

[P2] What's a CETL all about?

Karen Moss and Neil Macfarlane

Centre for Effective Learning in Science (CELS)

School of Biomedical and Natural Sciences, Nottingham Trent University

Karen.Moss@ntu.ac.uk

INTRODUCTION

CELS is one of the 74 HEFCE funded Centres for Excellence in Learning and Teaching (CETL), one of only half-a-dozen CETLs with a science theme and the only one dealing with both traditional 'core' sciences – chemistry, biosciences and physics - and the emerging interdisciplinary sciences such as forensic science and sports science.

THE AIMS OF CELS

Creating a new image for science as:

Relevant

Accessible and

Achievable

within both HE and schools

Based on our excellent record in teaching science within HE and our nationally recognised widening participation activities, we are creating a centre to enable teams to develop and trial new approaches to teaching and presenting science to both communities.

THE APPROACH

Create TIP-TOP teams and a building to house CELS

- Teams for Integrated Projects across Science (TIPS)
- Teams for Outreach Projects in Science (TOPS)

- Work with students, NTU's Progression Partnerships and the Royal Statistical Society's Centre for Statistical Education (RSSCSE)

[Team members will have sabbaticals to develop their project area]

The CELS building will form the nucleus of a science-education development centre: providing both space for staff seconded to the centre to develop and experiment with materials/ approaches; and a venue for dissemination events – both locally and nationally. It will include:

- a 100 seat lecture theatre
- 3 seminar rooms
- IT suite
- School lab
- Offices for seconded staff
- Meeting and exhibition space

We want to:

- Use best practice in educational research to design better ways to teach science
- Increase the number of science students and support the learning of science students locally
- Provide a significant new resource base for science teaching nationally

OUR OBJECTIVES

1. **CELS will develop new materials for teaching scientific concepts using existing models of learning:** eg Context-Based Learning (CBL); Concept Learning (CL), Problem-Based Learning (PBL), by devising materials in a range of formats –including e-learning (VLE, Neural Networks), to help students understand and engage with science concepts at a deeper level. Our rationale is that science concepts often focus on abstractions and foster in students the idea that science is idealized and divorced from the real world. Such disconnection makes it difficult for students to apply theories to real life issues and problems. There is evidence that for deep learning to occur students should be able to connect the new topic to their previous experience. CELS needs to help lecturers understand conceptual development in students - particularly concrete and abstract thinking - in order for staff to develop effective learning materials. A focus of CELS will be application of appropriate E-learning tools, in particular the locally developed, highly innovative and interactive learning system the *Neural Network*.

2. **CELS will develop individualised instruction materials to support the learning of entrants to HE with non-standard backgrounds:** Recent research has identified differences in syllabus content between Access courses and 'A'-level (A2) leading to gaps in knowledge and conceptual understanding. This also affects interdisciplinary programmes where candidates' entry qualifications include a mixture of AS and A2 sciences. Individualised instruction materials will be written to support specific student needs and achievement of desired learning outcomes, building on our extensive experience in physics, eg FLAP (Flexible Learning Approach to Physics) and STOMP (Software Teaching Of Modular Physics).

3. **CELS will apply the outcomes of FDTL Assessment projects to all subject areas in science, focusing on formative assessment and portfolios:** outcomes from EFEL (Biosciences) and related cognate FDTL projects such as FAST (Formative Assessment for Science Teaching) will be applied to all science areas locally –through development of assessment criteria, assessment briefs and the use of formative feedback. In particular, CELS will look at the research into more modern assessment methods, which encourage a profile approach to assessment, for example work on portfolios. This allows a focus on process rather than product and concentrates on deeper learning skills such as analysis, synthesis and evaluation, dovetailing with PDP developments.

4. **CELS will raise the aspirations of local people to enter HE through outreach work** including developing a credit rated scheme for students working in schools; experiments to improve interest in, and understanding of, science; and outreach work in all science areas. CELS will build on our existing programmes of activities and links with Progression Partnerships and the RSSCSE schools-based projects eg *Experiments at School*.

5. **CELS will develop methods for evaluating effectiveness of different learning approaches,** both quantitative and qualitative methods will be investigated: CELS will critically evaluate the differences between quantitative, qualitative, absolute and relative measures of the effectiveness of a course in achieving its learning objectives, and demonstrate whether its effectiveness can be measured.

If you are interested in any of these developments, would like to find out more or get involved then please contact: **Dr Karen Moss**, the Director of CELS, at the above address.