Towards a Learning Ecology using Modest Computing to Address the 'Banking Model of Education'

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Abstract. It is suggested that most learning technologies used in higher education reinforce what is known as the *banking concept of education*. Teachers and designers often give too much importance to results and content delivery. We explore the role of learning technologies to promote students' meaningful learning, critical thinking and collaboration, as well as teacher's awareness and orchestration. Our approach aims to bridge the gap between principles of pedagogy, student modelling, modest computing and usability. We will show the applicability of our approach as a learning ecology including in three scenarios: face-to-face, remote, and mobile learning environments.

Keywords: Design ·Modest computing ·Learning ecology ·Banking education

1 Introduction

It has been posed that most learning technologies used in higher education courses reinforce what is known as the *banking model of education* [2]. This term was first used by Freire [3] to describe the type of teacher-student relationship where the former attempts to *deposit* content into the latter. Students are receivers of information rather than critical thinkers [3]. Teachers and designers of learning technologies, often inadvertently, give more importance to the results and the content rather than the process of meaningful learning [6]. We propose the development of a learning ecology to promote students' meaningful learning, critical thinking and collaboration, as well as to enhance teacher's awareness and *orchestration* [1]. We refer to learning ecology as the series of technologies, practices and other contextual factors underpinning student's learning opportunities distributed across multiple spaces. Our research aims to show how the particular affordances of learning technologies can be exploited by teachers and designers to define and enact learning tasks that address the banking model of education by promoting collaboration, dialogue and problem-solving skills.

2 Proposed Approach and Work in Progress

Figure 1 shows the main elements of our approach. The first element is the *Theoretical Layer*. This includes the pedagogy and learning theories we ground upon. For example, we ground on Freire's ideas [3] that propose ways to tackle banking educa-

tion through teacher-student dialogue and problem-posing collaborative activities. Various tools that afford these activities have been presented in the ITS/AIED community. This approach is closely related to other well established principles such as the promotion of meaningful learning (e.g. Novak's concept maps) and constructivism [6]. Our second layer aims to bring those theories to practice, into real learning settings. This includes the metaphor of *orchestration* [1]. This is an usability approach that highlights the role of the teacher and technology in terms of coordination and awareness. In addition, we aim to align to the idea of *modest computing* [1] which proposes practical ways to exploit the affordances of technology to make them useful for teachers and learners, even if complexity of the technical approach is minimal.

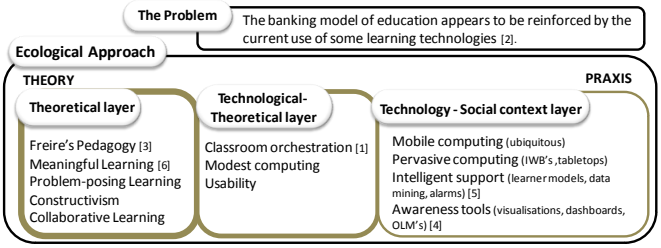

Fig 1. Our three layered approach: educational theory, orchestration and technologies.

Finally, we aim to integrate the *Technology-Social context layer* with the theories, including the use of *intelligent* tools (e.g. as suggested by McCalla [5]; data mining, automated alarms and learner models), or even simpler approaches such as student's data visualisations and teacher's dashboards (modest computing) [4] that can provide enough support to help teachers and students enhance their dialogical relationship. These tools complement a number of emerging technologies that are currently being used for teaching and learning in ubiquitous (e.g. mobile computing), pervasive (e.g. tabletops and interactive whiteboards) and remote (internet-based) environments.

The work will explore the applicability of our approach as a learning ecology in, but not limited to, three potential scenarios: a face-to-face pervasive setting for small-group problem-posing activities [4]; an open learning system for remote collaboration and a mobile ubiquitous environment. From the teacher's perspective our work seeks out to provide them with dashboards that help them *orchestrate* the technology, *monitor* student's progress and receive automated alarms of student's inactivity.

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