Chapter XXI

CommuniCubes: Intermediate Technology for Interaction with Student Groups

Stephen J. Bostock, Keele University, UK
Julie A. Hulme, Keele University, UK
Mark A. Davys, Keele University, UK

Abstract

This chapter describes an innovation supporting interaction between a teacher, and a student group. It argues that there are five modes of engagement for students in groups. The mode of group interaction with a teacher can benefit from mediation by a voting, or response, technology. An exploratory pilot study of a novel, nonelectronic technology to support this mode is described. CommuniCubes enable every student in a group to vote individually on options presented to them. They were used by a large group in a stepped, lecture theatre, and by smaller groups in seminar rooms. The evaluation found the overall student response to be positive. The reasons students gave for CommuniCubes being both helpful and unhelpful to their learning are summarized. The costs and benefits of this technology and electronic voting devices are compared, and the issues for further research are discussed.
Modes of Engagement

There is a continuing dilemma in higher education. The didactic lecture continues to be widely used with large groups, yet the evidence is that it is ineffective for student learning (Bligh, 1998). It is used for reasons of tradition, efficient use of faculty time, and existing infrastructure. “For the individual learner, the lecture is a grossly inefficient way of engaging with academic knowledge. For the institution it is very convenient, and so it survives” (Laurillard, 1993, p. 109). If lectures are only verbal information transmission, then student activity is restricted to listening and note-making. In contrast, we know that understanding requires “active learning” (Biggs, 2002): learning activities and interactions with other learners. In most universities, face-to-face interaction between a student and a teacher is seen as essential to the quality of the learning experience. Theories of student learning stress the necessity of interaction such as dialogue or discussion (Laurillard, 1993; Mayes, 2001), but as a class size grows, so the amount and quality of interaction with individuals is diluted.

There have been numerous responses to the problem of organizing learning activity and interactivity in large groups (Davies, 2003; Gedalof, 1998; Smith, 1997). One is to improve the lecture’s efficiency of information transmission through improved performance and display technologies (Andreson, 1990). Another is to reduce the information being transmitted, and include individual or small group activities (e.g., Bligh, 1998, chapter 19; Brown & Manogu, 2001; Davies, 2003; Race, 2000, chapter 2). Another is to use technology to facilitate responses to structured questions from all the students in a group, typically through electronic voting handsets. These personal response systems (PRS) vary in sophistication from those supporting simple, anonymous voting, to those providing individual feedback (e.g., d’Inverno, 2003; Draper, 2005; Draper & Brown, 2004; McCabe, 2004; McCabe & Lucas, 2003; Wit, 2003).

There are numerous lists or classifications of teaching/learning activities (e.g., Biggs, 2002; Conole & Oliver, 1998; Hegarty, Bostock, & Collins, 2000; Laurillard, 1993; Shuell, 1992), some fine-grained and others broader. The following list seems especially appropriate for face-to-face teaching. Concentrating on student engagement in the teaching/learning situation, we suggest there are generally five types of teaching/learning activities (Brown & Manogu, 2001), five modes of student engagement in groups.

1. **Transmission/reception:** A didactic transmission of information involves the teacher talking, and possibly writing notes (chalk and talk), or displaying a transcript. This places the students in a passive role, with their cognitive activities limited to listening and taking notes, which, for most students, is unlikely to result in understanding at the time.

2. **Multimedia transmission/reception:** Enhanced presentations use additional media to bring impact and realism to the information transmission. This might take the form of integrated, digital, multimedia presentations, but not necessarily: for example, demonstrations, images, sounds, video, and debates between tutors. Students see and hear more realistic or more applied situations, in more memorable