

Chapter 24

The Importance of a Collaboratory: Using Collaboration Software to Engage and Assess Students in Computer–Screen–Based Tutorials

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ABSTRACT

Researchers have identified active collaborative learning and membership in learning communities as factors that facilitate the engagement of learners. In the reported student engagement study, a commercially available software utility was used to establish such an environment in a computer laboratory. This chapter addresses the following issues: will collaborative learning result in more student engagement and what type of software will support such activity? The collected data includes anonymous survey responses, mean marks for assessable components, and tutorial attendance figures for 2011 (pre-intervention) and 2012 (post-intervention) and 2013 (modified content with post-intervention style delivery). Freeform responses in the anonymous student survey were positive towards the experience. In 2012 with respect to those of 2011, mean assignment and tutorial participation marks for the students improved, while those for other assessable components appeared to have worsened. Student engagement, as reflected in tutorial attendance and assignment marks, were better in 2012. In 2013, the study was repeated with the focus of the tutorials changed to group problem solving with the tutorial participation reflecting student contributions during such sessions. The mean marks for the exam, the laboratory participation and for the course improved over those for 2012 and 2011, respectively. The other means slightly improved over those for 2011 but were slightly worse for those for 2012.

DOI: 10.4018/978-1-5225-2584-4.ch024

INTRODUCTION

Active collaborative learning, as well as membership in learning communities, have been identified by researchers to engage learners (Leach & Zepke, 2011). Donovan and Loch (2013) argue that students regard collaboration very highly, as it enables them “to observe other students solving problems, and to receive prompt feedback on misconceptions” (p. 10). Furthermore the consequential formative feedback received by the attending students, from each other as well as from the academic, has been found to have the greatest positive consequences on their learning (Bull, Jackson, & Lancaster, 2009; Koile & Singer, 2006). In general, the evidence is there “that active and collaborative learning techniques enhance student learning ... [and] reduce attrition” (Loch, Galligan, Hobohm, & McDonald, 2011, p. 941).

These are the research questions addressed by the student engagement study reported in this chapter:

- Will the students be more engaged, hence perform better, if they have the opportunity to collaboratively participate in a learning community (such as a tutorial)?
- Will the use of collaboration software, which facilitates the monitoring and sharing of student activity, support the establishment of such a community?

BACKGROUND

As demonstrated by others in the literature, learner-centred education can be enabled with the integration of tablet PCs for student use in variety of face-to-face venues (Loch, et al., 2011). Previous investigations by the author have shown that experiential learning of basic electronics, using circuit simulation software, such as *NI Multisim* (<http://www.ni.com>), for both individual and group study, facilitates student engagement with content and deep learning (Banky, 2005, 2008). Besides tablet computers, technologies such as Learning Management System (LMS), instant messaging, text messaging, email, collaborative/conferencing technologies, mobile (or cell) phones for voice calls and internet access, social networking sites, virtual worlds, blogs, wikis, online multi-user computer games, podcasts/webcasts, social bookmarking/tagging, software used to create audio/video materials, presentation software, data analysis software, Google docs, e-portfolios, GPS tagging, library search engines, internet search engines, RSS feeds, interactive whiteboards, and web development software have been applied to improve student engagement (Gosper, Malfroy, McKenzie, & Rankine, 2011).

The intervention described in this chapter was an attempt to expose the students not only to problem-solving activities but to give them the opportunity to “explaining aloud” associated concepts in the hope that they will adapt this learning strategy while solving problems from their text book; because “research across a variety of domains has consistently supported the findings that students learn better when they explain to themselves [or to others] the material they are studying” (Fonseca & Chi, 2011, p. 296).

The venue chosen for the reported student engagement study, and shown in Figure 1, not only had twenty tablet computers, each with an installed copy of the simulator software, but also a commercially available collaboration software utility, *NetSupport School* (<http://www.netsupportsoftware.com>). The latter was used to establish a collaborative environment in the teaching space. This software utility permits the monitoring, by an academic, in real-time over a local-area network, the on-screen activities of students in the computer laboratory. Furthermore, it also enables the display of either the academic’s or a student’s computer desktop on the venue’s data projector(s) and/or video screen(s). The venue setup

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