

Representations of ICT uses and practices of freshman university students: the case of an Education Department in Greece

MELPOMENI TSITOURIDOU, KONSTANTINOS VRYZAS

Department of Early Childhood Education
Aristotle University of Thessaloniki
Greece
tsitouri@nured.auth.gr
kvryzas@nured.auth.gr

ABSTRACT

The purpose of this research is to investigate the representations of ICT uses and practices of freshmen in the department of early childhood education of the Aristotle University of Thessaloniki, Greece. The sample consisted of 147 freshmen students. This study explores students' ICT skills, the ways in which these skills are learned and the students' perception of the usefulness of ICT in terms of their studies and future careers. The vast majority of students appear to be able to surf the net and communicate on-line, while a smaller majority can handle word processing. Almost half the students had never worked with databases or web authoring programmes. The students believe that using ICT will play an important part in their future studies and recognize the crucial role of ICT in their professional lives, regardless of their own ability to use software programmes.

KEYWORDS

Representations, ICT uses, ICT practices, university students, digital skills

RÉSUMÉ

Le but de cette recherche est d'étudier les représentations des usages et des pratiques en TIC des étudiants de la première année, du Département de

l'Éducation Préscolaire de l'Université Aristote de Thessalonique. L'échantillon se composait de 147 étudiants. Cette étude explore les compétences des étudiants en TIC, les moyens par lesquels ces compétences sont acquises et la perception des élèves concernant l'utilité des TIC en termes de leurs études et leurs carrières professionnelles. La grande majorité des étudiants apparaît capable de naviguer sur internet et communiquer en ligne, tandis qu'une minorité peut gérer le traitement de texte. Près de la moitié des élèves n'avait jamais travaillé avec des bases de données ou des programmes de création web. Les étudiants pensent que l'utilisation des TIC jouera un rôle important dans leurs études et reconnaissent le rôle crucial des TIC dans leur vie professionnelle, indépendamment de leur propre capacité à utiliser des logiciels.

MOTS-CLÉS

Représentations, utilisateurs des TIC, pratiques TIC, étudiants universitaires, compétences numériques

INTRODUCTION

Contemporary society is a society in transition, in which our actions are more and more mediated by digital technology. It is not, of course, a digital society, because this would require it to have been created through the development of digital technology. In reality, the opposite is the case. The principal actors are those who have created and developed digital technologies in order to attain their own objectives (Martin & Grudziecki, 2006).

Digital technologies are a tool for economic and social development. In the emerging knowledge society, knowledge acquires ever increasing importance in relation to natural resources (UNESCO, 2005). ICTs are regarded as a vital component in the knowledge economy because they allow automation, they provide tools for creativity, they facilitate local and global communication and support wholesale post-mandatory education and lifelong learning. Thus a population equipped with skills and confidence in the use of ICTs has a basic advantage in the contemporary competitive world. And so all governments have an interest in ensuring their educational systems provide their graduates with a satisfactory level of the relevant skills. People who fail to acquire such skills are at risk of social and cultural exclusion (Reich, 1991; Castells, 1996, 1997, 1998; Selwyn, 2004).

The ability to use ICTs with ease and confidence is seen as a necessary condition for participation in a rapidly changing world. ICT skills are vital at work, in education and in daily life. However, it is not only user skills which are so important. Attitudes

to ICTs and confidence about using them are just as, if not more, important, because they affect personal initiative and the acquisition of knowledge and other skills (Dupagne & Krendl, 1992; Cuckle, Clarke & Jenkins, 2000; Mumtaz, 2000; Tsitouridou & Vryzas, 2003; Selwood, 2005).

ICTs establish a new relationship with knowledge. They broaden access to knowledge, abolish the limits between formal and informal education and provide new educational opportunities and challenges. They contribute to an epistemological change in the concept of knowledge itself, since they transform not only the conditions of access to knowledge, but also the very nature of knowledge. The challenge for the user today is to acquire the ability to handle huge quantities of information and data. The user needs to search, to select, to classify, to analyse and to create a personal store of knowledge which will allow him to learn how to learn. Knowledge is no longer the acquiring of information, but the construction of a creative interaction with information, capable of generating new concepts of significance (Rosado & Belisle, 2006).

ICTs increase opportunities for access to knowledge, allow the development of cooperative approaches and the activation of more autonomous ways of learning (Kennewell, 2004). Increase in levels of familiarity with ICTs offers students the chance to participate in potential learning communities and experience processes of self-managed learning. Of course, relations between technology and education are not simple and one-dimensional, but complex (Watson, 2001; Loveless, 2003; Buckingham, 2007; Selwyn, 2007). We must make a distinction between the opportunities offered by ICTs and their results. Opportunities and results must not be confused (Vryzas, 2006). The results of ICT use depend on each occasion on the specific framework in which that use occurs (Reynolds, Treharne & Tripp, 2003). What is important, then, is not the tool so much as the educational environment in which we use it. There are enormous challenges for the development of pedagogically innovative practices (Kozma, 2003). We should note, however, that the question of the use of ICT in education, and particularly in early childhood education, is a controversial issue. Both positive and negative viewpoints have been formulated (Clements & Nastasi, 1993; Wright & Shade, 1994; Turbill, 2001; Siraj-Blatchford & Whitebread, 2003; Van Scoter, 2008; Mc Kenney & Voogt, 2009). However that may be, what is of interest is the way in which ICT are used (Cuban, Kirkpatrick & Peck, 2001; Buckingham, 2003).

The integration of ICT in education presupposes the acquisition of certain user skills. The definition of ICT skills is a complex matter. ICT user skills depend on the type and level of use, the level of the educational system and the personal interests of each individual. Moreover, skills will inevitably change over time, as new activities emerge and older ones disappear. In the case of university students, the relevant ICT skills are those required to meet the needs of a contemporary university course

(Haywood & Haywood, 2003).

Students arriving at university possess ICT skills which they have acquired through either formal or informal education. The purpose of this paper is to investigate the representations of ICT uses and practices of freshmen in the department of early childhood education of the Aristotle University of Thessaloniki, Greece. Specifically, we explore ICT skills, the ways in which these skills are learned and the students' perception of the usefulness of ICT in terms of their studies and future careers.

The exploration of representations of ICT uses and practices, as well as the views of students on the role of ICT in education and in their career prospects, is an important issue, insofar as it might contribute to the successful integration of ICT into university studies programs.

DEFINING ICT USES AND PRACTICES

The ability to use ICTs is regarded as a necessary condition for living and working in the information society. It involves almost all areas of daily life, from communication and leisure to education and work. However, the dynamic of digital participation has not yet been the subject of any thorough study. There has been no adequate exploration of such issues as which individuals resist an individual technology, or technology in general. How are these individuals differentiated from other social groups? How large is this group and how can it be identified within social structures? Despite the endless futurology in relation to new technology, we still know too little about the patterns of non-use of new technologies (Selwyn, 2003).

There is a lack of clarity in relation to the definition of what it really means to be able to use a computer. The technology has become so complex that no one individual can now be expected to master it in the way that it could formerly be mastered. ICTs are being disseminated more rapidly than any other technology to date. The concept of ICTs is no longer confined to computer hardware or software, or internet access, but involves a broad range of heterogeneous technologies, types of information and resources.

Technology use is regarded as a cognitive process, distributed and operating through a broader social and cultural environment (Proulx, 2001). Uses are defined socially and evolve over time. A use responds to a set of rules involving the use of an object, material or symbolic (Docq & Daele, 2003). The concept of use implies the various relations – technical and social – which are established between individuals or social groups and technical objects (Le Marec, 2001). It concerns a continuing process of definition, ranging from adoption to appropriation via use (Breton & Proulx, 2002). Uses are related to the appropriation of ICTs, which has both a cognitive and an empirical dimension, crystallized within the means of using a technique and realized for

purposes of emancipation, development or sociality. The process of appropriation requires that the user must possess a minimum level of technical and cognitive control of the object. This control must be incorporated in a creative way into the everyday practices of the user. Thus, appropriation must offer the capacity for deviation, reinvention or access to the conception of innovations (Certeau, 1990; Chambat, 1994).

Technology use requires the acquisition of a specific number of skills and level of expertise. ICT use is characterized by a technical rationality which permeates the whole communication process (Jouët, 2000). Uses are seen as social scenarios and means of dealing with situations. In this approach, uses cannot be modeled because they are, in part, invented by users (Agostinelli, 2003). The user tends to deviate from the specified uses. Real uses are not always the same as those laid down by designers or manufacturers. They evolve and may no longer match the original intention of the designer (Flichy, 1995).

Uses are also incorporated within social relations which represent the source of their production. Motivations, methods of use and the meaning attached to practices all arise from society (Jouët, 1993a). Use is seen as a social construction, associated with the evolution of lifestyles within a society (Chaptal, 2008). ICTs are not neutral, but can challenge established behaviours, because social relations are also constructed through communication practices (Jouët, 1993b).

There are four phases involved in the social incorporation of ICTs: adoption, discovery, learning and commonplace. ICTs are vehicles of an imaginaire world of representations and values which gives them a symbolic dimension and initiates both adoption and the framing of first uses, and then, in the final stage, a demystification which marks the passage to a usual, familiar object (Jouët, 2000).

Exploration of uses must involve both social relations and the creation of a social bond through digital networks. It covers a wide range of areas (Le Marec, 2004; Paul & Perriault, 2004; Perriault, 1989) and has already been the object of numerous studies (Haywood & Haywood, 2003; SPOT PLUS Project, 2003; Rae, 2004). Study of uses is related with three forms of approach: analysis of mediated communication, the social history of techniques and the sociology of different lifestyles (Proulx, 2001).

There is a huge distance between technological logic and the individual logic of use adopted by the user. Studies of use initially focused on a technological logic, ignoring the cultural logic which alone is capable of casting light on the development of mentalities within an information society. Recent studies, however, have attempted to draw links between the social and technical, to seize the symbolic dimension of the practices which drive the techniques, or to perceive uses as forms of mediation (Bélisle, Liautard & Rosado, 2006).

A distinction must be drawn between the concepts of practice and use. The latter

is more limiting and implies simple use, while practice is a more sophisticated concept which covers not only the using of various techniques but also the behaviours, attitudes and representations of the individuals related, directly or indirectly, with these techniques. We should note that most studies make no distinction, and the concepts of use and practice are confused.

The term 'use' implies a social activity consisting in the using of an object for some purpose or for the satisfaction of a need; it implies practices but also behaviours, habits or attitudes. A practice, on the other hand, is a set of established habits, specific ways of acting. Behaviour embraces the concept of practice, in part, because it comprises all the objectively observable reactions of an individual. The study of uses, as contrasted with that of practices or habits, focuses on regular patterns of behaviour susceptible of measurement and involving the way in which we make use of an object. In no circumstances should we overlook what users do to and with technologies in order to fit them into their lives. Like any other object, technological objects also have a symbolic value. They mean things to people. What is of interest, then, is the meaning people attribute to technologies, how they perceive them and speak of them (Haddon, 2005).

The theory of technological determinism ascribes a decisive role to technology. It views technology as subject to its own technical logics, which lead to inevitable results. In contrast with a deterministic approach, we should not conflate access to ICTs with use of ICTs, since access will not invariably lead to use. Likewise, the use of ICTs will not necessarily entail meaningful use for the individual (Bonfandelli, 2002).

The deterministic approach ignores the role of the user and the fact that the relationship between access to, and use of, ICTs is a complex one. Making a significant distinction between access and use, we see that once a person has acquired the appropriate conditions for access to different technologies, his failure to make meaningful use of them is not necessarily due to technological factors, or even to psychological factors, as technologists generally assert. In fact, as a range of studies have shown, individuals' engagement with ICTs is based on a complex mix of social, psychological, economic and, above all, pragmatic factors. ICT engagement is thus less a matter of access and ownership, more a matter of how individuals develop relations with ICTs and how capable they are of using the social resources which pave the way from access to use (Jung, Qiu & Kim, 2001).

Technology offers a number of 'options' or 'choices' based on individual contingencies which determine its varied impact on individual persons. Thus interaction between ICTs and individuals is not as straightforward as the dichotomy between user and non-user constructed in previous studies, and is certainly not determined exclusively by issues of physical access to technology (Selwyn, 2004).

METHODOLOGY

Our sample consisted of 147 freshmen students in the Early Childhood Education Department of the Aristotle University of Thessaloniki. Of these 97% were women and 3% men. 82.8% of the students had their own computer with internet access. Of these 26.5% had both a desktop and laptop computer, 57.8% only a desktop computer and the others a laptop. It should be noted that the overwhelming majority (98.8%) were Windows users. The research was conducted in October 2009, i.e. at the start of the academic year, so that the research data would reflect the ICT experience acquired before their university studies began.

In order to collect the data we used a questionnaire consisting of both open and closed questions and including three sections:

The first section covered the ICT skills professed by the students. The students were asked to rate themselves for their skills in the use of ten well-known software applications (word-processor, spreadsheet, email program, database, graphics program, web browser, web authoring program, presentation manager, chat program, on-line bibliographic databases). For each application a specific example of a task was given, in order to ensure the maximum standardization of the students' responses. Specifically, the students were asked if they believed they had the skills to complete the example task given in each programme, if they would need any help to perform the task or if they had never performed the task.

The second section covered the time, place and means of ICT knowledge acquisition. The students were asked when, where and how they had acquired their ICT knowledge: IT lessons in junior high school, IT lessons in senior high school, Using computers in other junior high school lessons apart from the IT lesson, Using computers in other senior high school lessons apart from the IT lesson, Computer teaching centres, Alone, Consulting books, Learnt from friends, Learnt from parents, Learnt from older siblings. Also students were asked if they have got ECDL qualification (European Computer Driving Licence). Additionally students were asked about: the place and the frequency of computers use for course work during their time at senior high school, the type and frequency of the internet practices for personal or recreational purposes (e.g. online communication, downloading music files, game playing) at the start of their university studies.

The third section refers to the perceived usefulness of ICTs in relation to the students' courses and professional prospects: Students were asked about the importance they attach to the use of technology on their university studies and on their future careers as teachers (not important at all, barely important at all, have no opinion, fairly important, very important). Finally students were asked about self-confidence in their skills to use ICTs in their university studies.

The questionnaire was based on those used in European studies to explore uses, attitudes and views of European students in respect of ICTs (SEUSSIS-Surveys of European Universities Skills for ICT for Staff and Students; SPOT PLUS- Survey Students' Perspective On Technology in Teaching and Learning in European Universities -Participation and Learning of University Students) (Haywood & Haywood, 2003; SPOT PLUS, 2003). It should be noted that basing our own questionnaire on those used in the aforesaid studies allowed us to compare a number of the results.

RESULTS

ICT skills

From a reading of table I we can discern four groups of software in which the students have similar (near) skill levels. The first group contains the web browser, the chat programme and the word processor. In this group the great majority of subjects are able to perform the tasks alone (78.6%, 73.7% and 65.7% respectively) while only a very small percentage have never carried out the tasks (7.1%, 7.1% and 5.1% respectively).

The second group features the e-mail programme and the spreadsheet. Here almost half the students (51.5% and 46.5% respectively) perform the tasks unaided, while the others are divided almost equally between those who would need some help and those who have never performed the tasks (29.3% and 19.2% for the e-mail programme and 26.3% and 27.3% for the spreadsheet).

The third group contains the graphics programme, presentation manager and on-line bibliographic databases. Here the students are divided almost equally into high, medium and low skill levels (38.8%, 28.6% and 32.7% in the graphics programme, 39.8%, 24.5% and 35.7% in the presentation manager and 36.4% , 30.3% and 33.3% in the on-line bibliographic databases).

The fourth group includes the database software and web authoring programmes. Here the majority of the students have never performed the tasks alone (48.5% and 48.5%), while only a small percentage (15.2% and 9.1% respectively) have performed the tasks unaided.

ICT skills are correlated to PC ownership in the following applications: word processor ($p=0.000$), spreadsheet ($p=0.003$), database ($p=0.000$), presentation manager and graphics programme ($p=0.000$), (correlation is significant at the 0.001 level). By contrast, the ownership of a computer does not seem to be related to ICT skills in the other applications.

TABLE 1

<i>Skills in use of software programmes</i>			
Software applications	I can do the task myself (%)	I would need some assistance to perform the task (%)	I have never performed this task (%)
word-processor e.g. to create a well formatted paper	65.7	29.3	5.1
spreadsheet e.g. to design a new sheet & enter simple numerical data	46.5	26.3	27.3
email program e.g. to send an attached document or image	51.5	29.3	19.2
database e.g. to create a new database of your own with simple text entries	15.2	36.4	48.5
graphics program e.g. to manipulate an image such as colour to B &W	38.8	28.6	32.7
web browser e.g. to look for weather or download music files	78.6	14.3	7.1
web authoring program e.g. to create a personal homepage	9.1	42.4	48.5
presentation manager e.g. to create a short talk with slides	39.8	24.5	35.7
chat program e.g. to talk to someone in another town or country	73.7	19.2	7.1
on-line bibliographic databases e.g. to search for a specific publication	36.4	30.3	33.3

Sources of ICT knowledge

The students were asked how, when and where they had acquired their ICT knowledge. As we see in table 2, the sources of ICT knowledge cited are as follows: 79.4% cite IT lessons at junior high school, 72.9% cite IT lessons in senior high school and 60.4% cite knowledge gained from friends. Acquisition of knowledge from personal initiative is cited by 37.2% of the students while parental involvement is cited by only 13.8%.

TABLE 2

<i>Sources of ICT knowledge acquisition</i>	
Sources of ICT knowledge	%
IT lessons in junior high school	79.4
IT lessons in senior high school	72.9
Using computers in other junior high school lessons, apart from the IT lesson	15.8
Using computers in other senior high school lessons, apart from the IT lesson	25.5
Computer teaching centres	36.2
Alone. Consulting books	37.2
Learnt from friends	60.4
Learnt from parents	13.8
Learnt from older siblings	35.8

Of the above sources of knowledge, only computer teaching centres and personal initiative correlate to ICT skill levels. It should be noted that 20% of the students had passed exams in computer use and knowledge (European Computer Driving Licence ECDL): 36.8% at the introductory level, 42.1% at the basic level and 21.1% at the advanced level. All those who had acquired this qualification stated that their source of computer skill acquisition was a computer teaching centre. Also, acquisition of a qualification correlated to ICT skill level in the following programmes: spreadsheets ($p=0.007$), databases ($p=0.001$) and presentations ($p=0.002$). The majority of those with high skill levels in these applications have the ECDL qualification. Finally, personal initiative as a source of ICT skill acquisition correlated with the ability to use such programmes as e-mail ($p=0.001$), graphics ($p=0.005$), and on line communication ($p=0.034$).

During their time at senior high school 66.7% of the students used computers for course work most frequently at home, 25.3% most frequently at school, 6.1% most frequently at the home of a friend and 2% most frequently at an internet café . In the same period 25.3% of the students used computers for course work twice or three times a week, 21.2% once a week and 53.6% rarely.

At the start of their university course 45.5% of the students used the internet for leisure purposes once or twice a week, 19.2% three to four times a week and 14.1% five or six times a week, while 12.1% did not spend any time at all on the net. Internet practices were as follows: 77.8% of the students involved in surfing, 70.7% in game playing, 68.7% in downloading music files and 57.6% in on-line communication. It should be noted that 98% of the students did not order products on-line, while none of the students carried out e- banking or similar activities.

Perceived usefulness of ICTs

As for the importance attached to ICT use by the students in terms of their university studies, 59.2% regard their use as fairly important, 18.4% as barely important at all, and 19.4% have no opinion. Very few students regard their use as very important or not important at all (1% and 2% respectively).

60.2% of the students claim that they have enough confidence in their skills to use ICTs in their university studies, while 19.4% are not sure if they have enough confidence and 20.4% have very little confidence. It should be noted that not a single student claimed to have a great deal of confidence or none at all. Ownership of a computer reinforces the importance attached to ICT use in the students' university studies ($p=0.016$). Likewise, computer ownership also influences the confidence students feel about using ICTs in their university course, since those with their own computer show more confidence ($p=0.000$).

In respect of the importance attached by students to ICTs in relation to their future

careers as teachers 31.3% regard them as very important and 44.4% as important, while 22.2% are not sure if they are important or not, and 2% view them as of little importance. No student claimed that ICTs are completely unimportant. The level of ICT skills does not affect the perceived importance of ICTs in the students' future as teachers.

DISCUSSION

According to their representations, the vast majority of first year students were able to surf the net and communicate on-line, while a smaller majority could handle word processing. Almost half the students had never worked with databases or web authoring programmes. Almost a third had never worked with graphics programmes, presentation manager, on-line bibliographic databases or spreadsheets. Finally, only half the students used e-mail on their own, while a third needed help with e-mail and word processing applications.

The students' knowledge of ICT use was mainly acquired from computer lessons in high school and from friends, only secondarily from personal initiative, computer teaching centres or older siblings, while parental contribution was negligible. However, of all these sources only computer teaching centres and personal initiative appear to assist in developing skills in the use of well-known software programmes.

During their time in senior high school the freshmen had not made frequent use of computers for their course work; certainly, computer use was more frequent at home than at school. Their experience of computer use in lessons other than the informatics course was limited, reflecting the absence of widespread utilization of ICTs in the secondary education curriculum in Greece.

The first year's students were often involved in internet practices for personal and recreational purposes. They surfed the net, played games, downloaded music files and participated in discussion forums on the net. Online communications today allow the forming of connections, the creating of communities and the organizing of action in previously unimaginable ways. Social networking concerns a broad range of personalized network-based applications and functions of interaction on the web (Bianco, 2009). This is a trend to use the internet for expressive purposes (Tufekci, 2008). Social computing empowers users lacking high levels of web use skills to involve themselves in social networking processes, transforming the way in which people process information and interact with it (Parameswaran & Whinston, 2007). What is special about social networking sites is not so much that they allow us to meet strangers, as that they allow users to articulate and make visible their social networks (Boyd & Ellison, 2007). Social computing, then, responds to needs for expression, communication and belonging in a community.

The freshmen students believe that using ICTs will play an important part in the studies that lie ahead of them. Most of them appear to have a fair degree of confidence in their ability to use ICTs in their courses, but a significant percentage do not share that confidence. At all events, the students recognize the crucial role of ICTs in their professional lives, regardless of their own ability to use software programmes. Studies have shown that ICT use is related to users' positive attitudes and depends on whether they perceive ICTs as useful in their work and professional advancement (Cuban, 1986; Dupagne & Krendl, 1992; Tsitouridou & Vryzas, 2001; Cuban, 2003; Teo, 2008).

Access to the technologies involved is now widespread, with most freshmen students possessing their own computer with internet access. However, access to ICT will not necessarily lead to the appropriate uses, and uses will not necessarily lead to a revolutionary change in the educational process (Badillo & Bourgeois, 2007). Technical skills in the use of ICT continue to be important, but ICT pedagogical approaches are considered increasingly important (Redmond, Albion & Maroulis, 2005).

Recent studies in European countries have shown a dramatic increase in levels of computer ownership and internet access (OECD, 2007; EUROSTAT, 2008; OECD, 2008). The acquisition of a computer is a personal investment which provides a powerful incentive for the acquisition of the relevant ICT skills, through formal or informal channels. The digital culture which takes shape outside the school poses a series of questions which relate to the necessity of education in the utilization of information. When information is available everywhere, knowledge is at risk of being lost in the sheer mass of data. This state of affairs may lead to a utilitarian and expedient view of knowledge (I learn what I need to know now), limiting cultural horizons. Education is called upon, then, to demystify the magical aspects of ICTs, both on the level of knowledge and on that of the quality of sources of information, and to cultivate the development of critical thought (Buckingham, 2003; Chaptal, 2003a; 2003b).

The findings of our study confirm those of other, similar, studies, taking into account, of course, differences in scale and the broad range of such studies (Haywood & Haywood, 2003; SPOT PLUS, 2003). Comparing the results of our own investigation with those of other studies, we see that in the latter both frequencies of internet access and freshman software skills are at higher levels. However, in these studies too the software programmes in which the students appear to be more skilled are surfing and communicating on line, using e-mail and word processing. Likewise, students show lower levels of skill in the use of presentation and database software. It should be noted that in these studies too the main sources of assistance and support in skills development were, first and foremost, family and friends, and only secondarily the school. Moreover, the overwhelming majority of freshmen were confident about their ability to use ICTs. Finally, most of the students believed that ICTs would play an

important part in their future careers, whatever they were studying (Haywood & Haywood, 2003; SPOT PLUS, 2003).

Requirements for ICT skills have increased, and there is every sign of this trend continuing in the near future. Of course, acquiring these skills does not necessarily mean that someone is digitally literate. Digital literacy goes beyond the simple ability to use a software programme or operate a device. It involves a whole range of complex cognitive, kinetic, sociological and emotional skills which users need to operate effectively in digital environments. Digital literacy does not consist in a set of context-free information processing skills, but rather a set of social organized practices in which individuals are involved (Scribner & Cole, 1981; Eshet-Alkalai, 2004).

CONCLUDING REMARKS

In the context of the emerging knowledge society, educational policy across Europe has introduced initiatives and programmes to develop skills and competences in the use of ICT. While not a panacea, ICT might nevertheless contribute effectively to educational innovation, provided, of course, that we approach them in a critical spirit. This approach will require learners who are active producers not merely passive consumers of messages (Westera, 2005).

Study of ICT use is essential if we are to understand the culture of a society permeated by media technology. As contemporary societies grow increasingly technology-mediated, we need to understand people's everyday interactions with these technologies. It is not merely a question of adjusting the technologies to people; people are now creating environments which are more and more mediated by technologies. When users in a variety of environments come face to face with digital technologies, we observe a domestication process. These technologies need to be integrated into daily habits and values of users, and into the structures of their environments. The concept of domestication is far removed from models which suppose the adoption of innovations to be rational, linear, mono-causal and technologically determined. It is closer to the position of technology within the dynamic complexity of everyday life (Berker, Hartmann, Punie & Ward, 2006).

Digital technology is associated with the genesis and maintenance of post-modern society. Digital literacy is seen as a characteristic of man in a socio-cultural environment. It is a component of individual identity. It is an evolving concept which was first understood as technological literacy. However, it must be seen as a set of social practices going beyond any narrow cognitive skill (Markauskaite, 2006). What is of significance is not so much the acquisition of ICT skills as the competences and understanding involved in responding to the changes ushered in by the information and knowledge society.

ICTs are not simply technical means for the processing and transmission of information; they also have a symbolic dimension. They are media which are inscribed within a set of representations, values, social practices – in brief, a form of culture. We need to weigh their uses and the set of social narratives accompanying them, as well as their distinctive properties, avoiding the technically oriented prejudices which approach ICTs in terms of efficiency and technological determinism (Bougnoux, 1991; Babou, 1998; Bougnoux, 1998).

It is by no means certain that technology can lead, by itself, to the anticipated changes. Even when the technology contains within itself a certain dynamic, this is not predetermined. Technology *per se* has no result, in contrast to the dream of the omnipotence of technique (Linard, 1992). What is significant is not the technology in itself, but the way in which we use it. We need to learn how to approach ICTs in a critical spirit, and above all to use them as a means, not an end in themselves (Buckingham, 2003).

REFERENCES

- Agostinelli, S. (2003). *Les nouveaux outils de communication des savoirs* (Paris: L'Harmattan).
- Babou, I. (1998). Des discours d'accompagnement aux langages: les nouveaux médias. *Études de Linguistique Appliquée*, 112, 407-420.
- Badillo, P. & Bourgeois, D. (2007). Learning and ICT in universities: from 'common' uses of ICT to a variety of learning models? Paper presented at the International Conference on Engineering Education, Coimbra, Portugal (www.ineer.org/Events/ICEE2007/papers/377.pdf).
- Bélisle, C., Liautard, D. & Rosado, E. (2006). De la logique technologique à la logique culturelle: questionner les études d'usages des TICEs (Troisième partie - Des analyses d'usages, 5-6) (<http://rhrt.edel.univ-poitiers.fr/document.php?id=678>).
- Berker, T., Hartmann, M., Punie, Y. & Ward, K. (2006). *Domestication of media and technology* (London: Open University Press).
- Bianco, J. (2009). Social networking and cloud computing: precarious affordances for the 'prosumer'. *Women's Studies Quarterly*, 37(1/2), 303-312.
- Bonfandelli, H. (2002). The Internet and knowledge gaps: a theoretical and empirical investigation. *European Journal of Communication*, 17, 65-84.
- Bougnoux, D. (1991). *La communication par la bande* (Paris: La Découverte).
- Bougnoux, D. (1998). *Introduction aux sciences de la communication* (Paris: La Découverte).
- Boyd, D. M. & Ellison, N. B. (2007). Social network sites: definition, history and scholarship. *Journal of Computer-Mediated Communication*, 13, 210-230.
- Breton, P. & Proulx, S. (2002). *L'explosion de la communication à l'aube du XXIe siècle* (Paris: La Découverte).
- Buckingham, D. (2003). *Media education: literacy, learning and contemporary culture* (Cambridge: Polity Press).
- Buckingham, D. (2007). *Beyond technology: learning in the age of digital culture* (Cambridge: Polity Press).

- Castells, M. (1996, 1997, 1998). *The information age: economy, society and culture*. Vol. I, II & III (Oxford: Blackwell).
- Certeau (de), M. (1990). *L'invention du quotidien: arts de faire* (Paris: Gallimard).
- Chambat, P. (1994). Usages des TIC: évolution des problématiques. *Technologies de l'information et société*, 6, 249-270.
- Chaptal, A. (2003a). *L'efficacité des technologies éducatives dans l'enseignement scolaire: analyse critique des approches française et américaine* (Paris: L' Harmattan).
- Chaptal, A. (2003b). Réflexions sur les technologies éducatives et les évolutions des usages: le dilemme constructiviste. *Distances et Savoirs*, 1, 121 – 147.
- Chaptal, A. (2008). La réalité des TICE: Un regard critique. In D. Andler & G. Guerry (eds) *Apprendre demain sciences cognitives et éducation à l'ère numérique* (Paris: Hatier), 13-25.
- Clements, D. & Nastasi B. (1993). Electronic Media and Early Childhood Education. In B. Spodek (ed.) *Handbook of research on the education of the young children* (New York: Macmillan), 251-275.
- Cuban, L. (1986). *Teachers and machines: the classroom use of technology since 1920* (New York: Teachers College Press).
- Cuban, L. (2003). *Oversold and underused: computers in the classroom* (Cambridge, MA: Harvard University Press).
- Cuban, L., Kirkpatrick, H. & Peck, C. (2001). High access and low use of technologies in high school classrooms: explaining an apparent paradox. *American Educational Research Journal*, 38(4), 813-844.
- Cuckle, P., Clarke, S. & Jenkins, I. (2000). Students' information and communications technology skills and their use during teacher training. *Technology, Pedagogy and Education*, 9, 9- 22.
- Docq, F. & Daele, A. (2003). De l'outil à l'instrument: des usages en émergence. In B. Charlier & D. Peraya (eds) *Technologie et innovation en pédagogie : dispositifs innovants pour l'enseignement supérieur* (Bruxelles: De Boeck Université), 113-128.
- Dupagne, M. & Krendl, K. A. (1992). Teachers' attitudes towards computers: a review of the literature. *Journal of Research on Computing in Education*, 24, 420-429.
- Eshet-Alkalai, Y. (2004). Digital Literacy: a conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia*, 13, 93-106.
- EUROSTAT (2008). Computers and the Internet: households (Summary of EU aggregates) (<http://epp.eurostat.ec.europa.eu>).
- Flichy, P. (1995). *L'innovation technique* (Paris: La Découverte).
- Haddon, L. (2005). Introduction. In L. Haddon, E. Mante, B. Sapio, K. Kommonen, L. Fortunati & A. Kant (eds) *Every day innovator: researching the role of users in shaping ICTs* (Dordrecht: Springer), 1-16.
- Haywood J. & Haywood D. (2003). *ICT skills of students in European Universities: the SEUSSIS Project Final Report* (Edinburgh: Scottish Centre for Research into Online Learning & Assessment).
- Jouët, J. (1993a). Pratiques de communication et figures de la médiation. *Réseaux*, 60, 99-120.
- Jouët, J. (1993b). Usages et pratiques des nouveaux outils de communication. In L. Sfez (ed.) *Dictionnaire critique de la communication* (Paris: PUF), 371-376.
- Jouët, J. (2000). Retour critique sur la sociologie des usages. *Reseaux*, 100, 489-521.
- Jung, J., Qiu J. & Kim, Y. (2001). Internet connectedness and inequality: beyond the divide. *Communication Research*, 28, 507–535.

- Kennewell, S. (2004). *Meeting the standards in using ICT in secondary schools* (London: Routledge).
- Kozma, R. (2003). Technology and classroom practices: an international study. *Journal of Research on Technology in Education*, 36, 1-14.
- Le Marec, J. (2001). L'usage et ses modèles : quelques réflexions méthodologiques. *Spirale*, 28, 105-122.
- Le Marec, J. (2004). Usages: Pratiques de recherche et théories des pratiques, *Hermès*, 38, 141-147.
- Linard, M. (1992). Les nouvelles technologies, moyen de repenser la formation des enseignants. In G.-L. Baron & J. Baudé (eds) *L'intégration de l'informatique, dans l'enseignement et la formation des maîtres* (Paris : INRP), 26-45.
- Loveless, A. (2003). *The role of ICT* (London: Continuum).
- Markauskaite, L. (2006). Towards an integrated analytical framework of information and communications technology literacy: from intended to implemented and achieved dimensions. *Information Research*, 11(3) (<http://informationr.net/ir/11-3/paper252.html>).
- Martin, A. & Grudziecki, J. (2006). DigEuLit: concepts and tools for digital literacy development. *ITALICS*, 5, 249-267.
- Mc Kenney, S. & Voogt, J. (2009). Designing technology for emergent literacy: the PictoPal initiative. *Computers & Education*, 52(4), 719-729.
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Technology, Pedagogy and Education*, 9, 319-342.
- OECD. (2007). *Country statistical profiles* (Paris: OECD).
- OECD. (2008). *Panorama des statistiques de l' OCDE* (Paris: OECD).
- Parameswaran, M. & Whinston, A. (2007). Social computing: an overview. *Communications of the Association for Information Systems*, 19, 762-780.
- Paul, V. & Perriault, J. (2004). Pratiques d'information et de communication: l'empreinte du numérique. *Hermès*, 39, 9-39.
- Perriault, J. (1989). *La logique de l'usage : essai sur les machines à communiquer* (Paris: Flammarion).
- Proulx, S. (2001). *Usages des technologies d'information et de communication: reconsidérer le champ d'étude ?* (Paris: UNESCO, SFSIC).
- Rae, S. (2004). Where, when and how do university students acquire their ICT skills? (<http://www.ics.heacademy.ac.uk/italics/Vol4-1/rae.pdf>).
- Redmond, P., Albion, P. & Maroulis, J. (2005). Intentions v reality: preservice ICT integration during professional experience. In C. Crawford et al. (eds) *Proceedings of Society for Information Technology & Teacher Education International Conference 2005* (Chesapeake, VA: AACE), 1566-1571.
- Reich, R. (1991). *The work of nations: a blueprint for the future* (London: Simon & Schuster).
- Reynolds, D., Treharne, D. & Tripp, H. (2003). ICT—the hopes and the reality. *British Journal of Educational Technology*, 34, 151–167.
- Rosado, E. & Bélisle, C. (2006). Analysing digital literacy frameworks. A European framework for digital literacy (eLearning Programme 2005-2006) (<http://hal.archives-ouvertes.fr/docs/00/13/77/79/PDF/Analysing-Edu-Frameworks.pdf>).
- Scribner, S. & Cole, M. (1981). *The psychology of literacy* (Cambridge, MA: Harvard University Press).
- Selwood, I. D. (2005). Primary school teachers' use of ICT for administration and management. In A. Tatnall, A. Visscher & J. Osario (eds) *Information technology and educational management in the knowledge society* (New York: Springer), 11-22.

- Selwyn, N. (2003). Apart from technology: understanding people's non-use of information and communication technologies in everyday life. *Technology in Society*, 25, 99-116.
- Selwyn N. (2004). Reconsidering political and popular understandings of the digital divide. *New Media & Society*, 6, 341-362.
- Selwyn, N. (2007). The use of computer technology in university teaching and learning: a critical perspective. *Journal of Computer Assisted Learning*, 23, 83-94.
- Siraj-Blatchford, J. & Whitebread, D. (2003). *Supporting Information and Communications Technology in the early years* (Buckingham: Open University).
- SPOT PLUS (2003). ICT in European universities: trends and perspectives SOCRATES Programme (MINERVA Action of the Directorate General for Education and Culture of the European Commission) (<http://www.spotplus.odl.org>).
- Teo, T. (2008). Pre-service teachers' attitudes towards computer use: a Singapore survey. *Australian Journal of Educational Technology*, 24, 413-424.
- Tsitouridou M. & Vryzas K. (2001). Early childhood education students' attitudes towards information technology. *Themes in Education*, 2, 425-443.
- Tsitouridou, M. & Vryzas, K. (2003). Early childhood teachers' attitudes towards computer and information technology: the case of Greece. *Information Technology in Childhood Education Annual*, 1, 187-207.
- Tufekci, Z. (2008). Grooming, Gossip, FaceBook and MySpace. What can't we learn about these sites from those who won't assimilate? *Information, Communication & Society*, 11, 544-564.
- Turbill, J. (2001). A researcher goes to school: using technology in the kindergarten literacy curriculum. *Journal of Early Childhood Literacy*, 1(3), 255-279.
- UNESCO (2005). *Towards Knowledge Societies* (Paris: UNESCO).
- Van Scoter, J. (2008). The potential of IT to foster literacy development in kindergarten. In J. V. Knezek (ed.) *International handbook of information technology in education* (London: Springer), 149-161.
- Vryzas, K. (2006). *Communication technologies and development of human society* (Thessaloniki: Vaniias -in greek).
- Watson, D. (2001). Pedagogy before technology: re-thinking the relationship between ICT and teaching. *Education and Information Technologies*, 6, 251-266.
- Westera, W. (2005). Beyond functionality and technocracy: creating human involvement with educational technology. *Educational Technology & Society*, 8 (1), 28-37.
- Wright, L. & Shade, D. (eds) (1994). *Young children: active learners in a technological age* (Washington, DC: NAEYC).