

Learning Spaces Toolkit: Teaching & Assessment Essentials

On Whiteboarding

A look at how whiteboards can enhance engagement with learning and be used to develop graduate capabilities

Whiteboarding and collaborative learning studios

Heather Lonsdale from Curtin University, Perth, Australia, visited talks about her 'Physically active collaborative learning in mathematics' project (presentation to Sheffield Hallam University Department of Maths, 2015). Her stand up classroom approach reflects the 'La Trobe method' as discussed by Seaton et al. (2015).



Students in a South African University using Whiteboarding techniques (Jeff Waldo)

'Tutorial-boards' – pedagogy for student whiteboarding

Seaton *et al.* (2015) connect whiteboarding to the 'flipped classroom' concept, in which the expectation to take part in whiteboarding activity promotes pre-class engagement and serves as an diagnostic activity necessary in flipped teaching. "At its core, in the flipped classroom pedagogy, face-to-face time is reserved for active engagement with the material, not as homework problems, but by discussion and interaction with peers and teachers." In their context, "problem sheets are handed out at the start of the class, and students work on them there" (p. 100), though they note variations on this even in Maths. They say that, "making connections to peers has been identified as a strong predictor of persistence and retention at university and cite student testimony confirming that the 'board tutorials' support this. The tutorial-board approach,

- Breaks down barriers: student to student;
- Breaks down barriers: student to teacher;
- Develops generic skills: group work and communication;
- Fosters authentic preparation.

"Everyone is compelled to be active in class: the low-ability student, the top student, and the ones in the middle; the students who prepare and the students who do not prepare." (p. 112)

Schaffner *et al.* (2015) refer to their own experience of whiteboarding,

At the start of the tutorial the class would be given a worksheet of problems and we would proceed, in pairs, to try to solve them on the blackboards. To students used to a regular dose of lectures followed by relatively large practical classes, where it was easy (and sometimes convenient) to be overlooked, this was initially a daunting experience. This was particularly so because our problem-solving techniques, or

Learning Spaces Toolkit: Teaching & Assessment Essentials

lack thereof, were always on public display... we began to discuss, share, and even passionately argue about the mathematics we encountered in our tutorials. We were also utterly engaged; it was impossible not to participate actively.

In this recent work Schaffner *et al.* first determined whether working at whiteboards, as opposed to working on similar problems in a traditional sit-down lesson, made any difference to student learning. Then, they structured the whiteboarding lessons carefully to determine how 'flipping' and the type of problems affected student learning. They found the following benefits. Whiteboarding,

- makes student thinking visible;
- provides immediate and effective feedback;
- encourages epistemological discourse;
- develops epistemological resilience;
- demands participation.

These support findings by Maclsaac and Falconer (2004) who say whiteboards (including portable huddle boards),

- provide a concrete venue to ground student discussion of experiments and problems;
- foster student dialog by providing venue, expectations, opportunity as regular classroom practice;
- foster alternative representations of problems by sketches, graphs, system maps, motion diagrams, pie charts, equations, etc.;
- greatly increase student dialog;
- use class time to discuss ideas rather than present them and to think maths and science rather than watch it done;
- engage students in a collaborative learning community, allowing them to,
 - practice step-by-step problem solving strategies;
 - present, explore, critique and check one another's work during this process.
- Examples from the InQbate CETL at the universities of Sussex and Brighton explored creative pedagogies in which students were facilitated and self-directed around project-based learning in whiteboarding rooms. Reports note how academic staff found it difficult to break new ground and move to a student-centred pedagogy.

There is a good literature on studio-based learning in which open spaces are described as the basis for fostering learning communities (e.g. Sims & Shreeve, 2012). Taylor (2009) recognises that traditional classrooms do not facilitate active learning and that colleges and universities are increasingly converting traditional classroom space into studio space. Research indicates positive effects on student learning when studio classroom space is combined with active learning pedagogy. Taylor suggests that studio space can launch teachers into active learning

Learning Spaces Toolkit: Teaching & Assessment Essentials

pedagogy, "Active learning ...improves problem-solving, collaboration, and communication abilities as well as motivation to learn." (p. 217)

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Last updated: 28 October 2016

Teaching & Assessment Essentials is online at: <https://blogs.shu.ac.uk/teaching>