

Active Learning



John Amos Comenius (1592-1670) held that students would learn more if teachers spent less time teaching, and the students spent less time passively listening. In the frontispiece to the *Didactica Magna* (1628) he writes:

*'Let the long and the short of our didactic be to investigate and discover the means for teachers to teach less, and learners to learn more.'*¹

Active learning is a term more widely-used in the context of school (primary and secondary) education than in tertiary education, but is growing in popularity within universities. It can be used to embrace almost any learning activity which involves the active participation of the student. At one end, project work is obviously 'active' but at the other, so is the use of personal response systems in lectures. Many people interpret active learning narrowly as problem based learning (PBL) but this is not the intended implication. PBL is simply one among many active techniques. Another general point is that an active learner will frequently be asking questions (of him/herself and of the teacher). The term co-operative learning, with its implication of students exchanging information and helping each other understand, is often used almost as a synonym for active learning.

Examples of active learning techniques include buzz groups, concept tests, personal response systems 'clickers', PBL, project work, group work, case studies, field work, mud cards, design-build exercises and the use of simulations.

Conclusions that can be drawn from the literature show that active learning:

- encourages deep rather than surface learning
- is encouraged by the use of spaces which are not conventional raked lecture theatres
- encourages students to take ownership of their own learning
- tends to be more resource intensive in terms of staff time, running costs and capital investment than 'chalk and talk', but
- can reduce the number of lectures, releasing staff time for more active engagement with students

Resources

For more examples on active learning techniques see the article 'Active Learning in Materials Science and Engineering' by Goodhew and Bullough² with further details and examples of active learning in practice at http://www.liv.ac.uk/engdept/active_learning/index.htm

There is a European online forum on Active Learning in Engineering which can be found at <http://www.ijee.dit.ie/forum/actlrn/ForumMain.html> The international CDIO (Conceive-Design-Implement-Operate) initiative (at www.cdio.org) supports many active learning techniques and has several UK members from whom advice can be sought.

¹ G. Macdonald Ross, www.philosophy.leeds.ac.uk/GMR/teachingepubs/WhyL&T.doc

² Active Learning in Materials Science & Engineering. Goodhew P.J., Bullough T.J. In proc. of CDIO Annual Conf. 06-09 June 2005, Kingston, Ontario.

How can we help?

UKCME can help by:

- Putting you in contact with one or more practitioners of any particular active technique;
- Running an awareness-raising workshop in your Department, Faculty, School or College.

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Higher Education Academy Resources

- There is a 'Guide for Lecturers' available on the HEA website entitled *Teaching Materials Using Case Studies: Assessment and Evaluation of Practice*. The guide explores the use of the case-based approach to support engineering education and, more specifically, their role in Materials Science related programmes. It looks at the 'traditional' Materials Science and Engineering courses as well as the more multidisciplinary courses (e.g. Biomedical Materials Science, Sports and Materials Science etc.). Further details can be found at <http://www.materials.ac.uk/guides/casestudies.asp>



- The HEA has been actively involved in the inception of the Centre for Active Learning (CeAL), an international centre of excellence reviewing, developing, promoting and embedding inclusive and exemplary active learning for students in geography, environment and related disciplines. Details can be found at <http://www.glos.ac.uk/ceal/index.cfm>
- The HEA is also coordinating projects in active learning in computing (ALiC) to shift towards far higher levels of active student engagement in computer science. For more information visit <http://www.dur.ac.uk/alic/>