especially when they have to move from elementary to secondary education, because they have to travel long distances, sometimes on foot, to reach their schools. Given the high rate of illiteracy, around 48% of the total population, it could be argued that thousands of children cannot join school because no infrastructure is put in place or made available in their areas. Also important to mention is the uneven distribution of schools throughout the country; while there are surpluses of schools in some areas, there are shortages in others although no consistent pattern exists to indicate whether surpluses and shortages are observed in urban or rural areas.

It is only when these variables are taken into consideration that the underdevelopment of the infrastructure becomes clearer. Yet, the figures in table 1.1, and figures 1.2 and 1.3 are consistent and revealing; they indicate dramatically decreasing numbers of students, teachers, and schools as we advance through the three levels of education. Such decrease is largely due to understaffed schools and poor and underdeveloped infrastructure. Therefore, the relationship between the shortage of teachers and the poor infrastructure is a strong one. The equation is simple: there are not enough teachers partially because there are not enough rooms where they could teach; in turn, there are too many students in the classroom partly because there are no other rooms where they could study, not necessarily because there are no teachers. Finally, it is important to mention that most schools are in dilapidated conditions and in need of renovation, and are inadequately supplied with water and electricity, especially in rural areas.

II.3. Inefficient Spending Policy

This section aims to examine spending at the macro and micro levels-that is, government spending on education in general and ICT in particular. It is expected that the findings of this investigation would help identify both national and local educational policies,

especially in relation to ICT use in learning and teaching, and unveil the extent to which they are and have been effective.

Based on the statistics provided by the Ministry of Economy and Finance and shown in table 1.2, spending on education in Morocco reached DH 37,430 million in 2008, accounting for 26% of the government budget and 5% of GDP. This budget is managed by the MNE, and consists of two major components: an operating (*Budget de fonctionnement*), and an investment budget (*Budget d'investissement*). The first accounts for 30% of the government operating budget, whereas the second makes up only 10% of the government investment budget. The figures gleaned from the 2009 Budget Bill indicate that 75% of the MNE's budget is spent in the form of wages and payments to employees while only 25% is allocated to the remaining components of the budget, such as investment in infrastructure and equipment. Based on these figures, it would be unfair to argue for more spending on education because little money will be left to spend on other public services. A legitimate argument is, however, to strike a balance between the operating and investment budgets. The share of the MNE's colossal budget allotted to wages, 75%, suggests that the total number of educational institutions, including schools, universities, administrations, and training centers, is so large that it requires a massive number of personnel, which is not the case. A personnel eating up 75% of the Ministry' total budget would normally be able to effectively manage all educational institutions, which combined with equipment receive only 25% of the budget. Meanwhile, renovation and expansion of existing institutions, whether they be educational, administrative, or training, and the building

	2006	2007	2008
Operating budget (million DH)	32,958	34,451	34,498
% of government budget	31.4	32.2	30.0
Investment budget (million DH)	2,345	2,645	2,932
% of government budget	10.7	10.0	10.2
Global MNE's budget (million DH)	35,303	37,096	37,430
% of government budget	27.8	27.8	26.0

Table 1.2: Government spending on education

Source: Ministry of Economy and Finance, 2009

of new ones take place at an extremely slow pace, which reveals low productivity and poor performance on the part of employees and calls for a qualitative rather than a quantitative approach to the management of resources and hiring policy. Putting in place effective monitoring and assessment tools to ensure accountability is likely to increase productivity, decrease spending on wages, and eventually help strike a balance between the operating and investment budgets of the MNE.

II.4. School Performance

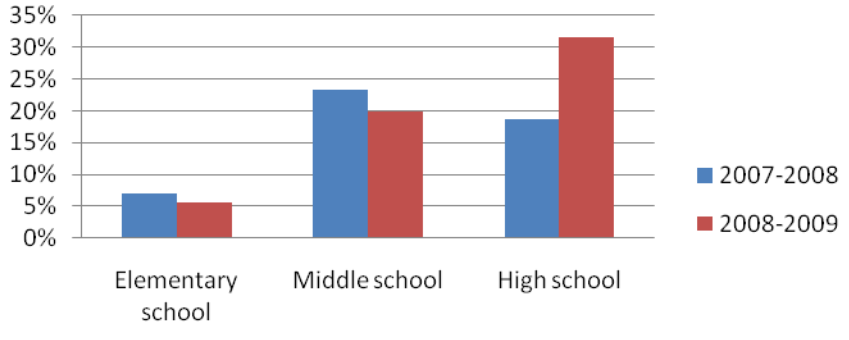
Given the observed inadequate staffing, poor infrastructure, and inefficient spending, a reasonable conclusion is that the performance of students, teachers, and administrative staff is most likely sluggish. Since there is no formal assessment procedure that regularly and accurately evaluates the performance of teachers and administrative staff on the job, this investigation of school performance will be based on three major indicators that will help assess the efficiency with which work is being done. These indicators are strongly interrelated. They consist of overcrowding (more than 41 students in a class), grade repetition (the process of having a student repeat a whole academic year as a result of failure to attain an average of 10 points out of 20 on the final cumulative result), and lastly school dropout. These are reliable indicators that distinguish high- from low-performing institutions, and predict the quality of education offered to the student community.

First, it is important to acknowledge the efforts made to increase enrolment in all levels of education, especially among children. According to the World Bank, the rate of literacy has increased from 84% in 1990 to 87% in 2008 among males of age 15-24, and the proportion of the students completing elementary education has risen from 82% to 87% over the same period (cited in the Oxford Business Group [OBG], 2009). These figures indicate that more students are able to meet the standards set by national and local educational authorities both in elementary and secondary education. Also important to recognize are the

efforts made by HM King Mohamed IV, the top executive power in the country, to increase the performance of the school system. In October 2009, His Majesty launched "the Emergency Plan," a four-year DH 31 bn emergency program meant to overhaul the educational system and concretize the policies set in the NCET. Among other goals, the Plan aims at doubling the percentage rate of the students passing the baccalaureate exam, upgrading 15,300 schools, supplying 300 boarding schools with water and electricity, and most notably raising the age of compulsory elementary education to 15 years of age. All these goals are set to be achieved within the next two years. The MNE in its turn is making efforts to improve the performance of the educational system as a whole. OBG (op. cit.) quoted the Moroccan minister of education, Ahmed Akhchichine, as saying "The goal [of the emergency plan] is to make schools more attractive, in order to restore people's confidence in Moroccan schools and help them fulfill their purpose" (OBG, 2009)

Nevertheless, improvement seems to be taking place at an extremely slow pace. Despite these efforts, only 15% of Moroccan high school students pass the baccalaureate exam. Compared to elementary school, the total number of students, as displayed in figure 1.2, has decreased by 40% in lower secondary school, and 52% in upper secondary according to the 2009 figures. Only half of middle school students, 12% out of 24%, make it to high school and only a fifth of them, 15%, pass the baccalaureate exam. This is not surprising given the difficult learning and teaching conditions characterized by high rates of

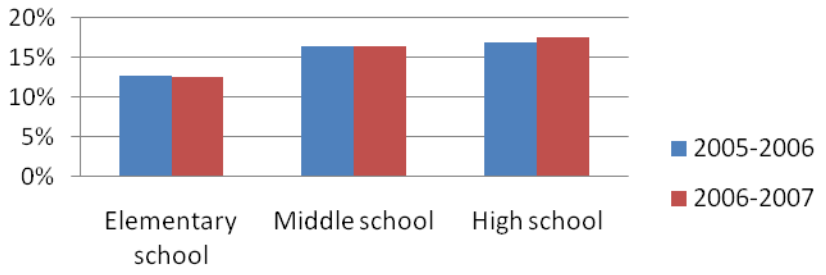
Figure 1.4: Overcrowding in elementary, and lower and upper secondary education in %



Source: MNE, op. cit.

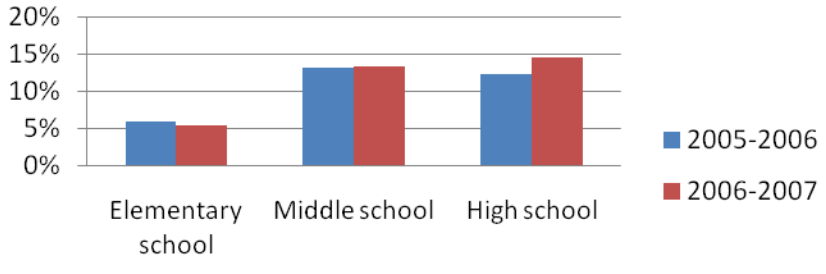
overcrowding (see figure 1.4.), a direct consequence of the variables discussed in II.1, II.2, and II.3. A class of 41 students or above is counted as overcrowded. As indicated in figure 1.4., the rate of overcrowding while comparatively low in elementary school, 5.6%, reached 19.9% in lower secondary education, and 31.6% in upper secondary, showing a decrease of 3.5% in lower secondary and an increase of 12.9% in upper secondary over the period 2008-2009. This naturally resulted in low performance on the part of students evidenced by high rates of grade retention (see figure 1.5.). In lower secondary, 16.4% of students repeat a whole academic year, whereas in upper secondary the percentage is even higher, 17.5%. With regard to school dropout (see figure 1.6.), the same pattern repeats itself: higher percentages of school dropout, especially in middle school, 13.4 %, and high school, 14.5 %. These figures reveal an educational system of poor performance and low productivity originating in flaws not so much in funding but rather in management, planning, and particularly the assessment policy. Failure to achieve the set standards and intended outcomes cannot be blamed on students, teachers, or administration only. Quantitatively speaking, spending is sufficient since the government spends 26% of its total budget on

Figure 1.5: Grade retention in elementary, and lower and upper secondary education in %



Source: MNE, op. cit.

Figure 1.6: School dropout in elementary, and lower and upper secondary education in %



Source: MNE, op. cit.

education, and the performance of students and teachers is predictable given the difficult learning conditions discussed in the two preceding sections. The problem seems to be in the assessment procedure; the educational authorities do not seem to take into consideration the learning and teaching conditions when setting the standards and outcomes students are required to achieve. There is a huge mismatch between the quality of education provided by the ailing system and the standards students are expected to achieve by the end of the course. It is imperative to close the gap between the enabling factors of achievement in the Moroccan context and the expectations from students. There is an urgent need for adjusting the exams' level of difficulty to the local and national socio-economic conditions, which determine to a large extent students' abilities and the school's range of performance. It would be more productive to start gradually administering final exams, especially those of the final years of middle and high school, at the local instead of national level, of course putting in place measures to ensure consistency, transparency, and accountability. Just as students learn differently, they also perform differently on exams. Also, the curriculum needs re-examination; quantitatively, students find themselves overwhelmed by an extremely overloaded study program, whereas, qualitatively, rote learning and memorization remain the central focus of the syllabus. Here, teachers having better knowledge of their students could change the course of the learning and teaching process by setting reasonable objectives within the range of their students' performance and assessing them accordingly.

However, lowering grade retention rates and increasing enrolment at all levels of education would inevitably require an increase in spending, which could send the country into a disastrous economic imbalance characterized by increasing spending and decreasing revenues. With 26% of the government's total budget spent on education, the country is still struggling to provide decent education for the few remaining numbers of students from elementary school. The conclusion is that fundamentally in the short run the country will be

unable to provide secondary education for all students currently enrolled in elementary education, around 4 million students. The total number of students in elementary, middle, and high school combined would double to 12 million, which is by all standards beyond the country's management and financial abilities. The current total number of students in both lower and upper levels of secondary education is a little more than 2 million; a doubling of this number would certainly necessitate a parallel doubling of expenditure, which is likely to further aggravate the learning and teaching conditions. Within this context, the goal of doubling the number of students passing the baccalaureate exam within the next two years set by the Emergency Plan is unreasonable as it would create chaos at universities, which are still struggling with the present numbers of students. In the short run, providing higher education for even half of the students in high school, a little less than 1 million, precisely 794,703, is practically beyond the country's financial capacities. It is more practical, therefore, to develop appropriate and efficient mechanisms to make the best use of what is available.

II.5. ICT Spending in Morocco

Based on data from an official document outlining the "*Maroc Numeric 2013*," or "Digital Morocco," a large-scale ICT project, published by the Ministry of Industry, Trade, and New Technologies in 2009, ICT spending on education, health, and social action combined does not exceed 0.7% of the country's total GDP compared to 1.8% in France. On the other hand, ICT spending on other sectors, as illustrated in figure 1.7, takes a larger share of GDP compared to education. For example, banking, finance, insurance, and real estate receive 3.2% of GDP in the form of ICT expenses. Energy, tourism, and lodging account for 2.7%. These figures show that education, in addition to health and social action, is not considered a productive sector that substantially contributes to economic development. While as previously mentioned it drains 26% of the total budget, its estimated impact on value added growth does not exceed, including health and social action, 3%. Value added growth is the

enhancement that a school or any other enterprise gives its product or service, the quality of education in this case (Investopedia.com, n.d.). Other sectors such as banking (24%), and industry (15%) contribute with greatly significant percentages to the country's value added growth, which explains the higher percentages of GDP allocated to ICT investment in these sectors. The repercussions of the variables discussed in these three sections include an extremely low student-computer ratio at the school level, and subsequently a limited use of ICT for learning and teaching purposes in the classroom context. The country is struggling with the provision of basic infrastructure, such as rooms and chairs, to guarantee education for larger numbers of children and increase literacy. In other words, focus is on increasing the number of students enrolled at all levels of education rather than the quality of education itself, which seems to be a realistic strategy. While efforts are made to introduce ICT in elementary and high schools, it seems impractical to speak of using computers in the classroom for learning and teaching purposes.

Figure 1.7: ICT spending in Morocco in % of GDP 2007

	Morocco	Comparison France	Estimated Impact VA growth
Banking, Finance, Insurance, Real Estate	3,2%	4,1%	24%
Businnes Process Offshoring	3,2%		
Energy	2,7%	3,1%	4%
Tourism & Accommodations	1,9%	2,0%	3%
Transportation	1,8%	3,4%	24%
Government	1,3%	3,4%	6%
Trade	1,1%	1,4%	13%
Industry	0,9%	1,4%	15%
Education, Health, Social Action	0,7%	1,8%	3%
Natural Resources	0,2%	1,5%	0%
Construction	0,2%	0,8%	1%
Services	0,1%	1,4%	17%

VA: Value added
Source: Ministry of Industry, Trade, and New Technologies, n.d.

II.6. Higher and Tertiary Education, and ICT Training in Morocco

The aim of this section is to examine the structural characteristics of the institutions of higher and tertiary education in terms of their ability to adequately produce quality ICT experts and technicians in order to ensure an effective and successful implementation of the government ICT projects. Emphasis is placed on training in computer use as a tool to enhance human learning and teaching capabilities.

Since there are no figures about the number of schools that specialize exclusively in 'technology education,' this investigation will focus on institutions with a syllabus including training in ICT for educational or professional purposes. Also, the proportion of ICT schools and graduates compared to other disciplines will be analyzed to provide an overview of the country's ICT training policy.

II.6.1. Institutions of Higher and Tertiary Education

Based on the data provided by the MNE there are 91 institutions in higher and tertiary education combined, some of which are colleges that make up parts of a whole university (e.g., College of Arts and Humanities) while others are independent specialized schools (e.g., School of Engineering). As indicated in figure 1.3, combined, the colleges of Arts and Humanities, and Law, Economics, and Social Sciences

Table 1.3: Distribution of higher education institutions

Type of Institution	2006-2007	% of Total Number of Institutions
Schools of Original (Islamic) Education	4	5%
Schools of Law, Economics, and Social Sciences	13	17%
Schools of Arts and Humanities	14	17%
Schools of Science	11	14%
Schools *Polydisciplinaires* (polidisciplinary)	9	4%
Schools of Science and Technology	7	9%
Schools of Medicine and Pharmacy	4	5%
Schools of Dentistry	2	3%
Schools of Engineering	10	11%
Schools of Trade and Management	7	4%
Institutes of Technology	8	9%
Schools of Education	1	1%
Schools of Translation	1	1%
Total	91	

Source: MNE, n.d.

make up 34% of the overall number of schools, whereas ICT schools, either for educational or professional purposes, account for 9%, a relatively significant percentage. Whether this percentage is sufficient or not depends on the needs of the country. It is important to point out that ICT training in Morocco does not take place at specific schools; rather, it is offered in a variety of schools, including colleges and independent institutions (see the highlighted items in table 1.3.) and for a variety of purposes -not only for educational goals. Based on the figures in table 1.3, ICT training infrastructure does not seem to be sufficiently developed although the training quality and capability of such infrastructure will be determined by the percentage of students and graduates in the various ICT disciplines.

II.6.2. ICT Training Institutions: Quality and capability

With regard to quality, there are no specific degree programs that provide focused training in teaching and learning during undergraduate studies at university. Teachers of all subjects, except those at technical and vocational schools, are originally college graduates, with a DEUG (a two-year college certificate) or a bachelor's or master's degree in a general field of study, admitted into a respective teacher training center (CFI, CPR, and ENS), where they receive a year of training in teaching and learning related to their particular specializations. The conclusion is that the technology-related institutions listed in table 1.3 are not, at least currently, educationally oriented-that is, they are not geared towards supplying the demands of the educational sector. Accordingly, it could be argued that teachers' ICT skills remain underdeveloped due to the lack of institutions (see table 1.3) offering focused training in ICT educational use. For an effective use of ICT in education, it is important to establish discipline-specific courses in teaching and learning that students would have to take as requirements of their general study programs. This would most likely increase job prospects, and most importantly improve the quality of educators, especially in terms of their ICT capability.

To examine the training capabilities of the ICT-related institutions in higher and tertiary education, a study of the patterns of student enrollment throughout the different schools and disciplines, and the number of graduates in each field of study will be conducted. To start with, there are 14 universities in Morocco; each consists of several colleges, which in turn contain several departments. These universities receive large numbers of students, around 250,000 at all universities combined. Among the biggest are Sidi Mohammed Ben Abdellah University in Fez, more than 41,000 students, Cadi Ayyad in Marrakesh, 35,000. Regarding tertiary education, the official data on the website of the Ministry of Economy and Finance (www.finances.gov.ma) indicate a total of 300,000 students in all disciplines combined over the period 2007-2008, which is somewhat larger than that of the overall enrollment at universities. The institutions of tertiary

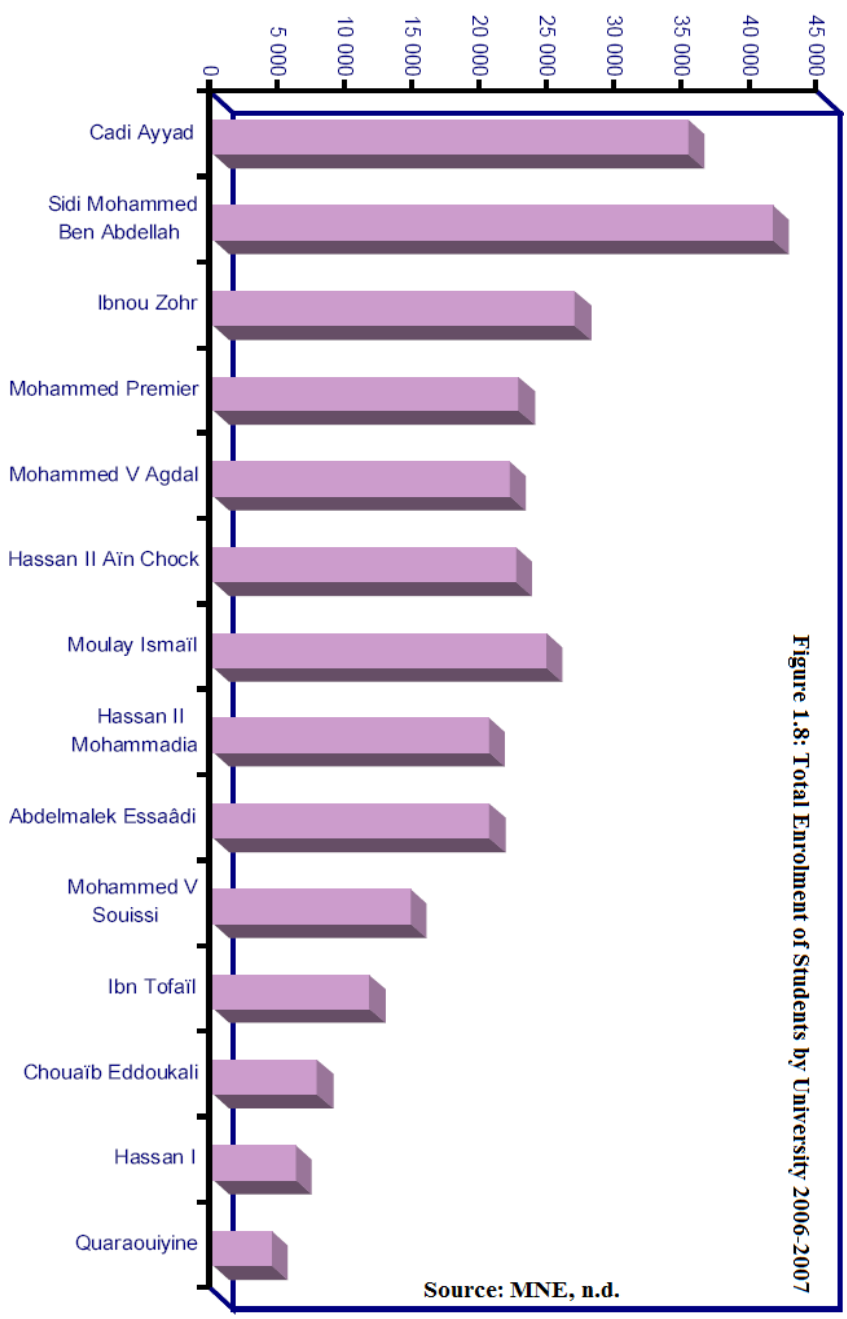
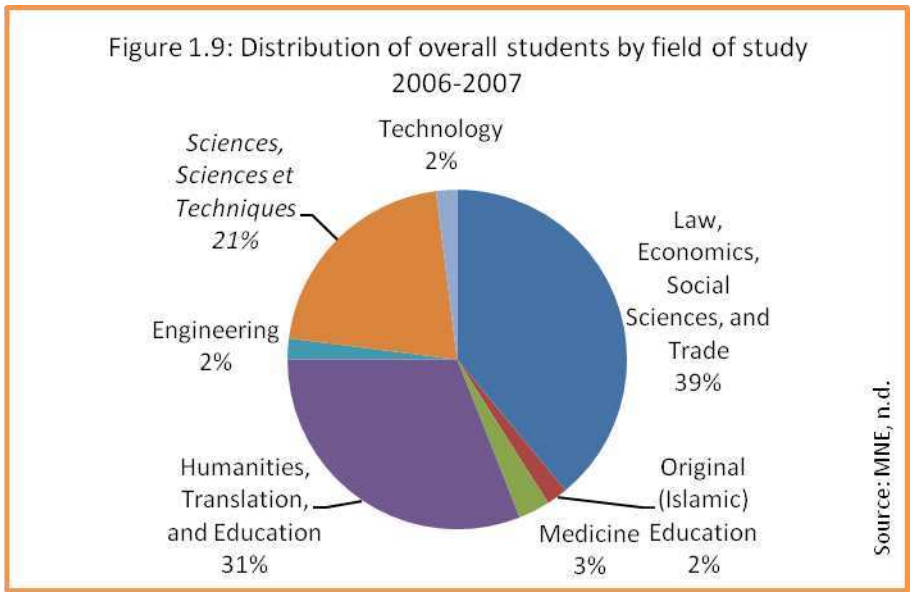


Figure 1.8: Total Enrolment of Students by University 2006-2007

education outnumber those of higher education and, therefore, are able to accommodate smaller numbers of students, usually with outstanding academic achievement.

II.6.3. ICT Specialists and Graduates

As illustrated in figure 1.9, the proportion of students majoring in ICT-related disciplines in both higher and tertiary education amounts to a total of 25%: 2% in Technology, another 2% in Engineering, and 21% in *Sciences, Sciences et Techniques* (Sciences, and Sciences and Technology), which consists of a wide range of technology-related majors, such as electronics. It is important to mention that schools of engineering, technology, and sciences and technology are highly selective, which implies that the percentages featured in figure 1.9. are not determined by choice; instead, they are dictated by the country's socioeconomic variables (see chapter I, section I.7).



To increase training and economic opportunities, an effective policy is supporting individual initiatives and encouraging private universities through subsidies, tax cuts, and partnerships, either between the government and the private sector or among private entities. Presumably, private institutions are more likely to produce highly skilled labor that meets international standards, which is beneficial for many reasons, particularly attracting foreign investment. International corporations would find it cost-effective and more lucrative to outsource production and/or services to Morocco, where there would be skilled and

comparatively cheap labor. In turn, local enterprises, including educational institutions, would benefit from foreign training expertise through the transfer of technology and know-how, and subsequently increase their competitive edge, which is likely to create more job opportunities and increase economic growth. Nonetheless, such strategy is not without costs and risks: first, it would further widen the gap between the haves, who can afford college tuitions, and the have-nots, those who cannot. Second, high- and middle-income families favor European education and, therefore, sending their children to Moroccan private institutions would be the last resort. Lastly, Moroccan skilled workers enticed by high salaries and better living conditions, often opt for living and working in developed countries. Among the most prominent private universities in Morocco and Africa is Al Akhawayn University in Ifrane (www.aui.ma), which offers a wide-ranging curriculum and supplies the local demands with highly qualified professionals and academics.

As the figures in table 1.4 indicate, the proportion of students with a bachelor's degree, master's degree, and/or doctorate in ICT-related disciplines (see the highlighted items in table 1.4) amounted to 16% of the total number of graduates over the period 2005-2006. The 16% divides among the three ICT-related disciplines as follows: Engineering accounts for 1.4%, Science and Technology makes up 2.2%, and Technology constitutes 2.2%. Similarly, the data provided by the APEBI (*Association des Professionnels des Technologies de l'Information*)

Table 1.4: Number of graduates by field of study and type of degree (2005-2006)

Field of Study	1st and 2nd cycle (*)	3rd cycle (**)	Total
Original (Islamic) Education	1,680	83	1,763
Law, and Economics and Social Sciences	20,155	516	20,671
Arts and Humanities	25,168	1,075	26,243
Sciences	5,893	1,319	7,212
Sciences and Technology	1,267	151	1,418
Medicine and Pharmacy	827	843	1,670
Dentistry	168	7	175
Engineering	723	158	881
Trade and Management	512	37	549
Technology	1,367		1,367
Education		52	52
Translation	40		40
Total	57,800	4,241	62,041

(*) Bachelor's Degree, Doctorate in (Medicine, Pharmacy, an Dentistry)
(**) Master's Degree (DESA, DESS) and the Doctorate (Doctorat et Doctorat d' Etat).

Source: MNE, n.d.

indicate that an average of 2,634 students graduate with a degree in ICT annually, and 4.5% of university students major in ICT (cited in Agnaou, 2009). In contrast, the proportion of graduates in other disciplines is remarkably higher: 42% in Arts and Humanities, 33% in Law, and Economics and Social Sciences, 11% in Sciences.

It is important to note that a large percentage of graduates, especially those with degrees in social sciences and the humanities, remain unemployed for longer periods of time. Conversely, those graduating with degrees in technology and engineering obtain employment fairly easily. In fact, employability is a valid indicator of the quality of education and training offered in tertiary and higher education. The former produces small proportions of graduates but with high employability, and the latter produces massive numbers of students but with low employability. Accordingly, it seems that the country relies on higher education to supply the basic needs of the economy, including the sector of education, whereas it depends on tertiary education to provide demand-driven and high-level experts critical for economic development. Taking into consideration the socio-economic factors, this is a realistic policy but not an effective one. Most institutions of tertiary education are physically and socially separate from those of higher education, which in a way limits the exchange of training expertise and sharing data and research among the different institutions.

III. ICT Infrastructure and Policies in Morocco

This chapter is aimed at investigating ICT infrastructure in terms of the phone and internet services in both the school and home settings. Learning and teaching with ICT takes place at schools and at homes, involving relatively various environments, namely family and school. The school environment, as indicated by the analysis in chapter two, provides very limited opportunities for ICT educational use due to the inadequate investment in equipment by the government, only 25% of the MNE's budget. The family environment could potentially compensate for the lack of access to computers and the internet at schools. To determine the extent to which family is able to increase access to educational technology, a study of the penetration rates, and the subscriptions associated with both the phone and the internet will be conducted. These two variables, penetration rates and subscriptions, can validly predict not only the ability of families and individuals to afford the computer and the internet but also the current attitudes towards ICT use and the value placed on such use among Moroccan families. In fact, any investigation of the existing ICT infrastructure in isolation from individual or corporate demand, which is in turn determined by financial ability, education, and culture will certainly yield inaccurate and fallacious findings.

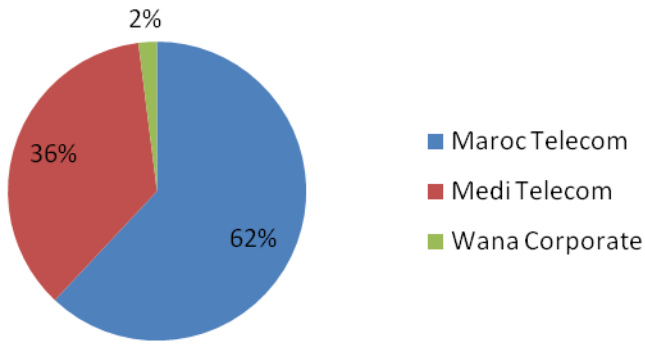
The situation of ICT infrastructure put in place in any given country is determined by the quantity and quality of the services provided and their prices, which are largely affected by the makeup of the market. That is, in a competitive market consisting of numerous phone and internet operators providing wide-ranging services, there is increasing investment in infrastructure and quality and a resulting decrease in prices, which significantly contributes to the expansion of the existing ICT infrastructure and ultimately increases the affordability of computers and internet services. Conversely, in a market characterized by limited services provided by a handful of companies, infrastructure remains undeveloped, and the affordability

of computers and internet services decreases due to low competitiveness. This second case scenario characterizes Morocco; there are only three internet and phone operators (see figure 2). While this reveals limited investment in infrastructure, low competitiveness and quality, and high prices, a study of the evolution of telephone and internet services in the country is necessary for an accurate evaluation of the infrastructure currently in place and the progress made.

III.1. Fixed-Line and Mobile Telephony in Morocco

Telephony has witnessed a dramatic change since the privatization of the telecommunications sector in 2001. Since then, the government has sold 51% of its shares in the largest mobile phone operator in the country, Maroc Telecom, to the French media corporation Vivendi.

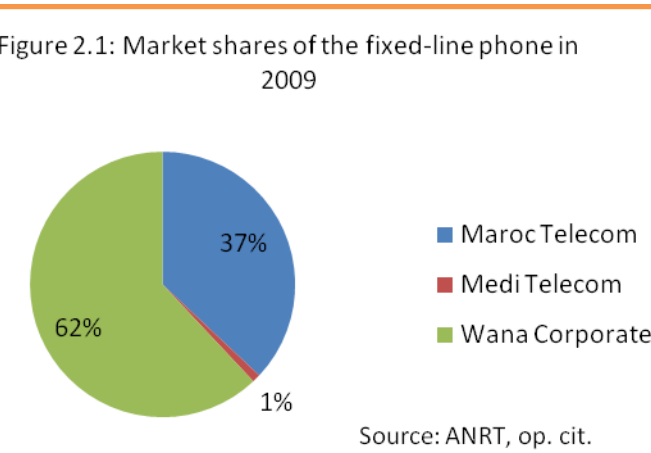
Figure 2: Market shares of the mobile phone in 2009



Source: ANRT, 2009

Furthermore, new phone operators, Medi Telecom and Wana Corporate, entered the market, resulting in an increase in phone subscriptions and overall penetration rate. As illustrated by figure 2 and 2.1, the market of mobile telephony is largely dominated by Maroc Telecom, which owns 62% of the market shares. Medi Telecom, also known as Meditel, comes second with 36% of the mobile market

Figure 2.1: Market shares of the fixed-line phone in 2009

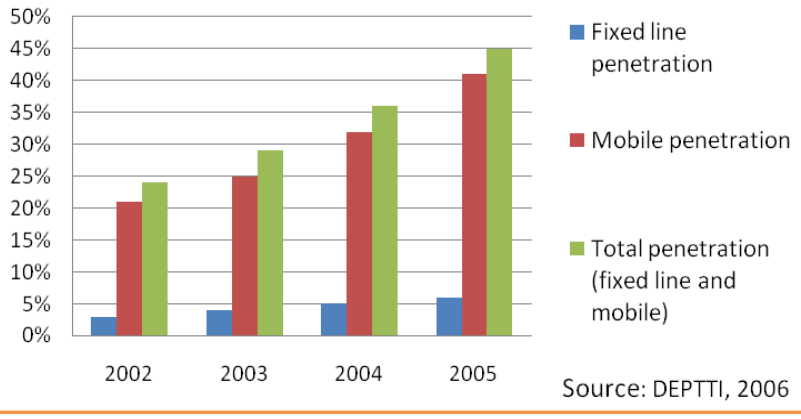


Source: ANRT, op. cit.

shares, and Wana Corporate, a newly-established operator is last with 2% of the market shares. On the other hand, Wana Corporate dominates fixed-line telephony with 62% of the market shares, Maroc Telecom accounts for 37%, and Medi Telecom owns no more than 1%. According to the CIA World Factbook, mobile phone users in Morocco total 22.8 million (2008) (ANRT, 2009).

The statistics supplied by the Secretariate of State in Charge of the Post, Telecommunications, and Information Technology, or (DEPTTI), indicate a dramatic increase in the overall penetration rate of telephony, including both the mobile and fixed-line, from 25% in 2002 to 45% in 2005. Mobile penetration has increased from 22% in 2002 to 41% in 2005, whereas fixed line penetration has remained relatively stagnant, rising from 3% to 6% over the same period (DEPTTI). Based on the data provided by the National Agency in Charge of the regulation of Telecommunications, or its French acronym (ANRT), the fixed line rate is currently 10%, whereas the mobile rate is 80% (2009). The overall number of mobile subscribers reached 25 million in 2009 compared to 12 million in 2005 while fixed-line subscriptions totalled 3 million (ARNT). Maroc Telecom, which currently holds the largest share of the mobile market, 62%, had 8 million mobile subscribers in 2005, accounting for 66% of the market shares at the time, and Medi Telecom held 4 million, representing 34% over the same period. No figures about Wana subscribers exist because the operator started business until 2007 and

Figure 2.2: Fixed-line and mobile penetration 2002-2005



Source: DEPTTI, 2006

no up-to-date figures could be obtained. With regard to fixed telephony, Wana has the largest percentage of subscribers, 62%, followed by Maroc Telecom, 37%, and Medi Telecom, 1%.

Since 2002, the market value of telecommunications services has doubled, reaching DH 24.9 billion in 2005 (DEPTTI, 2006). Accordingly, the remarkable increases achieved at the level of phone penetration rates, subscriptions, and market value suggests significant improvements in the infrastructure, the quality of products and services, and the affordability of the telephone services. These improvements are in large part driven by the observed increase in the competitiveness of the market and the resulting value-added gains and price reductions stimulated by the privatization of the sector.

III.2. The Internet Market

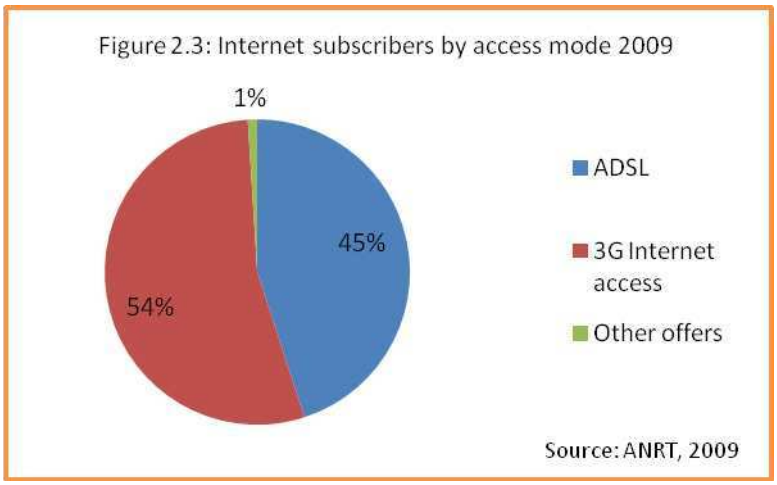
There is a strong interconnection between telephone and internet services since both are operated by the same companies, which implies that the improvements discussed in the preceding section will most certainly positively affect the internet market. This latter is characterized by a variety of internet services made available to meet the needs of customers and most importantly adjust to their different financial capacities. There are five major internet access modes in Morocco:

1. The traditional dial up access to the internet, which is based on a preliminary monthly subscription with an Internet Service Provider (ISP), allows users who have a telephone line and a computer equipped with a modem to access the internet. Payment of the time of connection is made according to the telephone tariff in force.
2. Dial up internet access without subscription allows users who have a telephone line and a computer equipped with a modem to connect to the internet without a contract or subscription. Subscribers pay only the time of connection according to the internet tariff.

3. "Flat Rate" offers are based on the payment of a monthly fixed amount of money for internet subscription and the phone.
4. Broadband access via ADSL (Asymmetric Digital Subscriber Line), which is a high-speed connection based on a telephone line, provides a wide range of quality internet connection (1024 kbit/s, 2 Mbit/s, 4 Mbit/s, 8 Mbit/s, 20 Mbit/s, etc) that allows for high-speed transfer, exchange, and retrieval of large amounts of data.
5. 3G internet access enables users to connect to the internet through a 3G network without a wired connection (ANRT, 2009).

Due to this variety in access modes, the internet market has dramatically expanded, reaching 1 million subscribers in September 2009 (ANRT). As indicated by the numbers in figure 2.3, the majority of subscribers, 54%, use the 3G internet connection, which is comparatively less expensive, DH 200 a month, and more convenient as no regular monthly payment is required, no subscription fee is charged, and connection is possible anywhere and anytime desired. The second widely used mode of access is ADSL, which provides quality internet connection but costs more; users have to make a monthly payment for both the internet, beginning at DH 100 (depending on the chosen speed of the connection), and the telephone, starting at DH 120. Also, ADSL is based on cable and, hence, is less convenient. Due to competition from the wireless providers, ADSL subscriptions have decreased by 2% in 2009 while 3G subscriptions have increased by 20%, reaching a total of 566,575 in 2009 (ANRT). This

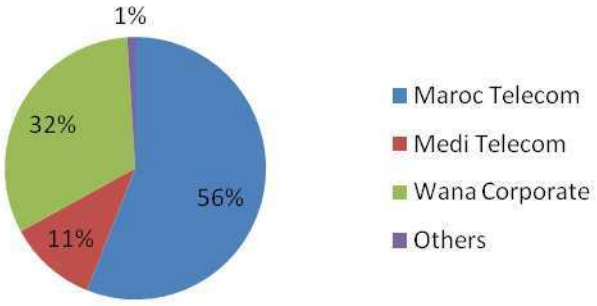
Figure 2.3: Internet subscribers by access mode 2009



increase in 3G subscriptions is brought about by Wana, the first operator to introduce wireless connection into the market.

In terms of the market shares, Maroc Telecom, as shown by the percentages in figure 2.4, has the largest share of the internet market, including all access modes, 56%, and dominates the ADSL market with 99% of the total subscriptions. Wana comes second with a share of 32% of the market as a whole and holds the largest percent of the 3G internet subscribers, 59%, compared to Maroc Telecom which owns only 20%. Medi Telecom comes last with only 11% of the total market shares and 20% of the 3G subscribers. In parallel with the observed increases in subscriptions, the use and penetration rate of the internet have remarkably expanded. As illustrated in figure 2.5, the total number of

Figure 2.4: Internet market shares 2009



Source: ANRT, op. cit.

Figure 2.5: Internet Users and Penetration Rate in Morocco
Thousand Users, % Population, 2004-2008

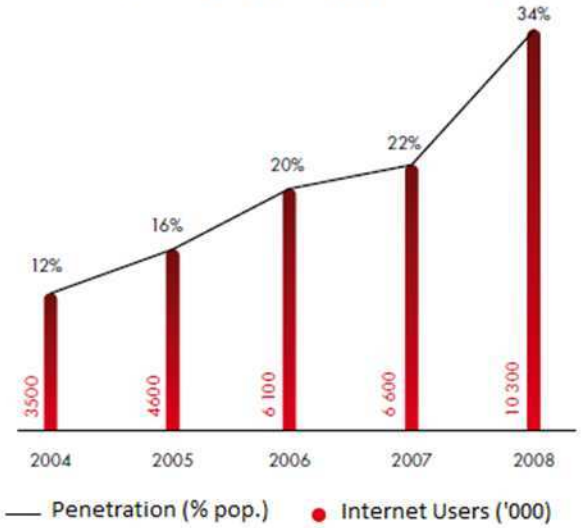
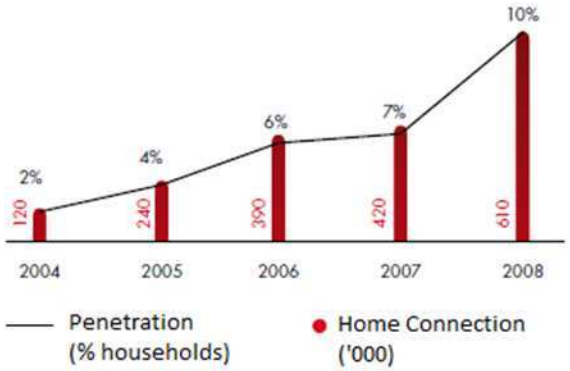


Figure 2.6: Penetration Rate of Internet Access at Home in Morocco, 2004-2008



Source: Ministry of Industry, Trade, and New Technologies, n.d.

internet users has increased from 3.5 million in 2004 to 10.3 in 2008. The penetration rate of

the internet has, in turn, risen from 12% in 2004 to 34% in 2008. Likewise, home internet access (see figure 2.6) has recorded a significant increase from a penetration rate of 2% in 2004 to 10% in 2008 (Ministry of Industry, Trade, and New Technologies, n.d.). This dramatic increase in both use and penetration of the internet is largely driven by the spread of cybercafés, the rise of wireless connection, and the price reductions brought about by competition among the three major internet operators, Maroc Telecom, Wana, and Medi Telecom (DEPTTI).

III.3. Income, Education, and ICT Educational Use

This section is meant to investigate access to home computing and the internet, which is determined by family income and education, and the implications of such access for educational use of computers.

There is no doubt that the observed increases (see figures 2.5, and 2.6) in the overall penetration rate of the internet and particularly at home will certainly help increase ICT use in learning and teaching. As discussed in chapter II, the poor structural conditions characterizing Moroccan schools provide very limited opportunities for learning with and about ICT. The growth of the internet market and the widening use illustrated in figures 2.5 and 2.6 imply a growing access to computers and the internet at a larger scale and subsequently at a competitive cost, which is likely to directly result in more opportunities for students to experiment with ICTs. In other words, the expanding access to ICT outside school, be it at home or at cybercafés, helps make up for the lack of such access at schools. Kennewell et al. (2000) indicate that students gain most of their computer experience outside of school; they point out that "a considerable proportion of our pupils inhabit a technologically rich environment, controlling far more advanced electronic multimedia equipment in their homes than they find in their schools" (p. 119). The same observation could be made about Morocco; there are far more opportunities outside schools, especially with the introduction of the

wireless connection into the market, to develop at least the basic skills associated with ICT educational use.

However, access to the computer and the internet outside school is determined by family income and education. While some families can afford computers and place value on having them at home, many others cannot afford having computers and do not value using them in education. Kennewell et al. (op. cit.) note that "there also exists a substantial group of pupils who have no such [computer] access at home." They add, "only the economically advantaged homes can afford to keep up with the most powerful devices and media" (p. 119). Given the lack of access to computers within Moroccan schools, the increases observed in internet subscriptions, use, and penetration are in fact a curse and a blessing: while they contribute to a widening use of ICT, they further widen the gap between the technologically rich and the technologically disadvantaged. This means that no matter how large internet use grows outside school, the role of the educational institutions in providing access to the required technology cannot be dispensed with because students having no home computers could be placed at serious disadvantage. It is the responsibility of the country, including the government, the private sector, and the civil society, to insure that all students have access to computers whether inside or outside schools. The failure to do so will result in economic stagnation resulting from a lack of investment in human capital, which will remain severely underdeveloped.

Besides income, family education plays an equally important role in ICT educational use both inside and outside schools. Education in this context refers to (1) awareness and knowledge of the benefits of ICT, (2) the willingness to use it in education, and (3) the value placed on such use. It is indisputable that financial capacity alone does not warrant ICT use in learning and teaching. Students' social environment, especially the level of education of their families, is also a major determinant of the educational use of ICT. Normally, less educated

families, whether they can afford access to the computer and the internet or not, have limited knowledge and awareness of the roles computers can play in education and, hence, place little value on ICT use in learning and teaching. Students growing up in such a family environment will develop little enthusiasm and motivation to use computers in learning even when access to the necessary technology is provided free of charge. On the contrary, families whose members are highly educated are sufficiently aware of the educational uses of ICT and, hence, seek opportunities to introduce their children into educational technology. It is important to indicate the conflicting claims relating to the correlation between income and education. In the Moroccan context, it is by no means accurate that income or social class positively correlates with education. Many wealthy families have low levels of, or no, education, and many low-income families have high levels of education. Therefore, it is fallacious, at least in Morocco, to assume a linear cause-effect relationship between affordability of technology and ICT educational use.

Thus, the adoption of and the willingness to use ICT are essentially determined by *awareness* of its educational uses. Regardless of its income, a family that considers the computer a distracting gadget associated with entertainment is unlikely to adopt its use. In other cases, even if there is awareness of its benefits in education, the use of computers is not encouraged because the syllabus requires and involves no such use. Students and families, as a result, find the aphorism "Bill Gates doesn't do my homework" (Kennewell et al. op. cit.) to be accurate because ICT use makes no difference in terms of their school performance and achievement. In such cases, families show reluctance to spend money on a gadget that will only, if used at all, distract their children from focusing on "serious matters. For many students and families, it is absolutely irrational to adopt the use of ICT in learning while schools do not require, motivate, and reward such use. This implies that regardless of income and awareness we cannot expect an adoption of ICT at home or outside of school without

parallel changes involving innovations in the syllabus, methodology, and pedagogy geared towards promoting ICT use.

A preliminary step, however, is to strengthen cooperation between homes and schools in order to build on and exploit the resources that each has to offer. With the development of an ICT strategy that builds on the external resources available at home, cybercafés, and the community at large, students and their families would find ICT educational use rewarding and motivating. Schools, for example, can forge partnerships with cybercafés and local associations to provide access and technical support for students and teachers who need to use computers for a particular task or course. Schools can also seek discounts from cybercafés and donations from the community, families, and the local authorities by providing records of their ICT use. In turn, the local educational authorities, specifically the school leadership and management board, can develop appropriate homework and coursework strategies in order to exploit the opportunities of use provided by the community. It is very likely that school assignments involving the use of computers would create the need for ICT use, help families see the relevance of such use, and eventually encourage them to invest in it.

It is extremely important that schools launch campaigns, preferably through oral communication with the community, to raise awareness about the benefits of the computer in education. At the national level, a proactive involvement of the media and the civil society is necessary for increasing investment in, and use of, ICT among families and public and private organizations. This is because the high rate of illiteracy in the country makes it difficult to develop a 'community culture' that values and encourages ICT use in education. The high rate of illiteracy, 48%, implies an intellectually less stimulating environment nationwide, which without involvement from the media and all other stakeholders will hardly encourage increased use of ICT in learning and teaching. The corollary is simply that without a combination of efforts and cooperation among homes, schools, and other public and private

organizations ICT use in the educational practice will remain very limited. Homes, schools, and other public and private organizations seem to be physically separate entities but in fact they constitute one organism; the well-being of one cannot be improved with cooperation from others.

III.4. Computer Experience, and Attitudes

This section is aimed at investigating the relationship between computer experience, and attitudes. Simpson et al. (1994) define computer attitudes as "specific feelings that indicate whether a person likes or dislikes using computers" (cited in Tondeur et al., 2008, p. 496). Kennewell et al. (2000) contend that underexposure to computers results in failure to develop favorable attitudes towards their use in the educational practice. The authors maintain that those, whether students or teachers, having home computers hold more favorable attitudes towards ICT use in education. Similar findings were echoed by Martin (1991), Kirkman (1993), Coley et al. (1994), and Selwyn (1997) who observed increased enthusiasm and motivation to learn with and about ICT among students having home computers (cited in Tondeur et al., op. cit.). Similarly, van Braak et al. (2004) note a correlation between computer experience and computer attitudes; "The more experience individuals have with computers, the more likely their attitudes towards computers will be favourable" (p. 416). In turn, Rozell and Gardner (1999) found computer experience to be predictive of computer attitudes (cited in van Braak et al., op. cit.). Having said that, there is also another variable that affects computer attitudes, innovativeness, which Rogers (1995) describes as "the willingness to adapt to an innovation compared with others in the same social system" (cited in Tondeur et al., 2008, p. 496). Innovative teachers, according to van Braak (2001), hold favorable attitudes towards the emerging innovations, and have an intention to adopt the innovation (cited in Tondeur et al., op. cit.).

III.5. School Structural and Cultural Characteristics

School cultural characteristics include innovativeness, supportive leadership, and goal orientedness, whereas the structural characteristics consist of ICT policy planning, ICT support, and Infrastructure (Tondeur et al., 2009). Although different in type, these characteristics are closely interconnected. For example, it is unrealistic to speak of innovativeness without adequate infrastructure in place and vice versa. With respect to the cultural characteristics, Maslowski (2001) defines the school culture as 'the basic assumptions, norms and values, and cultural artefacts that are shared by school members" (cited in Tondeur et al., 2008, p.497). Stoll and Fink (1996) describe the culture of a school as "being a combination of the realization of relationships, beliefs, attitudes and ideologies of all those that work in the establishment" (cited in Kennewell et al., 2000, p. 32). Kennewell et al. (op. cit.) state:

> For it to use ICT effectively, a school must possess a culture that incorporates a strong belief that using ICT can help pupils to learn, increase the efficiency of the day-to-day activities within the school and generally improve the quality of the school's performance. (p. 32)

It is the assumptions, norms, and values that define the ways in which a school undertakes its structural development (Kennewell et al., op. cit.). A school adopting an innovative culture is better able to determine the structural changes needed to foster ICT use in education. Innovativeness refers to "staff's attitude towards educational innovations and to what extent they adapt themselves to change," whereas goal orientedness "reflects to what extent the vision of innovations are clearly formulated and shared by the school members" (Tondeur et al., 2008, p. 497). On the other hand, supportive leadership refers to the degree of involvement of the school principals and other staff members in developing a shared ICT policy and providing the necessary logistic and technical support (Tondeur et al., op. cit.).

"Headteachers continue to be the powerful definers of the culture, ethos, and organization of their schools" (Kennewell et al., 2000, p. 33).

With reference to the school structural characteristics, Chiero (1997) indicates that the availability of resources, including equipment, supplies, time, space, human support services, and training, is essential for a successful implementation of ICT in education. Galanouli et al. (2004), and Lai and Pratt (2004) stress the importance of training and ICT-related support; in their viewpoint, the willingness to use ICT in education is determined by the level of support provided by ICT specialists and not only the availability of the equipment. Because of time constraint and the limited experience in ICT, teachers often feel unconfident using computers in front of their students. In fact, they consider ICT a separate subject which they have nothing to do with and feel they are teaching someone else's subject. Therefore, if ICT is to be adopted in the educational practice, it is necessary to provide teachers and students alike with the support needed. Otherwise, teachers will always find using ICT in learning and teaching frustrating and distracting (Kennewell et al., 2000).

Tuijnman, and Ten Brummelhuis (1992) indicate the factors affecting the initiation and continuation process of a major change, such as the integration of ICT in education. In the initiation process, three factors are involved: relevance, readiness, and resources. Relevance refers to the "perceptions of the usefulness of the innovation," usually measured by investigating practitioners' expectations from the planned change. Readiness "involves the school's capacity to use reform" and includes teachers and principals' attitudes, experience, knowledge, and skills relevant to the intended change. Resources involve "the availability of financial means, computer equipment and appropriate software materials" (Tuijnman, and Ten Brummelhuis, 1992, p.292). With respect to the continuation process, four major factors were identified:

(1) The formulation at school level of explicit policy with respect to the goals, means and ends of computer education,

(2) The organization of staff development, such as the offering of inservice courses for teachers,
(3) The setting up of the monitoring channels and evaluation procedures, and
(4) The organization of technical and expertise support for teachers in need of practical help. (Tuijnman, and Ten Brummelhuis, 1992, p.292)

Since the integration of ICT in education in Morocco is still at the initiation process, it is important to work towards enabling Moroccan schools to fulfill the three requirements-relevance, readiness, and resources-necessary for an efficient implementation of ICT use in the educational practice. The government ICT projects seem to be centered around the supply of equipment, whereas the culture, readiness, and resources of schools receive scant attention. Tondeur et al. (2008) maintain that "Any attempt to improve a school that neglects school culture is, according to Fullan (2001),'doomed to tinkering' because school culture influences readiness for change" (p. 497). As discussed in chapter II, Moroccan schools do not seem to support the planned reform, ICT integration in education. Yet, such a conclusion would remain inaccurate without an investigation of the government ICT projects, which would reveal how effective their implementation has been or is likely to be.

Chapter Four:
The Government ICT Projects

IV. The Government ICT Initiatives

The aim of this chapter is to briefly describe the government ICT projects and examine what they have to offer with respect to computer attitudes, experience, training, infrastructure, software, and access to computers and the internet among teachers, students, and the community at large. There are large-scale projects, such as the "2008 Plan: a Classroom-Multimedia-the Internet," *Maroc Numeric*, GENIE, and there are subprograms, such as CATT, NAFIDA, INJAZ, and MARWAN launched to concretize the major guidelines of their corresponding projects. Although they are described separately, these projects are interconnected and complementary; they constitute different parts to one comprehensive ICT strategy. The relationship among these different parts or projects will be investigated.

IV.1. "2008 Plan: a Classroom-Multimedia-the Internet"

The "2008 Plan: a Classroom-Multimedia-the Internet" was aimed at providing all institutions of elementary and secondary education with computers and connection to the internet. The MNE planned to provide 20,000 training and educational institutions with 34,800 computers and 18,000 printers over a period of nine years (1999-2008). Also, the Ministry aimed to connect all schools to the internet by the end of 2008 with the aim of facilitating the exchange of data and strengthening cooperation among schools. The rationale behind this program was, as indicated by the Department in Charge of Strategy, Studies and Planning (DSEP), to improve the quality of education, and essentially enable students to develop the skills and knowledge necessary to effectively function in the global information society. In a document issued in 1999, the DSEP maintains in relation to the role of ICT in education that:

> The new information and communication technologies (NICT) must be seen as an opportunity for the [educational] institution to improve its results. Their appropriation by the educational community will contribute to the overall and integrated training that we wish for our pupils, while enabling the institution to better accomplish its mission. (qtd. in Agnaou, 2009, p.99)

With respect to elementary education, the plan was to help pupils perform basic tasks with the computer, such as retrieving files, sending and receiving messages, and accessing websites, and enable them to appropriately use the available educational software, such as games and other materials for social and personal development. In lower secondary education, the aim was to build on students' computer experience in elementary school in order to facilitate the acquisition of new skills, such as using word processor and spreadsheets. In turn, the target in secondary education was the development of advanced skills and ultimately more effective use of ICT in education. For this purpose, a strategy of gradual equipment of all high schools was adopted. The initial phase of the project included the provision of computers and internet connection to 40 high schools. At the level of training, the MNE planned to set up multimedia rooms equipped with computers connected to the internet, overhead projectors, and printers at all teacher training centers such as CFIs (Centre de Formation des Instituteurs), and CPRs (Centre Pédagogique Regional); these were expected to receive eight computers each by the end of 2008.

As identified by the DSEP (1999), expectations from the "2008 Plan" include:

- Offering equal opportunity in access to knowledge and information;
- Making training and teaching faster, more flexible, and more accessible;
- Reducing the costs of teaching and training;
- Increasing the number of people who benefit from in-service training;
- Developing collaborative learning and team work in order to improve performance and productivity
- Bringing out the teaching team from its isolation and preparing the ground for exchanges within the educational community. (qtd. in Agnaou, op. cit., p.103)

With reference to these expectations, Agnaou maintains that the "2008 Plan" has not met its objectives. While some high schools have received limited numbers of computers extremely insufficient compared to the total number of students, the majority, if not all, have not been yet connected to the internet. The failure to achieve the objectives outlined above originates from persistent inefficiencies in planning and management; the budget, 428,3 million

dirhams, allocated to the project is enough to provide many more schools with computers and connectivity than those that have been equipped thus far (Agnaou, op. cit.). Given the learning and teaching conditions discussed in chapter II, such a large-scale project is, as indicated by Fullan (2001), "doomed to tinkering"-that is, trying to improve education without useful results (Dictionary.com, 2010). The feasibility of any major ICT project is determined not only by the budget allocated to it but also by careful examination of the aforementioned factors (relevance, readiness, and resources) in relation to the population and institutions targeted. Taking into consideration the lack of adequate infrastructure and the high rates of illiteracy and poverty, the failure to achieve the objectives outlined in the "2008 Plan" can be predicted even without investigation. This is because the project overlooks the criteria specified by Tuijnman, and Ten Brummelhuis (1992). For a successful integration of ICT in education, it is imperative to take into consideration the relevance of the innovation, the readiness of all those concerned, and resources endowed by the physical and social settings within which the change is planned to take place.

IV.2. CATT-PILOTE

Launched in 1999 within the framework of the "2008 Plan" and funded by the U.S. Agency for International Development (USAID), the Computer-Assisted Teacher Training (CATT) aimed at training pre- and in-service teachers in elementary education to use ICT in the educational practice. Specifically, CATT targeted teacher training centers, or CFIs (*Centre de Formation d'Institeurs et d'Institurices*), in seven provinces, namely Errachidia, Al-Hoceima, Essaouira, Ouarzazate, Sidi Kacem,Taroudant, and Tiznit. The training provided covered a wide-ranging set of skills associated with educational as well as administrative uses of the computer and the internet. The CATT training strategy consisted of workshops aimed at enabling the teacher trainees to (1) acquire basic computer skills, such as using word processor and spreadsheets, and (2) gradually develop other skills related to communication,

networking, administration, maintenance of multimedia centers, and finally instruction and research. Beneficiaries of the CATT training included 70 CFI instructors and 490 teacher trainees. In addition to training, the project included providing six computers to each of the seven training centers, and linking them together via the website '*Ibtikar*' (the Arabic word for "innovation") to allow for the exchange of data and facilitate communication. According to Coupe and Haichour (2002), CATT successfully managed to achieve its objectives; achievements included setting up multimedia rooms, developing a technology-based curriculum, and adopting an assessment procedure to assess progress. Overall, a total number of 1500 participants benefited from the program (Coupe, and Haichour, op. cit.).

IV.3. The GENIE Program

GENIE is a large-scale ICT project initially launched by HM King Mohamed VI in 2005 and later revised in January 2009. It consists of four main axes: infrastructure, training, digital resources, and promotion of good ICT practices. Together, these axes aim to (1) provide elementary and secondary schools with computers and internet connection, (2) train teachers, supervisors, managers, (3) develop appropriate digital resources, and (4) assist users to observe, develop, and promote good ICT practices.

IV.3.1. Infrastructure Axis

As illustrated in table 1.5, the strategy of the GENIE program consists of gradual equipment of 9,260 educational institutions over a period of five years starting from 2009 through 2013. These institutions will have fixed multimedia rooms with connection to the internet, and later mobile carts. The multimedia rooms will be equipped with at least 8 computers (but not over 15) connected to

Table 1.5: Number of institutions to benefit from the GENIE program 2009-2013

Year	2009	2010	2011	2012	2013	Total
Number of Institutions	838	2,119	2,103	2,100	2,100	9,260

Source: genie.gov.ma

the internet, a video projector, a printer, and a pack of basic software materials. In the future, the plan is make available two computers in each classroom for students at the fourth, fifth, and sixth levels of elementary education. In terms of the amount of use, the aim is to insure a minimum of three hours of ICT use per week to elementary and middle school teachers, and four hours to high school teachers. For students, the objective is to insure a minimum of one hour of access to pupils at elementary school, two hours to middle school students, and three hours to those at high school (MNE, n.d.).

To insure the continuation of the project, there are procedures in place developed to provide maintenance of the equipment, and renew the fleet of computers whenever necessary. In addition, each ICT facility will have a facilitator to manage the multimedia rooms, and maintain, install, and upgrade relevant soft- and hardware. With reference to achievements, about 2000 schools have been equipped with computers and connection to the internet, and 107 ICT training centers have been set up at the regional Academies of education and training (AREF). During the second half of 2009, 939 schools were equipped with computers and connection to internet (MNE, n.d.).

IV.3.2. The Training Axis

The aim of the GENIE program is to train more than 230,000 teachers, principals, inspectors, and managers by the year 2013 through a variety of workshops and modules aiming to provide the skills and knowledge necessary for effective ICT use in their respective occupations. Specifically, there are three modules; each consists of several different workshops. The first module provides twelve hours of training and consists of four workshops aiming to provide a general introduction into ICT use in education. The second module includes twelve hours of training and five workshops meant to enable beneficiaries to use basic computer applications, conduct online research for resources, and communicate and exchange data. The specific module provides 24 hours of training and includes workshops

tailored to the specific needs of inspectors, directors, and teachers. The training strategy consists of:

1. training in ICT use for all teachers, and administrative staff of the Regional Academies of Education and Training (AREF), delegations, and schools;
2. training in ICT use for learning and teaching purposes, and the development of digital educational content for all inspectors and teachers; and
3. training in maintenance and management of multimedia rooms.

Given the massive numbers of teachers, inspectors, and directors, a strategy of cascade training was adopted. In other words, a team of master trainers selected by the MNE and trained by experts in Rabat will train regional trainers, four persons, at each of the sixteen AREF. The regional trainers, in turn, will train staff, two to three people, at all elementary, and secondary schools, and these staff will train their colleagues. To provide quality training, each AREF will have two multimedia rooms equipped with twenty computers connected to the internet (MNE, n.d.).

As shown by the figures in table 1.6, the training of teachers will take place in two phases. The first will provide training to a total of 55,034 teachers, whereas the second will insure training to 121,376 teachers. In both phases combined, a total of 176,410 teachers will be trained. The majority of these trainees are elementary school teachers because, as displayed in figure 1.3, the total number of teachers in elementary education is much larger than that in secondary education.

Table 1.6: Number of teachers to benefit from the GENIE program according to level of education

	Elementary School	Middle School	High School	Total
GENIE 1	17,045	19,634	18,355	55,034
GENIE 2	69,057	30,386	21,933	121,376
Total	86,102	50,020	40,288	176,410

Source: genie.gov.ma

With respect to the number of beneficiaries to be trained over the period 2009-2013, the goal, as displayed in table 1.7, is to gradually train a total of 19,600 teacher trainees, 9,260 school principals, 2,671 inspectors by the end of 2013. More than half of the total number of these trainees will be trained in 2009 and 2010. Based on a document outlining the achievements of the GENIE program published by the MNE, 600 master trainers, and about 6000 regional facilitators have received training in ICT in the first half of 2009, whereas 60,000 teachers, 2,600 inspectors, and 2000 directors have been trained in the second half (MNE, n.d.).

Table 1.7: Number of beneficiaries over the period 2009-2013

Beneficiaries	2009	2010	2011	2012	2013	Total
Teachers	61,083	38,724	27,857	24,373	24,373	176,410
Teacher Trainees	3,920	3,920	3,920	3,920	3,920	19,600
School Principals	2,412	1,298	1,350	2,100	2,100	9,260
Inspectors	2,671	----	----	----	----	2,671
Total	70,086	43,942	33,127	30,393	30,393	207,941

Source: genie.gov.ma

IV.3.3. The Axis of Digital Resources

Concerning the digital Resources, the program will make available software materials related to the various disciplines, such as mathematics, physics, chemistry, language (Arabic, Amazigh, French, English, Spanish). Also, the educational software will include digital encyclopedias in Arabic and French specific to the different levels of education, and learning materials related to upper secondary science subjects (physics, mathematics, chemistry, etc.). These materials will be developed in partnership with Al Akhawayn University in Ifrane and other countries such as France, Romania, Jordan, and Korea; they will include lessons, simulations, interactive exercises, etc. In September 2009, the government launched the National Laboratory of Digital Resources to localize the production of software, increase its relevance, and meet the increasing sector-based demands. Lastly, the axis related to the

development of good ICT practices involved launching awareness campaigns to promote adequate use of ICT in education and by the general public. Currently, there is a ministerial ICT guidebook published and circulated at the beginning of the school year; among its major goals is to raise awareness about the benefits and good uses of ICT in education and other contexts (MNE, n.d.).

IV.4. The Nafida Project

Nafida, the Arabic word for 'window', is a subprogram launched in 2006 within the framework of the GENIE program; among its major goals is to increase ownership of computers and access to the internet among teachers. The program covers 50% of the total cost of every purchased computer and subscription to the internet. The financial support is granted by Mohamed VI Foundation for Social Development, which contributes with DH 1000 to each computer purchased, and the MNE, which contributes with another DH 1000 to each laptop. In regard to internet connection, both the Universal Service Fund of Telecom and Mohammed VI Foundation provide a grant of 60 DH for each monthly subscription to the internet. Of the 60 DH, the Universal Service Fund of Telecom provides 40 DH and Mohammed VI Foundation contributes with 20 DH (MNE, n.d.).

IV.5. "Maroc Numeric 2013"

"Maroc Numeric 2013," or "Digital Morocco 2013," is a large-scale project launched in 2009 and aimed at expanding ICT use in education, business, government, and public administration by the end of 2013. It is financed by the government and banking institutions, which both agreed to allocate a budget of 5.2 billion dirhams to the project. Besides increasing the efficiency with which work is done within government agencies, *Maroc Numeric* aims to increase access to the internet among Moroccan youth and families. The plan is to bring the rate of home access to high-speed internet connection from one in ten Moroccan families to one in three families by 2013. To increase access to the internet among

the youth, the Ministry of Industry, Trade, and New Technologies in partnership with the Ministry of Youth and Sport, and *Poste du Maroc* (Post of Morocco), plans to set up 400 computer centres in low-income neighborhoods and remote areas. In this respect, the head of the ANRT, Azeddine El Montassir, was quoted as saying, "one hundred centres will be set up in partnership with the Ministry of Youth and Sport, and the other 300 will be set up with the help of other partners including *Poste du Maroc*" (qtd. in Magharebia.com, n.d.). These computer centers will be in the form of youth clubs providing access to the internet free of charge. The Minister of Youth and Sport, Moncef Belkhyat stated, "all youth clubs will provide Internet access so that young people can get online free of charge" (qtd. in Magharebia.com, n.d.). Also among the aims of the project are:

1. providing computers and internet connection to more than 80,000 engineering students;
2. subsidizing nearly 60% of purchases of sector-specific IT solutions by small and medium-sized businesses; and
3. creating 26,000 new jobs according to the government forecasts

To this end, a national fund dedicated to ICT development, with an initial budget of 100 million dirhams, was created in partnership with the Association of Information Technology Professionals to encourage the use of ICT across businesses, and educational institutions (qtd. in Magharebia.com, n.d.).

IV.6. The INJAZ Project

INJAZ, the Arabic word for 'achievement', came within the framework of the "Maroc Numeric 2013" project, and aims to financially support ownership of computers and access to the internet among engineering students and those studying towards a bachelor's degree in science or information and communication. The program consists of a pack including internet service (compulsory) and a light or ultralight laptop subsidized by the Universal Service

Fund of Telecom, which covers 85% of the total cost of the computer and subscription to the internet. Also, the objective of INJAZ is to train 80,000 engineers and tech-savvy professionals by 2013. In 2009, 16,000 students benefited from the program. INJAZ will help improve the quality of education and therefore the employability of students (injaz.ma, 2009).

IV.7. The Marwan Project

Marwan, or the Moroccan Academic and Research Wide Area Network, was launched in 1997 and activated in 2002. Its main objective was to create a network to connect sixteen Moroccan universities to the internet and among each other. Particularly, MARWAN was aimed at facilitating communication and the exchange of data and research findings within and across universities and training institutions. Also, the program aimed to facilitate sharing information at the regional, national, and international level, and to provide vocational training to educational institutions and scientific research centers to promote ICT use for educational purposes. MARWAN consisted of several stages: the first was to connect the sixteen universities through the installation of routers and access servers. The target institutions of higher education and professional training were planned to interconnect via routers and access servers existing in each of the target cities. Overall, the plan was to connect together about 631 institutions of education, training, and research across sixteen cities (Agnaou, 2009).

IV.8. Conclusion

The first part of this research study aimed at investigating the various factors affecting ICT use in education, including both those inherent in the educational system as a whole, and those associated with ICT educational use, in particular. To provide a framework of this research study, several definitions of 'ICT' and the different terms associated with 'educational technology' were provided. To identify the central goal behind the introduction of technology at schools, the stipulations of NCET regarding ICT use in education were

investigated. The conclusion derived from the investigation was that the country has no clear ICT policy. The aim, as stipulated in the Charter, is to *familiarize* (rather than to *utilize*) students and teachers with the basic uses of technology. While this is a realistic goal, the government ICT projects (see chapter IV) seem to be far from realistic. For example, the "2008 Plan" was launched with the aim of providing all schools (both elementary and secondary) with computers and internet connection by the year 2008. Thus far (2010), the Plan has not achieved even 40% of its objectives (see chapter VI, section 2).

The failure to achieve the objectives of the government ICT initiatives is in fact predictable. A study of the Moroccan school structural characteristics (see chapter II) revealed persistent problems inherent in the educational system as a whole. These problems include mainly understaffing, poor infrastructure, and inefficient spending. In addition to a lack of investment in equipment and human resources, Moroccan schools suffer large shortages of teachers and high rates of overcrowding. Given these conditions, it seems unrealistic and inefficient to speak of providing all schools with technology. It also seems unrealistic to speak of ICT use in the educational practice. This is mainly because these government ICT initiatives overlook the reality of Moroccan schools and fail to take into consideration teachers and students' concerns. These latter, as a result, show little or no commitment to the reform simply because their immediate concerns are not addressed. Ignoring teachers and students' concerns naturally leads to ignoring the government initiatives regardless of the availability of technology at schools.

Chapter Five:
Research and Methodology

Chapter V: Research and Methodology

V.1. Instruments

This research study is aimed at investigating the effects of teachers and students' attitudes and overall school structural and cultural characteristics on ICT use in teaching and learning. The study employs a questionnaire to examine teachers and students' attitudes towards ICT use in the educational practice, and interviews to explore school structural and cultural characteristics. The latter include mainly the computing and networking facilities, technical support, and ICT training. Because this study explores ICT use from the teaching and learning dimensions, two distinct questionnaires were designed: a teacher questionnaire (TQ), and a student questionnaire (SQ). These two have the same objectives except that the TQ contains an additional section on ICT training. Both elicit information about school infrastructure, teachers and students' attitudes towards ICT, their computer experience, and the effects of these variables on ICT use in education. However, the TQ contains an additional section on ICT training while the SQ does not, which explains the difference in the total number of items of which each questionnaire consists.

More specifically, both the TQ and SQ consist of an introduction delineating the purpose of the study and ensuring confidentiality to all participants, and both were designed according to the variables likely to affect computer use. The SQ contains four sections: background, computer equipment and literacy, attitudes, and ICT in learning. The TQ comprises the same sections except that it consists of an additional section on ICT training. The background section for both questionnaires elicits information about the demographics (age and gender), and socio-economic characteristics (education, income, area of residence, and site of the institution) of the target population. The demographic and socioeconomic

variables largely affect ICT use in education. Hermans et al. (2008) maintain that:

> Interplay can be assumed between teachers [and students] as individuals and the social context (team or school) to which they belong. It can be hypothesized that the properties of the particular social context influence individual teacher [and student] beliefs and in turn this context is also influenced by the individuals who make up the particular social context. (p.1502)

The computer equipment and literacy section seeks to examine teachers and students' level of access to computers and the internet and the frequency and purpose of ICT use. Also, this section aims to:

1. determine the relationship between the demographic and socio-economic variables and the level of access to computers and the internet, and
2. identify the relationship between access to computers and the internet and the frequency of ICT use.

Marcinkiewicz (1993) studied the relationship between access to and actual use of computers and found that "Simply having more technology did not in itself persuade teachers to begin to use it" (para. 1).

The third section of SQ and TQ are concerned with participants' attitudes towards ICT and consist of a five-point Likert scale (strongly agree, agree, undecided, disagree, and strongly disagree). This section consists of 14 items that fall under four major indices: enjoyment, anxiety, familiarity, and utility. The aim of this section is to explore the kind of interconnection existing among these four indices and how they affect attitudes towards ICT use among teachers and students. Researchers (e.g. Massoud, 1991; Fletcher-Flinn & Suddendorf, 1996; Rosin & Weil, 1995; Enochs, Riggs, & Ellis, 1993) found a strong relationship between attitudes towards computers and psychological factors such as interest, utility, confidence, and self-efficacy (cited in Lumpe and Chambers, 2001, p. 94).

The fourth section of the TQ and SQ aims at investigating school structural and cultural characteristics mainly in terms of ICT facilities, length of access to such facilities, and parents and teachers' attitudes towards ICT use among students. In turn, this section contains two tables: the first consists of seven items meant to measure students and teachers' perceived impact of ICT on their culture, and the second comprises ten items aimed at measuring teachers and students' level of confidence using computers either for exploitative (e.g. sending and receiving emails) or creative (e.g. creating websites) purposes. It is important to note that the tables for both the TQ and SQ consist of the same number of items.

The fifth section of the TQ is concerned with ICT training and is aimed at exploring the kind of professional development programs teachers are involved in. It seeks to investigate:

1. schools' ICT policies especially in terms of the incentives offered to the teachers who use ICT in the educational practice, and

1. teachers' level of satisfaction with the computing and networking facilities and the ICT support provided at their respective schools.

Student Questionnaire				Teacher Questionnaire			
Sections	Questions	N° of items	Total	Sections	Questions	N° of items	Total
Background	1 - 8	8	31 questions / 42 items	Background	1 - 9	9	38 questions / 71 items
Computer Equipment/ Literacy	9 - 19	11		Computer Equipment/Literacy	10 - 17	8	
Attitudes	20 - 21	13		Attitudes	18 - 20	22	
ICT in Learning	22 - 31	10		ICT Training & Experience	21 - 26	16	
				ICT in Teaching	27 - 38	16	

Table 1.8: Content summary of the questionnaires

Table 1.8 illustrates the similarities and differences, both in content and number of items, existing between the SQ and TQ. The former consists of fewer questions and items

than the latter. The TQ questionnaire contains 38 questions comprising 71 items, whereas the SQ consists of no more than 31 questions composed of 42 items. 'Questions' can contain several 'items.' As previously mentioned, the difference in the number of questions and items each questionnaire consists of is largely due to the fact that the TQ consists of an additional section on ICT training.

It is important to note that each section of the TQ and SQ is designed to answer one central question. These questions are as follows:

Section I: To what extent do the demographic and socio-economic factors affect access to computers and the internet?

Section II: How does access to computers and the internet affect ICT use in teaching and learning?

Section III: How do attitudes towards computers affect ICT use in education?

Section IV: To what extent does school ICT infrastructure contribute to increased ICT use in education?

Section V: To what extent does ICT training contribute to increased ICT use in education?

V.2. Participants

The sample for this study consists of two major groups: teachers and students. Each contains a cluster of subgroups representing different levels of education, socio-economic backgrounds, and geographical regions. The student group includes three subgroups: high school, university, and students at *Les Classes Préparatoires aux Grandes Écoles* (CPGE). Each of these subgroups represents a different geographical region and level of education. Participants representing high school live and study in Tagounite, Zagora, whereas those representing university study in Fez but come from different parts of Morocco. The same

could be said about students at CPGE; they all study in Meknes but come from different parts of the country.

The fact that each of these subgroups consists of participants representing different institutions and geographical areas, both rural and urban, makes the sample representative of a large segment of the Moroccan population. The diversity characterizing the sample in terms of geography, socio-economic status, and education is paramount; it implies a wide range of socio-cultural values, which would help detect the nuances arising from differences in the abovementioned variables. Yet, the sample is, by no means, representative of the entire country, especially that the overall number of participants in this study is limited and their exact place of residence remains unknown. Very few participants were willing to reveal where they exactly live.

With respect to the teacher group, it consists of two major subgroups: in-service teachers (n = 13), and pre-service teachers (n = 10). Each of these subgroups represents different institutions and come from different parts of the country. The pre-service teachers (also called teacher trainees) are currently (2010) pursuing a one-year training at the Fez Teacher Training Center (CPR) and will be teaching English at middle school by the beginning of the next academic year. These trainees come from different parts of the country, but their exact areas of residence remain anonymous. Very few participants were willing to reveal their exact place of residence. The second subgroup consists of 13 high school teachers. Six of them are currently (2010) pursuing their graduate studies at SMBA University in Fez. They all come from and teach in different parts of the country, such as Fez, Taounate, Errachidia, Zagora, and Rabat, and they all teach at public schools. The remaining seven teach high school students in Tagounite in Zagora and come from different parts of Morocco.

The teacher group comprises two major subgroups; each consists of participants representing different levels of education and geographical regions, which makes the sample representative of the structural and cultural characteristics of a large number of Moroccan schools. The fact that these teachers come from and teach in different parts of the country would at least give a general idea about the prevailing 'ICT culture' and available infrastructure across a large number of institutions throughout the country. Similarly, the fact that the sample consists of pre-service and in-service teachers would help identify what is being done with respect to ICT training at the level of both the Teacher Training Centers (CPR in this case) and schools and/or universities. Teachers' attitudes reflect the general school ICT policy and its prevailing culture and values. Yet, the sample is by no means representative of the entire country mainly because the number of teachers participating in this study does not exceed 20 and their exact areas of residence remain unknown, which makes any claim to its representativeness of the entire country inaccurate.

V.3. Procedures

The data collection process spanned over a period of two weeks (first two weeks of April, 2010). Using his social network, the researcher asked colleagues, classmates, and relatives to fill out and administer the TQ and/or SQ to their own classmates, students, and/or colleagues. Thus, an electronic copy of TQ and SQ was emailed to a relative teaching English at Sidi Salah High School in Tagounite in Zagora, who in turn administered them to his students (n = 20) and colleagues (n = 7) and mailed them back to the researcher upon completion. Likewise, 20 copies of the SQ were handed to a relative studying at *Les Classes Préparatoires aux Grandes Écoles* (CPGE), at Reference High School in Meknès, who administered them to classmates and submitted them to the researcher completed. Lastly, the researcher handed 15 copies of the SQ to a relative in the third year of SMBA University in

Fez, who in turn administered them to classmates and turned them in to the researcher upon completion.

The rest of the questionnaires were administered by the researcher, who asked a teacher trainer at Fez Teacher Training Center (CPR) for permission to administer the TQ to the trainees or would-be teachers of English. Permission was granted and 10 copies of the TQ were handed to the teacher trainer who distributed them to the trainees during class and turned them in to the researcher completed at the end of class. In addition to the seven in-service teachers from Tagounite, the researcher administered several copies of the TQ to colleagues (n = 6) and classmates (n = 3) pursuing their graduate studies at SMBA University in Fez. Both colleagues, who are mainly high school teachers of English, and classmates filled out the questionnaires and handed them back to the researcher completed.

It is important to note that initially the aim was to analyze the data collected from each subgroup (e.g. high school versus university students, and pre-service versus in-service teachers) independently. Because of time constraints, these subgroups were combined under two major groups (the teacher, and student) and analyzed accordingly. Still, the subgroups, as discussed in section V.2, make up a sample representative of different geographic regions, educational levels, and socio-economic backgrounds, which will certainly increase the reliability, validity, and consistency of the findings of this study.

Given that the administration of paper-based questionnaires is time-consuming and costly, the initial goal was to design a web-based version of both the TQ and SQ using the Active Server Pages (ASP) technology, which helps tabulate data in an automatic, timely, efficient, and cost-effective manner. Because of technical problems related to low-speed connection and the lack of adequate software, a paper-based version of the TQ and SQ was adopted and data was manually processed and tabulated. The number of responses each

question and/or item received were marked down. Then, the total number of responses each question and/or item received were counted and converted into percentages and later into graphs to facilitate the reading of the findings of the study.

V.4. Interviews

In addition to teachers and students, this research study is concerned with ICT training and educational policies. Therefore, educational authorities at the regional and local level were interviewed to elicit the overall ICT policy of the country. Top educational authorities in the country are, after the MNE: the academies (l*es Académies Régionales pour l'éducation et la formation* [AREF]), the delegations (*les Délégations provinciales de l'enseignement* [DPE]), and high schools directors. There are sixteen AREFs in Morocco; each runs the educational affairs of a given region (sixteen regions). The AREFs were established within the framework of decentralization in the country. With respect to DPEs, they come second after AREFs; each DPE runs the educational affairs of a particular province. Regions consist of several provinces. Given the financial factor and time constraint, the interviews included only the AREF of Meknes Tafilalft, and the DPE in Fez. To compare and contrast the information provided by each type of educational authority with the reality at schools and the views of school leaders, mainly school principals, the interviews included the directors of (1) *Les Classes Préparatoires aux Grandes Écoles* (CPGE) at Reference High School in Meknes, and (2) Omu Ayman High School in Fes. The CPGE is under the jurisdiction of the AREF of Meknes Tafilalft, and Omu Ayman High School is under the DPE in Fez.

The interviewees include Mohamed Jabouri, head of the Division of Educational Affairs at the Academy of Meknes Tafilalft, Mr. Karoumi, representative of the DPE in Fes, Abdellah Faraji, director of the CPGE in Meknès, and the director of Omu Ayman High School. A semi-structured interview consisting of questions about ICT infrastructure, training,

and software was employed. Interviewees were asked to elaborate on the three major points (infrastructure, training, and software) in relation to their respective institutions; they were also asked about the overall ICT policy of their institutions, that is, what they expect from the introduction of ICT in education. In addition to comparing and contrasting the information provided by each institution, the interviews aimed at investigating what is being done at the level of AREFs, DPEs, and schools with respect to ICT, and finding out how consistent and coordinated their policies are.

It is important to note that all requests of interviews were obtained; the interviewees showed varying levels of cooperation when dealing with the questions. It was observed that school principals were more willing to admit the weaknesses characterizing the introduction of ICT in education. On the other hand, representatives of the AREF of Meknes Tafilalt and the DPE in Fez focused only on achievements and avoided weaknesses. It is also important to note that these interviews, although not representative of all other AREFs, DPEs, and schools, constituted an opportunity to establish direct contact with the educational authorities.

Chapter Six:
Students' Attitudes towards ICT:
Data Analysis

VI.1. Background Information

This section is meant to provide an overview about the geographical, educational, and socio-economic characteristics of the 58 participants who contributed data to the study. As discussed in chapter III, section 3, geographical region, education, and socio-economic status are closely related to the use of computers. Given that this study deals with the factors affecting ICT use in education, the research sample consists of a balanced number of participants in terms of the demographic, geographic, educational, and socio-economic variables. This is essential to the reliability of the findings of this study. Huge discrepancies in the number of participants across these four variables would likely yield inaccurate findings.

Age	Less than 18	18 ~ 25	25 ~ 30	More than 30	No answer
	7 / 12%	46 / 79%	5 / 9%	0 / 0%	0 / 0%

Gender	Male	Female	No answer
	23 / 40%	31 / 53%	4 / 7%

Level of education	High school	University (undergraduate)	CPGE	Graduate	No answer
	20 / 34%	23 / 40%	9 / 15%	5/ 9%	1 / 2%

Site of the institution	Major city	Small city	Village	No answer
	35 / 60%	3 / 5%	19 / 33%	1 / 2%

Area of residence	Rural	Urban	Suburban	No answer
	25 / 43%	25 / 43%	4 / 7%	4 / 7%

Table 1.9: Student profile (a)

As illustrated in Table 1.9, the majority of participants, 79%, are between 18 and 25 years old. All participants willingly indicated their age particularly because none of them exceed 30 years. Females constitute 53% of the overall number of participants, whereas males make up 40%. These percentages do not add up to 100% because 7% of participants did not indicate their gender, which is an insignificant percentage that does not invalidate the findings of the study. High school students account for 34% of the total of participants, university students constitute 49%, and students at CPGE make up 15%. Participants are equally distributed

across urban and rural areas; 43% live in urban areas, and another 43% live in rural areas. Although the majority, 60%, study in major cities, a substantial percentage study in rural areas, namely villages. Important to note is that some questions were left unanswered, which is why some percentages do not add up to 100%. Excluding the area of residence, these percentages are seemingly not balanced, whereas in fact they are. This is because there are far more schools and students in urban areas than in rural areas. Figure 2.7 is a graphic representation of the data in table 1.9. It features the variables of age, gender, level of education, and the area of residence. The close percentages characterizing each of these variables reflect a balanced sample representative of different cultural and structural segments of the Moroccan society.

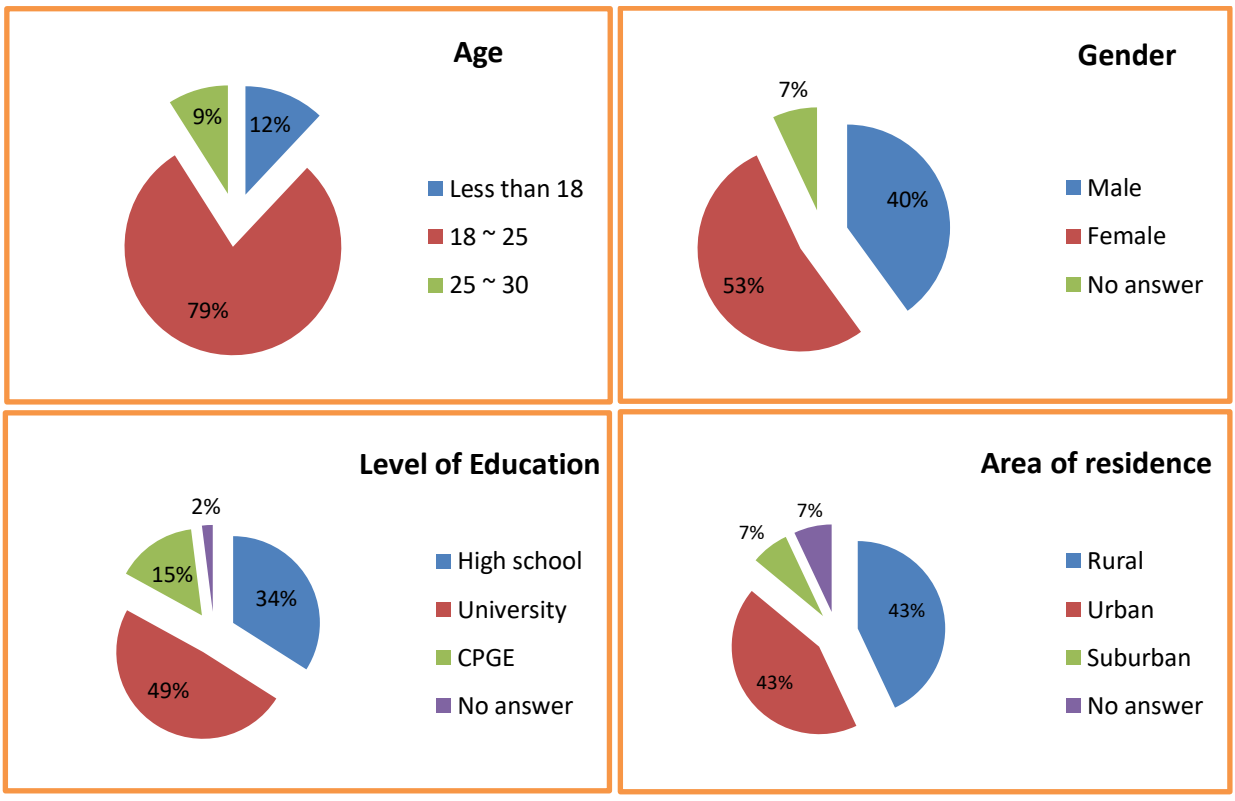


Figure 2.7: Student profile in graphical form

In addition to the abovementioned variables, ICT educational use is also affected by socio-economic factors, namely parents' education and income. The figures in table 2 show that 45% of the participants' parents have no formal education while 53% do have an education, mostly elementary (24%) and secondary (21%). This shows that the sample includes two different intellectual environments: one is rich and stimulating and the other is poor and unchallenging. This balance in the percentage of illiterate and educated parents would help detect the nuances arising along the lines of family education and computer use among children. This study employs the range of annual income to distinguish among four major socio-economic classes: low-income (less than 20,000 DH a year), middle-income (between 20,000 and 40,000 DH a year), high-income (between 40,000 and 80,000 DH a year), and wealthy (more than 80,000 DH a year). This classification is relative. It is based on an estimation of the average salaries most workers in the country receive (between 3000 and 5000 DH a month). As illustrated in table 2, 27% of participants come from low-income families, 33% from middle-income families, and 27% belong to high class. Since there is no dominant class, it could be argued that this sample is representative of all three economic classes. Important to note is that 11% of participants left the question about income unanswered, which explains why the percentages do not add up to 100%. Overall, parents' education in this study seems to be in consistency with income. No discrepancies or contradictions in the percentages are observed.

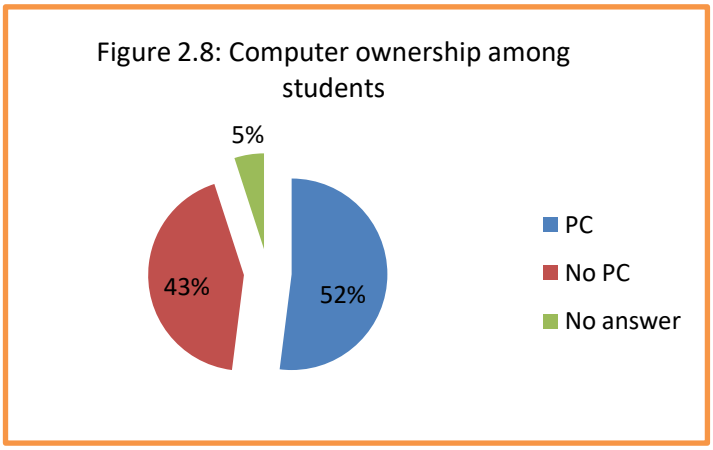
Parents' level of education	None	Elementary school	High school	University (Undergraduate)	Graduate	No answer
	26 / 45%	14 / 24%	12 / 21%	2 / 3%	3 / 5%	1 / 2%

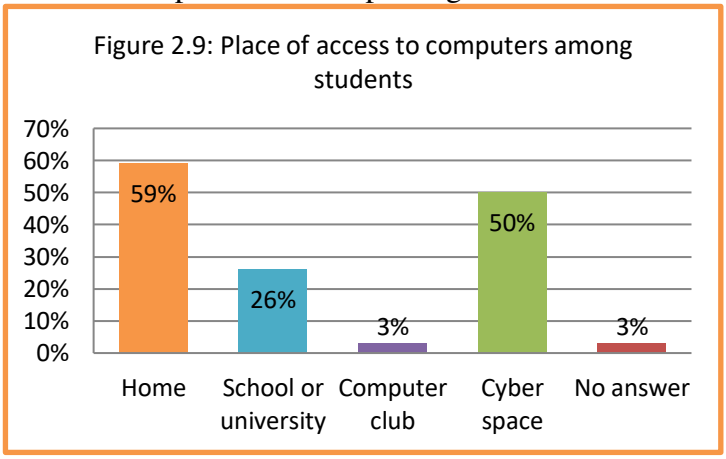
Parents' annual income in 1000 DH	Less than 20,000	20,000 ~ 40,000	40,000 ~ 80,000	80,000+	No answer
	16 / 27%	19 / 33%	16 / 27%	1 / 2%	6 / 11%

Table 2: Student profile (b)

VI.2. Computer Equipment and Literacy

The purpose of this section is to investigate computer literacy, ownership, and use among respondents. The findings reveal that an overwhelming majority of participants (98%) use computers. The remaining 2% left the question unanswered. This reveals a high rate of computer literacy among respondents although a large proportion of them do not own computers. As displayed in figure 2.8, 52% of respondents own computers while 43% do not. Given the socio-economic variables characterizing this sample, these findings are predictable. The relative balance in the percentage of computer owners and non-owners reflects a parallel balance in terms of gender (40% of males versus 53% of females), area of residence (43% rural versus 43% urban), level of education (34% high school versus 49% university), and socio-economic status (see table 2). Yet, it seems that parents' income and education affect computer ownership to a greater extent than the rest of the variables. The most important conclusion to be derived from these findings is that there is no such gap in computer ownership among participants. When asked about *where* they access computers, the majority (59%) said at home, 50% mentioned cybercafés, and 26% said at school or university. The percentages in figures 2.8 and 2.9 reveal a relationship between ownership of and access to computers. The participants owning computers (52%) usually access them at home (59%). Those who do not own computers (43%) usually access them at cybercafés

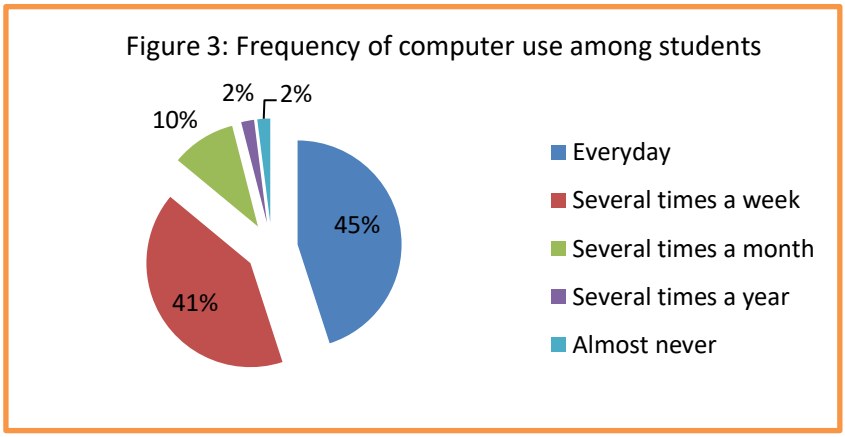




(50%). Some do not personally own a computer but share one with family, which explains the 7% difference between ownership of and home access to computers. Also, the findings show that schools are not technology-rich environments. Only 26% reported that they access computers at school. This suggests a lack of equipment and thus preparedness to integrate ICT in education in Morocco. On the other hand, homes are becoming technology-rich environments, which would partly compensate for the lack of access to technology at schools.

With respect to the frequency of computer use, 45% of participants use computers *everyday*, 41% *several times a week*, and 10% *several times a month*. These figures are in consistency with the previous results. Those having home access to computers (59%) are more likely to use them *everyday*, whereas those who access them at cybercafés (50%) use them *several times a week*. Nevertheless, not all those who have computers at home (59%) use them *everyday* (45%). Compared to ownership and the place of access to computers, the frequency of computer use among students is relatively high, which is likely to increase familiarity with computers and motivation towards using them in education. Only 10% of participants said they use computers several times a month. Hence, high frequency of use suggests that students are better prepared to use computers in learning. All they need is to be able to access them at school. It is important to note that the percentages above add up to more than 100% because participants could choose more than one answer.

Figure 3: Frequency of computer use among students



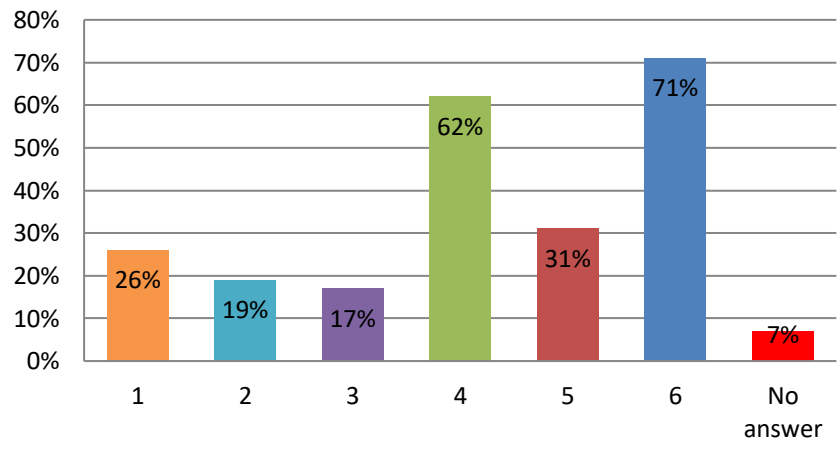
To find out how computers are being used among the student population, participants were asked to select among six items representing two major modes of computer use: creative and exploitative. The first three items (1, 2, & 3) represent the creative mode, whereas the remaining three (4, 5, & 6) items represent the exploitative use of computers. As featured in figure 3.2, respondents use computers mostly for exploitative and educational purposes, namely MS office (62%) and dictionaries and encyclopedias (71%). Important to note is that

C.	Application	Percentage
1	Graphics packages (drawing, image retouching, etc.)	(26%)
2	Programming	(19%)
3	Web design	(17%)
4	Office packages (word processing, presentations, spreadsheets, etc.)	(62%)
5	Computer games	(31%)
6	PC Dictionary/Encyclopedia	(71%)
7	No answer	(7%)

Table 2.1: Uses of the computer among students

computer use for entertainment purposes is not as prevalent among students as usually thought by the general public. Only 31% of participants reported that they use computers for entertainment purposes, namely computer games. In addition, the use of computers for creative purposes is limited. This is because such a kind of computer use requires some level of technology education, and adequate access to computers at schools. As previously indicated, Moroccan schools do not currently meet these two criteria. It is important to note that these percentages add up to more than 100% because participants could choose more than one answer, and some of them (7%) left the question unanswered.

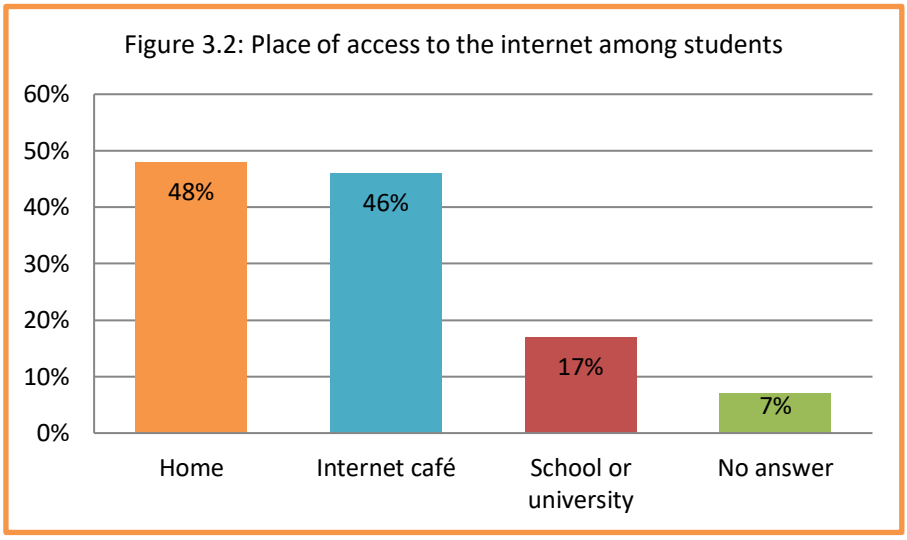
Figure 3.1: The rates of computer uses among students



Given that 59% of participants have home access to computers, an equal percentage of them (50%) do not need help *at all* when using computers while 48% need help *from time to time*. These findings reveal that the level of independence when using computers interrelates with computer ownership, which culminates in more familiarity with the technology and more confidence in solving the problems encountered. Other determinants of the level of independence in computer use are the frequency and the length of experience using computers. Although they may not have computers at home, those who have been using computers for a long time are likely to be more familiar with computers and thus more capable of performing different tasks independently. In contrast, those who have just recently started using computers are usually less familiar with computers and may need more help than those who do not have computers at home but have been using them for a long time. Important to note is that the lack of familiarity with computers could make technology a source of frustration and anxiety, which in turn might result in avoidance of computers, and, as a result, a failure to develop competent use of computers. The mere presence of technology at home does not guarantee its adequate use.

Because access to computers, whether at school or outside, does not necessarily mean access to the internet, a separate section was devoted to the internet. A comparison between access to computers and the internet shows that 98% of participants use computers while 91% use the internet. This suggests that computer use among students is 7% higher than internet use although no discrepancy between the two is observed. Those who use computers also use the internet. In fact, internet penetration among the student population is significant given that 43% of them live in rural areas and have no computers. It is important to note that 2% of participants did not indicate whether they use the internet or not, which is why the percentages do not add up to 100%.

As illustrated in figure 3.2, 48% of those who use the internet access it at home, 46% access it at internet cafes, and 17% at schools or universities. These results reveal less use of the internet compared to the use of computers. While 59% of participants have home access to computers, less (48%) have home access to the internet. The same could be said about access to the internet at cybercafés and schools. While 26% of participants use computers at school, only 17% access the internet at school. Similarly, 50% of participants access computers at cybercafés, whereas no more than 46% access the internet at internet cafes. Moreover, the findings show that not all those who have computers (52%) have internet at home (48%) although this is no huge discrepancy. Those who have computers also have internet at home. When it comes to schools, only a minority (17%) provide students with access to the internet. Compared to the budget devoted to the provision of schools with equipment and the internet (see chapter IV), this percentage does not constitute a great development. It is important to note that the percentages in figure 3.2 add up to more than 100% because participants could choose more than one answer and some of them (7%) left the question unanswered.



To find out how access to the internet affects its use, the frequency of using the internet among students is hereof investigated. While 45% of participants use computers *everyday*, and 48% have internet at home, only 35% use the internet for a period ranging between 4 and 10 hours week, and 33% use it between 1 and 3 hours. Those who use the internet for more than 10 hours a week total 29%. These percentages indicate a consistency between home access to the internet (48%) and the amount of its use. The combination of those who use the internet for a period between 4 and 10 hours a week (35%) and those who use it for more than 10% hours (29%) reflects a considerable amount of internet use among most students (64%). Important to mention is that whether home access to the internet is regular or intermittent remains unknown, which makes consistency between access to and use of the internet relative. Another important factor is participants' level of education. Most of the students surveyed are either in third and last year of university or last year of a master program. These students are actively engaged in research and are currently working on either their monograph or MA theses, which would make the findings of this study inapplicable to other levels of education and other phases of students' academic life. Nonetheless, there is no evidence to support or refute such argument.

Number of hours per week	n°/58	Percentage
1 ~ 3 hours a week	19	33%
4 ~ 10 hours a week	20	35%
More than 10 hours per week	17	29%
No answer	2	3%
total	58	100%

Table 2.2: The frequency of internet use among students

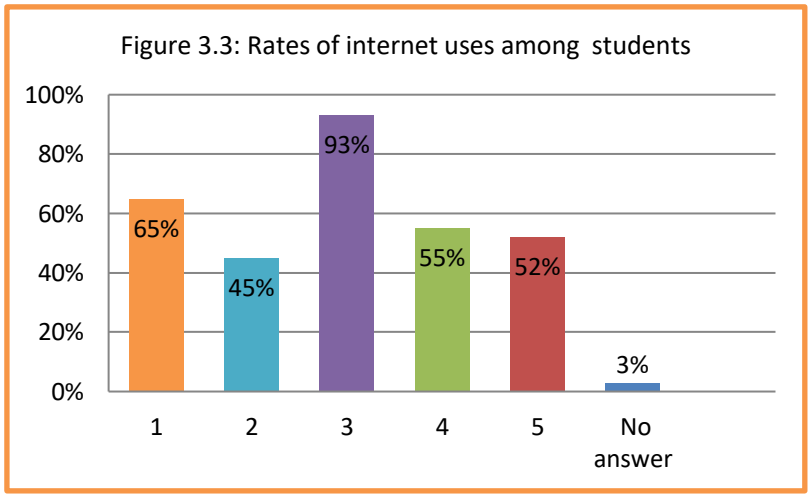
The items in table 2.3 reflect three major categories of internet use: communicative (items 1 & 2), educational (3 & 4), and entertainment (5). These are undoubtedly interrelated. The percentages in table 2.3 and figure 3.3. show that the majority of participants use the internet for educational purposes. While computers are widely used for MS office (Word, Powerpoint, Excel, etc) and dictionaries, the internet is used mostly for doing research and homework (93%) sending and receiving emails (65%) and downloading books and articles

(55%). Compared to the educational and communicative purposes, internet use for entertainment purposes is not as prevalent as usually thought. Only 52% of participants said they use the internet for entertainment purposes. It is important to note that these percentages add up to more than 100% because participants could choose more than one answer. In addition, 3% of participants left the question unanswered. One reason to the increasing computer and internet penetration across the student population could be that they are mainly used for educational purposes. Families become more willing to invest in educational technology when they know that it will be used mainly for educational purposes. Conversely, families show reluctance to invest in computers when they know that they will be used mainly for entertainment purposes although this depends on family education.

C.	Application	n°/58	Percentage
1	Sending / receiving emails	38	65.5%
2	Participation in chat rooms and discussion boards	26	45%
3	Research and homework	54	93%
4	Ordering, reading, and downloading books, articles, etc.	32	55%
5	Entertainment (e.g., playing games, downloading and listening to videos, etc.)	30	52%
6	No answer	2	3%

Table 2.3: Uses of the internet among students

More importantly, computers and the internet are becoming an integral part of student life. In Morocco, the general impression is that computers are mainly used for communicative and/or entertainment purposes. This is likely to be the case with the uneducated segment of the population. For students, especially those at university, it seems that they are making effective use of computers and the internet in education. Chatting and playing games is out of date for most of them.



VI.3. Attitudes of Students towards ICT.

The purpose of this section is to investigate participants' attitudes towards computer use in education and the relationship existing between human beings and 'information technology.' As defined by Loucks-Horsely, Hewson, Love, and Stiles (1998), attitudes, sometimes used interchangeably with beliefs, are "the ideas people are committed to-sometimes called core values …. They shape goals, drive decisions, create discomfort when violated, and stimulate ongoing critique" (cited in Lumpe and Chambers, 2001, p. 93). There are three major underlying factors that affect attitudes towards computers. These are: Enjoyment, anxiety, and utility. Each of these will be investigated based on a five-point Likert scale ranging from "strongly disagree" to "strongly agree" and consisting of 14 items adapted mainly from Agnaou's (2009) questionnaire survey. Some items are meant to be check-questions. To facilitate the calculation of the results, participants' responses were collapsed into negative (1 & 2), and positive (4 & 5) positions.

VI.3.1. Enjoyment

Enjoyment is "the possession, use, or occupancy of anything [in this context computers] with satisfaction or pleasure" (Dictionary.com, n.d.). This index is important because enjoyment maintains and increases student motivation towards computer use. Motivation, in turn, correlates with increased interest in using computers and positive attitudes towards them. Table 2.5 summarizes the results for computer enjoyment among students. In order that the percentages on each Likert scale add up to 100%, a separate column for the items left unanswered was included. The results in table 2.5 are calculated after having collapsed negative (1 & 2), and positive (4 & 5) values into two distinct positions.

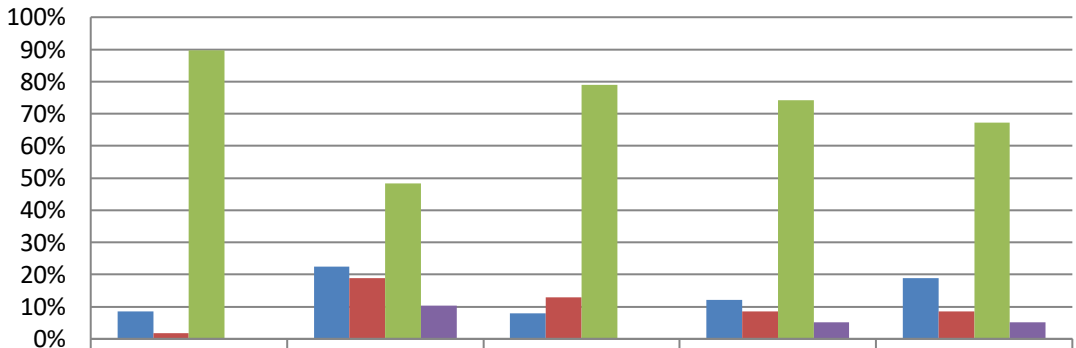
The figures in table 2.5 and figure 3.4 reveal high levels of computer enjoyment among participants. Excluding the second item about teacher use of computers in the classroom context, participants reported high levels of computer enjoyment, 67% or above, across all four remaining items. One explanation to this is that computers allow for some

N° of statements		Negative	Neutral	Positive	No answer
1	I enjoy using the computer.	5 (8.62%)	1 (1.72%)	52 (89.65%)	0 (0%)
2	I believe that the more often teachers use computers, the more I will enjoy school.	13 (22.41%)	11 (18.96%)	28 (48.27%)	6 (10.34%)
3	I feel comfortable and confident working with a computer.	5 (8%)	8 (13%)	46 (79%)	0 (0%)
4	Computers are necessary in life.	7 (12.06%)	5 (8.62%)	43 (74.13%)	3 (5.17%)
5	I enjoy lessons on the computer.	11 (18.96%)	5 (8.62%)	39 (67.24%)	3 (5.17%)

Table 2.5: Computer enjoyment among students

control over learning and provide an effective alternative to the traditional teaching methods prevailing at Moroccan schools. Although machines, computers sometimes can be more responsive to students' learning needs. Given the high rates of overcrowding in the Moroccan

Figure 3.4: Rates of enjoyment from computer use among students



	1	2	3	4	5
Negative	9%	22%	8%	12%	19%
Neutral	2%	19%	13%	9%	9%
Positive	90%	48%	79%	74%	67%
No answer	0%	10%	0%	5%	5%

classroom, teachers usually find it hard to accommodate all students' learning interests. With computers, learning what is interesting in each and every school subject is a possibility, whereas with a teacher this may not always be the case. Also, the emotional dimension to

learning with computers is paramount. Computers allow for anxiety-free learning: learning takes place with little or no emotional damage and no imposition, whether of a belief, idea, style, or preference, is attempted. Interesting to note is that the rates of computer enjoyment are higher when students *themselves* use the computer than when the *teacher* does. When asked if they would enjoy school if teachers were using computers in class, only 48% of participants said 'yes.' This is because the element of control in learning is limited if not absent. More importantly, students (67%) see computer use as detrimental to their academic success and necessary for effective functioning in their lives. The majority of participants (74%) said that computers are necessary in life. This implies that students have no tendency to avoid computers; instead, they embrace them to improve their academic achievement. If computers were embraced mainly because of the entertainment derived from them, participants would not have indicated that they are necessary in life. It is important to note that some participants left some items unanswered, which is why the percentages do not add up to 100%.

VI.3.2. Computer Anxiety

This section is aimed at measuring computer anxiety among students. Chua, Chen, and Wong (1999: 610) define computer anxiety as ''a fear of computers when using the computer, or when considering the possibility of computer use'' (qtd. in De Young and Spence, 2004: 56). Important to note is that computer enjoyment interrelates with computer anxiety. That is, high levels of enjoyment imply low levels of anxiety. The figures in table 2.6 and figure 3.5 confirm this interrelationship. The majority of participants reported low levels of computer anxiety on all three items. Students reported low levels of *nervousness* (20%) and feelings of *irritation* (18%) from working with or when wanting to use computers. However, responses to the third item (computers are addictive and enslaving) seem to reveal a degree of anxiety towards computer use. This is partly because of the ambiguity characterizing the meaning of

the terms 'additive' and 'enslaving.' There is no clue as to whether students are rating the

N° of statements		Negative	Neutral	Positive	No answer
1	Working with computers makes me nervous.	39 (67.24%)	5 (8.62%)	12 (20.68%)	2 (3.44%)
2	I feel irritated when I want to use a computer.	29 (50%)	8 (13.79%)	11 (18.96)	10 (17.24%)
3	The computer is addictive and enslaving.	14 (24.13%)	12 (20.68%)	26 (44.82%)	6 (10.34%)

Table 2.6: Computer anxiety among students

effects of computer use on *themselves* or on *society* in general. There is wide consensus among the participants (67%) that working with computers is not a source of uneasiness, whereas no such consensus exists as to whether computers are *additive* and *enslaving*. A

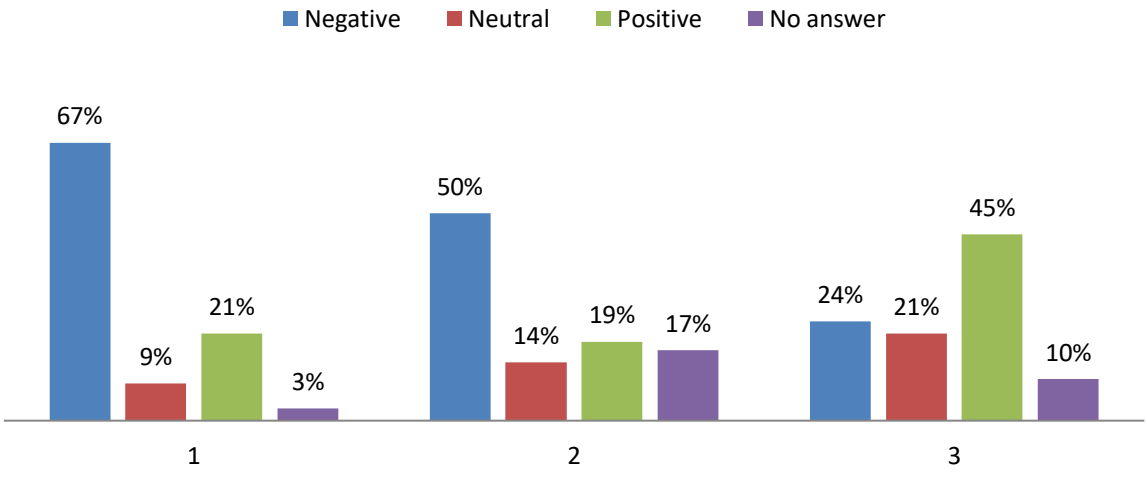


Figure 3.5: Rates of computer anxiety among students

substantial percentage of participants (24%) indicated that computers are not addictive; 21% remained neutral, and 10% abstained from answering the question.

VI.3.3. Computer Utility

The purpose of this section is to investigate computer utility among students. In the literature, 'computer utility' is used interchangeably with 'outcome expectancy.' Bandura (1977) maintains that "in order to voluntarily use a computer, the student must not only believe in his/her own capability to do so but must also believe in the possibility of a positive outcome from its effective use" (cited in Riggs and Enochs, 1993: 3). Speaking about

computer utility among teachers, Marcinkiewicz (1993) links computer utility to motivation. He developed a theory, called 'the expectancy theory', consisting of three major components: expectancy, instrumentality, and valance to show how computer utility correlates with its use. Marcinkiewicz (op. cit.) states:

> Expectancy theory would predict that one would be motivated to *use* a *computer* for teaching [and learning] if one believed that expending a modest amount of effort would result *in* competent *use* of *the computer* (expectancy), and using *the computer* would be instrumental *in* achieving a valued goal (instrumentality), such as improved instruction [or learning], if *the* goal of improved instruction is valued by *the teacher* (valence). (para. 3)

As illustrated in table 2.7 and figure 3.6, participants reported high rates of computer utility. The majority believe that competent use of computers is detrimental to their academic (94%) and professional (65%) lives. No wide agreement exists as to whether computer use motivates students to work harder; only 49% said they would work harder if they could use

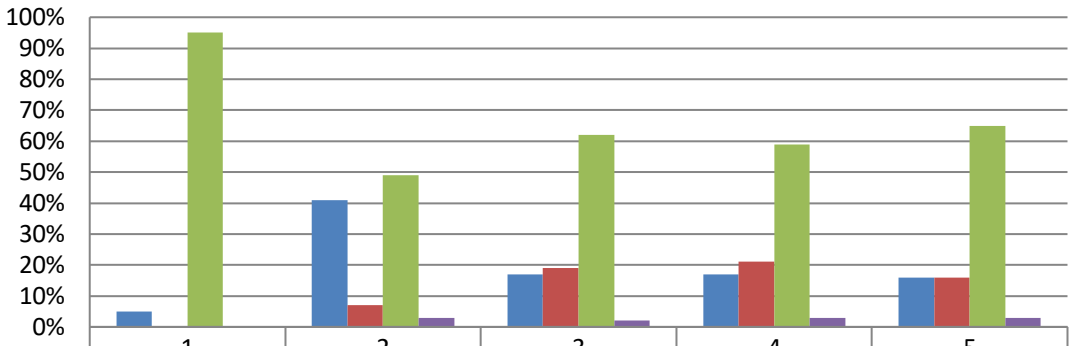
N° of statements		Negative	Neutral	Positive	No answer
1	I believe that it is very important for me to learn how to use a computer.	3 (5.17%)	0 (0%)	55 (94.82%)	(0%)
2	I would work harder if I could use computers more often.	24 (41.37%)	4 (6.89%)	28 (48.27%)	2 (3.44%)
3	I can learn more from books than from the internet.	10 (17.24%)	11 (18.96%)	36 (62.06%)	1 (1.72%)
4	The computer improves the overall quality of education.	10 (17.24%)	12 (20.68%)	34 (58.62%)	2 (3.44%)
5	I will be able to get a good job if I learn how to use a computer.	9 (15.51%)	9 (15.51%)	38 (65.51%)	2 (3.44%)

Table 2.7: Computer utility as expressed by students

computers more often. This might be because some participants have been using computers for a long time, whereas others have just recently started using them. Moreover, participants (62%) seem to place more value on books than on computers. This shows that computer use does not necessarily undermine the use of books. It also reveals

that increased use of computers does not necessarily lead to total dependence on them. Again,

Figure 3.6: Rates of computer utility among students



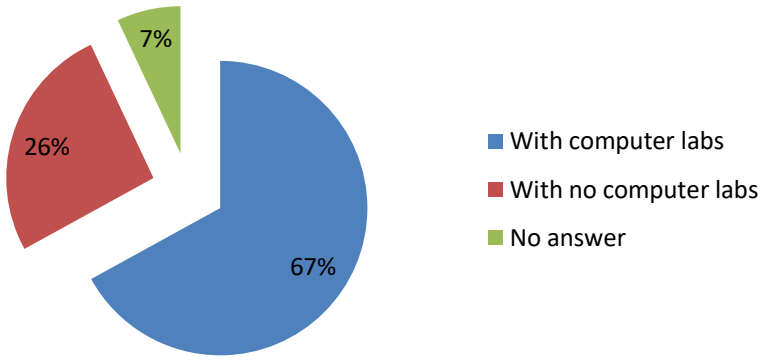
	1	2	3	4	5
Negative	5%	41%	17%	17%	16%
Neutral	0%	7%	19%	21%	16%
Positive	95%	49%	62%	59%	65%
No answer	0%	3%	2%	3%	3%

a small number of participants left some items answered, which does not invalidate the overall results.

VI.4. Student Use of ICT in Education.

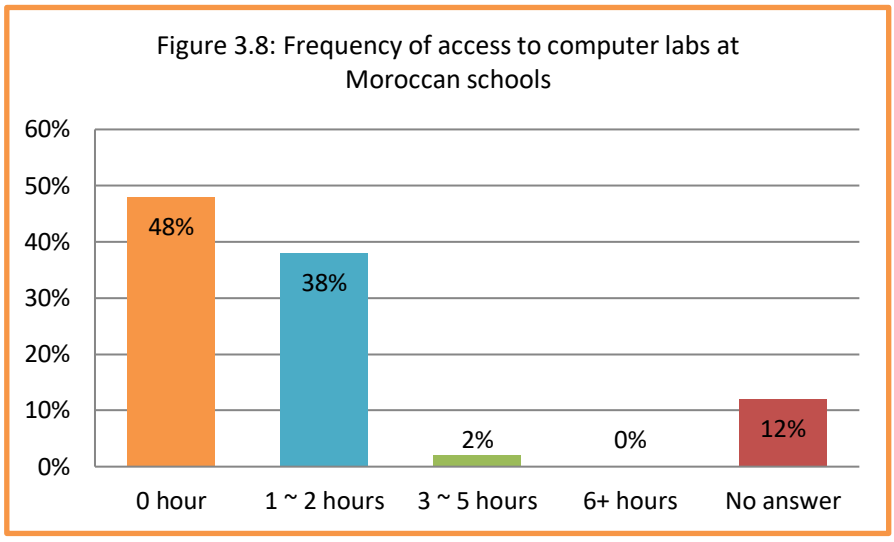
This section is concerned with the use of ICT in learning and teaching in the school context. Adequate access to computers and the internet at school is a prerequisite to ICT use in the educational practice. Therefore, the purpose of this section is to investigate school structural and cultural characteristics, namely the networking and computing facilities,

Figure 3.7: Computer labs at Moroccan schools



and find out how they affect the level of computer use in education. The percentages in figure

3.7, show that 67% of schools have computer labs, whereas 26% do not. These findings imply that a significant percentage of schools have been provided with computers; however, the student-computer ratio remains unknown. Given that only 26% of participants use computers at school, it could be argued that the computer-student ratio is very low. This is clearly pictured in figure 3.8, 48% of those who have computer labs at their schools said they do not use them *at all*, 38% said they use the computer labs for a period between *1 and 2 hours a week*. Thus, computer use at schools remains very limited and is not even enough for the *familiarization* of students with the basic uses of educational technology. These results imply that it is early to talk about the *utilization* of ICT in teaching and learning. Given the lack of infrastructure, schools can neither offer ICT courses to develop competent use of computers nor provide adequate access to the internet to foster research and link practice to theory. Even when ICT courses are offered, students do not attend them because they are too theoretical. When participants were asked if they have taken classes or attended workshops to learn about using ICT, 45% said they have not while 36% said they have but mostly at private institutions. This again shows the relationship between the school infrastructure and ICT use in the school context.



To find out how the lack of infrastructure affects computer use among teachers, participants were asked to rate the reasons they believe bar their teachers from using ICT in the classroom context. As displayed in table 2.8, a majority of participants (58%) cited the

lack of sufficient equipment and facilities as the main reason why teachers do not use computers in class. Second comes the lack of familiarity with ICT (41%) on the part of teachers. The lack of educational software comes as the third major reason (29%) why teachers do not use ICT in the teaching process. This confirms the positive correlation

Reasons for not using computers	Number of responses	Percentages
Lack of familiarity with ICT	24	41.37%
Dislike / fear of ICT	15	25.86%
Lack of adequate educational software	17	29.31%
Lack of sufficient equipment and facilities	34	58.62%
Unanswered	3	5.17%

Table 2.8: The reasons for the lack of ICT use in education

existing between ICT infrastructure and use. It is unrealistic to speak of training teachers to teach with ICT while there are very few or no computers to use. The availability of adequate computing and networking facilities at schools is elemental to the integration of ICT in education. The presence of enough computers at school makes it impossible to avoid the use of technology and forces teachers and students to learn how to use ICT or otherwise their incompetence will be embarrassingly exposed among colleagues, classmates, students, and teachers. With the absence of ICT facilities from school, teachers and students will expend little time and effort to learn how to use ICT because their incompetence will, most likely, not be exposed among colleagues, students, classmates, and teachers. The lack of technology at school does not force teachers and students out of their safe bubble, whereas its presence does. As discussed previously (see chapter III, section 3), the culture of a school is a reflection of its structure. Although computers are perceived to be useful in learning and teaching, there will always be an excuse for not using them at school. It is important to note that 5% of the participants abstained from answering the question, which again does not invalidate the results.

In addition to the school environment, the family environment plays a critical role in the adoption of ICT in education. Since all of the participants surveyed are unemployed, computer ownership is essentially determined by parents' level of income, and attitudes towards ICT use among their children. The assumption is that highly *educated* parents are more likely to invest in and encourage computer use because they are more *aware* of its benefits and thus hold favorable attitudes towards its adoption at home. Provided that 45% of participants' parents are uneducated and 24% have only an elementary education, one would assume that computer use in education is limited at Moroccan homes. This is because the lack of education results in a lack of awareness of the potential uses of the computer, and thus a failure to develop favorable attitudes towards its adoption ensues. To examine the extent to which this hypothesis is valid in the Moroccan context, students were asked to cite what their parents believe they are doing when using computers. Table 2.9, provides a summary of parents' beliefs about computer use among their children. The table consists of four items representing two main categories of computer use: entertainment (1 & 2), and education (3 & 4). A majority of participants (67%) indicated that their parents believe they are *doing homework* when using computers, and 60.34% said their parents believe that they are *reading and writing*. Only 29.31% said that their parents believe they are using the computer for *entertainment* purposes. Thus, it could be argued that parents associate the use of computers among their children mainly with *education* rather than *entertainment*. These findings are predictable since the decision to have a computer at home is usually premised on favorable attitudes towards its potential uses in education. The fact that 52% of participants have computers at home shows that schools are far behind homes in the adoption and utilization of

N° of item		Number of responses	Percentages
1	Chatting and playing games	17	29.31%
2	Listening, watching, downloading videos	17	29.31%
3	Doing homework	39	67.24%
4	Reading and/or writing	35	60.34%
5	Unanswered	2	3.44%%

Table 2.9: Parents' beliefs about computer use among their children

computers in education. These findings also suggest that the lack of access to computers at school does not necessarily mean a lack of computer use in education. Nevertheless, these results also suggest a 'digital divide' between schools and homes, on the one hand, and the haves and have-nots, on the other hand. It is important to note that 3.44% of participants did not answer this question, and that the percentages add up to more than 100%.

To explore participants' attitudes towards computers at the macro level, a five-point Likert scale containing six items assessing the effects of computer use on cultural identity was included. In addition to the school and home environments, the views of the general public are also critical to the adoption of ICT in education. These views are held among all segments of society and are not specific to any one particular group or organization. Being an active

N° of Statements		Negative	Neutral	Positive	No answer
1	The Internet widens the gap between the rich and the poor	15 (25.86%)	16 (27.58%)	27 (46.55%)	0
2	The Internet discriminates against minority cultures	20 (34.48%)	14 (24.13%)	20 (34.48%)	4 (6.89%)
3	The Internet leads to the domination of Western cultures	8 (13.79%)	13 (22.41%)	33 (56.89%)	4 (6.89%)
4	The Internet opens up new possibilities of self-representation to local cultures.	2 (3.44%)	13 (22.41%)	42 (72.41%)	1 (1.72%)
5	The Internet unites the world.	5 (8.62%)	11 (18.96%)	42 (72.41%)	0
6	The Internet facilitates and increases communication with family and friends.	3 (5.17%)	6 (10.34%)	49 (84.48%)	0

Table 3: Participants' beliefs about the effects of internet use on cultural identity

segment of society, participants were asked to rate the effects of using the internet on their cultural identity. Table 3 consists of six items: the first four epitomize the perceived negative effects of internet use on culture, and the remaining three represent the positive effects. As illustrated in figure 3.9, there is no consensus as to whether the internet has negative effects on cultural identity or not. Participants' positions divide among negative, neutral, and positive. For example, 46.55% of participants indicate that the internet does widen the gap between the rich and poor, 27.58% are neutral, and 25.86% objects to the statement. The same

could be said about discrimination against minority cultures; while 34.48% say that the internet does discriminate against minority cultures, another 34.48% say it does not, and 24.13% remain neutral. In contrast, there is wide agreement among participants that the

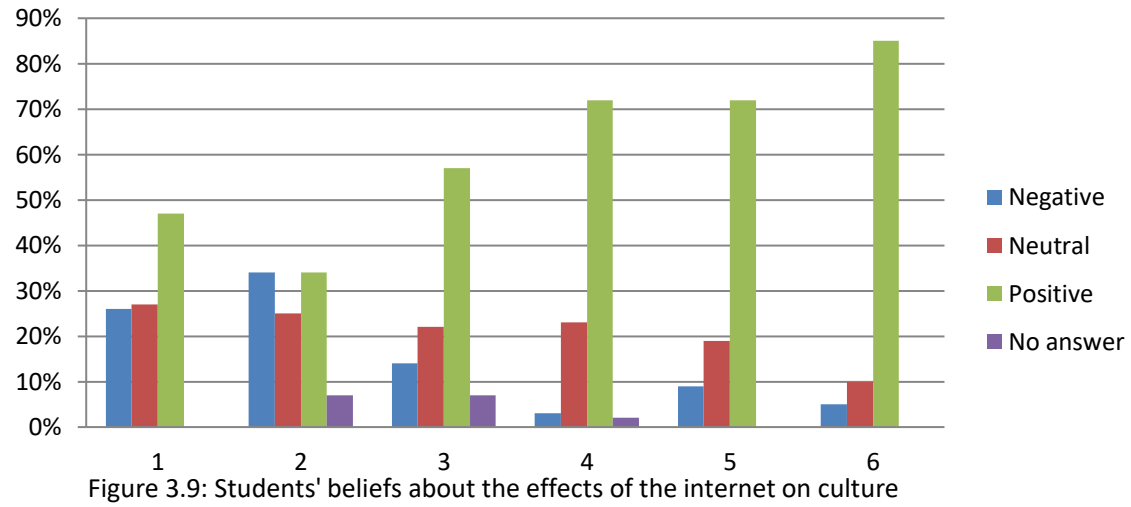


Figure 3.9: Students' beliefs about the effects of the internet on culture

internet has positive effects on cultural identity. The internet is widely credited for its role in facilitating communication, unifying the world, and providing opportunities for self-representation to local cultures. For the participants, the internet is a means that advances rather than undermines the status of local cultures.

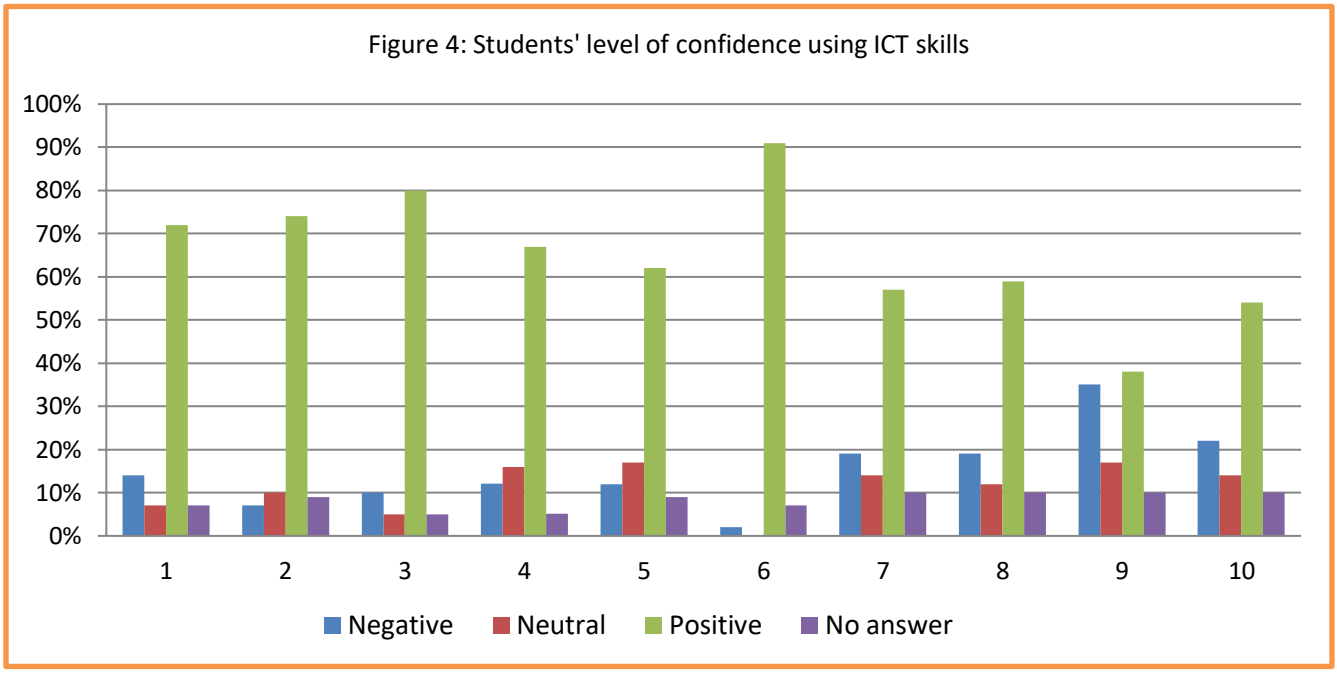
To investigate how beliefs about the perceived effects of the internet on cultural identity affect computer experience, a five-point Likert scale consisting of 10 items measuring participants' level of confidence when using ICT skills was included. The 10 items represent two major categories of use or skills: *exploitative*, and *creative* skills. The first six items represent the skills of exploitation, whereas the last four constitute the skills of creation. As illustrated in figure 4, the majority of participants reported high levels of confidence when

N° of statement		Negative	Neutral	Positive	No answer
1	copy and paste selected material from one document to another	8 (13.79%)	4 (6.89%)	42 (72.41)	4 (6.89%)
2	use a word-processor	4 (6.89%)	6 (10.34%)	43 (74.13%)	5 (8.62%)
3	use email	6 (10.34%)	3 (5.17%)	46 (79.31%)	3 (5.17%)
4	send email to several people at once	7 (12.06%)	9 (15.51%)	39 (67.24%)	3 (5.17%)
5	send email with document attachment(s)	7 (12.06%)	10 (17.24%)	36 (62.06%)	5 (8.62%)
6	use an internet search engine (e.g. Google) to find Web pages	1 (1.72%)	0%	53 (91.37%)	4 (6.89%)
7	bookmark web sites so as to keep track of updates	11 (18.96%)	8 (13.79%)	33 (56.89%)	6 (10.34)
8	use the computer to create a slideshow presentation (e.g. PowerPoint)	11 (18.96%)	7 (12.06%)	34 (58.62%)	6 (10.34)
9	create and edit graphics for multimedia presentation or Web pages	20 (34.48%)	10 (17.24%)	22 (37.93%)	6 (10.34)
10	create my own website	13 (22.41%)	8 (13.79%)	31 (53.44%)	6 (10.34)

Table 3.1: Students' level of confidence using ICT skills

using the computer for *exploitative* purposes. Participants are highly confident using word processor (74.13%), sending emails to several people at once (67.24%), and with attachments (62.06%) and surfing the internet (91.37%). Conversely, participants reported low levels of confidence using the computer for *creative* purposes. For example, only 53.44% of participants indicated that they can create websites, and no more than 37.93% cited that they can edit and create graphics for slideshow presentations or web pages. Given the lack of adequate access to computers (26%) and the internet (17%), these findings are predictable.

The *creative* use of computers requires a level of *technology education*, which is unavailable at Moroccan schools. It remains to be said that the percentages do not add up to 100%



because a small number of participants varying between 5% and 10% abstained from answering the questions.

The last question in the SQ was meant to be a check-question to all the factors affecting ICT use in education. As displayed in table 3.2, participants have to rate the factors

Barriers to internet use among students	Number of responses	Percentages
Lack of access to a computer	6	10.34%
Money	24	41.37%
Trust and privacy	11	18.96%
Disapproval of parents	6	10.34%
Language	9	15.51%
Reliability of the information online	18	31.03%
None	18	31.03%

Table 3.2: Barriers to computer use among students

that bar them from using ICT in learning. In consistency with the findings of all preceding sections, a majority of participants (41.37%) cite money as the most critical factor in the use of ICT in the educational practice. Second comes the reliability of the information online (31%). This is also consistent with the previous findings. Participants (62.06%) have previously indicated that they can learn more from books than the internet (see chapter

VI.2.3). In turn, parents have highly favorable attitudes towards computer use among their children. Only 10.34% of participants said that their parents disapprove of their use of the computer, which is most likely to take place in cases where the computer is used mainly for entertainment purposes. It is important to note that 31.03% reported that they have no difficulties accessing and using the technology.

Chapter Seven:
Teachers' Attitudes towards ICT:
Data Analysis

VII.1. Background Information

The purpose of this chapter is to investigate the factors affecting ICT use in teaching. Teachers are decision makers, and their decisions are influenced by geographic, socio-economic, individual, and organizational factors. Without an understanding of these variables, effective ICT use in education is unlikely to materialize. To explore whether and how ICT is being implemented at the level of teaching and training, the study included two major sub-groups: teacher trainees (n = 10), and experienced teachers (n = 13). These subgroups, as

Gender	Male	Female	No answer
	12 / 52.17%	9 / 39.13%	2 / 8.69%

Age	-25	25 ~ 35	26 ~ 45	46 ~ 55	56+	No answer
	12 / 52.17%	10 / 43.47%	1 / 4.34%	0 / 0%	0 / 0%	0 / 0%

Teaching experience	0 ~ 1	2 ~ 5	6 ~ 9	9 ~ 15	16+	No answer
	14 / 60.86%	5 / 21.73%	3 / 13.04%	0%	1 / 4.34%	0%

Work settings	Middle school	High school	Language center	No answer
	9 / 39.13%	11 / 47.82%	1 / 4.34%	2 / 8.69%

Hours taught per week	0-5	6 ~ 10	11~ 15	16 ~ 20	21+	No answer
	7 / 30.43%	3 / 13.04%	0%	5 / 21.73%	6 / 26.08%	2 / 8.69%

Table 3.3: Teacher profile (a)

illustrated in table 3.3, represent different geographic areas, levels of educations, and teaching backgrounds. More than half of the participants (52.17%) are less than 25 years old, whereas 43.47% are between 25 and 35 years old. A majority of participants (52.17%) are males, and 39.13% are females. All participants answered the question on age while 8.69% of them abstained from indicating their gender. The reason for this could be social, cultural, or personal. Some participants do not indicate their gender for fear of identity theft. Others prefer to remain anonymous for privacy concerns.

A majority of participants (60.86%) have between one year of teaching experience or no experience at all, and 21.73% have between 2 and 5 years of experience. This is mainly because 43.47% of participants are teacher trainees, who have not started teaching yet. Those who have a long teaching experience (between 6 and 9 years) do not exceed 13.04%. Nevertheless, the majority of participants (59.57%) teach a large number of hours: 26.08%

Work status	Language teacher-full time	Language teacher-part time	Pre-service teacher	No answer
	12 / 52.17%	1 / 4.34%	10 / 43.47%	0%

Area of residence	Rural	Urban	No answer
	7 / 30.43%	10 / 43.47%	6 / 26.08%

Site of the institution	Major city	Small city	Village	No answer
	8 / 34.78%	3 / 13.04%	10 / 43.47%	2 / 8.69%

Degrees earned	DEUG	Licence / BA	DEA, DESA, DES(S)/MA	Teaching certificate
	2 / 8.69%	19 / 82.60%	1 / 4.34%	1 / 4.34%

Table 3.3: Teacher profile (b)

teach *more than 21 hours a week*, 21.73% work *between 16 and 20 hours*, and 13.04% work *between 6 and 10 hours a week*. Only 30.43% indicated that they teach between five hours or do not teach at all. These results imply that a majority of participants (59.57%) have been practicing teaching for an adequate amount of time and possess sufficient knowledge of the conditions characterizing the work environment.

As previously mentioned, a substantial percentage of participants (47.82%) are high school teachers of English, whereas 39.13% are teacher trainees or would-be middle school teachers. Only a minority of participants (4.34%) teach at private language centers; the remaining 95.66% work at public institutions. Thus, the findings of this study are applicable only to public institutions. Full-time teachers make up 52.17% of the total number of

participants, whereas teacher trainees (or pre-service teachers) constitute 43.47%. Given the scope of the study, university teachers could not be included in the sample.

The participants living in urban areas total 43.47%, whereas those living in rural areas amount to 30.43%. Therefore, the sample includes both rural and urban areas, particularly because there are far more teachers and schools in urban areas than there are in rural areas. Important to note is that 26.08% of participants did not indicate their area of residence. In addition, 8% of teachers live in urban areas but work in villages. The percentage of those working in *villages* is 43.47%, whereas those working in major cities do not exceed 34.78%. There is no discrepancy between those who live and work in urban areas and those who live and work in rural areas. It remains that a majority of participants (82.60%) hold bachelor's degrees (*la licence*). Only a minority (4.34%) hold a master's degree. These findings imply that most teachers have some level of experience working with computers. This is because most B.A. holders type and submit a research paper (monograph or thesis) by the end of their degree programs. It is important to note that some questions were left unanswered, which is why the percentages do not sometimes add up to 100%.

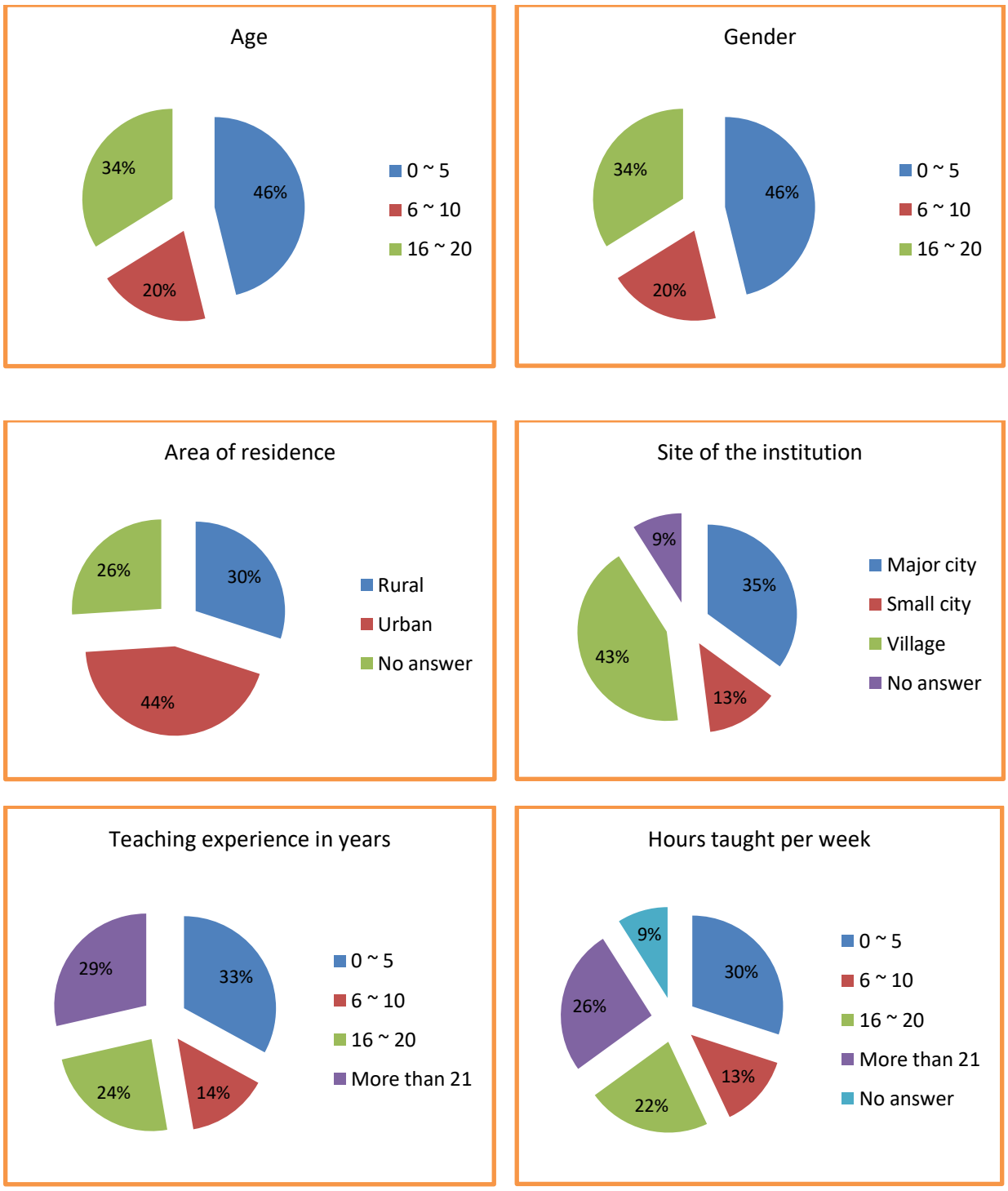
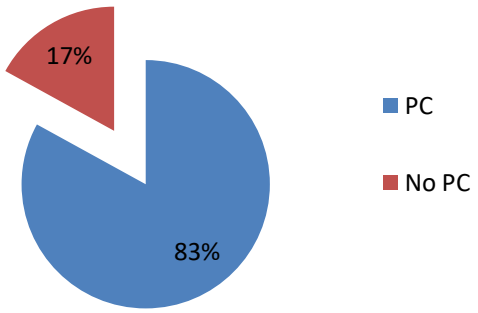


Figure 4.1: Teacher profile in graphical form

VII.2. Access to and Use of Computers among Teachers

The use of ICT in education starts with adequate access to technology. This section aims to investigate computer ownership among teachers and their access to and use of technology inside and outside school. The percentages in figure 4.1 show that a majority of teachers (83%) own computers. Computer literacy is even higher: 96% of participants reported that they use computers, whereas only 4% said they do not. The high rate of computer ownership among teachers has been boosted by the NAFIDA project (see chapter IV), which financially supports teachers to acquire a personal computer. The NAFIDA project covers 40% of the total cost of every computer purchased. Also, teachers' educational background, and age could be vital factors in computer ownership. All participants teach English, and most of them are less than 25 years old. Teachers of other subjects and age groups may not be as motivated to own computers. It is important to note that the 17% without computers are mostly teacher trainees who cannot yet benefit from the NAFIDA project. Compared to students, computer ownership is higher among teachers (83%). The rate of computer ownership among students (52%) is lower. The hypothesis here is that teachers use computers more often than students. Adequate access to technology culminates in increased use of ICT in education. Kennewell et al. (2000) indicate a correlation between access to home computers and teachers' attitudes towards using them in the

Figure 4.1: Computer ownership among teachers



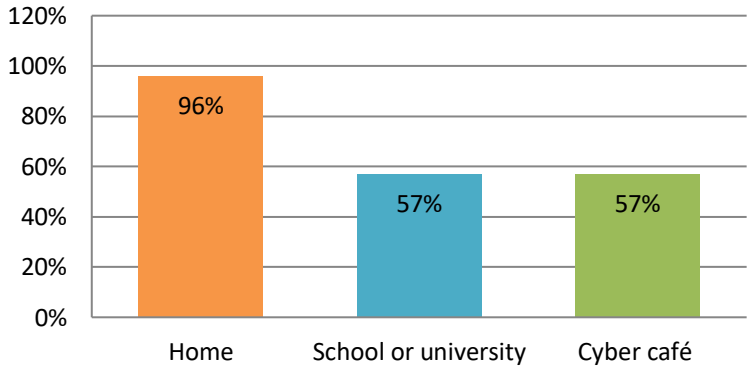
educational practice. They maintain that:

> The positive impact of a home computer on key factors of teachers' attitudes is clear. When teachers have a practical means of accessing technology over an extended period, they are able to develop and practice skills, and they eventually begin to appreciate the affordances of the technology, its potential for improving the efficiency of teaching and learning processes, enjoying its use and beginning to overcome stereotypical reactions due to gender or subject background. (p. 97)

Given that a majority of teachers (96%) have home access to computers, the assumption is that ICT use in teaching is widely practiced at Moroccan schools. This, however, remains to be verified by the ensuing results of the study.

As displayed in figure 4.2, almost all teachers (96%) have home access to computers. Other places of access include schools (57%) and cybercafés (57%). These percentages add up to more than 100% because participants could choose more than one answer. Given that most teachers access computers at home (96%) the assumption is that ICT use in teaching is widely practiced in the classroom context, especially that 57% of participants indicated that they access computers at school. These findings reveal that teachers have far more access to technology than students. While 96% of teachers indicate that they have home access to computers, only 59% of students mention that they access computers at home. The same observation could be made about access to computers at school. While 57% of teachers access computers at school, only 26% of students have access to technology at their institutions. Still, more teachers (57%) access computers at

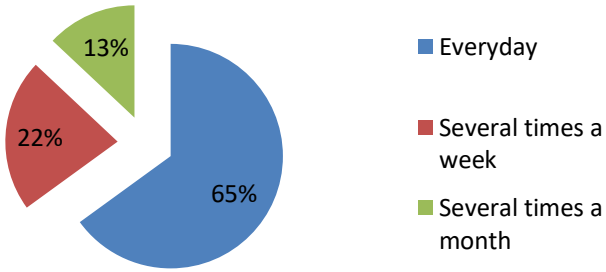
Figure 4.2: Place of access to computers among teachers



cybercafés than students (50%). Yet, the figures show that not all teachers who access computers at home use them at school. Most teachers (96%) have laptops and can use them in the classroom context. The low level of computer use among teachers at school reveals that access alone does not warrant ICT use in teaching. There are other variables, such as access to computers among students, technical support, and training, that affect ICT use in the educational practice. Overall, teachers and students report more access to computers at home than at cybercafés and schools, which implies greater use of ICT in education among both teachers and students.

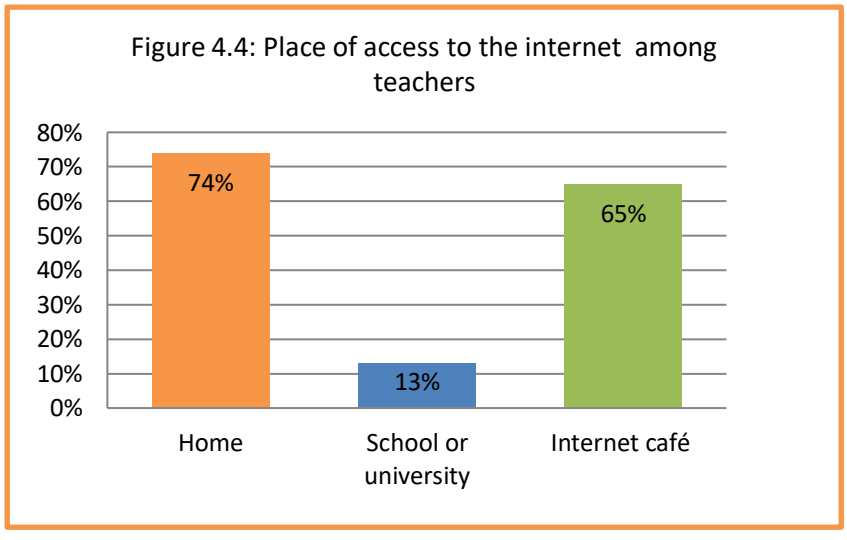
The percentages in figure 4.3 confirm the positive correlation between access to and use of computers. The majority of participants (65%) use computers *everyday*, 22% use them *several times a week*, and 13% *several times a month*. These findings reveal that adequate access to the technology leads to an increased frequency of its use. Yet, not all the teachers who have computers at home use them on a daily basis. While 96% of participants have personal computers, only 65% use them *everyday*. This implies that the frequency of computer use among teachers varies according to access at home and also other variables (e.g. training, experience, attitudes, etc). Generally, teachers use computers more frequently than students, which confirms the hypothesis that increased access to computers leads to a higher frequency of their use. The majority of teachers (65%) use computers on a daily basis, whereas only 45% of students use computers *everyday*. With this in mind, the assumption is that teachers are more familiar with computers and more

Figure 4.3: Frequency of access to computers among teachers



competent in using them. Less access to computers on the part of students supposedly makes them less familiar with computers and less likely to use them in learning. Nonetheless, the results do not suggest a strong relationship between the frequency of accessing computers and their utilization in the classroom context. Even though 96% of teachers have computers at home and 65% use them on a daily basis, only 57% use them at school. Besides, the nature of use remains unknown. These findings imply that high frequency of using computers does not inevitably lead to their utilization in the educational practice. It remains to be noted that the percentages add up to more than 100% because participants could choose more than one answer.

With respect to the internet, the majority of teachers (74%) have internet at home. Other places of access include internet cafes (65%) and schools (13%). These percentages add up to more than 100% because participants could choose more than one answer. These figures indicate a high rate of internet penetration among teachers, which is supposed to increase ICT use in education. On the other hand, the results reveal lower access to the internet among teachers compared to the level of access to computers. While 96% have home access to computers, only 74% have internet at home. This is mainly because the internet is costly. For many teachers, accessing the internet when needed at cybercafés is more cost-effective than having it at home. Moreover, the findings suggest that teachers have more access to the internet than students. While most teachers (74%) have home access to the internet, only 48%



of students have internet at home. The assumption here is that teachers are more competent users of the internet compared to students. Such an assumption, however, remains to be verified by the ensuing findings of the study. As illustrated in figure 4.4, schools provide very limited or no access at all to the internet (13%) which indicates that those who access computers at schools (57%) actually do so using their own computers. The reason why most teachers have computers but do not use them in the classroom context is the lack of technology observed at the school level. When technology is absent from schools, teachers do not feel obliged to use it and thus avoid it. In other cases, teachers want to use computers in teaching but have little confidence to do so in front of their students due to the lack of ICT training. Even when training is provided, it remains merely theoretical because there is very little technology to use for practice. Yet, home access to the internet has positive effects on the learning and teaching process. Even if teachers are not using ICT in the classroom context, they could be using it to develop effective teaching materials.

There is a relationship between home access to the internet, and the frequency of its use. The figures in table 3.4 confirm such a relationship. Most teachers (35%) use the internet *between 4 and 10 hours a week*, and another 35% use it for *more than 10 hours week*. Those who use the internet between *1 and 3 hours* a week total 22%. These results reveal a high level of internet use mainly driven by a high rate of access to the internet among teachers. In addition, teachers use the internet as frequently as students do although they have far more access to the technology. While 35% of teachers use the internet *between 4 and 10 hours a week*, an equal percentage of students, 35%, use it for the same amount of time. Compared to 35% of teachers, 29% of students use the internet for *more than 10 hours week*. Also, 22% of

Number of hours per week	N°/23	Percentage
1 ~ 3 hours per week	5	22%
4 ~ 10 hours per week	8	35%
10+ hours per week	8	35%
No answer	2	8%
Total	23	100%

Table 3.4: Frequency of internet use among teachers

teachers, compared to 33% of students, use the internet *between 1 and 3 hours a week*. Although these percentages show that teachers use the internet a little more frequently than students, they do not reflect the huge difference in the level of access to computers and the internet existing between students and teachers. These findings demonstrate that although students have far less access to the technology, they are far more motivated to use it compared to teachers. This also disconfirms the hypothesis set forth previously: more access to the computer and the internet at home does not make teachers more familiar with technology and more likely to use it in education. Given the limited access to the technology, students in fact use computers more frequently than teachers. The reason for this could be that teachers have less free time because they work and have other family obligations. It is important to note that 8% of participants left the question unanswered, which is why the percentages do not add up to 100%.

VII.3. Teachers' Attitudes towards Computers, and ICT Use in Education

The purpose of this section is to investigate participants' attitudes towards computers, in general, and ICT use in education, in particular. The findings gleaned from the preceding section show an increased access to and use of technology among teachers, which is likely to culminate in increased computer experience. According to van Braak et al. (2004), "the more experience individuals have with computers, the more likely their attitudes toward computers will be favourable" (p. 408). This section aims to explore the kind of correlation existing between computer experience, and attitudes towards ICT use in the Moroccan context.

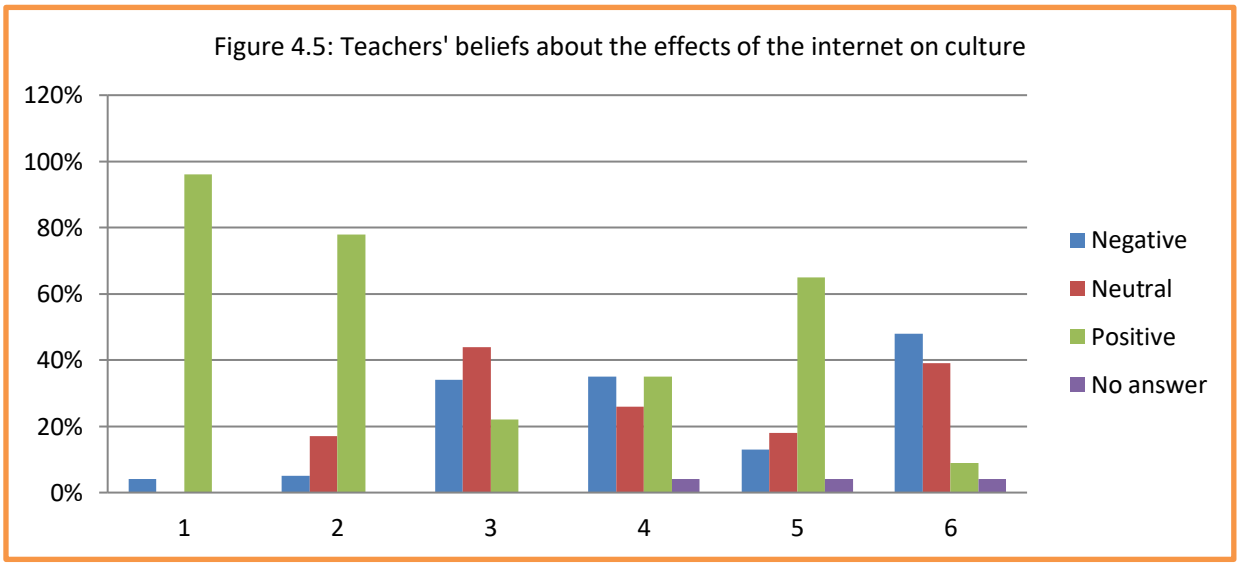
VII.3.1. Teachers' General Attitudes towards ICT

Teachers' general attitudes towards computers will be examined using a five-point Likert scale. This latter consists of six items assessing participants' beliefs about the effects of the internet on their cultural identity. These beliefs are usually shared across all segments of society and are not specific to any one group or organization.

The first three items in table 3.5 represent the perceived positive effects of the internet on cultural identity, and the last three represent the negative effects. As pictured in figure 4.5, teachers' beliefs about the effects of internet use on cultural identity are highly positive. The internet is widely credited for its critical role in facilitating communication (95.65%), and

N° of statement		Negative	Neutral	Positive	No answer
1	The Internet facilitates and increases communication with family and friends.	1 (4.34%)	(0%)	22 (95.65%)	(0%)
2	The Internet opens up new possibilities of self-representation to local cultures.	1 (4.34%)	4 (17.39%)	18 (78.26%)	(0%)
3	The Internet unites the world.	8 (34.78%)	10 (43.47%)	5 (21.73%)	(0%)
4	The Internet leads to the domination of Western cultures	8 (34.78%)	6 (26.08%)	8 (34.78%)	1 (4.34%)
6	The Internet discriminates against minority cultures	3 (13.04%)	4 (17.39%)	15 (65.21%)	1 (4.34%)
7	The Internet widens the gap between the rich and the poor	11 (47.82%)	9 (39.13%)	2 (8.69%)	1 (4.34%)

Table 3.5: Teachers' beliefs about the effects of the internet on culture



providing opportunities for self-representation to local cultures (78.26%). Meanwhile, there is no consensus as to whether the internet unifies the world: participants' beliefs divide among negative (34.78%), neutral (43.47%), and positive (21.73%). The reason for this could be the ambiguity and overgeneralization characterizing the statement, which explains why most participants (43.47%) remained neutral.

On the other hand, there is no agreement among participants as to whether the internet has negative effects on culture. Participants' attitudes divide among negative, neutral, and positive. While 34.78% of participants indicate that the internet leads to t*he domination of Western cultures*, another 34.78% indicate that it does not. The same observation could be made about discrimination against minority cultures and the gap between the rich and the poor. While 65.21% of participants indicate that the internet *discriminate*s *against minority cultures*, 47.82% believe that the internet does not widen the gap between the rich and the poor. This shows a lack of consensus, especially because discrimination usually results in a widening gap between the have and have-nots. Overall, the results indicate positive attitudes towards internet use. Teachers believe that the internet empowers them culturally, socially, and economically.

VII.3.2. Teachers' Attitudes towards ICT Use in Education

To explore teachers' attitudes towards ICT use in education, the study employs a five-point Likert scale consisting of 12 items representing five major indices: enjoyment, anxiety, familiarity, training, and the impact of ICT use on teaching.

A. Computer Enjoyment

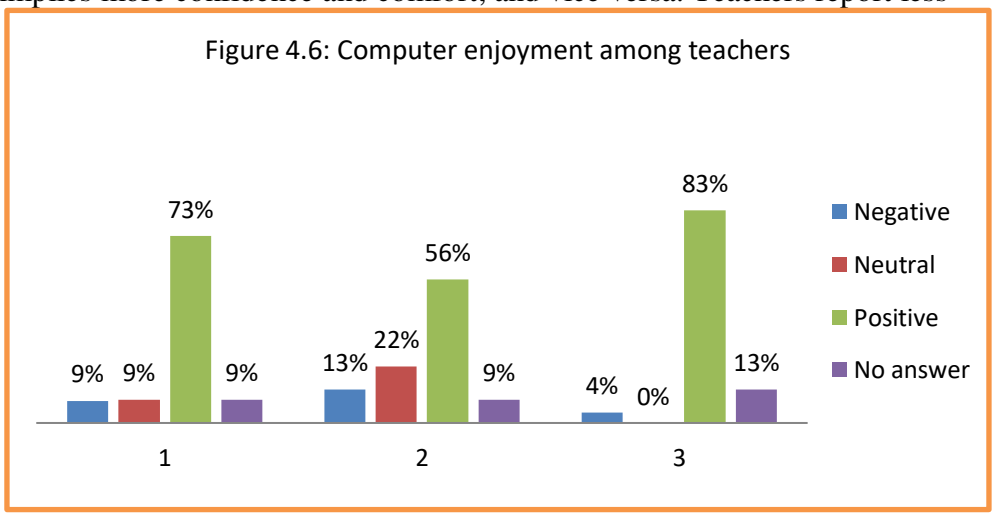
The level of enjoyment derived from computer use affects motivation and ultimately attitudes towards ICT use in education. The objective is to investigate how the increased level of computer use observed among teachers has affected the level of enjoyment they

derive from its use. A majority of teachers (65%) use computers on a daily basis, which is an indicator of high rates of computer enjoyment. The figures in table 3.6 and figure 4.6 show high levels of computer enjoyment among teachers. In response to the first two items in figure 4.6, the majority of teachers (73%) indicate that they enjoy using computers, and 56.52% report that they feel confident and comfortable using computers. Compared to teachers, who have more access to computers and the internet at home, students seem to be more confident

N° of statements		Negative	Neutral	Positive	No answer
1	I enjoy using the computer.	2 (8.69%)	2 (8.69%)	17 (73.91%)	2 (8.69%)
2	I feel comfortable and confident working with a computer.	3 (13.04%)	5 (21.73%)	13 (56.52%)	2 (8.69%)
3	Computers are necessary in life.	1 (4.34%))	(0%)	19 (82.60%)	3 (13.04%)

Table 3.6: Computer enjoyment among teachers

using computers than teachers. Students reported higher rates of computer enjoyment and confidence. Compared to 89.65% of students, only 73% of teachers indicate that they enjoy using computers. Similarly, 79% of students indicate that they feel comfortable and confident using computers, whereas only 56% of teachers say so. First, this confirms the hypothesis that more enjoyment implies more confidence and comfort, and vice versa. Teachers report less enjoyment and lesser confidence using computers. Students, on the other hand, report more enjoyment and more confidence using computers. Second, the findings show that although students have less access to technology, they have more favorable attitudes towards its use. The reason for this could be related to age, and the socio-economic status. The



argument might be that teachers already have a job, whereas students do not, which makes the latter keener to learn how to use ICT in order to optimize their job prospects. While this might be the case, teachers are also aware of the importance of computer use in their lives. Most teachers (83%) compared to 74.13% of students, indicate that computers are necessary in life. It is important to note that some participants (between 8% and 13%) left the questions unanswered, which is why the percentages do not add up to 100%.

B. Computer Anxiety

Anxiety affects motivation and thus attitudes towards ICT use in education. There is a negative relationship between anxiety and computer use-that is, high levels of computer anxiety result in low levels of computer use. Since teachers reported high levels of computer enjoyment, it is expected that they have low levels of computer anxiety. The figures in table 3.7 and figure 4.7 show low levels of computer anxiety among teachers. The majority of teachers (56.52%) cite that computer use does not cause them to be nervous. Only 26% reported that working with computers makes them feel nervous. Also, computers are not a source of frustration for the majority of teachers (78%). As it is the case with students, there

N° of statements		Negative	Neutral	Positive	No answer
1	Working with computers makes me nervous.	13 (56.52%)	2 (8.69)	6 (26.08%)	2 (8.69)
2	I feel frustrated when I want to use a computer.	18 (78.26%)	2 (8.69)	1 (4.34%)	2 (8.69)
3	The computer is addictive and enslaving.	7 (30.43%)	6 (26.08)	8 (34.78%)	2 (8.69)

Table 3.7: Computer anxiety among teachers

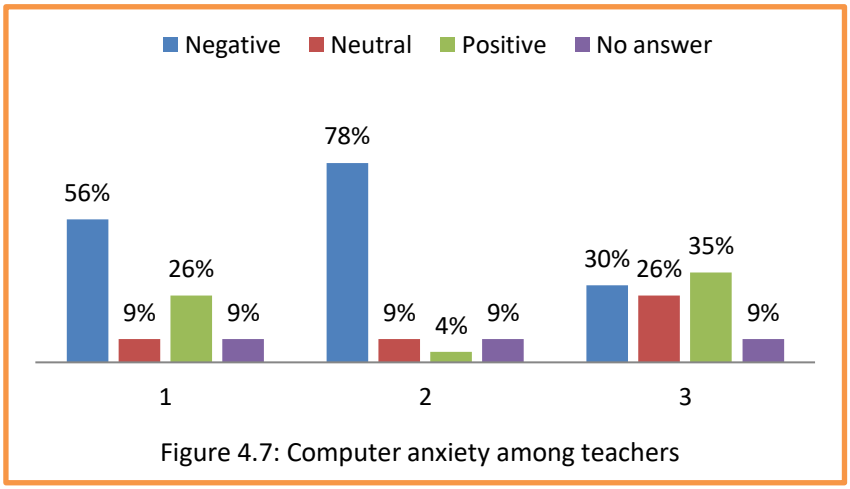


Figure 4.7: Computer anxiety among teachers

is no consensus among teachers as to whether computers are additive and enslaving. Teachers' attitudes are divided among negative (30%), neutral (26%), and positive (35%). This might be because of the ambiguity characterizing the terms 'addictive' and 'enslaving.' There is no clue as to whether teachers are talking about addiction and enslavement in relation to themselves or to the general public. The conclusion is that for the majority of teachers computers are not a source of anxiety. Rather, they are a source of enjoyment. It is important to note that some participants abstained from answering the questions, which is why the percentages do not add up to 100%.

C. Computer Familiarity

Familiarity is defined as the "thorough knowledge or mastery of a thing, subject, etc" (Dictionary.com, n.d.). It interrelates with the level of confidence using computers. High levels of familiarity suggest high levels of confidence using computers. The high rates of computer enjoyment and confidence reported suggest high levels of computer familiarity.

N° of statements		Negative	Neutral	Positive	No answer
1	I think that it takes a long time to finish when I use a computer.	13 (56.52%)	1 (4.34)	7 (30.43%)	2 (8.69)
2	I can learn more from books than from the internet.	9 (39.13%)	5 (21.73)	7 (30.43%)	2 (8.69)

Table 3.8: Computer familiarity among teachers

The figures in table 3.8 and figure 4.8 show relatively high levels of computer familiarity among teachers. The majority of participants (56.52%) mention that it does not take them a long time to finish when using computers while 30.43% indicate that it does. In contrast, there seems to be no consensus as to whether books are more valuable than the internet. While 39% of the participants report that they can learn more from books than from the internet, 30% indicate the opposite. The ambivalence observed in teachers' views towards the second item can be traced to the ambiguity characterizing the statement. Whether one places more value

on books than on the computer does not necessarily make him or her more familiar with its uses. Thus, whenever there is ambiguity in a statement or whenever it depends on the context, ambivalence ensues. Important to note is that some participants (8.69%) did not answer the questions, which is why the percentages do not add up to 100%.

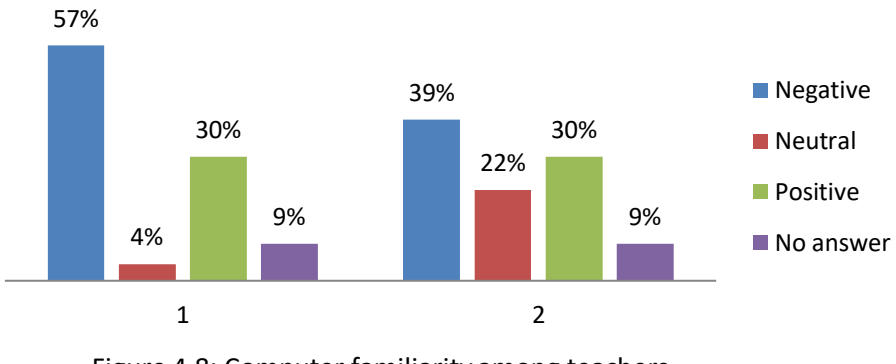


Figure 4.8: Computer familiarity among teachers

D. Training and the Impact of ICT on Teaching

With respect to training, the aim is to assess teachers' willingness to actively engage in learning how to use ICT in the educational practice. Almost all teachers have access to computers (96%), but very few use them in the classroom context. The findings indicate that these teachers have high levels of computer enjoyment, familiarity, and confidence. Yet, classroom computer use is very limited. It is either that teachers place no value on computers, which does not seem to be the case, or that they value computers but do not know how to use them for teaching purposes. To determine which is the case, we asked teachers if it is important for them to learn how to use computers. A majority of teachers (87%) indicate that

N° of statements		Negative	Neutral	Positive	No answer
1	I believe that it is very important for me to learn how to use a computer.	1 (4.34%)	(0%)	20 (86.95%)	2 (8.69%)
2	The computer improves the overall quality of education.	2 (8.69%)	1 (4.34%)	15 (65.21%)	2 (8.69%)
3	I believe that the more often I use computers, the more students will enjoy school.	2 (8.69%)	4 (17.39%)	14 (60.86%)	2 (8.69%)

Table 3.9: Training and the impact of ICT on teaching

it is in fact important for them to learn how to use technology. These findings indicate that there is no tendency on the part of teachers to avoid computers or undermine their use in education. In relation to the perceived impact of ICT on teaching, the majority of participants (see figure 4.9) believe that computer use in the classroom has positive effects on teaching. Teachers (61%) believe that computer use improves the overall quality of education, and 56% believe that computer use in teaching leads to increased enjoyment of learning among students. These results indicate highly positive views towards the use of computers in education among teachers.

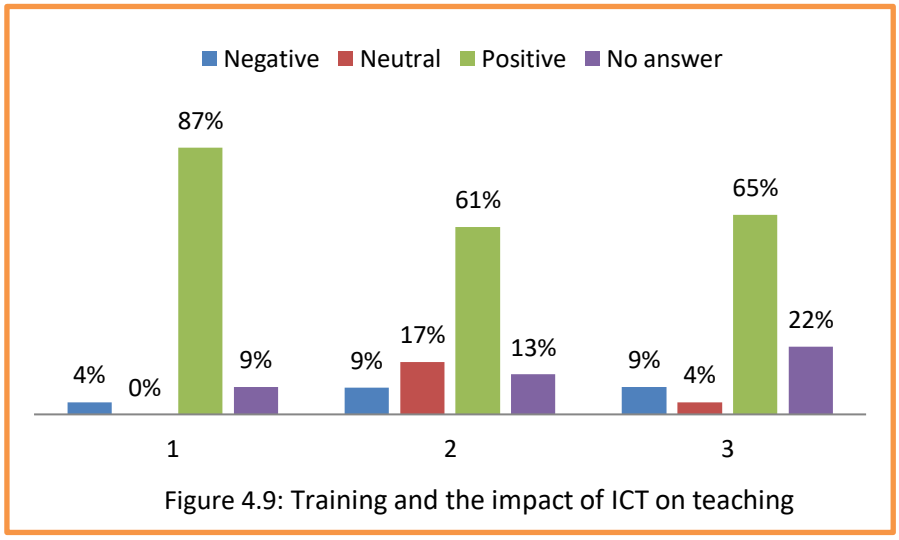
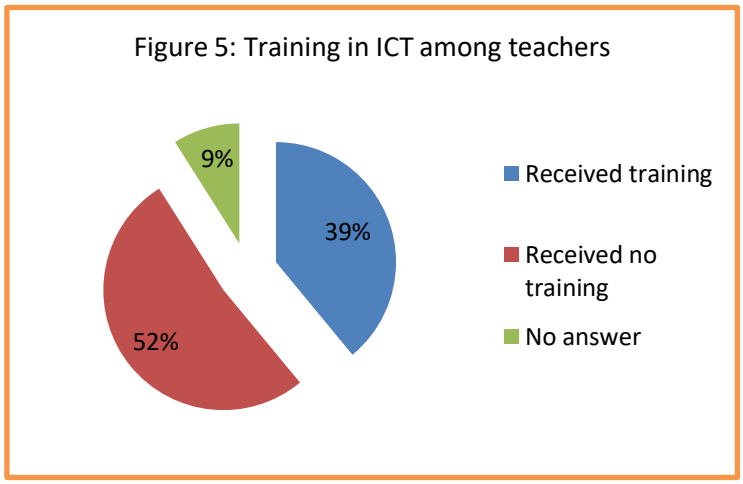


Figure 4.9: Training and the impact of ICT on teaching

Training plays a critical role in the integration of ICT in education. The level of training provided at any school is closely related to infrastructure. As displayed in figure 5, a substantial percentage of participants (39%) have received some level of training in ICT, whereas a majority (52%) have not. This is mainly due to the lack of equipment at school. It is simply unrealistic to speak of training while there is little or no access to computers at schools. With the limited access to



technology, training is likely to be irrelevant and useless even when it is provided. It remains to be said that 9% of participants abstained from answering the question.

In some cases, the training provided by the educational authorities is obsolete because it does not meet teachers' varying needs, nor does it accommodate their different levels of competence. As illustrated in table 4, teachers find the internet a better tool to learn how to use ICT in the educational practice. A majority of participants (65.21%) cited websites as their main source of knowledge about ICT. Colleagues come as the second major source of knowledge about ICT. University courses and professional conferences come third with 21.73% each. These findings demonstrate the importance of access to computers and the internet. Teachers depend mainly on websites to develop competent use of ICT because they have access to the technology. Also, the results confirm the hypothesis that adequate access to the technology leads to increased experience in using it. The fact that teachers use the internet to learn about ICT indicates that they are able to locate information and use it for educational purposes. Thus, financially supporting teachers to acquire a computer with internet connection is a wise decision on the part of the MNE, but without adequate access to the technology at the school level the impact of such a policy on ICT use in education will remain very limited.

Source of knowledge about ICT	n°/23	Percentage
Journals	3	13.04%
Professional conferences	5	21.73%
Listservs	0	0%
University courses	5	21.73%
Public libraries	1	4.34%
University libraries	1	4.34%
Colleagues	8	34.78%
Web sites	15	65.21%
Other	0	0%

Table 4: Teachers' sources of knowledge about ICT

To explore teachers' level of confidence using ICT skills, a five-point Likert scale was employed. The scale consists of 10 items: the first six items assess teachers' *exploitative use* of the computer and the last four measure their *creative use*. In relation to the exploitative use, the majority of participants reported high rates of computer confidence. As indicated in table 4.1 and figure 5.1, teachers are highly confident using word processor (82.60%), sending

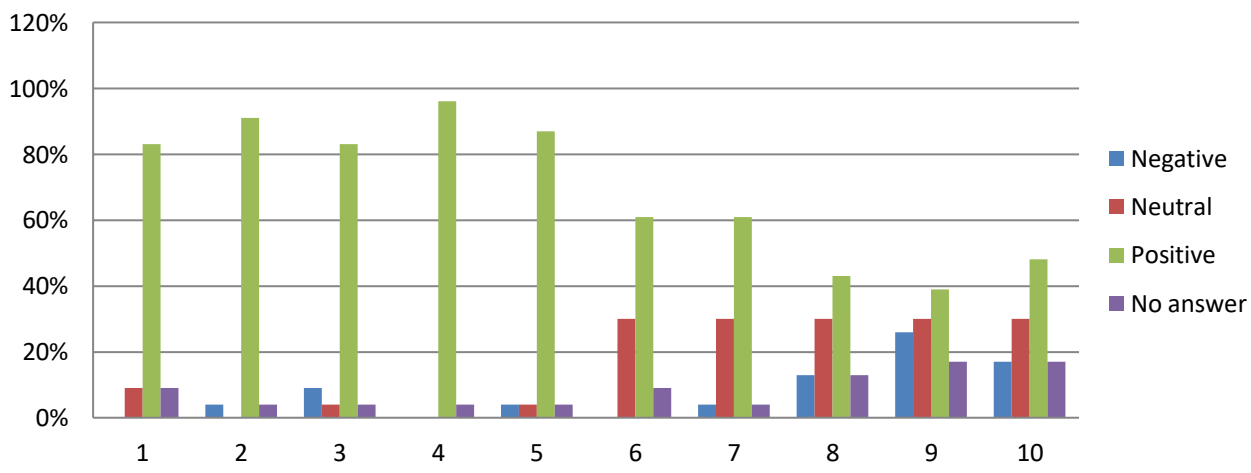
emails to several people (82.60%) and with attachments (95.65%), and using search engines to find web pages (86.95%). With respect to the creative use of the computer, teachers

N° of statement		Negative	Neutral	Positive	No answer
1	use a word-processor	(0%)	2 (8.69%)	19 (82.60%)	2 (8.69%)
2	use email	1 (4.34%)	(0%)	21 (91.30%)	1 (4.34%)
3	send email to several people at once	2 (8.69%)	1 (4.34%)	19 (82.60%)	1 (4.34%)
4	send email with document attachment(s).	(0%)	(0%)	22 (95.65%)	1 (4.34%)
5	use an internet search engine (e.g. Google) to find Web pages	1 (4.34%)	1 (4.34%)	20 (86.95%)	1 (4.34%)
6	bookmark web sites so as to keep track of updates	(0)	7 (30.43%)	14 (60.86%)	2 (8.69%)
7	use the computer to create a slideshow presentation (e.g. PowerPoint)	1 (4.34%)	7 (30.43%)	14 (60.86%)	1 (4.34%)
8	create and edit graphics for multimedia presentation or Web pages	3 (13.04%)	7 (30.43%)	10 (43.47%)	3 (13.04%)
9	create my own website.	6 (26.08%)	7 (30.43%)	9 (39.13%)	4 (17.39%)
10	create a database of information about important authors in a subject	4 (17.39%)	7 (30.43%)	11 (47.82%)	4 (17.39%)

Table 4.1: Teachers' level of confidence using internet skills

reported relatively lower levels of confidence. Only a minority of participants (39.13%) can create websites, and create and edit graphics for presentations or web pages (43.47%). Rates

Figure 5.1: Teachers' level of confidence using ICT skills

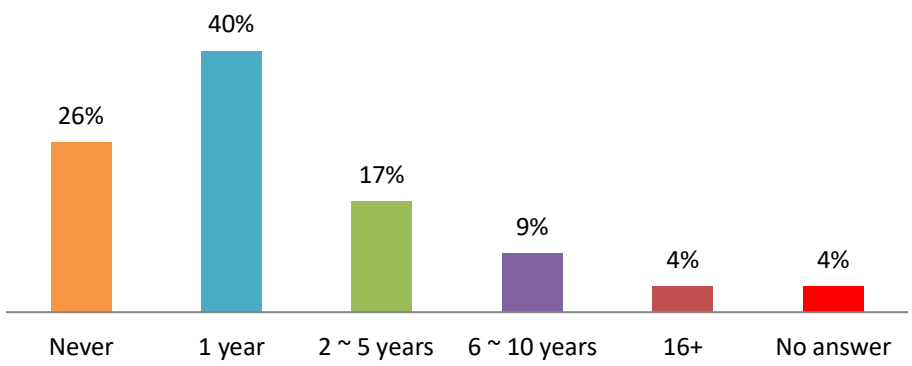


of confidence are higher among teachers when it comes to creating slideshow presentations (60.86%). As clearly pictured in figure 5.1, teachers are far more confident using technology

for *exploitative* than *creative* purposes. This is predictable given the lack of infrastructure at school and the ensuing lack of training. Unlike the exploitative use, the creative use of technology requires some sort of formal training, which Moroccan schools are practically unable to provide at least currently.

To investigate the level of ICT use in teaching, participants were asked if they have any experience teaching with ICT. As illustrated in figure 5.2, ICT use in teaching is very limited. While 26% of participants indicate that they have no experience teaching with ICT, 40% report that they have only a year of experience in teaching with ICT. Only a minority of teachers (17%) have been using ICT for a period ranging between 2 and 5 years. This indicates that although 96% of participants have home access to computers their use of ICT in education remains very limited. Besides, ICT as stated by participants themselves (39.13%), is hardly encouraged at their institutions.

Figure 5.2: Experience in teaching with ICT among teachers



To identify how the limited technology available at school is being used, teachers were asked to rate the main purposes for which computers are used at their respective institutions. As illustrated in table 4.2, the computers at school are used mainly for administrative purposes (82.60%), whereas the use of computers for teaching and learning purposes remains very limited (34.78%). It seems that classroom computer use is not yet plausible in the Moroccan context. van Braak et al. (2004) distinguish between two types of computer use:

supportive computer use, and classroom computer use. The first refers to "the use of computers for pro-active and administrative tasks. Examples are the use of computers for student administration and evaluation, preparing worksheets and keeping track of pupils' learning progress" (p. 408). The latter refers to "the use of computers to support and/or enhance the teaching or learning process, such as the use of computers for demonstration, drill and practice, instruction and differentiation (op. cit.). Finally, it is important to note that the percentages in table 4.2 add up to more than 100% because the participants could choose more than one answer.

Major uses of the computers at school	N°/23	Percentage
Didactic use by teachers	8	34.78%
Communication purposes	4	17.39%
Administrative purposes	19	82.60%
Classroom use by students	8	34.78%
No answer	2	8.69%

Table 4.2: Major uses of the computers at school

VII.4. The Interviews

The interviews were meant to verify the findings gleaned from the TQ and SQ. To increase the reliability of the results of this study, it was necessary to establish direct contact with school leaders and educational authorities. The target institutions included: the AREF of Meknes Tafilalft, the DPE in Fez, the CPGE in Meknes, and Omu Ayman High School in Fes. The interviewees were asked to elaborate on three major points: ICT infrastructure, training, and educational software. They were also asked about their expectations from the introduction of ICT at schools.

VII.4.1. AREF of Meknes Tafilalft

The first interview was conducted at the AREF of Meknes Tafilalft. The initial plan was to interview the director of the Academy, but the request was turned down. The researcher was referred to Mohamed Jabouri, the head of the Division of Educational Affairs, who accepted the request for an interview.

Mohamed Jabouri started by mentioning that focus is currently on equipping all high schools with the necessary technology and generalizing ICT use at all levels of upper secondary education. He said that the equipment of schools is carried out mainly by the MNE, but emphasized that civil society and the private sector are also involved in the process. Private schools, banks, and parents have, in many cases, provided schools with computers especially those which have not been equipped with the technology. When asked if students are sufficiently exposed to technology at schools, Jabouri indicated that ICT is not yet generalized at all levels of secondary education and is not a compulsory school subject. When asked if there are any incentives for schools and teachers to integrate ICT in the educational practice, Jabouri reiterated that emphasis is currently placed on equipping schools with the necessary technology to insure adequate access for students and teachers. This reveals that the integration of ICT in education is seen as a linear step-by-step processes. There is more focus on equipment (the means) than the end or the purpose for which the technology should be used.

An important observation is that Jabouri had more to say about the administrative use of technology than its educational use. He enthusiastically mentioned that the MNE has provided all school principals, inspectors, and directors of divisions with a package consisting of a laptop, a modem, and a printer. Nothing was said about whether these administrators received any ICT training to guarantee an effective use of the technology made at their disposal. Assuming that all administrators know sufficiently about the administrative use of ICT, Jabouri argued that access to the technology among administrators will certainly facilitate communication, collaboration, and the exchange of data among all educational institutions. With respect to training, Jabouri indicated that the AREF of Meknes Tafilalft regularly holds workshops and training programs for teachers, principals, and inspectors to insure an effective use of the technology made available to them. He notes that trainees are

grouped together according to their level of computer competence to make the training more effective and relevant. Yet, trainees, he said, have different levels of computer competence, which makes it hard for trainers to respond appropriately to their different needs. It seems, from the interview with Jabouri, that ICT training is meant to *familiarize* the trainees with the basic uses of computers. No specific training meant to foster ICT use for teaching and learning purposes seems to have taken place.

VII.4.2. The Delegation or DPE in Fes

The DPEs in Morocco function at a more local level; they, in conjunction with the AREFs, manage the educational affairs of provinces at a micro level. The initial plan was to interview the head of the delegation, but the request was turned down and the researcher was referred to Mr. Karoumi, who is in charge of the communications and media division.

Karoumi started by mentioning that the integration of ICT in education comes within the framework of the National Initiative for Human Development. He said that the target is currently to equip all high schools with computers and the internet in order to introduce students and teachers to technology and encourage its use in education. The aim is to familiarize students, teachers, and staff with the basic uses of ICT rather than to utilize it in the educational practice. Karoumi indicates that a majority of high schools have been provided with computers and admitted that not all schools have been covered. He also mentioned that all school principals, inspectors, and heads of divisions have been provided with a package consisting of a computer, a modem, and a printer.

Like Jabouri who focused more on equipment, Karoumi indicated that the reason why ICT is not effectively used in education is the lack of adequate access to the technology at school. He also mentioned the difficult learning and teaching conditions, such as overcrowding and the overloaded programs of study, to point out the difficulty of using ICT

for teaching and learning purposes in the classroom context. Karoumi maintains that in large classes the use of ICT in the classroom is very unlikely even if the technology is available. He emphasizes the importance of individual and private initiatives by students and teachers, who have demonstrated a high level of computer competence although schools have fallen short of providing adequate access to ICT. The interview with Mr. Karoumi reveals that the educational authorities have no plans, at least currently, to integrate ICT in the learning and teaching process. This is predictable given the lack of technology at school and the difficult learning and teaching conditions characterized by overcrowding and overloaded study programs.

VII.4.3. CPGE in Meknes

The CPGEs across the country receive small numbers of students with outstanding academic achievement. The small size of class at these schools makes ICT use in the educational practice viable. The school principal, Abdellah Faraji, accepted the request for interview and displayed a high level of cooperation when dealing with the questions.

When asked about the ICT infrastructure available at his institutions, Faraji said that the school does not suffer a lack of equipment or resources but rather a lack of training and investment in human capital. In his viewpoint, the integration of ICT in education remains very unlikely without the development of human resources. Faraji notes an absence of a clear national ICT policy and maintains that the government ICT initiatives have stopped at random and inadequate equipment of schools. No plans, he adds, were developed to make good use of the technology provided. He admits that the ICT resources available at his institution are not adequately used due to the lack of ICT specialists and indicates many difficulties associated with setting up, repairing, and upgrading equipment. The interview with Faraji reveals another flaw in the implementation of ICT use in education. Even when schools provide adequate

access to the technology, the use of ICT for teaching and learning purposes remains very limited due to the lack of training. CPGEs are highly selective institutions renowned for quality and innovation. The fact that computer use in education at these institutions is very limited shows that it is very early to talk about ICT use in learning and teaching at high schools.

VII.4.4. Omu Ayman High School

The aim behind this interview was to elicit the views of school principals about the prospects of ICT use at their institutions. When asked about the ICT infrastructure available at her institution, the director of Omu Ayman High School indicated that there is a total of 20 computers at the institution. These computers, she explains, are meant to familiarize students with the basic uses of technology. She notes that ICT use in teaching and learning is not yet a practice at the institution. There are no specific competencies, she adds, that students are expected to develop from the use of computers at school. The director indicates that students have demonstrated an ability to develop competent use of ICT despite their insufficient exposure to the technology at school. The conclusion derived from the interview with the principal of the school is that ICT use in teaching and learning is not yet a priority. This is at a time when millions of dirhams are being spent to foster computer use in the educational practice (see chapter IV).

VII.5. Conclusions and Implications

The aim of this research study has been to investigate the factors affecting ICT use in education in Morocco. Several factors have been identified; some are inherent in the educational system, and others are associated with the implementation of the government ICT

projects. Those inherent in the educational system comprise:

1. understaffing of schools,
2. poor infrastructure, and
3. inefficient spending policy.

These three factors have resulted in a very limited ICT use in education at Moroccan schools. The use of ICT in the classroom context is very limited despite the high rates of computer ownership among teachers. This is partly because the most pressing issues, such as overcrowding, and the ailing conditions of the classrooms and schools continue to be ignored by decision makers. Motivation plays a critical role in the success of any major reform. The level of motivation among teachers and students is closely related to the extent to which reform, the introduction of ICT in education, addresses their immediate needs. These latter include particularly clean and comfortable chairs, boards, and classrooms, adequate access to electricity and potable water, small size of classes, etc. Also, regular renovation of the classrooms, the building of new ones, and continuous maintenance of the hygienic conditions of the bathrooms and other facilities are key determinants of the success of educational reform.

Sustainable improvement of the teaching and learning conditions is paramount because it brings actual benefits for teachers and students and leads to the development of positive attitudes towards the institution as a whole. A school that provides the conditions necessary for social and intellectual growth makes its members (teachers and students) more committed to the improvement of its educational standards. It is important, therefore, to improve the physical conditions of the classrooms in order to guarantee an active involvement of teachers and students in any major reform of education. When their immediate needs are appropriately addressed, teachers and students become more willing to invest time and effort to contribute to the success of the reform.

Unfortunately , the teaching and learning conditions at Moroccan schools continue to deteriorate despite the colossal budget allocated to the sector (26% of the government budget) and the many reforms introduced throughout the last decade. The attempts to integrate ICT in education have all failed to meet their objectives. For example, the "2008 Plan" (see chapter IV) had as an objective the provision of all schools (both elementary and secondary) with computers and internet connection by the year 2008. Thus far, not even high schools have adequately been provided with the necessary technology. The findings of this study reveal that access to the technology at school is very limited for both teachers and students.

It is important to note that the government ICT projects (chapter IV) have failed to provide adequate access to the technology, let alone to integrate its use in education. It is equally important to note that the limited use of ICT in education is not only due to the lack of access to the technology but also due to the failure to address teachers and students' concerns. The rates of overcrowding continue to rise, and the conditions of the classrooms continue to deteriorate. To use Michael Fullan's (1994) words, not only has the country failed to *restructure*, but it has also failed to *re-culture*. The failure to *restructure* and *re-culture* is not due to the lack of resources; rather, it is due to the lack of planning. The budget allocated to the ICT projects (see chapter IV) is enough to provide adequate access to the technology at least for all high schools.

More importantly, the findings of this study reveal that the use of ICT in education remains very limited even when there is adequate access to the technology either at home or at school. In this study, although a majority of teachers (96%) have home access to the computer and the internet, their use of ICT in the educational practice remains very limited. In the case of the CPEG in Meknes, ICT use in teaching and learning, as stated by the director of the school, is very limited despite the resources at the disposal of teachers and students. These two examples confirm that ICT use in education at Moroccan schools will remain very

unlikely unless teachers and students' concerns are appropriately addressed. As long as reform continues to overlook their immediate needs, teachers will continue to show reluctance to contribute to its success. It is important that the country creates the conditions necessary to motivate teachers and students and encourage their involvement in the reform.

Most importantly, a sustainable improvement of the learning and teaching conditions is very unlikely without the development of new cultures and new procedures. To develop new cultures (*re-culture*) and introduce new procedures (*restructure*), there is a need for more thinking than spending. In other words, there is a need for expert studies of the different factors likely to affect the implementation of any reform project. These studies should not stop at identifying problems; they should also come up with appropriate solutions to the obstacles likely to arise during the implementation of the reform. Arguing for more spending on education is impracticable and ineffective. The government already spends 26% of its total budget on education. Money is an extrinsic motivator that does not necessarily lead to change. Even if the government provides incentives for teachers who develop ICT materials, the use of technology in education is unlikely to take place. This is because there is a need for an intrinsic motivator; one that allows teachers to harness the uses of educational technology, save time and energy, and most importantly improve the teaching and learning conditions. Therefore, it is of paramount importance of create comfortable learning and teaching conditions to boost teachers and students' morale, reverse the prevailing negative attitudes towards school, and guarantee the contribution of all stakeholders in the process of reform.

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Appendix

Student Questionnaire

Information and Communication Technology (ICT) in Education

This questionnaire aims at assessing students' use of information and communications technology (ICT) in education in Morocco. The questionnaire is administered within the framework of a research study conducted in a master program at SMBA University, Fez. The research study seeks to examine how ICT can improve student performance and achievement by eliciting their views, attitudes and expectations.

If you don't understand a word or a question, please ask your teacher, supervisor, or friends for help; otherwise, send me an email and will be more than happy to answer any questions that you may have.

All responses will be held in strict confidentiality and will be used only in the processing of statistics.

Thank you for your help and for your valuable time

Section 1: Background

1. Age: ☐ Less than 18 ☐ 18 ~ 25 ☐ 25 ~ 30 ☐ More than 30

2. Sex: ☐ Male ☐ Female

3. Level of education: ☐ High school ☐ University ☐ Graduate
☐ Other (please specify) ……..

4. Major field of study (specialization), if any: ……..

5. Parents' level of education: ☐ None ☐ Elementary school ☐ High school
☐ University ☐ Graduate

6. Parents' annual income in thousand Dirhams:

☐ -20,000 ☐ 20,000 ~ 40,000 ☐ 40,000 ~ 80,000 ☐ 80,000+

7. Area of residence: ☐ Rural ☐ Urban ☐ Suburban

8. Where is your school/university located?

☐ Major city ……. ☐ Small city …… ☐ Village ……

Section 2: Computer Equipment/Literacy

9. Do you use computers? ☐ Yes ☐ No (if no, please move to Q. 20)

10. Do you have your own computer? ☐ Yes ☐ No

11. Where do you usually use the computer? (please check all items that apply)

☐ Home ☐ School or university ☐ Computer club

☐ Cyber space ☐ Other (please specify) ……...

12. How often do you use the computer?

☐ Every day ☐ Several times a week ☐ Several times a month

☐ Several times a year ☐ Almost never

13. What purposes do you use the computer for? (please check all items that apply)

☐ Office packages (word processing, presentations, spreadsheets, etc.)

☐ Graphics packages (drawing, image retouching, etc.)

☐ Programming

☐ Computer games

☐ Web design

☐ PC Dictionary/Encyclopedia

☐ Others (please specify) ……..

14. When you use the computer, do you need someone (e.g., teacher, assistant …) to be around to help you?

☐ Not at all ☐ From time to time ☐ Almost always

15. Do you have access to the internet?

☐ Yes ☐ No (if no, please move to Q. 20)

16. Where do you usually access the internet? (please check all items that apply)

☐ Home ☐ School / University

☐ Internet Café ☐ Others (please specify) ……..

17. How many hours a week do you use the Internet?

☐ 1 ~ 3 hours a week ☐ 4 ~ 10 hours a week ☐ More than 10 hours per week

18. What purposes do you use the Internet for?(please check all items that apply)

☐ Research and homework

☐ Sending / receiving emails

☐ Participation in chat rooms and discussion boards

☐ Online-shopping

☐ Ordering, reading, and downloading books, articles, etc.

☐ Entertainment (e.g., playing games, downloading and listening to videos, etc.)

☐ Others (please specify) ……..

19. With whom do you communicate most over the Internet? (please check all items that apply)

☐ Other students ☐ Teachers and staff

☐ Friends, family, and acquaintances ☐ Others (please specify) ……

Section 3: Attitudes

20. To what extent would you (dis)agreee with the following statements? Please select one level of (dis)agreement for each statement to indicate your answer.

SD: Strongly Disagree, **D**: Disagree, **U**: Undecided, **A**: Agree, **SA**: Strongly Agree

	SD	D	U	A	SA
I enjoy using the computer.					
I believe that it is very important for me to learn how to use a computer.					
I believe that the more often teachers use computers, the more I will enjoy school.					
I feel comfortable and confident working with a computer.					
I would work harder if I could use computers more often.					
I think that it takes a long time to finish when I use a computer.					
Working with computers makes me nervous.					
I can learn more from books than from the internet.					
I feel frustrated when I want to use a computer.					
Computers are necessary in life.					
I enjoy lessons on the computer.					
The computer is addictive and enslaving.					
The computer improves the overall quality of education.					
I will be able to get a good job if I learn how to use a computer.					

21. What do you think is the most appropriate metaphor for the Internet? (please check all items that apply)

☐ An information-Highway ☐ A reference library

☐ A garbage pin ☐ An overcrowded place

Section 4: Socio-Cultural Environment and ICT Use

22. Is there a multimedia room in your school? ☐ Yes ☐ No (if no, please move to Q. 26)

23. How many hours a week do you use the multimedia room at your school?

☐ 0 hour ☐ 1 ~ 2 hours ☐ 3 ~ 5 hours ☐ More than 6 hours

24. Have you taken classes or attended workshops to learn more about using ICT?

☐ Yes ☐ No

If yes, please indicate the name, time, and place of the course and/or workshop .

……
……

25. How do you use the multimedia room? (check all items that apply)

☐ Individually ☐ In pairs and groups

☐ With the teacher ☐ Other (please specify)……

26. Most teachers think that computers are:

☐ A useful tool ☐ A useless tool ☐ Both a useful and useless tool

27. If most teachers do not use ICT in their teaching, what, do you think, are their reasons?

(check all items that apply)

☐ Lack of familiarity with ICT ☐ Dislike / fear of ICT

☐ Lack of adequate educational software ☐ Lack of sufficient equipment and facilities

☐ Other (please specify)……..

28. When you are using the computer, your parents believe you are: (please check only one answer)

☐ Chatting and playing games ☐ Listening, watching, downloading videos

☐ Doing homework ☐ Reading and/or writing

☐ Other (please specify) …….

29. To what extent would you (dis)agree with the following statements? Please select one level of (dis)agreement for each statement to indicate your answer.

SD: Strongly Disagree, **D**: Disagree, **U**: Undecided, **A**: Agree, **SA**: Strongly Agree

	SD	D	U	A	SA
The Internet facilitates and increases communication with family and friends.					
The Internet leads to a globalization of culture(s).					
The Internet discriminates against minority cultures					
The Internet leads to the domination of Western cultures					
The Internet opens up new possibilities of self-representation to local cultures.					
The Internet unites the world.					
The Internet widens the gap between the rich and the poor					

30. Please select one level of (dis)agreement for each statement to indicate your answer.

SD: strongly disagree, **D**: disagree, **U**: Undecided, **A**: agree, **SA**: Strongly Agree

I feel confident that I could …

	SD	D	U	A	SA
… copy and paste selected material from one document to another					
… use a word-processor					
… use email					
… send email to several people at once					
… send email with document attachment(s).					
… use an internet search engine (e.g. Google) to find Web pages					
… bookmark web sites so as to keep track of updates					
… use the computer to create a slideshow presentation (e.g. PowerPoint)					
… create edit graphics for multimedia presentation or Web pages					
… create my own website.					

31. What is/are your greatest barrier(s) for not using the Internet? (check all items that apply)

☐ Lack of access to a computer ☐ Money ☐ Trust and privacy

☐ Disapproval of parents ☐ Language ☐ None

☐ Reliability of the information found on the Internet

Please use this space if you have any comments about this questionnaire or the topic under investigation

……
……
……
……
……
……..

Thank you very much for your help and valuable time

Teacher Questionnaire

Information and Communication Technology (ICT) in Education

This questionnaire aims at assessing teachers' application of Information and Communications Technology (ICT) in teaching and learning in Morocco. The questionnaire is administered within the framework of a research study conducted in a master program at SMBA University, Fez. The research study seeks to examine how ICT can increase teacher effectiveness and improve student achievement by eliciting their views, attitudes and expectations.

All responses will be held in strict confidentiality and will be used only in the processing of statistics.

Thank you for your help and for your valuable time

Section 1: Background

1. Age: ☐ -25 ☐ 25 ~ 35 ☐ 26 ~ 45 ☐ 46 ~ 55 ☐ 56+

2. Sex: ☐ Male ☐ Female

3. How many years have you been teaching?

☐ 0 ~ 1 ☐ 2 ~ 5 ☐ 6 ~ 9 ☐ 9 ~ 15 ☐ 16+

4. In which of the following setting(s) do you currently teach? (Check all items that apply)

☐ Primary school (1-6) ☐ Middle school (7-9)

☐ High school (lycée) ☐ University

☐ Specialized school of higher education ☐ Language center

☐ Other (please specify)…….

5. What status do you have in your institution?

☐ Language teacher-full time ☐ Language teacher-part time

☐ Pre-service teacher ☐ Technical media instructor

☐ Supervisor ☐ Other (please specify)…….

6. How many hours per week do you currently teach?

☐ 0-5 ☐ 6 ~ 10 ☐ 11~ 15 ☐ 16 ~ 20 ☐ 21+

7. Which is the highest degree you hold?

☐ DEUG ☐ Licence / BA ☐ DEA, DESA, DES(S)/MA

☐ Doctorate / PhD ☐ Language teaching certificate

8. Where is the institution where you teach located?

☐ Major city ……. ☐ Small city …… ☐ Village ……

9. Area of residence: ☐ Rural ☐ Urban ☐ Suburban

Section 2: Computer Equipment/Literacy

10. Do you use computers? ☐ Yes ☐ No (if no, please move to Q. 18)

11. Do you have a personal computer? ☐ Yes ☐ No

12. Where do you usually use the computer? (Please check all items that apply)

☐ Home ☐ School or university

☐ Cyber space ☐ Other (please specify) ……...

13. How often do you use the computer?

☐ Everyday ☐ Several times a week ☐ Several times a month

☐ Several times a year ☐ Almost never

14. Do you have access to the Internet? ☐ Yes ☐ No (if no, please move to Q. 18)

15. Where do you usually access the Internet? (please check all items that apply)

☐ Home ☐ School / University

☐ Internet Café ☐ Others (please specify) ……..

16. How many hours a week do you use the Internet?

☐ 1 ~ 3 hours per week ☐ 4 ~ 10 hours per week ☐ 10+ hours per week

17. With whom do you communicate most over the Internet? (please check all items that apply)

☐ Other teachers ☐ students and administrative staff

☐ Friends, family, and acquaintances ☐ Others (please specify) ……

Section 3: Attitudes

18. What do you think is the most appropriate metaphor for the Internet? (Check all items that apply)

☐ An information-Highway ☐ A reference library ☐ A garbage pin

☐ An overcrowded place ☐ Other (please specify) ……..

19. To what extent would you (dis)agree with the following statements? Select one level of (dis)agreement for each statement to indicate your answer.

SD: Strongly Disagree, **D**: Disagree, **U**: Undecided, **A**: Agree, **SA**: Strongly Agree

	SD	D	U	A	SA
The Internet facilitates and increases communication with family and friends.					
The Internet leads to a globalization of culture(s).					
The Internet discriminates against minority cultures					
The Internet leads to the domination of Western cultures					
The Internet opens up new possibilities of self-representation to local cultures.					
The Internet unites the world.					
The Internet widens the gap between the rich and the poor					

20. To what extent would you (dis)agreee with the following statements? Please select one level of (dis)agreement for each statement to indicate your answer.

SD: Strongly Disagree, **D**: Disagree, **U**: Undecided, **A**: Agree, **SA**: Strongly Agree

	SD	D	U	A	SA
I enjoy using the computer.					
I believe that it is very important for me to learn how to use a computer.					
I believe that the more often I use computers, the more students will enjoy school.					
I feel comfortable and confident working with a computer.					
I would work harder if I could use computers more often.					
I think that it takes a long time to finish when I use a computer.					
Working with computers makes me nervous.					
I can learn more from books than from the internet.					
I feel frustrated when I want to use a computer.					
Computers are necessary in life.					
I enjoy lessons on the computer.					
The computer is addictive and enslaving.					
The computer improves the overall quality of education.					
I will be able to get a good job if I learn how to use a computer.					

Section 4: ICT Training and Experience

21. Have you received any (pre-service or in-service) training on using ICT in teaching?

☐ Yes ☐ No

22. To what extent did your degree program prepare you for teaching with ICT?

☐ Well prepared ☐ Somewhat prepared ☐ Not sure

☐ Somewhat unprepared ☐ Extremely unprepared

23. How many courses did you take in your pre-service training that focused on using ICT for teaching?

☐ 0 ☐ 1 ~ 2 ☐ 3 ~ 4 ☐ 5 ~ 6 ☐ 7+

24. Have you taken classes or attended workshops to learn more about using ICT in teaching?

☐ Yes ☐ No

If yes, please indicate the name, duration, and place of the course(s) and/or workshop(s).

……
……

25. Which of the following is your main source of knowledge about ICT?

☐ Journals ☐ Professional conferences ☐ Listservs ☐ University courses

☐ Public libraries ☐ University libraries ☐ Colleagues ☐ Websites
☐ Other (please specify) ……..

26. Select one level of (dis)agreement for each statement to indicate your answer.

SD: strongly disagree, **D**: disagree, **U**: Undecided, **A**: agree, **SA**: Strongly Agree

I feel confident that I could …

	SD	D	U	A	SA
… use a word-processor					
… use email					
… send email to several people at once					
… send email with document attachment(s).					
… use an internet search engine (e.g. Google) to find Web pages					
… bookmark web sites so as to keep track of updates					
… use the computer to create a slideshow presentation (e.g. PowerPoint)					
… create edit graphics for multimedia presentation or Web pages					
… create my own website.					
… create a database of information about important authors in a subject					

Section 5: ICT in Education

27. Is ICT encouraged at your school?

☐ Hardly encouraged ☐ Adequately encouraged ☐ Strongly encouraged

28. How long have you been using ICT in teaching?

☐ Never ☐ 1 year ☐ 2 ~ 5 years ☐ 6 ~ 10 years ☐ 11 ~ 15 years ☐ 16+ years

29. How confident do you feel using ICT in teaching?

☐ Extremely confident ☐ Somewhat confident ☐ Not sure
☐ Somewhat unconfident ☐ Extremely unconfident

30. Does your school offer incentives for teachers who develop ICT materials?

☐ Always ☐ Sometimes ☐ Never

31. What are the computers at school used for?

☐ Didactic use by teachers, such as to make teaching materials

☐ Communication purposes

☐ Administrative purposes

☐ Classroom use by students

32. How would you describe the ICT resources and facilities at your disposal (at work or at home) for applying ICT in your work and development?

	Unsatisfactory	Satisfactory	Good	Excellent
-Computing facilities:				
-Networking facilities:				
-Software support:				
-Technical support:				

33. Does your institution provide you with a computer that you can use at work or at home?

☐ Yes ☐ No

34. Place numbers in each of the boxes to rank the factors which you consider most significantly contribute to the use of ICT in teaching and learning.

☐ Provision of computer facilities

☐ Level of institutional interest in ICT

☐ Level of interest of key personnel

☐ Support from the administration

☐ Realistic expectations by the administration

☐ Other (please specify) …….

35. Do you think the introduction of computers has modified the teacher's role? If so, in what way?

……
……

36. In what way does your institution support ICT activities, if any? What else could be done to encourage and support the development of ICT materials?

……
……

37. People say that an information gap exists between those who use ICT and those who do not and that an inequality results, namely the 'digital divide.' Do you perceive such a gap around you?

☐ Yes ☐ No

If yes, please describe ……..

……..

38. Do you think that ICT education at school helps overcome the digital divide?

☐ Yes ☐ No

Please explain how……

Thank you for your help and for your valuable time