Ubiquitous Professional Training for Teachers Using the uProf! Model

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INTRODUCTION

Technological uptake and consistent change and innovation in education have been urged by the decisively faster pace that economic systems, social relations and individuals have had since the diffused embracing of Web 2.0, that is the web of social networking tools (Leone & Guazzaroni, 2010), towards Web 3.0, that is a more connected, open and intelligent network thanks to semantic applications (Spivack, 2013).

Undeniably, living, working and learning are more and more ubiquitous, that is wireless and characterised by high mobility and embeddedness (El-Bishouty, Ogata, & Yano, 2007; Leone & Leo, 2011a). Most European countries have made significant investments over the last years with a view to ensuring universal access to information and communication technologies (ICT), with considerable success (Education, Audiovisual and Culture Executive Agency, 2011). Specifically, embedding ICT in education and training systems has required relevant changes across the technological, organisational, teaching and learning environments of classrooms, workplaces, and informal learning settings; further efforts, though, are required in this direction (European Commission, 2008; Education, Audiovisual and Culture Executive Agency, 2011). A precondition for using computers in educational contexts is that they are widely available and users are familiar with them. With reference to formal education, data (Education, Audiovisual and Culture Executive Agency, 2011) show that currently no great disparity between schools in availability of ICT equipment exist, but a lack of educational software and support staff still affect instruction. Thus, the solution to an effective use of ICT in education and training is not technology itself, but an advancement in understanding how new technologies are and can be used to support learning, and what are the barriers in the way of success.

Being an ICT-integrating teacher means going beyond ICT skills, and developing an understanding of the complex relationships between pedagogy, content and ICT (Alayyar, Fisser & Voogt, 2012). Moreover, while in most European countries centrally promoted online resources and general pedagogical support are available to guide teachers' practical implementation of innovative technology-enhanced learning in the classroom (according to TIMSS - *Trends in International Mathematics and Science Study 2007*) (Education, Audiovisual and Culture Executive Agency, 2011), no research literature seems to document the activation of tailored in-class techno-pedagogical tutoring to teachers during the implementation. A later study carried out on behalf of the European Commission (Pelgrum, 2010) shows that teachers often have difficulties in implementing ICT in the teaching-learning process and that they need support to accomplish this task. Finally, the outcomes of more recent research experiences (Leone, 2013) highlight that teachers perceive in-class techno-pedagogical tutoring as a basic need for the enhancement of their professional skills and, as a result, of their students' learning.

This article illustrates *uProf!*, a model for teachers' professional training in ubiquitous learning by tablets and Quick Response (QR) codes. The model has been designed, implemented and successfully validated within a full-immersion, learner-centred and metacognitive course for 80 Italian high school teachers who are part of a school network for the enhancement of curriculum continuity from middle into high school.

BACKGROUND

Ubiquitous devices allow to create a Computer Supported Ubiquitous Learning (CSUL) environment. A CSUL could be embedded in everyday life (Ogata & Yano, 2004) and is characterised d by permanency, accessibility, immediacy, interactivity, situatedness and adaptability (Curtis, Luchini, Bobrowsky, Quintana, & Soloway, 2002; Leone & Leo, 2011a). Learning theories for CSUL are authentic learning (Brown, Collins & Duguid, 1989), situated learning (Lave, & Wenger, 1991) and learning by doing (Schank, 1995).

These premises highlight the strong potential that ubiquitous learning (uLearning) provides to a lifelong learner, that is to the activator of economical, cultural and social growth of our society and of the systems within. In a lifelong learning vision, the individual is a primary resource of knowledge: the individual's empowerment extends progressively to his/her context and to society as in a network. Empowerment has to be considered as the success key of the relation between a community of practice and the organization to which it is linked. The "double link" described by Wenger & Mc Dermott & Snyder (2002) is crucial for the survival and the development of both, community of practice and organization: the first conducts the improvement of its members' expertise through informal interaction and learning; the second relies on experts grown in the community of practice to identify and implement strategies, to focus on objectives and outcomes of its units.

Through this process old and new borders of knowledge, competence and skills merge and widen. Coherently, traditional educational systems need to evolve into more open and flexible systems, systems that could allow users to choose a learning path according to their learning styles, needs and interests, at any time along their life. In a lifelong learning vision, change and learning are strictly linked: change requires learning and, vice versa, no learning takes place without change (Leone, 2010).

As a result of the current evolution of education systems, the aims of vocationally-based education are beyond training and instruction, to encompass the development of standard features essential to professional competence and lifelong learning (Savery & Duffy, 1994). These include the acquisition of domain knowledge and competencies, and of generally applicable competencies (i.e., ability to adapt to change and participate in change, communicate, collaborate in groups, and be self-directed lifelong learners) (Minasian-Batmanian, Koppi & Pearson, 2000).

THE *uPROF!* MODEL

In the label of this model, *uProf!*, "u" stands for "ubiquitous" and "Prof" for "a professional," that is, "a person engaged in an activity and having an impressive competence in it," for "professional," that is characterized by or conforming to the technical or ethical standards of a profession, " and for "professor," that is either a teacher and "a person who affirms a faith in something" (in the definitions from the Merriam-Webster dictionary), the belief in ubiquitous learning.

The *uProf!* model has been devised for teachers' professional training in ubiquitous learning, in order to support them in acquiring the mind-set (beyond the skill-set) to successfully facilitate technology-enhanced learning. The *uProf!* model has been developed in the vision of lifelong learning and thus of the individuals' empowerment, that is the teachers' and subsequently their students' empowerment, by learner-centred environments characterised by a bottom-up approach, personalisation and adoption of new technologies as means of ri-mediation of networked knowledge (Leone & Guazzaroni, 2010).

Needs, Objectives, and Competences

The *uProf!* model aims to meet teachers' need for knowledge and skills to implement effectively inclusive ubiquitous learning environments, and for in-classroom tailored tutoring during initial implementations.

General learning objectives of the *uProf!* model are: supporting the acquisition and improvement of techno-pedagogical knowledge, competences and skills that teachers could spend in their different domains; providing teachers with tools to personalise and making flexible their students' learning.

Specific learning objectives are: increasing teachers' awareness of the relevance of digital skills for the development of active citizenship; enriching the teachers' professional and personal background by knowledge exchange practices, on the basis of innova-

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