Preface

The massive and exponential spreading of digital equipment during last two decades has greatly influenced human way of living. As never before it has been possible to get, to manage and to share any kind of information by means of little, handy and relatively cheap instruments, like mobile phones and smartphones. Furthermore, the digital structure of information, made of thousands and millions of bits, independent each other, and the Internet with its social networks, led people to easily develop the features of “personal authoring for information and its wide spreading”; as a consequence anyone has been persuaded that information could be acquired, stored, modified, and suddenly made available as new information.

The evidence for the above statements can be easily found in recent events like the Muslim spring, or Arab spring: notwithstanding the difficulties still evident in the societies of Northern Africa and Middle East in fact, the wishes and aspirations of those people may never become a collective desire and lead to the request of profound social changes, whether digital instruments, digital communication and the Internet were not available.

The target of a global communication, which looked easy and possible without bulky and expensive equipments and with less or no skills and competences, induced many people to think that a new season for the participation in democratic life was now available and new digital literacy, developed in a personal and intuitive way, was finally possible.

The same result is implicitly included in Prensky (2001) definitions, and especially in the separation he proposes between “digital natives” and “digital immigrants.” The formers, born in a context populated of a multitude of digital equipments, develop an intuitive and personal interaction with the new instruments, and are able to use them without being forced to think about their structure and functioning.

The main conclusion from what has been reported until now is that some kind of information, especially that made of sounds, images and movies, can be today easily managed by people, who capture them from the environment they are immersed in, and make them available to others with the simple transmission on social networks.

These behaviours and the undertaken actions, on another hand, do not exclude many and profound consequences for mankind; at least, they solicit questions on the connection between new and traditional features, skills and competences in human subjects, like the following ones:

- What skills and competences are needed in today society, to be better citizens and to easily adapt to its continuous changes?
- How much “new competences,” and digital competences among them, are connected to more traditional ones?
• What literacy are needed in formal and informal education to help people better learn and develop the competences needed in the knowledge society?
• What role must play school, at all levels of education, to help people hit the targets suggested above while changing its connection with knowledge and education?

No complete and final answer has been given until now to any of the former questions, probably for the cross-disciplinary features of the underlying problems.

Some attempts have been made to propose possible solutions, first from computing scholars and soon after from researchers and scientists in other different fields.

Computing scientists have long questioned on the topics to be included in education to let students be more clever and able in solving different kind of problems; they also made great efforts to analyze human-computer interaction and the influence of computing on human thinking, and they are still working on these fields to make computers better and better. As regards the relation between computer and education they are today mainly focused on computer education and computing curricula, while many other institutions and organizations are debating on more general topics like the computing core topics to be included in school curricula and the digital competences to be developed in the youth and for lifelong learning.

Historically speaking, the first step in the proposal of instruments and methods for the development of suitable computing knowledge, and consequently for the improvement of personal knowledge, has been the definition of new literacy, i.e. computing, IT and ICT literacy. The main idea supporting those definitions suggested that people could develop new learning strategies and use the new digital instruments while learning the basic elements of information technology.

On this side, many associations of Computer Professionals, like AICA in Italy and CEPIS in Europe, developed since 1997 special curricula: ECDL syllabus (European Computer Driving Licence) and EUCIP syllabus (European Certification of Informatics Professionals), to let people get the certification concerning the basic knowledge and skills for personal computing or for network management.

Different hypotheses and suitable proposals were developed by other institutions all over the world on this side.

The Committee on Information Technology of the Computer Science and Telecommunications Board in the US National Research Council (1999), published the report “Being fluent with Information Technology,” by which educational institutions were explicitly invited to propose special training activities to the students, on the abilities specifically needed for the information society.

The Association of College and Research Libraries (ACRL 2000) proposed a definition for the information literacy: “the group of skills needed for individual development in modern-day societies” and described the features of these skills.

The UNESCO (2002), on another hand, defined media education as the education allowing people to develop the understanding of the means of communication in the society they live, and settled the skills needed to use these means in relation to others. UNESCO, first among the organizations proposing instruments and methods for a new literacy, considered these skills an essential part of the civic training.

For the ETS (2002), the ICT literacy has the following meaning: “digital technology, communications tools, and/or networks, to access, manage, integrate, evaluate and create information in order to function in a knowledge society.”

The basic differences between the above proposals have been grouped in the following two categories by M. Tornero (2004):
• **Scope:** The ACRL proposal refers to information management in general, regardless of the means through which it may be accessed; UNESCO refers to the means of communication in a broader sense; ETS confines itself to digital means;

• **Framework of applicability:** UNESCO makes its proposal within a framework of democratic society, and therefore within a collective context; the ACRL and the ETS make their proposals within the framework of individual competence, which is cognitive and technological.

More recently a great attention has been devoted to the impact that new technologies have on mankind, when passing from the discussion on how people use digital resources and processes, to the analysis of what they must know and be able to do with technologies.

The shift in the focus attention, from a discipline centered paradigm to a human centered paradigm, implies the growing of the interest of scientific community for the development of individual competences, which are seen as active involvement of subjects in their interaction with reality, and people knowledge and skills are considered much more important than the knowledge of instruments and processes (Le Boterf, 1990).

On this side a great effort has been made by European Institutions to define the basic skills and competences for lifelong learning, which are considered essential to be the citizens in the European “knowledge society.” The result of this effort has been a recommendation for all countries belonging to the European Community, by which the set of key competences has been settled; digital competences, the fourth among them, are considered especially important because of their cross cultural features with respect to language (reading/writing) and calculus competences (Council of European Parliament 2005).

The definition reported in the recommendation of the European parliament states that digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.

In other words digital competence requires a sound understanding and knowledge of the nature, role and opportunities of IST in everyday contexts: in personal and social life as well as at work. The skills needed include: the ability to search, collect and process information and use it in a critical and systematic way, assessing relevance and distinguishing real from virtual while recognising the links. Individuals should have skills to use tools to produce, present and understand complex information and the ability to access, search and use internet-based services; they should also be able to use IST to support critical thinking, creativity and innovation.

It must be noted that the opinions and statements by computing scientists and public institutions reported until now, mark the evolution of “thinking about IT/ICT” when passing from “teaching IT/ICT structure and functioning” to “teaching in a proficient way how to use IT/ICT.” The possible last step on the way of the connection between human knowledge and IT/ICT is the “teaching-learning in a world populated of IT/ICT,” where it is clear that the use of digital technologies influences human way of learning and building new knowledge. On this side new meanings are emerging for digital literacy and digital competence, and we’ll report in what follows the proposals of the scientific community at least from two different perspectives: by the organization sciences and by the human and social sciences.

As regards the first viewpoint, digital literacy and competence are strictly connected with the application of the ideas, instruments and methods of knowledge management, both in corporate and organizations and in the subjects belonging to them.
The deep changes in knowledge construction phenomena evidenced in the knowledge management practices induced to think that suitable instruments and methods could be used to help students in the creation of an ecology of information and in the successful use of technology for the building of new knowledge. This strategy has been called Personal Knowledge Management (PKM).

The term PKM was first introduced in 1999 in two North American Universities (Sorrentino, 2008): UCLA (University of California at Los Angeles) and Millikin University (in Decatur). The two places assigned different meanings and perspectives to PKM also if they essentially agreed on some key features for it.

At UCLA, in the Anderson School of Management, professors aimed at the creation of a program for their MBA students, it had to help students to face the information explosion that the Internet was producing. The main aim of the PKM program was to teach students some basic Knowledge Management principles and their application, like using computer-based tools; students would then acquire a mindset and a methodology enabling them to process information and transform it into knowledge. The training for PKM concentrated around five tasks:

- Searching/finding
- Categorizing/classifying
- Naming things/making distinctions
- Evaluating/assessing
- Integrating/relating

At Millikin University PKM was better viewed as based on a set of problem solving skills that have both a logical or conceptual as well as physical or hands-on component. The program, as defined at Millikin University, consisted of seven “information” skills:

- Retrieving information
- Evaluating information
- Organizing information
- Collaborating around information
- Analyzing information
- Presenting information
- Securing information

These skills were, and still are, thought capable of the improving of individual’s performances and of intrapersonal/interpersonal relationships.

It has to be noted that special tools are integral part of PKM because of the need of the technological support for enacting this discipline. Furthermore, several changes intervened in recent years to amplify the above set of skills. For instance, sharper skills are today required to exploit the new generation of “super-search engines,” to manage the new media, to access qualified information (less ranked by authorities, and more by crowds) etc.

Among the most used tools for PKM there are: new aggregators, feeds, blog engines, metadata creation tools, multimedia management tools, mind mappers, concept mappers, tools for voice and video conferencing, personal schedulers, web assistants etc.
The pioneers of PKM stated that the development of skills for creating and maintaining “personal” knowledge is not a casual activity. Skills can be taught in an academic environment, they can be instigated and facilitated in an enterprise environment but, in all cases, an act of self-responsibility on the part of the individual is fundamental and necessary. As a result PKM requires a continuous investment in time and resources by people who decide to adopt them.

On the side of human and social sciences two main positions must be reported, both involving the constructivist psycho-pedagogical paradigm.

First, the interactivist followers applied the ideas of Piaget and Ausubel, and suggested that digital equipments can be used to solicit the highest way of thinking in children and more generally in people, that is to construct mental models for the understanding of the world. S. Papert (1991), probably the best known among them, invented the term “constructionism” for the description of the human way of knowing and interpreting phenomena and created special instruments to give concreteness to the above idea; the graphics programming Logo language, the better known product by Papert, has been used in many experiences all over the world to teach pupils the basic ideas of computer programming and the algorithmic way of problem solving. Otherwise stated, digital literacy and the development of digital competences are the natural requisite for new ways of learning and interpreting phenomena.

On another hand the socio-constructivist followers, started from the local and situated learning experiences involving the use of digital equipments, to state how important these equipments could be to induce collaborative learning and to create communities of learning, by stimulating communication among subjects and peer-to-peer learning among the members of the community.

In this last case the author’s experience with students in a Faculty of Humanities attending the course of Latin Paleography, can be useful to understand the different perspectives by which phenomena can be explored and discussed (Cartelli, 2005). The different viewpoints emerging from the studies carried out can be synthesized in the following statements:

1. The communities of students involved in the use of information systems for teaching and research had all the features of CoLs or FCL as described by Brown and Campione (1996). Some new features never observed before were also detected in the students’ skills: working in a group (in traditional paleography courses it is a very rare experience), easier facing of complex tasks (thanks to the help each student could have from their colleagues), and raising of the individuals’ peculiarities within the community (for the orientation to specializing in doing something when people work together on a common commitment). The ICT also had a great role in the paleography teaching experiences because they helped students in experimenting a meta-cognitive environment and cognitive apprenticeship strategies, involved them in the discussion and evaluation of the procedures they took part in, and let them experiment meaningful learning.

2. The same communities of students had many features of the communities of practice (CoPs). With respect to the corresponding communities in organizations and corporations, which are autonomously created and have no hierarchies, the presence of a hierarchical structure has to be noted (professors and their collaborators organize the work, suggest what to do, support everyday activity, etc.). Further differences between groups of students and CoPs are: (a) community skills are mostly induced/transmitted by professors and not freely shared among individuals, (b) community memory is not made of the repositories of expertise but it is made of the data in the databases (i.e., it is mostly represented by the scientific knowledge available from sites browsing and database querying).
Nevertheless, the groups of students can be considered CoPs because (a) there is a common task shared among all community members, (b) there is a reciprocal commitment regulating interactions and sharing of experiences among the subjects in the community, (c) there is a shared repertoire of knowledge, instruments and methods by means of which common knowledge is preserved and transmitted (Wenger, 1998).

3. At last, the groups of students involved in the teaching of paleography, based on the use of special information systems, had the features of virtual communities. This conclusion emerged from the collaboration of many national and foreign scholars, who worked on the systems via the Internet, and usually did not know the students involved in the project. Nonetheless their contribution were very important for students and for the construction of the community memory. As soon as the students became familiar with the digital instruments and the information systems they were able in participating in community discussions and work on the documents to be analyzed.

It has to be noted that the different contexts of application for the considerations reported until now, mostly coming from the fields of high and adult education, had their counterpart on schools experiences, at all levels of education and all over the world. In Italy they inspired many experiments funded by the Ministry of Education, on the introduction of IWB (Interactive Whiteboards) in the classes and on the construction of new learning experiences (some names for the corresponding education projects were innovate-school, innovate-teaching, classes 2.0 etc.).

Furthermore, as usually happens, the experiences carried out in the schools are still limited to the role of experiments and do not influence everyday teaching in a more structured and articulated planning and practice of teachers’ work; nonetheless teachers perceive the need of changing the strategies to be adopted at school to let it be less distant from the students’ life experiences.

The complex situation today present at school has been well synthesized by L. Galliani (2004), who has proposed an integrated model for the use e-learning strategies at school; in his model web based learning (WBL) and computer mediated communication (CMC), both have an important role and determine the development of knowledge, skills and competences in the students. The contexts they produce and the experiences they can induce lead to a wide panorama of possible educational environments where information processes, knowledge processes and learning processes have different complexity depending on the involvement of technology use (see Figure 1).

The problems and the experiences reported until now and the attempt to answer the questions formulated formerly, resulted in the writing of this book, where the issues discussed and the proposals of the different authors induced to create five different sections.

The first section is devoted to the analysis of the links and connections between digital literacy and culture. The second section discusses the evaluation and development of digital literacy in students, teachers, professors and more generally in adults; the proposal of technological environments for the development of digital competences in students, the digital experiences from teachers in their training courses and the difficulties in the use of digital equipments in university students are only some topics among the ones discussed in this section. The third section looks at the connection between digital technologies, blended learning and reflecting competences. The fourth section focuses on digital technologies and digital competences for education in the attempt of discussing the finding of new fields of application for them and the fifth and last section reports of different experiences on digital technologies and literacy.

In what follows the different section are analyzed with a special attention to the explanation of the contribution by the different authors.
Section 1 begins with *Beyond Babel: Multiliteracies in Digital Culture* by Monica Fantin. The paper highlights the importance of the concepts of media literacy, and digital and informational literacy, to understand the multimodal meaning of multiliteracies and their interfaces. An analogy with Babel is used to help understand the different ways that this concept articulates the linguistic, visual, audio, spatial, and gestural dimensions in digital culture. In this context learning experiences in formal and informal environments are discussed. The concept of personal literacy is also presented in order to state the importance of subjectivity in the interactions that the multiliteracies offer. At last a diagram that highlights the importance of mediation and the forms of appropriation that express concepts and experiences in search of a transformative pedagogical practice is reported to understand the multiliteracies as a condition of dialog, expression and participation in the culture.

Chapter 2, by Karin Tweddell Levinsen, Birgitte Holm Sørensen, titled *Formalized Informal learning – ICT and Learning for the 21st Century*, reports research in a fluid context, the everyday school experience. In their study emerging new performances and uses of ICT are observed and provide the opportunity to study the relation between network society competences, learners’ informal learning strategies and ICT in formalized school settings over time. Longitudinal research-projects into social practices are both subjects to and capture changes in society. The study has found that aspects of ICT such as multimodality, intuitive interaction design and instant feedback invites an informal bricoleur approach. When integrated into certain designs for teaching and learning this allows for what the authors call *Formalized Informal Learning* and find support for network society competences building.

Chapter 3, by Tony Jewels & Rozz Albon, *Reconciling Culture and Digital Literacy in the United Arab Emirates*, starts by analyzing the effort the United Arab Emirates made to take a prominent role in introducing e-business initiatives throughout the Gulf region; this effort was translated into widespread access of the Internet technology for their citizens, under the hypotheses that:

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**Figure 1. Structure of the technological educational environments teachers can use at school**

![Diagram](image-url)
• Appropriate e-business frameworks and infrastructures needed such instruments and suitable competences for people,
• Regular exposure to the Internet does contribute to gaining these necessary 21st century skills, although, it is not the only means of acquiring digital literacy.

It might be expected that with such widespread access to the Internet the population would become digitally competent, but an ethnographic case study methodology carried out by the authors shows that a new form of digital divide limiting the acquisition of such digital skills can be detected.

Section 2 starts with Transformation of Individual Learning through Informatics and Information Technology Activities in Primary School by Valentina Dagiene and Vaiva Grabauskiene. The authors analyze the support to individual learning both from the technological and pedagogical sides. Their starting point is the creation of natural learning environments, which are naturally inter-disciplinary. They propose the use of digital technologies for the personalization of learning, to interdisciplinary combine the content of close concepts. The paper deals with basic concepts of interdisciplinary content analysis – informatics and information technology impact to an individual learning in primary school.

Chapter 5 was written by Antonio Cartelli and Angela Di Nuzzo, and titled Digital Literacy and Competence in Students Attending a Faculty of Humanities. The paper aims at discussing and verifying the contradictions reported in former studies, on the behaviors of students at different stages of schooling when using digital equipments. First of all the behaviors and the tendencies in the use of digital technologies by university students are discussed. Soon after the model for digital literacy structure and assessment is reported. At last an investigation on university students is described and the results emerging from the analysis of their answers is discussed. The survey has been submitted to 331 students in a Faculty of Humanities, and the students’ answers have confirmed the presence of a contradictory reality: digital technologies are mainly used to communicate in social networks or to play music and movies, not to manage information concerning the topics to be studied, but it is evident the students’ interest for the most recent aspects of the application of digital technology and for the improvement in the quality of their use.

Chapter 6, Transformation of Individual Learning through Informatics and Information Technology Activities in Primary School, by Valentina Dagiene, deals with the information and communication technology (ICT) competency needed by teachers for effective teaching in the 21st century. It first aims at the analysis of the existing pre-service education programmes for teachers’ ICT competency in Lithuanian universities and colleges, soon after it reports strategies for self-evaluation of future teachers technological and pedagogical ICT competency, and at last compares the results with the course requirements for the teachers’ educational ICT literacy, based on the existing Lithuanian requirements for teachers’ pedagogical ICT literacy programmes. The paper is based on the data of the research study “Teachers’ Training on ICT Application in Education” developed by the Institute of Mathematics and Informatics in 2009. Conclusions and recommendations for the study are proposed to implement deeper content-based modules for pedagogical ICT competency and skills in all-level pre-service teacher education as well as in-service training courses.

In chapter 7, Antonella Nuzzaci writes on Technological Literacy in the Profile of Skills of University Professor in the New European Higher Education System. The paper first describes the requirements of the European Higher Education Area (EHEA) - international and cross-cultural, Information and Communication Technologies (ICTs), that appear increasingly important in all fields of university studies. From the analysis of the literature review it emerges that, despite the considerable attention focused on
the technological know-how of university teaching, few studies examine these elements. Educational research in the field of ICT is in fact mainly devoted to the design of digital systems.

The paper aims at focusing on professors, by defining the technological skills necessary to develop the new European System of Higher Education, in order to facilitate the development of skills, general learning, disciplinary, and professional digital education. To hit this target the paper highlights the three perspectives guiding university education: the integration and use of new educational technologies in universities, the European convergence and application of ICT, the innovation and education needed to bridge the gap between universities and teachers facing reality, both socially and professionally. Main purpose of the study is to contribute to the debate on the interactions between academic literacy, technological skills and employment perspectives for university teachers.

Jeffrey Hsu, Zhongxian Wang, and Karin Hamilton, authors of *Developing and Managing Digital/Technology Literacy and Effective Learning Skills in Adult Learners*, start by observing how different the needs of adult learners are from those of traditional undergraduate students, and consequently hypothesizes a suitable design for adult education programs to meet this needs. In particular, as emerges from scientific literature, digital and technology literacy needs, including general computing skills, computerized communications, online and distance learning, and web 2.0 tools make navigating coursework an additional challenge aside from the content itself.

The authors’ main hypothesis for adult education experiences is based on the use of intensive weekend classroom sessions, on-line distance learning, and specialized teaching methods; an improved learning environment tailored to unique needs and career goals can be offered to business undergraduate adult students (those who are older, have substantial business experience and knowledge). An important component of the authors’ work is the development of technology and digital literacy skills, to “fill the gaps” of students who may have extensive business or working experience, but are less than proficient in the use of technology. Relevant theories and frameworks from education and psychology are used to support the techniques and methods discussed. A model of adult learner technology integration is created based on both a review of theory/relevant research and experiences gained with an adult business undergraduate program. Examples relating to specific kinds of courses and situations are also included.

Section 3 begins with authors Esther del Moral Pérez and Lourdes Villalustre Martínez, and their contribution, *Good Teaching Practice and Good Quality Indicators for Virtual and Blended Learning: Project MATRIX*. The M.A.T.R.I.X (Modalities of Telematic Learning and Inter-university Results that can be Extrapolated to Blended Learning) project identified and described the diverse teaching methods and practices applied in a representative sample of virtual and blended learning degree courses taught at different Spanish Universities using the G9 Shared Virtual Campus. The author purpose is to extrapolate the experiences considered as “good practice” in the new blended learning contexts and methodologies proposed by the EHEA, using as indicators the quality of the learning design as assessed by experts, the satisfaction level of the students taking the courses, their effective contribution to attaining specific and generic competence in different subjects etc.

Chapter 10 was written by Dimitrios Roussinos and Athanassios Jimoyiannis. *Blended collaborative learning through a wiki-based project: A case study on students’ perceptions* reports on the investigation the authors made on university students’ beliefs and perceptions of a wiki authoring activity, designed to support blended and collaborative learning. The research started from the popularity that wikis are gaining in schools and higher education institutions and from the literature promoting them as collaborative tools supporting students’ active learning. The study has been administered in the context of an authentic coursework project activity in a first semester university course on Information and Communication
Technologies (ICT), attended by 47 first year students. The authors found that the students in the sample were generally positive about the collaborative experience offered through the wiki and the consequent learning outcomes. Students’ perceptions of the functionality and usability of the wiki environment were also positive, because they considered the wiki as an effective and easy to use technology.

Antonella Nuzzaci, author of chapter 11, *Developing a Reflective Competence for a Master Level Program on E-learning: the Leonardo Project REFLECT*, reports of the effects of an activity of reflection on a group of students enrolled in the Master for Intercultural Education and European dimension of distance education, who participated in the construction of the model for a “reflection participant” and a self-evaluation tool to be used for training teachers. The teaching activity was part of the research carried out within the Leonardo da Vinci project “REFLECT” - “reflective practice for training the trainers”. Reflective Practice and VET (Vocational Education and Training), aimed at the creation of a specific methodology for the implementation of reflective practices in VET contexts and, more generally, for the acquisition of learning, so that new processes of updating and re-professionalization required by the challenges of today’s society could be started. During the experience a testing laboratory was created, it was inside the Faculty of Education at the University of Valle d’Aosta, and aimed at bringing together teaching and research functions within the higher education system; the target was hit with an experiment involving the direct training of educators and teachers, which showed how deep were the changes induced in the actors involved in the process. The main result of the study is concerned with the development, enhancement and strengthening of skills through online reflective mode, with the use of tools which determine specific reflexive patterns especially centered on the contexts.

Section 4 begins with a work by Carlo Giovannella, Claudia Di Lorenzo, Simona Scarsella, and Corrado Amedeo Presti. Their paper, *Educators’ expectations on Technology Enhanced Education (TEE): should and could they be modified?* reports and discusses the result of a survey focused on the perceptions and expectations on TEE applications, conducted among 500 Italian educators (university, high/ middle/elementary schools and professionals) involved in on-line or blended learning practices. The authors show that whether the expectations may depend on the educational level, they are quite basic: support to content sharing (78%) and production (65,5%), communication (59%), assessment (59%) and team working (59%) are at the top of rank; much less relevant appear to be items like: support to socialization, process design and personalization. The authors report also that very similar results have been obtained from a survey on schools’ teachers, novices for TEE, attending a Master in “e-learning: methods, techniques and applications.” The survey was conducted after the conclusion of the first part of the master made according to a very traditional old-fashion distance learning process: content download, self-evaluation tests, tutor assistance upon request. However, after the participation to the second part of the Master, organized as a collaborative, design inspired, problem, project and process based learning) experience, the students’ opinions on TEE changed in a fairly considerable manner, and more complex and broad-spectrum expectations on technologies emerged.

*Benefits and Risks of Social Networking Sites: Should they Also Be Used to Harness Communication in a College or University Setting?* by Angelina I. T. Kiser is chapter 13. The paper starts from the analysis of the challenges university and college professors are facing in the use of effective and efficient communication with their students. From literature revue the use of social networking sites to engage students and the U.S. 2010 Digital Year in Review (2011) appear as possible solutions to the problem, mostly because the social networking continues to grow as one of the web’s top activities with 9 out of every 10 U.S. Internet users accessing break down communication barriers. The study includes an in-depth review of the uses, benefits and risks of social networking sites as well as how they might be
utilized in a college or university setting. The researcher in this study surveyed university business students at a private, four-year, Hispanic-serving institution in Texas about their use of social networking sites and how professors might integrate these sites into the curriculum.

Francesca Cuzzocrea, Anna Maria Murdaca, and Patrizia Oliva author chapter 14: *Using Precision Teaching Method to Improve Foreign Language and Cognitive Skills in University Students*. The paper first analyzes the difficulties in learning a foreign language by high school students. It emerges that in the last few years too much emphasis has been placed on oral communication skills so that English teachers made their students speak English without paying enough attention to grammatical accuracy. As a result, the authors suggest that while students’ ability in terms of fluency has improved, they often cannot communicate appropriately in English due to a lack of grammatical knowledge. The study explores the potential of Precision Teaching software developed for the improvement of English grammar rules. Two groups were compared, one having used the software and the other following a traditional textbook-based approach. The students who used the software showed significantly higher learning scores than students who did not. In addition, after using the software students show increased scores in some cognitive abilities that are related to foreign language learning.

The final section, Section 5 begins with *Use of the Internet by Medical Practitioners in Private Hospitals in Warri, Delta State, Nigeria*, by Esharenana E. Adomi and Ericson Egbaivwie. This study was intended to explore the use of the Internet by medical practitioners in private hospitals in Warri Delta State, Nigeria. Descriptive survey design was adopted and a questionnaire was the instrument used to collect data. The sample population under analysis for the study were one hundred and thirty-seven (137) medical practitioners from thirty (30) private hospitals in Warri. The findings revealed that most medical practitioners used the Internet on a regular basis; a majority of the medical practitioners started using the Internet between 1 – 5 years ago; most of the medical practitioners spend 2 – 5 hours using the Internet per visit; a majority of medical practitioners used the Internet without assistance. Medline, journals and PubMed were the Internet resources used by most of the medical practitioners. Main results of the investigation are: a) the Internet use enable the respondents to improve patient care, keep them up-to-date; b) the high cost of the Internet access and the lack of access to the Internet by most patients were some of the problems most part of medical practitioners had to face.

The study recommends that hospital management should provide their medical practitioners with Internet facilities to enable them have access to the most recent and accurate information for effective service delivery.

Christopher Babatunde Ogunyemi, author of *Literacy and Space Technology in Nigeria*, examines literacy as it affects Space Technology in Nigeria. It explains how literacy is applied to space development and its digital importance. The paper is divided into four parts. The first section redefines literacy in order to understand the possibilities of meanings based on the perceptions of James (1984), Onukaogu (2008), Arua (2009) and Ajayi (2009) that conceptualize the complex nature of literacy and its need. The second part visualizes the role played by literacy in educating technological advancement in Nigeria, bearing in mind that in 1999, the Federal Government of Nigeria approved the Nigerian Space Policy and the implementation of the space program. As outlined in the policy, the program started with the establishment of a National Space Research and Development Agency (NASRDA), under the Federal Ministry of Science and Technology. The third section underscores the socio-economic relevance of literacy in enhancing global space technology for Nigeria while the fourth section relates Ajayi’s projection in a meta-critical manner, to see how literacy rethinks the state of the mind in enhancing excellent technology, so that Nigeria can become a world power. The theoretical framework for this paper is the
“Transformational Theory,” by which “learning occurs as a result of transformation of participation in culturally valued activities,” such as space technology. Friere (1972), Rogoff (1994), Stolle (2007) and Ikpeze (2009) define this theoretical framework by stimulating knowledge, reading and interpretation of concept to human society. The paper emphasizes practical findings to stimulate excellence and literacy relevance in science and technology.

Munir Abbasi and Lampros K. Stergioulas wrote chapter 17, Hybrid Wireless Networks for E-learning and Digital Literacy – Testing and Evaluation. The paper starts by considering how satellite communication networks are today increasingly integrated into the infrastructure of modern Terrestrial communication networks and are becoming popular for the delivery of educational content and data, as well as education-centric services, including information, tele-conferencing, entertainment or ‘edutainment’ services. With fresh demand for new services and applications, it is becoming essential that wireless network architecture should seamlessly interoperate with new and existing technologies, protocols and standards. The paper reports of recent work on the use of hybrid wireless network infrastructures for delivering tele-education and e-learning applications to remote communities, by combining a variety of satellite, terrestrial and wireless technologies, and provides the results from live scenarios carried out employing various methods of interoperability testing. The analysis of the results examines a number of different issues such as delay, jitter, packet loss, latency, throughput measurement and bandwidth. By combining satellite and terrestrial (wireless) technologies, full coverage and high capacity can be achieved for true broadband services for delivering educational content. The interoperability among such diverse networks imposes a number of challenges regarding service provision and management. The end-to-end quality of service management implies that features such as service scalability between different networks have to be available. On the other hand, wireless QoS provides a promising diversified platform for a wide range of seamless applications.

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