

## Chapter 5

# The Role of Multi-Agent Social Networking Systems in Ubiquitous Education

### Enhancing Peer-Supported Reflective Learning

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#### **ABSTRACT**

*Knowledge it could be argued is constructed from the information actors pick up from the environments they are in. Assessing this knowledge can be problematic in ubiquitous e-learning systems, but a method of supporting the critical marking of e-learning exercises is the Circle of Friends social networking technology. Understanding the networks of practice in which these e-learning systems are part of requires a deeper understanding of information science frameworks. The Ecological Cognition Framework (ECF) provides a thorough understanding of how actors respond to and influence their environment. Forerunners to ecological cognition, such as activity theory have suggested that the computer is just a tool that mediates between the actor and the physical environment. Utilising the ECF it can be seen that for an e-learning system to be an effective teacher it needs to be able to create five effects in the actors that use it, with those being the belonging effect, the demonstration effect, the inspiration effect, the mobilisation effect, and the confirmation effect. In designing the system a developer would have to consider who the system is going to teach, what it is going to teach, why it is teaching, which techniques it is going to use to teach and finally whether it has been successful. This chapter proposes a multi-agent e-learning system called the Portable Assistant for Intelligently Guided Education (PAIGE), which is based around a 3D anthropomorphic avatar for educating actors ubiquitously. An investigation into the market for PAIGE was carried out. The data showed that those that thought their peers were the best form of support were less likely to spend more of their free time on homework. The chapter suggests that future research could investigate the usage of systems like PAIGE in educational settings and the effect they have on learning outcomes.*

DOI: 10.4018/978-1-60566-703-4.ch005

## INTRODUCTION

E-Learning is a term that describes electronically supported information systems that seek to impart knowledge. Or is it not as clear as that? Brown & Duguid (2002) ask whether there is something that the term knowledge catches that information does not and goes on to talk about networks of practice where actors within them have practice and knowledge in common. Mantovani (1996) suggests that knowledge is something that is constructed through social context and Suchman (1987) argues that plans, which can be seen as cognitive structures, are resources for action, suggesting that they are what affect the practice of an **actor**. These authors would seem to suggest that **knowledge** is what groups of actors construct through their individual interpretations of the information they share during their participation networks of practice.

Educational institutions that use electronic means to deliver their learning can be considered to be e-learning **networks of practice**. The use of e-learning systems in these networks opens up the possibility of increasing the flow of information and the use of knowledge, where the participants can support each other as critical friends. Such e-learning systems can make use of peer-assessment techniques, which can enhance self-directed learning and reflection (English, Brookes, Avery, Blazeby, & Ben-Shlomo, 2006). One social networking methodology that can achieve this is the Circle of Friends, which has the potential to act as a learner's list of approved peers, who could peer-assess their work critically and fairly. The **Circle of Friends** fits into a long history of using the Internet as an environment for developing relationships and increasing sociability (Weng, 2007). The first social networking service on the Web was Classmates.com, which launched in 1995 and used the Old School Tie social networking method, which is defined as a method for building networks of users using the schools and universities they graduated from. This was

followed in 1997 with the launch of SixDegrees.com, which utilised the Web of Contacts model, which is defined as a technique for displaying social networks using social networking analysis that the user doesn't manage it. The advantage of the Circle of Friends, which was developed in 1999 as part of the Virtual Environments for Community and Commerce (VECC) Project (Bishop, 2002; Bishop, 2007a) is that it allows the user to manage their network and decide who they want to be friends with. The 2001 implementation of the Circle of Friends as part of Llantrisant.com allowed users to classify their friends according to whether they trusted them or not, combining it with the Circle of Trust that was also developed in 1999. One of the potential problems of the Circle of Friends is that it might promote "friendship marking", which B. L. Mann (2006) defines as peer over-marking where there is a reluctance to provide critical comments and suggest that such problem may not be easily overcome by using online peer assessment. Understanding how people learn through peer-assessment and the role of technology such as the Circle of Friends in enhancing the learning outcomes of learners requires a deeper understanding of human behaviour within networks of practice.

## BACKGROUND

Understanding networks of practice draws on various aspects of information science, including emerging fields such as post-cognitive psychology. It has been argued that there should be a framework for understanding actors based on ecological perceptual psychology (Kytta, 2003). It is quite clear that any model to explain the behaviour of **actors** that ignores the possibility of direct perception, or one that ignores the role of the environment assuming that actors are wholly self-motivated and independent of their environment cannot fully explain the behaviour of actors in either physical or virtual environments. The **Ecological Cogni-**

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