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# Developing digital immigrants' computer literacy: the case of unemployed women

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## Abstract

**Purpose** – The purpose of this study is to evaluate the effectiveness of a 40-hour computer course for beginners provided to a group of unemployed women learners with no/minimum computer literacy skills who can be characterized as digital immigrants. The aim of the study is to identify participants' perceptions and experiences regarding technology, any barriers and challenges faced throughout the computer course and the extent to which the computer course assisted them in becoming computer literate and employable. This case study was based on the European Commission's EQUAL program.

**Design/methodology/approach** – A case study approach was employed making use of qualitative and quantitative data. Quantitative data were collected using three different questionnaires (the background questionnaire, the Loyd/Gressard Computer Attitude Scale questionnaire and the Computer Skills Tests questionnaire) and qualitative data were collected through two focus groups. A total of nine unemployed women with no/minimum computer literacy skills were the focus of investigation. The 40-hour computer literacy course and the data collection process took place in May-June 2007.

**Findings** – Results demonstrated the effectiveness and necessity of computer courses for digital immigrants. The participants developed an acceptable level of computer literacy skills and a more positive attitude towards technology. They further realized the importance of possessing computer literacy skills specifically in relation to their employability, professional path and career development. Their self-esteem in relation to technology was also increased on professional, educational, and personal levels.

**Originality/value** – The study confirms the necessity to explore further instructional design and implementation of digital immigrants' education and training regarding computer technology.

**Keywords** Technology, Computer literacy, Computer courses, Digital immigrants, Unemployed women, Age groups, Cyprus

**Paper type** Case study

## 1. Introduction – literature review

In recent years we have experienced computer technology expansion in our daily activities. The society we live in has often been described as the "Information Society" because its infrastructure essentially is founded on information technology, computers and electronic communication systems (Goddard, 2002; Honey, 2001; Polonoli, 2001). As a result of the ever-presence of Information and Communications Technology (ICT) in society, new forms of work, communication and economic growth have emerged in



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what is today a global society (Eteokleous, 2008a; Hadjithoma and Eteokleous, 2007). ICT also removes time and space constraints and increases flexibility and accessibility to education and knowledge. Knowledge increasingly defines the line between wealth and poverty, between capability and powerlessness, and between human fulfillment and frustration. A country able to mobilize and diffuse knowledge can rapidly raise its level of development, help all its citizens to grow and flourish, and take its proper place on the twenty-first century global stage (Eteokleous, 2008b). Consequently, ICT is related to the economic needs of the twenty-first century, is an important aspect of employability, and a requirement to enter the workforce (Eteokleous, 2008a; Hadjithoma and Eteokleous, 2007).

A number of definitions regarding digital and computer literacy were provided in the literature. In 1997, Glister (1997, p. 50) defined digital literacy as “[...] the ability to understand information and more important to evaluate and integrate information in multiple formats that the computer can deliver”. Along the same lines Saadi (2007) described computer literacy as the ability to achieve desired outcomes via a computer. More specifically, Saadi (2007) defines computer literacy as a general understanding of basic computing principles, knowledge of at least one computer operating system, and proficiency with specific software programs. Warlick (2005) refers to digital literacy as the ability to locate, organize, understand, evaluate, and create information using digital technology, like computer hardware, software, the internet, cell phones, PDAs, and other digital devices. Additionally, Hofstetter (2006) defines it as the degree to which individuals are familiar with computer operating systems and applications. Finally, some definitions in the literature are more related to the social-cultural context, society characteristics and our way of living. Specifically, Markham (2004, p. 100) says that digital literacy “[...] is an umbrella term for a set of social practices that are interwoven with contemporary ‘ways of being’” and Merchant (2009, p. 42) defines digital literacy as “[...] the ways in which new technologies intersect with changing practices in meaning-making in the contemporary world literacy”.

Each one of us uses technology very differently in terms of frequency and kind of use. Use is influenced by various demographics (i.e. age, gender, educational background, occupation) and factors such as personal interest and motivation, attitudes towards technology, technology value and usefulness, and opportunities. Prensky (2001) characterized as digital natives youth under 18, born and raised in the Information Age. They have also been characterized as digital learners (Richardson, 2009). Digital natives use Web 2.0 tools extensively in order to play internet games, visit social networking websites, use email, search for information, communicate through chat rooms, participate in blogs and discussion forums, develop their own websites, and become net-writers through wikis and other mediums (Hargadon, 2009). On the other hand, another group, the digital immigrants (Prensky, 2001), are those who were already adults while the technology and the internet were evolving. Nevertheless, in order to survive they adjusted to the new setting and made technology an integral part of their lives, frequently using it for educational, personal, and professional purposes.

Computer literacy is a necessary life skill for survival and access to the work force and society. For unemployed women, developing computer literacy skills can be considered as a step towards employment and a successful career path. Numerous projects around the world were established in order to develop digital immigrants’

women computer literacy skills. For example, the Bayanloco Community Learning Center trains women in rural Nigeria to use information technology (Fantsuam Foundation, 2007). Another example is the Tel-Nek, a project that aims to equip women from rural and semi-rural areas of Bangalore district with vocational IT skills (Tel-Nek, 2008). The above projects revealed that computer training often leads to increased job opportunities for these women (Fantsuam Foundation, 2007; Tel-Nek, 2008).

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*The context of the study*

Given the increasing necessity of developing women's computer literacy level and the various worldwide efforts that took place, the European Commission's EQUAL program (Equal opportunities – reconciling family and professional life – new routes for woman program) was established. The program aims to encourage women's employment and promotion to high ranking positions of the professional hierarchy by providing equal opportunities and reconciling family and professional life by opening new routes and creating opportunities for women who can be characterized as digital immigrants. It offers an introductory computer literacy skills course to a group of unemployed women with no/minimum computer literacy skills to increase their employability and personal development (European Commission, Employment and Social Affairs, EQUAL Common Database, 2006). The program was established and has operated in Cyprus since 2006 as developing computer literacy skills for digital immigrants, in this case women, was revealed to be a vital skill for employment given the increasing number of unemployed women with no/low computer literacy skills in Cyprus.

*Main aim*

The purpose of this study is to evaluate the effectiveness of a 40-hour computer course for beginners provided to a group of unemployed women with no/minimum computer literacy skills. Specifically, the study aims to identify participants' perceptions and attitudes regarding technology and also examines their learning experiences and the difficulties and challenges faced throughout the computer course. Finally, the study identifies the extent to which they were helped by the computer course in becoming computer literate and also employable. This case study was based on the EQUAL program.

**2. Research methodology**

A case study approach was employed making use of qualitative and quantitative data following Creswell's (1996) guidelines. The case study was comprised of nine unemployed women with no/minimum computer literacy skills who attended a 40-hour computer literacy course for beginners. The course and the data collection process took place May-June 2007.

The quantitative aspect of the study was addressed through three questionnaires. During the first week of the course two questionnaires were given to the participants:

- (1) the background questionnaire examining a number of parameters such as age, marital status, educational background, computer and internet use; and
- (2) the Loyd/Gressard Computer Attitude Scale questionnaire (Loyd and Gressard, 1984, Loyd and Loyd, 1985) aiming to identify the participants' perceptions on computer literacy.

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Although this is an instrument developed in 1985 and the terms of computer and digital literacy are continuously evolving, the Loyd/Gressard instrument was considered to be the most appropriate one for the purposes of this study since it measures basic computer skills and women (digital immigrants) had zero to minimum computer skills and limited experience with computers. The Loyd/Gressard Computer Attitude Scale questionnaire is a Likert-type instrument consisting of 40 items, which present positively- and negatively-worded statements of attitudes toward computers. Participants check whether they strongly agree, slightly agree, slightly disagree, or strongly disagree with each statement. The items were coded so that the higher the score, the more positive the attitude. The maximum score for the Computer Attitude Scale is 160. These 40 questions are divided into four categories (subscales) of ten questions each with a total possible score of 40 each subscale:

- (1) computer anxiety;
- (2) computer confidence;
- (3) computer liking; and
- (4) computer usefulness.

Upon completion of the course the participants were given a third questionnaire, the Computer Skills Tests questionnaire, aiming to evaluate the knowledge and skills in the different modules. Specifically, the participants were given five different tests (each one consisting of 15 questions) on the various parts of the course:

- (1) basic computer skills;
- (2) word processing skills;
- (3) e-mail/internet skills;
- (4) spreadsheets skills; and
- (5) presentation graphics skills.

These 15 questions have a consistent structure aiming to reveal the skills acquired by the participants in the specific part of the course. MS Excel was used to analyze the quantitative data from the three questionnaires, where mainly descriptive statistics were conducted. The study does not aim to generalize the quantitative results of the study but rather to identify and measure participants' characteristics, attitudes, knowledge, and skills.

The qualitative component was addressed through two focus groups: one conducted upon course completion and the other conducted one month after course completion. These focus groups aimed to allow an in-depth examination of women's attitudes and perceptions about computers and computers' role in job employability as well as their experiences related to the course, challenges faced, and effectiveness of the course. The focus group interview protocol included open-ended questions to provide the participants the opportunity to freely express themselves on the subjects under investigation, further explain their ideas and opinions, and comment on others' views (Kvale, 1996). One month after the course completion the participants were invited for a second focus group session aiming to examine the extent to which they applied what was learned from the course. Six out of nine women participated. On average, the duration of each focus group was one hour.

The qualitative data were coded and categorized based on themes that emerged, in line with the research objectives of the current study. The data were analyzed with the method of continuous comparison of data, comparing and identifying common themes and topics as well as emerging issues (Maykut and Morehouse, 1994).

### 3. Data analysis – discussion

#### *Basic background information*

The analysis of the demographics data showed that four participants were in the 41-50 age group, two married, one divorced, and one single. Three women were aged 21 to 30 and single and two were in the 31-40 group; one was single and the other one married. All four married women and the divorced one had children of elementary and high school ages. As far as educational background, seven were high school graduates and two held a college diploma. All women were unemployed and looking for work from two months to three years. Six women did not own a computer, while the three who owned a PC did not use it frequently although they were quite interested in using it to browse the internet as a source of information, and those with children to help their children with their homework. The most common reasons for not using them frequently were lack of computer skills, lack of time, and low level of English language skills.

#### *Women's attitudes towards technology*

The Loyd/Gressard scale questionnaire measured women's attitudes towards technology. Specifically, regarding the first subscale, "Anxiety", six of the participants reported not feeling very comfortable with the computer; however they had no fear towards computers and believed that their willingness to learn would ease the computer learning process. On the other hand, three reported a fear of failure but expressed their strong will to learn. The same three participants expressed their interest to start working with computers in their everyday lives, their readiness to face the challenges that might appear related to technology, and developing computer skills.

Concerning the second subscale, "Confidence", five of the participants expressed low to medium confidence when it came to working with computers. The remainder of the participants appeared to have minimum confidence and medium to low degree of ease in working with computers. Finally, eight of the participants agreed that they do not feel that figuring out computer problems appeals to them. Given the above, this group of women preferred to focus their learning on computer applications instead of the technical aspects.

In regards to the third subscale, "Computer Liking", four of the participants agreed and five of them slightly agreed that working with computers would be enjoyable and stimulating. Also, seven of the participants enjoyed talking with others about computers.

Finally, the last subscale, "Usefulness", revealed that eight of the participants understand the significance of computer literacy. However, four participants expressed their concerns that knowing how to work with computers will increase their job possibilities. Specifically, these women argued that they were not fully convinced that developing computer literacy skills will enhance their job opportunities and that they

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will become employable. Seven women showed their strong agreement that learning about computers is worthwhile and they would be able to work with computers.

Overall, the participants had a relatively positive attitude towards technology, realizing at some level its usefulness and value for their professional future as well as on personal and educational levels. Although they expressed a number of concerns, appeared to be hesitant, and showed a low degree of confidence, they were willing to be further educated and develop their knowledge and skills regarding technology.

### *Computer skills tests*

The computer skill tests evaluated women's knowledge and skills developed in the following areas:

- basic computer skills;
- word processing skills;
- e-mail/internet skills;
- spreadsheets skills; and
- presentation graphics skills.

Specifically, they were equipped with basic skills such as how to:

- operate the mouse;
- work with files;
- create simple documents using MS Word;
- perform basic Excel tasks;
- develop simple PowerPoint presentations;
- search/browse the internet; and
- send, receive, reply and forward e-mail messages.

Analyzing the results from the tests showed that six out of nine women received high scores at the tests, showing the development of skills in all five modules, two developed average skills and only one developed minimum to no computer skills. Given that women had minimum to no computer skills when they started the course, these test results indicate the course was effective.

### *Focus groups*

Upon completion of the course, the first focus group was scheduled. The participants' excitement and satisfaction with the course was shown greatly. They reported mainly positive learning experiences gained through the course. The participants confirmed they overcame their "technology" fears, became more comfortable in operating the computer and its various applications, and increased their self-confidence in relation to computer usage. They were not feeling technologically left out anymore and they were able to "catch-up" on technology. In addition, the participants who had children reported greater enthusiasm as they felt they were in a position to "speak" the same language with their children regarding technology. One of the women commented: "I can finally communicate with my children." The importance of the above is twofold. First of all, the participants greatly benefited from the course since they could help

their children with their homework. They highlighted that technology was needed not only for the homework related to their computer courses but often in the homework related to many courses (i.e. exercises, research, and presentations). Second, the participants reported they better understood why their children spend so much time at the computer every day, and specifically why they use the internet. Of course, they were not as skilled and knowledgeable as their children; however they shared a common ground and an acceptable level of understanding which increased communication between them. Furthermore, realizing technology's usefulness and value for their children's educational and professional lives also enhanced their knowledge regarding technology and specifically internet dangers and threats for children. Consequently, they were in a better position to make informed decisions in protecting their children.

The participants also discussed barriers while attending the course. The main problem was a lack of time to keep up with course responsibilities such as homework and practice at home. Three of the participants reported difficulties in attending the course since they had to find someone to take care of their children. Another three of the participants reported difficulties in understanding and acquiring the learning material, and parts of the modules. For example, two of them reported difficulty in using the mouse while two others were frustrated as they found typing very time consuming. Two participants reported having difficulties in formatting a word document and four in selecting the correct function to use in MS Excel.

During the second focus group that took place one month after course completion, the six women who participated reported they were confident with the computer skills they had gained. Specifically, they agreed they gained daily life skills by knowing how to use the technology and stated they had been using the computer in their everyday activities. Acquiring internet and e-mail skills kept them up-to-date with the world's latest news and they could shop via the internet, mainly for books and clothes. Four women reported spending many hours on the computer either because they were still slow in finding the tools or because they were challenged to "search" and learn new things. Finally, two women reported helping their husbands in the small family businesses they owned mainly using word processing and the internet.

Given their overall experiences, the women provided valuable suggestions on how to improve the course for adult learners with no/minimum computer literacy skills, or in other words digital immigrants with a poor academic background. Recommendations include:

- extending the hours of the course in order to have more in-class and additional lab time;
- repeating the learning materials several times within a more collaborative learning environment and including team work; and
- allowing for the opportunity to repeat the course in the future with some add-ons as well as attend the next-level course.

The participants also expressed their preference for lecturers' tailor-made, hands-on notes and exercises in combination with a simple introductory textbook illustrating capture screens. In addition, they recommended that courses targeting digital immigrants should have a high degree of flexibility and be adjustable to the needs of the group in order to be successful and effective.

#### 4. Conclusions and recommendations

The results of the study demonstrate the effectiveness of the EQUAL program. The participants' enthusiasm, motivation and willingness to be further educated and attend more computer courses was apparent. Out of nine women, six developed an acceptable level of computer literacy skills and a more positive attitude towards technology. They further realized the importance of possessing computer literacy skills specifically in relation to their employability, professional path, and career development. In addition, their self-esteem and self-confidence in relation to technology was also enhanced at professional (i.e. increased employability), educational (i.e. they were further educated) and personal levels (i.e. personal shopping, getting closer to their children).

The outcomes of this study provide recommendations that enhance the teaching and learning process for computer courses designed for digital immigrants. It also highlights significant factors that can influence the design and development (learning material, instructional strategies and techniques) of such courses.

This introductory computer course for unemployed female digital immigrants emerged as highly beneficial and provided an opportunity for learning in this technologically oriented, interconnected, internet-based world. Computer centers and higher educational institutions (i.e. colleges and universities) can contribute to assisting digital immigrants by scheduling flexible, user-friendly computer courses adjusted to the needs of the digital immigrants.

Finally, the study sets the foundation to further explore digital immigrants' education and training in regards to computer literacy development, the learning material, and the strategies and techniques to be taken into consideration when designing and implementing such courses in order to be more effective and successful as well as to achieve digital immigrants' smooth and successful induction to the ICT society and the working environment.

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Dr Despo Ktoridou holds a BSc and a MSc in Computer Engineering and a PhD in the field of Expert Systems from Saint Petersburg Electrotechnical University in Russia. Her Doctoral dissertation was "Distance learning educational systems for early childhood education: methods, facilities and means". From 1993 until 1999 she worked as an engineer for computer companies. In 1999 she became employed as an Assistant Professor of Educational Technology at Intercollege in Cyprus. Since 2007 has been an Associate Professor of MIS at the University of Nicosia. She is an ACM and IEEE member, as well as an ETEK certified engineer. Her research and teaching interests concentrate on the areas of expert systems applications, e-learning, m-learning, social networking application in higher education, and managing IT innovations. She has presented papers at numerous refereed international conferences and has published many papers in refereed journals. Dr Ktoridou participated in EU and local funded programs and was invited to be guest lecturer by foreign universities. Dr Despo Ktoridou is the corresponding author and can be contacted at: [ktoridou.d@unic.ac.cy](mailto:ktoridou.d@unic.ac.cy)

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