

## Learning to teach physics – Online

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**Abstract:** The University of Canberra Schools of Teacher Education and of Electronics and Telecommunications Engineering have established a new Graduate Certificate in Physics Education. The course has been designed to meet the needs of the NSW Department of Education and Training (DET) and provides an integrated combination of physics content knowledge, laboratory skills and pedagogic theory, specific to the teaching of physics, which will enable science educators to teach physics at secondary level to year 12 and take a leadership role at the school level in the planning and delivery of Preliminary and HSC Physics courses.

The course is to target established science teachers with science degrees and teaching qualifications. These teachers will be sourced from anywhere in NSW and consequently the course will be delivered online. All teachers taking the course are fully funded by the NSW DET. Enrolments for 2002 are 32 with the prospect of a similar number for 2003. Designing such a course is a significant responsibility, as it could influence how physics will be taught in over 60 schools in NSW in the immediate future.

In this poster we will discuss the intended objectives and content of the course, our philosophy behind the course content as well as the technicalities of how the course will be presented online.

## Real and virtual experiential learning on the Mekong: Field schools, e-sims and cultural challenge

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**Abstract:** This poster describes two innovative and linked approaches to teaching the environmental geography of a region remote from students' normal experiential options. The first approach is field-based learning through Field Schools carried out over five weeks as a collaboration between Sydney University students and students in Vietnam, Laos and Thailand. The second approach is a structured role-playing web-based simulation exercise (e-sim) on Mekong Basin environmental management challenges, run over four weeks for students at three Australian universities from both social and physical science backgrounds (human and environmental geography; groundwater management and engineering). All 20 students who participate in the Field School also go on to join the approximately 150 students who are part of the e-sim.

Both the Field School and the e-sim have multiple objectives, including substantive learning about development and environmental challenges as experienced and dealt with by different social actors in the six countries of the Mekong Region and by Australian and other external interests in that region. Another significant objective is to give students experiential skills in dealing with cultural difference, particularly in the field of environmental and natural resource management. Two dimensions of culture are part of this process: the cultures of different societies and countries, and the discipline cultures of the social and natural sciences.

## Teaching and learning contemporary physics concepts online

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**Abstract:** For about 15 years Kansas State University has offered a course called Contemporary Physics which targets secondary education and other science majors. The course is strongly activity based, and the students work through a series of explorations and applications to build an understanding of energy conservation, the particle and wave nature of electrons, the wave function and other quantum physics concepts. In order to make this course more accessible to under-



prepared physics teachers in Kansas we have adapted this course to an online format. We have made every effort to preserve the successful teaching and learning environment of the existing course in the online version by including computer-based and hands-on activities, interaction with fellow students and individual feedback. The first group of students has completed the online course and this poster will present some results of the evaluation on student learning and experiences using this delivery method.

Additional information is available at <http://www.phys.ksu.edu/perg/>.

[This project is supported by the National Science Foundation under grant CETP 98-76676, Eisenhower Professional Development Program and the United States Department of Education 'Preparing Tomorrow's Teachers to use Technology' Grants.]

## **A web-based resource for radiation safety courses**

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**Abstract:** CQU runs regular courses for intending Radiation Safety Officers from a variety of industry sectors. Participants have varying levels of prior knowledge to bring to the intensive three day program. To cater for those students whose prior knowledge of radiation physics is weak the print-based media for the course have been converted into a CD-ROM incorporating animations, worked examples, progress checks and self-assessment items. This allows the students who need extra study time on the basic physics concepts to cover as much as possible of the material before commencement of the course. The first course sessions can then concentrate on students' individual problems and the required program content. This approach also allows the student with strong prior learning to submit an assessment test and be awarded a partial course exemption.

Although the material selection is specifically for Radiation Safety training the CD-ROM has also been used in bridging courses, as reinforcement for first year students, and within our Engineering Technology Instrumentation program. The number of students who have used the CD-ROM is not statistically significant but student feedback on the material is very positive.

## **Just how different are they? Learning physics in the wake of the NSW HSC syllabus changeover**

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**Abstract:** In February 2001 we began research into the different ways incoming first year students experience their studies in physics. We designed a survey instrument to measure the 2001 cohort of students' approaches to learning, their ideas about the nature of the subject, their perspectives on the learning environment at university and their performance on assessment.

Interrelations between these different factors form a broad picture of student learning and groups of students with distinct patterns of experience have been identified. In 2002 we are repeating this study with the aim of examining any qualitative or quantitative changes in these patterns of experience that coincide with the changeover to the new NSW Higher School Certificate syllabus. An understanding of our students' experiences will provide the necessary background to review our own tertiary physics courses and tune them to meet the needs of future students.