Chapter 9
Integrating Educational and ICT Innovations: A Case Study of Master Course

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ABSTRACT

The paper explores the effectiveness of a new computer-supported collaborative problem solving educational approach in higher education at a master's course level. After outlining the technological and pedagogical characteristics of a new digital cooperative environment, as well as the constructivist, learner-centered philosophy of the Daosan Master (Management of Health-care Services) at the University of Salerno, the integration of the educational approach and the technological support is reported and discussed in an exploratory case-study. The authors show that a large number of post-graduate students have been able to participate in a dense collaborative problem solving activity within a relatively short lesson period, working and reflecting on a real problem of healthcare management. This indicates that the experience is effective in fostering reflexivity, collaboration and situated learning in management training.

1. THEORETICAL FRAMEWORK

In education the idea of problem solving has been long influenced by the traditional representation of schooling, according to which the classroom is a social context in which students have little ownership of decisions (Bruner, 1996). Teaching and learning were considered asymmetrical roles, where students had to make basically individual decisions, such as in problem solving tasks, attempting to choose the correct solution previously established by the teacher. Since Vygotsky, we

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know that in education, as in any other social or work context, the ability to solve problems is situated and depends upon the interactions, the affordances and the shared knowledge created in classroom (Cole, 1996). This leads to the idea that teaching must improve students ability to make decisions and solve problems, both individually and collaboratively, in order to enable them to better face the real world's situations. Within this general framework, an educational approach has been developed by LEAD project - *Technology-enhanced learning and problem-solving discussions: Networked learning environments in the classroom*, www.coffee-soft.org – funded by the EU VI FP. The basic idea is to use the computer supported collaborative problem solving to foster student's ability to produce new knowledge and creative solutions, instead of re-producing and simply applying what was taught by the teacher. This approach is the outcome of a joint research activity in four EU countries, carried out by psychologists, pedagogists and computer scientists in school, university, R&D and software evaluation.

Although it is broadly accepted that computers can support collaborative problem solving; it is indeed a matter of fact that putting into practice the theoretical concept above stated in a real classroom's problem solving activity is not an easy task to accomplish. The first requirement is to make visible the structure and context of the problem students are required to solve, that is to "embody" the process of collaborative problem solving interaction is crucial. The interaction between different perspectives leads to more in-depth thinking, to manage information but also to participate in the process of sharing information through discussion and argumentation (Ligorio et al., 2009). These requirements also affect the management of time constraints, materials, participation and group-working in classroom. Collaboration requires communication between participants (students and teacher) during their attempts to solve problems, in order to reach shared understanding about what the questions means, about how to answer it and checking answers, and about how to coordinate how they will work together: who will do what and when? Such a coordinated collaboration is actually what a collaborative environment could enhance.

From this perspective, the educational focus is on the development of collaborative, reflective and creative skills rather than on learning the ability to solve specific problems, the latter becoming a conceptual tool to experience those skills. Thus, in this study the concept of collaborative problem solving is used in a broader sense, including a wide range of those collaborative activities in which students must analyze, apply, share, make decisions, argue and discuss, summarize, etc. to achieve a common solution to a real-life problem. This vision has been instantiated in a new collaborative environment, named CoFFEE.

2. A DIGITAL FACE-TO-FACE COOPERATIVE ENVIRONMENT

CoFFEE (Cooperative Face2Face Educational Environment) (De Chiara et al., 2007; Manno et al., 2007) is an open-source suite designed to enhance multi-modal, face-to-face and computer supported, collaborative problem solving. CoFFEE has been already used in several studies, testing a wide range of collaborative problem solving pedagogical activities (Ligorio et al., 2009; Enriquez et al., 2008). A brief overview of CoFFEE tools and features will be now provided in order to describe the digital educational environment in which the case study has been situated.

CoFFEE is a software suite - based on Eclipse Rich Client Platform - made of five main applications (Figure 1). The **CoFFEE Controller** is the teacher application that coordinates class' activities, while each student runs a **CoFFEE Discusser** client application. The classroom activity is described in a XML *session* file (that is a sequence of steps including a set of tools), managed run-time by the CoFFEE Controller. A session can