

IMPROVING UNIVERSITY TEACHING
NATIONAL TEACHING DEVELOPMENT GRANT PROJECTS (INDIVIDUALS)
1997-98

Commonwealth of Australia 1998
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The above Website provides information on 1998 National Teaching Development Grants (Organisational) and 1998 Staff Development Grants

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INTRODUCTION

This publication is the fifth in the series, *Improving University Teaching*. It describes the projects selected for funding under the 1997 National Teaching Development Grants (NTDG) program and the 1998 NTDG (Individuals) program.

In late 1996, the Minister for Employment, Education, Training and Youth Affairs, Senator Vanstone, established the *Committee for University Teaching and Staff Development* (CUTSD) with a budget of \$20 million over three years. The Committee, which commenced operation in early 1997, is charged with identifying and promoting good teaching, learning and assessment practices in universities; encouraging and fostering innovation in higher education teaching; and providing staff development opportunities for academic and administrative staff. In doing so, CUTSD is building on the work developed by the former Committee for the Advancement of University Teaching (CAUT) and the Commonwealth Staff Development Fund (CSDF).

A substantial part of CUTSD's responsibilities is the administration of the NTDG program which is being expanded from late 1997 to include project grants not only for individual academics but also for organisational units in universities. The Committee also administers the National Teaching Fellowships program and grants allocated for academic and administrative staff development (the Staff Development Grants program).

1997 National Teaching Development Grants

The 1997 NTDGs were approved by Senator Vanstone on the recommendation of an Ad Hoc Selection Committee which the Minister appointed in 1996 to assess 1997 applications in the period before CUTSD was finalised, thereby enabling successful applicants to begin their project work in early 1997. The Committee, chaired by Professor Michael Jackson, included some former members of CAUT and others who were very familiar with the NTDG program.

Of the 480 applications received, 88 were selected for a grant. To ensure that each application was considered fairly, the rigorous assessment processes developed by CAUT were closely followed. All applications were assessed against the selection criteria specified in the guidelines provided to applicants. Unsuccessful applicants received feedback on their proposal.

1998 National Teaching Development Grants (Individuals)

The 1998 NTDG (Individuals) were approved by Dr David Kemp, the current Minister for Employment, Education, Training and Youth Affairs. Of the 258 applications received, 72 were recommended for grants. This drop in number of applications reflects the expansion to Organisational grants referred to above, the results of which will be published separately in 1998, along with results of 1997 and 1998 Staff Development Grants.

The projects outlined in the following pages offer a range of exciting initiatives. There is, overall, a strong focus on innovations which are potentially applicable across institutions and disciplines, with a number of projects involving actual collaboration between faculties or universities. These partnerships are particularly encouraging, given the key role played by ideas-sharing and dissemination in the ongoing quest to improve the ways in which we help our students to learn.

CUTSD has important tasks ahead, not the least of which is sustaining and enhancing the impact of the NTDG program on the higher education landscape. I am mindful of the debt we owe to CAUT

and to the influence of that Committee's work in changing the ways we approach funding university teaching developments. Finally, I would also express my appreciation of the work undertaken by the Ad Hoc Selection Committee and the Panel members assisting CUTSD.

Ingrid Moses
Chair, CUTSD

1997

NATIONAL TEACHING DEVELOPMENT

GRANT PROJECTS

HUMANITIES

Non-English Languages

1. Internet-based language learning

The project aims to develop the language proficiency of students learning Korean by using the Internet to provide a purposeful and meaningful context for language studies.

The project will transform a class into a virtual magazine company which publishes on the World Wide Web (WWW). It will be based on student-centred learning with the students themselves being in charge of the various activities of the publishing company. While they are developing their language proficiency, students will acquire generic and transferable skills such as computer, interpersonal communication and teamwork skills. The project will also pioneer a new way of developing multimedia learning materials where the expertise of the teachers is combined with the interest of the students in generating new language learning materials, a process that will be applicable to other language courses.

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2. Teaching writing skills in French through a WWW mediated collaborative course

The project seeks to exploit the World Wide Web (WWW) to improve the writing competencies of advanced foreign language learners.

Using the WWW to establish an inter-university resource network, the project team will pool language teaching expertise and existing instructional materials to create a comprehensive set of interactive writing tutorials. Exercises will target dictionary usage, English/French translation, error identification and correction, textual cohesion and various forms of text manipulation. While the design and implementation of the project will be developed and tested with second and third year advanced level students of French, the methodology and resulting WWW formats and templates will be applicable to the teaching of writing in other languages.

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3. A computer-based resource for developing Italian writing skills

The project will produce a computer-based writing facility which enables rapid access to abundant examples of 'real' Italian language use. The facility will combine a word processor with a corpus of authentic texts and text-analysis software for exploring the corpus. Hence while composing at the computer, learners will be able to examine the use of words and expressions in context and borrow patterns of words for inclusion in their own writing. The project also entails the development and evaluation of a methodology for using this writing facility in both class and private practice.

The project rationale draws on recent research into second language acquisition which emphasises the promotion of learner autonomy through the development of learning strategies. Working at the writing facility, learners will act as researchers with direct access to data. This will allow them to develop not only writing skills but also learning strategies, such as the perception of similarities and differences and the formulation and testing of hypotheses. The integration of software and the methodology for using the writing facility will be directly applicable to the teaching of other languages.

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4. Preparing a CD database of Yolngu (Arnhemland Aboriginal) literature

The project will develop a CD database of all the literature published in Yolngu languages over forty years, accessible through descriptors which reflect Yolngu categories of knowledge and text and Yolngu goals for the students of their languages and cultures.

The project will help to meet the needs of intermediate and advanced students of Yolngu languages and culture who are required to study a range of Yolngu languages and to study aspects of Yolngu life, culture and history through texts produced by Yolngu writers in Yolngu languages. The program is being developed with guidance and direction from an advisory committee of Yolngu elders and educators.

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English and Literature

5. Development of a 'virtual world' of archival documents to assist professional writing students' exploration of the creative writing process

The project aims to help professional writing students understand the creative writing process through unique archival documents relating to the work of selected successful children's writers. From these archival documents, a 'virtual world' will be created so that students of children's literature and others who are interested can explore the 'sociology' of the writer.

Students will encounter learning activities on both the CD-ROM and accompanying printed guide which will, for example, assist them to develop a personal style, editing principles, and skills in creating narratives and targeting an audience. The 'experience' of the virtual world is expected to lead to the following learning outcomes for students: enhanced understanding of the writing, publishing and critical scene; strengthened knowledge of the craft in general; and an increased capacity to experiment with a wider range of writing techniques, extrapolate principles and issues relating to the marketplace and assess potential problems and new prospects.

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Fine Arts, Visual and Performing Arts and Music

6. The tertiary music student and the recorder - exploring the skills and content of an Australian contemporary recorder ensemble repertoire through a self-paced interactive learning package

The project will produce an interactive multimedia package (CD-ROM, video and written material) which enables tertiary students studying music and music teaching to learn about recorder ensemble playing.

The package will contain a video and audio recording of a respected group performing modern Australian recorder quartets composed in a variety of styles. It will allow the user to follow the music score with the group performance, and to have the option of zooming in on only one part and one player in the group. Playing suggestions made by the performers and supporting background material on the pieces presented by their composers will be included in the package.

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7. Principles of animated motion and timing

The project involves the prototyping of a computer-based interactive CD-ROM teaching resource for students of animation, multimedia arts and audiovisual media. The disc will be both a learning tool and reference resource that provides a self-contained learning environment for the study of a wide range of basic and advanced principles of animated movement.

The project takes advantage of new computer technologies that provide two essential factors for effective learning in animation timing - a time-based medium and the ability to interact with the medium. The project encapsulates fifty years of animation practice, as well as the professional and teaching experience of the Queensland College of the Arts' animation section.

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Philosophy

8. The philosophical image

The project, which is intended to enhance traditional methods of teaching philosophy, aims to compile an analytical database of electronic teaching resources for philosophy, concentrating particularly on film and television material, audio tapes, CD-ROM and network-accessible resources.

The project will employ a research assistant to analyse critically the various available resources, providing a database of the possible uses of each film, audio tape or CD-ROM. The research assistant will work under the direction of the project leaders, and will consult members of the Department and philosophy educators around Australia with regard to the kind of analysis required. The project will incorporate information gained from a pilot project funded by ANU's Teaching Development Fund.

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9. Taking theory to task: applying task-based approaches to the teaching of critical theory

The project will build on experiments in pedagogy currently being employed within the subject, *Coping with Change*, to develop a manual of suggestions for task-based tutorial exercises (including exercises involving technology).

The exercises will be indexed under a key word system organised around the key critical nubs commonly encountered in contemporary transdisciplinary critical philosophy (eg 'authorship', 'performance', 'identity', 'discipline', 'otherness'). It is anticipated that the exercises will facilitate students' learning by grounding critical theory in their everyday life experiences and helping them to develop 'proto-theoretical' ways of thinking before they encounter the established canons of critical thinkers and theorists. It is expected that the project will have widespread applicability across a range of disciplines.

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SOCIAL SCIENCES

Accounting and Management

10. A multimedia simulation of information systems auditing

The project will develop a self-paced interactive multimedia simulation for auditing students that integrates the latest computer auditing tools into case studies within a 'real world' banking environment. This approach will introduce state-of-the-art tools into auditing courses and expose students of information systems to 'real world' auditing environments and techniques.

Learners will actively explore organisational auditing to discover how to identify, observe effects of, and report on auditing outcomes such as the detection of errors and frauds. Using high quality video, sound and graphics linked to a computer-auditing language, students will develop an understanding of how auditing models are organised into appropriate strategies for different work contexts and establish better links between auditing theory and practice in case-based scenarios.

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11. Improving graduate transition and lifelong learning skills in business students

The project aims to facilitate the transition of students to work by developing a resource kit for learning the concepts and tools underlying performance in 'knowledge work' professions. The kit, which is based on new views of the changing nature of work in such professions, will encourage students to compare their abilities with those considered essential by experts, and to map out a path for self-learning both in university courses and on the job. Readings and exercises will be provided in four areas: learning and self-management tools; identifying assumptions; collaborating; and valuing.

It is anticipated that the kit will motivate and empower students to take responsibility for the further development of lifelong learning skills which are not currently taught in universities. While the kit will be trialed in existing courses in two disciplines (management and information systems), it should be useful in a wide range of courses in knowledge work professions, and in supporting independent study.

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12. Developing and teaching Aboriginal perspectives in management and administration

The project aims to address a central problem which Batchelor College and the University of South Australia have encountered in management and administration courses for Indigenous Australian students, namely, the lack of curriculum material which encompasses an Aboriginal perspective. Readings and other resources in most subjects are usually based around mainstream management texts which do not always allow understandings to be developed for Aboriginal management contexts. Furthermore, most Aboriginal students in these two institutions live in rural and isolated areas, study through various forms of flexible learning delivery and have not experienced a wide range of learning resources.

The project will develop curriculum and improve the learning materials used in four subjects across four awards by developing a series of videos and accompanying course materials. Using the insights of successful Aboriginal managers, the learning resources will be constructed in such a way as to challenge students to begin fashioning their own perspective in approaches to management and administration. By pooling resources, the two institutions aim to develop a resource which is applicable to a number of teaching situations.

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13. Applying problem-based learning to the first year accounting curriculum

The project seeks to convert the first-year subject, Introductory Accounting, to a problem-based learning format, generating materials which can be used in other universities teaching the same subject. The application by students of discovery and problem-solving strategies will allow them to explore issues which go beyond the accounting discipline, and to see the relevance of accounting to an array of business decisions.

The project is designed to enable first year undergraduate students to change their conceptions of effective learning in a subject which has traditionally reinforced rote memorisation and the application of algorithms to known exercise formats. It is expected that the adoption of the approach being developed by the project will lead to a more effective understanding of accounting, a more thorough development of skills relevant to the accounting profession, and higher student pass rates.

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14. Inside the organisation: a shell for interactive business case studies on the World Wide Web

The project aims to demonstrate and assess the potential of the World Wide Web (WWW) environment to enhance the traditional strengths of case studies and contribute to improved learning outcomes. The project will produce a generic shell for the development of interactive case studies. The shell will be developed from a hypertext case study in strategic management.

It is anticipated that the project will give students a richer and more intimate view of organisations than is possible in paper cases, allowing them to communicate with peers and tutors while navigating the case material, and to update and expand case material through access to external databases. The capacity for self-paced and self-directed learning will be enhanced and off-campus students provided with equitable access to learning materials.

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Education

15. Exemplary teaching practice in special education

The project will develop a self-paced teaching video resource and reference manual for students studying special education at the University of Newcastle to help them complete their teaching practicum subjects.

A series of six videos demonstrating the use of exemplary teaching practices in a range of special education settings will be produced. The videos and the accompanying reference manual should assist students studying internally and externally to observe practical demonstrations of special education instructional techniques, to gain some insight into matching teaching practices to the instructional needs of school students with special needs, and to integrate these teaching practices into an instructional cycle.

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16. Helping student teachers to understand foundation thermodynamics concepts

The project will design and construct a computer-based, individualised, tutorial package which aims to help science student teachers achieve a deep understanding of a key concept in thermodynamics (the nature of heat itself), introduce them to the educational worth of interactive multimedia, and encourage their thinking about the evolution of ideas in the history of science.

The package will help students to confront personal theories and will render accessible the foundation ideas inherent in familiar, everyday objects and phenomena (eg heat pumps and the weather). It will contain simple equipment and text, together with computer-based interactive multimedia (IMM).

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17. Using reciprocal peer learning

The project aims to enhance the use of reciprocal peer learning activities in selected disciplines (electrical engineering, law, nursing and management). These activities will include student-led workshops, learning exchanges, learning partnerships, formal study groups and peer feedback on self-assessments. Through these approaches, students will develop skills such as working effectively in a team, learning from and with others, and how to plan, negotiate and manage their learning.

An earlier NTDG-funded project focused on the development of materials to support student learning in these areas within the School of Adult Education at UTS. The transfer of the ideas to other disciplinary areas, however, is much more difficult than it may at first sight appear. This project is expected to lead to the development of systematic and practical guidance for students on the effective use of peer learning methods which take account of different disciplinary and learning contexts.

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18. Development of decision making for ethical practice in early childhood student teacher education

The development by this project of learning materials, involving video and computer-assisted learning packages, aims to ensure that early childhood teacher education students have the opportunity to address ethical issues which they may encounter in their professional practice.

The packages will be used in group teaching sessions, and by individuals on campus, as well as by distance education students on their own or in a tele-/video-conferencing session with their lecturer. Dissemination of the teaching packages throughout Australia and internationally is expected to benefit students, other stakeholders and the children with whom they work.

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19. Moving from transmission to inquiry and more equitable practice in the teaching of mathematics

A major task for pre-service teacher education in mathematics is to ensure that, in their own teaching, graduates do not fall back on transmission methods which they may have experienced at school.

The project will incorporate relevant cognitive theory and modelled 'constructivist' practice and also demonstrate, through the videos to be developed, how various practices of the mathematics classroom marginalise many students. Pre-service teachers will be encouraged to reflect on how the mathematical content might better be taught through inquiry or problem-solving methods which do not operate in discriminatory ways.

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20. Student teacher interns' professional development using mentoring casebook learning activities

This project will design a learning approach which helps both interns and mentors to maximise the effectiveness of the mentoring relationship.

A mentoring casebook will present a series of field-based vignettes, using video and print media. Guided group discussions and personal reflections relating to six major issues in teacher mentoring will enhance the effectiveness of the mentoring relationship and thus facilitate the development of practical teaching skills. Teacher-mentors will be given equipment for a variety of mentoring functions, including the provision of effective support, assistance, advice and feedback. Student-interns will be encouraged, through mentoring, to integrate teaching theory and practice and develop skills in reflective practice.

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21. Development of pedagogical competencies in primary teacher trainees for teaching NESB students through the use of an interactive multimedia training program

The project will develop an interactive multimedia program to provide primary teacher trainees with an understanding of the language needs of primary school students with a non-English-speaking background.

The program will be structured around a series of simulated experiences upon which teacher trainees will be required to reflect and thereby extract learning-enhancing pedagogical principles. After each cycle of reflection, trainees will be provided with readings dealing with second language learning and literacy principles. This will provide them with theory that forms the basis for further reflection upon each simulated experience. The program will provide a variety of pedagogical situations through the use of video clips, case studies, textual information and discussions on bulletin boards, and will utilise the various forms of media in an interrelated and interdependent strategy.

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22. Using the Internet to engage distance education students in communicative, reflective and critical learning

The project takes advantage of the opportunities offered by the Internet for distance education students to participate daily with fellow students in developing their approaches to learning.

Internet access will be combined with the best features of existing print media to create (for teachers studying externally a postgraduate course in Curtin University's National Key Centre for Social Science and Mathematics) a virtual learning community where communicative, reflective and critical learning occurs. The project evaluation will investigate the extent to which the Internet-based component of the course enhances or constrains the quality of students' learning experiences and outcomes so that the best mix of print-based and information technology media can be determined.

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23. Helping student teachers assess the mathematical performance of children

The project aims to address difficulties encountered by pre-service primary teacher education students in making the transition from mathematics, as they have experienced the subject at secondary school, to what is expected of them as primary classroom teachers.

A set of videos will be produced, each focusing on one space or measurement task chosen for its richness and significance and showing a sequence of individual children performing this task at a range of levels. Each of these videos is intended to act as a catalyst for pre-service primary school teachers in, for example, helping them to reassess their view of what constitutes mathematical activity by comparing their experiences with those in which they see the children engaged. During the second year of the project, a CD-ROM, based on extracts from the videos and supporting printed materials, will be produced to enable students to access more easily the ideas for self-directed and distance learning.

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24. Preparing teachers for inclusionary practice: a case study approach

The project comprises an interactive multimedia (IMM) program of case studies to allow trainee teachers in physical education and other areas to develop a stronger understanding of the special needs of school children with disabilities, and to explore appropriate examples of best teaching practice.

Through interaction with twelve case studies, student teachers will encounter the problems facing learners with disabilities and their peers, parents and teachers in educational environments. They will discover the key barriers to integration and create their own understanding of exemplary practice. The CD-ROM-based program will be designed by Diploma in Education course lecturers and an expert in the needs of the disabled, and developed by the University of Western Australia's Development Unit for Instructional Technology (DUIT) with assistance from a secondary school and from allied professional organisations.

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25. Improving external students' science pedagogical content knowledge

The project aims to address difficulties experienced by externally-enrolled teacher education students who report that their lack of knowledge and confidence as regards science content inhibits their capacity to plan and conduct effective teaching encounters in science with primary school children.

Five video case studies of university students involved in science activities with children will be developed to enhance students' process skills and their content knowledge. These instructional videos will be supported by case study commentaries, and by printed background knowledge materials directly related to concepts. Unit assessment will be linked to the student-child science activities, when students will be asked to view an interaction and comment on the child's science conceptual development, and to the quality of the responses and questions of the student teacher. The project will compare students' use of critical aspects of content and process in their own videos of interactions (set as unit assignments) with those demonstrated in the instructional videos.

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26. Aboriginal site specific mathematics materials development project

This project aims to enable Aboriginal teacher education students enrolled at Batchelor College and based at particular communities to develop site-specific problem-solving, task-centred activities based on the *Working Mathematically* strand in mathematics, a curriculum profile for Australian schools (Curriculum Corporation, 1994). These curriculum materials will be supported in their development, delivery and evaluation through electronic classroom networking.

The project will produce four teaching/learning packages as each participating community develops its own site-specific materials, and a transportable package which will serve as a model for community-based curriculum development in mathematics. It is expected that the project will help students to develop their own mathematical understandings and problem-solving skills through the development of site-specific materials, produce a model for community-based curriculum development, and improve the quality of students' teaching and learning.

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27. Experiential learning in sociology: The grounded assignment and tutorial system (GATS) approach

The project aims to help students link the theoretical content of the sociological subject, *Schools in Context*, with the actual situations in which this content is professionally relevant. The mechanism for achieving this is the *Grounded Assignment and Tutorial System* (GATS).

An immediate outcome of the GATS approach will be the development of curricula to meet the needs of the 160 student-teachers enrolled in the required subject for increased vocational orientation within the contexts in which they will teach. This will result in theoretically-grounded, experiential knowledge of community organisations and populations. An intermediate outcome will be the development of a rationale and procedure for restructuring sociological subjects along experiential learning lines which is guided by input and evaluations from both students and community organisations. A final outcome will be the production and dissemination to all Australian faculties of education and other relevant professional education communities of a print booklet and video, *A Guide to Experiential Learning in Professional Education*. The project is expected to assist students in professional education programs, such as education, nursing and the health sciences, to connect theory with practice in sociological subjects.

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28. Developing critically reflective skills and understandings for teaching in physical education

The project plans to develop an interactive multimedia teaching program to assist both student teachers and teachers to develop critically reflective skills in their teaching of physical education, and responds to the increasing pressures on faculties of education to provide more flexible modes of delivery.

The multimedia program will be produced as an interactive CD-ROM and is expected to contribute to developing critical reflection skills and understandings in physical education curriculum and pedagogy. Using the proposed program, students will learn to recognise and critique a range of values, attitudes and practices in school physical education.

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Psychology and Linguistics

29. Transmitter assisted learning: access and participant preparation

This project aims to explore further the use of *Transmitter Assisted Learning* (TAL) and to develop, trial and publish guidelines for participants on its use. The guidelines will take the form of a booklet which will give an overview of the system in intensive learning environments, video-support material demonstrating the process in counselling and interviewing respectively, and an information leaflet to enable wide dissemination of, and access to, the material.

Trials conducted by Charles Sturt University in 1995 and 1996 have highlighted the need for student entry into the TAL training environment to be preceded by preparation which informs the student about the setting, the nature of the equipment, how it will and will not be used by lecturers, and how the student can best take advantage of the opportunities offered. Lecturers also need preparation in the use of the equipment to facilitate the productive engagement of students in the learning experience. Hence the material being developed by the project is expected to assist in the preparation of all participants and to make the use of the equipment accessible to students in other fields and in other institutions.

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30. Clinical skills training: effective approaches to alcohol and other drug problems

The project aims to develop five modules which cover core clinical strategies for use with people who have alcohol and other drug problems. Strategies covered are: motivational interviewing; assessment and raising the issue; relapse prevention; brief intervention; and skills for working with Aboriginal people with alcohol and/or other drug problems.

Modules will contain written guides to the topic, readings, and a videotape demonstrating skills and using trigger questions to engage the student in the application of skills. Each module will be a complete learning segment capable of standing alone, of being integrated into related study areas, and of being independently assessed.

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31. Understanding correlation and regression

The project is developing *StatPlay: C&R* which will consist of computer-based demonstrations and highly interactive simulations to improve understanding of correlation and linear regression. Designed to be used alongside standard statistical packages and textbooks, *StatPlay: C&R* will be readily applicable to use in lecture demonstrations, by large and small groups of students, and by individuals.

A range of tools will give the user flexible and immediate control over many aspects of the data and its presentation. In a series of microworlds or 'playgrounds', dynamically-linked multiple representations of major aspects of correlation and regression will be presented. The playgrounds will include correlation, range restriction, covariance, regression, regression to the mean, and standardised regression. Each playground will have practical exercises connecting its lessons to the problems facing students as researchers and as readers of the scientific literature. Gains in student understanding as assessed by exams, measures of conceptual understanding and practical performance are expected. *StatPlay: C&R* will be disseminated internationally.

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Other Social Sciences

32. Developing a self-paced broadcast voice training program

The project will produce a self-paced audio and text manual to help students develop professional broadcast voice skills for radio and television.

The program will be available on an audio-cassette, with a printed manual, as well as on the World Wide Web (WWW). The self-paced learning program will comprise sample professional voice examples, common mistakes, exercises for breathing techniques and pronunciation, health care for the broadcast voice, exercises designed to develop self-listening and monitoring skills, discussion of news-reading techniques, alternative examples of commercial and non-commercial media outlets, practice news bulletins and progressive test exercises for feedback. The program is being developed for journalism students, but will also be suitable for anyone wishing to develop media and public-speaking skills in Australia.

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33. Developing clinical decision-making and intervention skills in postgraduate counselling students

The project aims to develop clinical decision-making and intervention abilities in postgraduate counselling students through the use of instructional videotapes of authentic counselling/psychotherapy sessions. Its primary objective is the production of two high-quality instructional videotapes and a guide for use in postgraduate courses in counselling, clinical psychology and social work.

One tape will be based on psychotherapy with an individual client, while the other will be based on marital therapy with a couple. The videos will be based on actual work with clients in a counselling agency, rather than on the use of actors or simulation, and will consist of extracts from the video recording of the full series of sessions of psychotherapy with the client(s), thus including material from all stages of work with each case. A commentary will introduce key issues of theory and techniques, with instructions to stop the tape and consider alternative responses at critical choice points. Further questions for class discussion, together with theoretical analysis of the critical choice-points identified, will be incorporated with selected readings in a student guide. The project will also produce four videotapes of whole therapy sessions which demonstrate excellent psychotherapeutic practice.

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34. **Multimediality: using interactive multimedia to develop multi-dimensional social and historical education**

The project will develop a repertoire of frameworks and teaching/learning strategies for using interactive multimedia capacities to engage students more actively and more multi-dimensionally in social, historical and cultural analyses and understandings.

The repertoire will be developed through three approaches, each using a range of multimedia and inter-textual comparisons. One approach will concentrate on comparisons between written texts, photographs and pictures; another on comparisons between film clips, and between film, still images and written texts; and the third on using on-line facilities for selecting, collating, and presenting findings in multimedia formats. The resulting models and strategies developed for fostering more multi-dimensional examinations and media literacies within Australian historical and social studies will be written up for wide dissemination.

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35. **Making moral imaginations in geography**

The project will develop written and electronic teaching-and-learning materials to help nurture and stimulate students' 'moral imaginations', that is, their autonomous capacities to recognise and react to complex moral issues.

A written resource package for students and teachers will be produced, comprising discussion of the need for ethical conduct in research practice, reviews of ethical theory, comments on specific matters in the conduct of research which might warrant moral contemplation, and examples of real ethical dilemmas confronted by geographers. The resources will prompt students to engage critically with moral imaginations, both their own and those of colleagues and peers. When confronted with ethical and moral dilemmas in their own academic and vocational research, students will be able to reflect on their own learning, appreciate the range of ethical perspectives which might colour decision-making, and respond in an ethical manner. While the project will be developed within geography, outcomes should be generally applicable to a wide range of disciplines.

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SCIENCES

Physical Sciences

36. Interactive multimedia computer-based teaching and self learning modules for undergraduate optics

Owing to the reduced time available for teaching optics in optometry courses, larger student numbers and the increased cost of demonstration equipment, opportunities for students to be given practical experience in optics have been decreasing.

The project aims to address this difficulty by designing a multimedia-based set of modules which enable the video-screen simulation of the structure of optical systems, the passage of light through instruments and the formation of images. These modules will be designed for use as a teaching aid in lectures and as an aid (and in some cases an alternative) to conventional laboratory work. The program will allow students to explore optical processes in both a guided manner and by free exploration, and will provide assessment exercises enabling students to monitor their understanding of optical principles and processes. The modules will also give students a greater opportunity to explore these processes in their own time and place and at their own pace.

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37. Enhanced learning of chemistry and physics for Indigenous students using IMM

This project is developing an approach to the teaching of chemistry and physics at the bridging or access course level which focuses on enabling Aboriginal and Torres Strait Islander students to learn various aspects of science in a way that maintains interest and relevance.

Using interactive multimedia (IMM), the project will produce six self-contained tutorials, three for chemistry and three for physics, which will be incorporated as components of access courses. Each module will deal with a different topic, and will contain material to help students understand concepts, gain practice in problem-solving and develop the language skills necessary for the sciences. The tutorials will allow independent, self-paced learning of concepts and ideas using real-life contexts as the initial ground on which to base the learning experience. This will in turn enhance students' general experience of chemistry and physics, giving them the confidence and skills to progress to tertiary courses that include these disciplines.

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38. Improving learning in undergraduate physics using integrated 'studio' environments to replace traditional lectures, laboratories and tutorials

This project aims to contribute to the development and evaluation of a 'studio' teaching and learning model to replace the lecture-tutorial-laboratory classes currently being used in four first-year physics units at the Curtin University of Technology.

The immediate aim of the studio is to increase understanding of physics, overall performance, interest, and class attendance, and to reduce the withdrawal rates for the target group. It consists of a specially-equipped classroom in which a team-teaching approach integrates theory, experiment and problem-solving activities in a student-centred, 'hands-on' learning environment. The project will evaluate the studio model from the perspective of both students and instructors over a period of two years. The experience and the evaluation are expected to have widespread application in various areas of undergraduate teaching and course design, university building design and staffing profiles in science and engineering faculties throughout Australia.

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Chemical Sciences

39. Development of microcomputer software which employs anaglyphic graphics to aid the perception of three-dimensional chemical structures

The project aims to develop an inexpensive stand-alone MS-Windows-based software module which will enable students easily to perceive and explore complicated three-dimensional chemical structures displayed on the microcomputer monitor screen. A primary method of perceiving these structures will be based on the graphics display of stereoscopic pairs as anaglyphic (red-blue) drawings which are visualised as three-dimensional by the user through a pair of inexpensive glasses with red and blue lenses.

The product is expected to have wide general teaching and learning applications at various levels in areas of chemistry, biochemistry, mineralogy and materials science. It could be used by teachers to provide a basis for the design of computer-based teaching experiments in those fields or to support related laboratory experiments and lecture-based theory. It could be used by students in individual learning environments, including campus, home, distance or 'off-shore' modes, with additional support provided through the Internet.

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40. The role of videoconferencing in enhancing teaching/learning via a virtual faculty

Using chemistry as a test vehicle, this project aims to examine the role of inter-university collaborative teaching via videoconferencing.

Through a 'Virtual Faculty', senior chemistry students in small science departments will be able to access classes offered by experts in distant centres. This exposure to a range of experts will not only encourage cross-fertilisation of ideas between lecturers and students but also broaden the exposure of isolated students to a range of expert knowledge. The use of videoconferencing will promote opportunities for peer and collaborative learning, thus providing richer learning environments for small groups of geographically dispersed students. The project is being developed as a crucial test of inter-university cooperation and a key option for enabling small universities to maintain vigorous, high quality degree programs in a climate of competing demands and increasing budgetary constraints.

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41. A model for the teaching of occupational health and safety and risk management within the science curriculum

The aim of the project is the development of a model for teaching occupational health and safety and risk management in the undergraduate curriculum. The funding for the project will be used to assemble the various parts of the model and implement it in the University of Adelaide's chemistry syllabus.

The model will enable students to develop skills which enhance their ability to view particular problems in a broader context. They will be able to relate their course material to the 'real world' and use the information to make informed choices about which set of chemicals or which particular path is appropriate on health and safety grounds. The project is expected to help meet the need for graduates with an ability to access important information affecting the general health and well-being of the community and to assess the risks associated with commercial and government activities.

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42. Learning strategies and early intervention to enhance student learning in chemistry

The project will introduce a new approach to teaching and learning for science students enrolled in Introduction to Chemistry at the Flinders University of South Australia. The aim is for students to develop the necessary skills to become free-thinking individuals who are capable, independent learners. The principal means by which the project will attempt to achieve this aim is an interactive intervention program.

The specific project aims are: to identify different approaches to learning in all students; to offer students a range of cognitive strategies or 'tools' by which learning is achieved and demonstrate the effective use of these strategies; to encourage students to reflect on their own learning; and to provide interactive teaching to support learning strategies, together with resource materials, directed at improving the learning technique used by a student, and hence at increasing the student's understanding of course concepts.

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Earth Sciences

43. Oz Soils – computer-based interactive teaching modules for fundamental soil science

The project will develop and evaluate eight teaching modules for a CD-ROM-based interactive multimedia program, *Oz Soils*, which will be used in teaching the fundamentals of soil science to university students. *Oz Soils* will make use of interactive animations, still graphics, and text, will include interactive self-assessment questions and is aimed at fostering a 'deep learning' approach in students.

Because of its flexible self-directed learning structure, it is anticipated that *Oz Soils* could be readily integrated into a range of university programs which require a basic understanding of soil science, including areas such as agriculture, forestry, ecosystems management, natural resources, engineering, mine site rehabilitation, geology, geography and biology.

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44. Virtual reality geology: extending field studies into the computer classroom

The project is designed to improve the efficiency and benefits of conventional field training programs through the application of newly developed 'virtual reality' techniques to build basic observational skills and better prepare geology students for traditional field work.

Computer-based simulations of local and overseas field sites will be developed. Packages will be prepared for each category, the first being based around existing field excursions near Melbourne (which are subsequently visited in the students' excursion program), and the second around important overseas locations which are currently the subject of ongoing scientific research programs in the School of Earth Sciences at La Trobe University. This will forge previously unattainable links between field experience in geologically important overseas sites, which it is not feasible for students to visit, and research-informed undergraduate teaching based on these distant locations.

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Biological Sciences

45. CARE - Caring for animals in research and education

The project aims to produce a resource package that meets the need for a comprehensive learning platform about the ethical use of animals in teaching and research.

The package will consist of an introductory videotape and an interactive multimedia teaching program, complemented by resource material for a discussion session and a workshop. The videotape, to be viewed by undergraduates before their first animal-based experiment, will introduce the ethical and legal aspects of animal use. The CD-ROM program, for honours and postgraduate students, will have a modular structure to enable students to work at their own pace with the components which are appropriate to their needs. The program will be multi-layered so that students can delve into any topic in depth. The timing of the workshop and discussion sessions will facilitate careful consideration of the material to enable attention to be directed to the real and important link between ethical issues and the practical aspects of maintaining high standards of animal welfare. As the ethics and the Code of Practice for the use of animals applies nationally, the package is expected to have wide applicability.

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46. An interactive multimedia package for teaching concepts and experimental skills in photosynthesis

The project seeks to provide a new approach to undergraduate teaching of photosynthesis at two levels by the production of a modular interactive multimedia software package.

The package will contain animated and video materials which explain the basic concepts of photosynthesis. These materials will serve as both an introduction to the experimental aspects and stand-alone material for use in undergraduate lectures. The package will also include simulated experimental models of photosynthetic gas exchange and other techniques which can be used either as stand-alone packages or, where equipment is available, to supplement and enrich a laboratory demonstration/experiment. In this way, students will have access to some of the latest techniques in the field and thus acquire an experience and knowledge base which facilitates a deeper understanding of the subject. The project will produce a prototype CD for subsequent commercial development.

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47. The virtual cell biology laboratory

The project aims to improve the teaching of research skills in molecular cell biology to higher level undergraduate students by producing a series of computer-based interactive programs, designed as virtual laboratory experiments, which are directed by the students. Each program will pose a motivating problem in modern molecular cell biology, guide the student to research the relevant literature and provide simulated access to the technologies required to investigate the problem. The results of the simulated experiments will be presented to students as digitised video or photographic images. These images will be taken from an archive to be developed in the project, which will comprise an extensive collection of the best available data from several major cell biology research laboratories in Australia and overseas. Students will be required to interpret the data and move to the next step of hypothesis testing until the motivating question has been answered.

The programs will be developed in parallel with a broad new teaching program in advanced molecular cell biology which will include wet laboratories, lectures and workshops. This approach will ensure that, from the outset, the computer-based instruction is securely embedded in the overall program.

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48. Interactive multimedia learning for plant identification

Plant identification can be a frustrating and time-consuming task for students because of the extensive terminology involved. This is particularly the case for Australian grass species with their small size and the terminology associated with the very modified floral parts.

The development by this project of a multimedia, computerised key to the grasses of Queensland, which comprise 60 per cent of the grasses of Australia, will significantly improve the learning experience of students. This will be achieved through a tutorial component and the extensive diagrammatic, video and sound assistance provided in the key to improve the understanding of the terms used for grass identification. Owing to the multimedia nature of the computer key, students will be able to learn more about the plants they are identifying and the characters used for identification.

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MATHEMATICAL SCIENCES

Pure Mathematics

49. Development of an interactive model for the use of desktop video conferencing technology to enhance teaching and learning mathematics

Using a desktop video conferencing system (DVC), the project will integrate remote collaborative technology, expertise in distance education, instructional science and the subject matter of mathematics to develop an interactive teaching/learning model for use in a 'virtual' face-to-face instructional environment.

The model is expected, inter alia, to facilitate flexible, efficient 'virtual working groups' that are independent of time and distance, encourage a shared interactive electronic classroom, provide a human (facial) contact which is collegiate and non-threatening and provides instant explanations by and for learners, integrate visual, audio, text, body language and other formats in teaching; and effectively teach with a video clip linkage through VCR.

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Applied Mathematics

50. Automated high-level diagnostic drill in first-year calculus

The project will 'finish' a prototype calculus tutor package developed by the project leader. The prototype poses problems such as 'differentiate the following expression' and allows students to enter an expression as the answer. It is subsequently able to dissect the student's expression rapidly and efficiently to produce a list of feedback statements about any errors which may be present, regardless of how many errors are made or how deeply within the expression the errors are located. In early trials with students, this instant, diagnostic feedback has been shown to be both reliable and helpful. The software makes use of the power of a commercial computer algebra package, but in such a way that students do not interact with it directly and do not need to know the conventions of the package.

The task of the current project is the implementation of a good visual interface for students to enter expressions, the expansion of the diagnostic rule set based on student trials, and the creation of several sets of graded problems.

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Statistics

51. Developing and synthesizing statistical skills through simulated project problems

To assist statistical synthesis and deep learning in large engineering statistics classes, the project leader has previously introduced group projects on own-choice problems involving data collection, analysis and reporting. Feedback has been very favourable on the learning value of such projects, but students need considerable help in such learn-as-you-go activities.

This project will produce, from past student projects, a comprehensive set of self-paced and guided problems, with reference to use of a statistical computing package, that simulate the student project experience from problem conception through to project report, providing opportunities to explore and analyse each dataset. Such a resource will provide invaluable learning experiences to students progressing from the introductory statistical stage to using statistics in real problems, and will assist students with projects involving data and variation.

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Other Mathematical Sciences

52. Support for maths anxious tertiary students: a delivery strategy for on-campus and distance students

Based on work that Macquarie University and the University of Southern Queensland have conducted over a number of years, the project will develop a support program for all 'maths-anxious' tertiary students.

A video and an associated interactive multimedia package will be produced to encourage group work and a constructivist approach to mathematics learning. Stage 1 of the project will be the production of a student workbook and a video to be scripted and filmed at Macquarie using the current course. The video will contain interviews with students describing their previous experiences with maths, how they feel now, and the topic, Number Systems and Operations, using a pose-pause-present approach to problem solving. Stage 2 (interactive multimedia package) will be designed to utilise the video script and tape, but to take this further by involving students in interactive problem-solving sessions, incorporating simulated group discussions based on a variety of solution paths.

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ENGINEERING AND PROCESSING TECHNOLOGY

Mechanical and Manufacturing Engineering

53. Remote access and operation of computer-controlled manufacturing facilities to enhance flexible learning for engineering students

The project aims to give off-campus students flexible access, through a home computer and modem, to expensive computer-controlled manufacturing machines, such as lathes and milling machines, known as computer-numerical-control (CNC) machines.

This access will enable students to manufacture components, obtain direct feedback on their designs and process specifications, and gain an increased level of knowledge and skills in the understanding and use of the hardware and software used in computer-aided design (CAD) and computer-aided manufacture (CAM). Off-campus students will be provided with a cost-effective, practical learning environment as equitable as those available to on-campus students.

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Civil Engineering

54. Virtual construction project site (VIRCON) to improve student learning of construction planning and optimisation processes

Real-life construction projects are complex, dynamic events which are subject to numerous, unforeseen variations and influences. This project will develop *Virtual Construction Project Site (VIRCON)*, a simulation package designed to assist student learning of construction planning and decision evaluation processes and to overcome the difficulties students have in visualising the physical dimension and hence the feasibility of the decisions they make as part of their project work.

VIRCON will be an interactive package in which the impact of the decisions made by students will be evaluated virtually instantly, and in which students will be able to obtain a visual 3D image of their plan along the time axis, ascertain feasibility and constructibility by the 'walk through' facility, and build the project graphically on the screen. The enhanced visualisation will help students communicate their ideas and think through a problem clearly.

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Information, Computer and Communication Technologies

55. A hands-on simulation game for teaching electronic commerce

The project will develop a simulation game which enhances student learning of electronically-facilitated business activities (Electronic Commerce, or EC).

During the simulation game, students will operate a simplified but realistic 'company' by exchanging business documents between computers (using the technique known as EDI or Electronic Data Interchange) with other student 'organisations' (both local and overseas) via the Internet. The game will allow students from business-oriented departments (including information systems, marketing and management) to gain a better understanding of and hands-on experience with EC technologies, such as the Internet and EDI.

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56. A WWW based algorithm animation for search algorithms

Many students have difficulty in understanding search algorithms which are fundamental to the field of computer science and particularly to the subfield of artificial intelligence. The primary reason for these learning difficulties is that the algorithms are presented as lines of text on a piece of paper which students must mentally translate into changes to complex data structures when executing programs.

The project leaders have found that students who develop good visual representations of the changing data structures gain a deeper understanding of the algorithms. Hence the planned algorithm animation is designed to help all students develop such visual representations. It is expected that this, together with the facility to experiment with different search parameters and receive immediate visual feedback, will enable most students to achieve a deeper understanding of search concepts and processes.

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Other Engineering and Technology

57. Environmental engineering electronic text

The project will develop an electronic text for an advanced undergraduate environmental engineering course.

The text will make extensive use of dynamic simulations while the software tools (Word and Matlab) will completely open the text for the student who will own it in a total sense. The student will not only be able to see all simulation details but will also be able to develop solutions, add comment, and import foreign material using the same software tools. Although the text can sit on a personal computer with the capacity for stand-alone use, its utility will be greatly enhanced when it is on a network with the capacity for groupwork, exchanges with the lecturer, and access to the full World Wide Web (WWW). With the aid of the electronic text, the student will be expected to gain a deeper understanding of the principles of environmental engineering. The text is aimed at fostering conceptual understanding so as to allow the future engineer to extend procedural knowledge to new situations.

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58. A flight laboratory video series to enhance student learning of aircraft flight mechanics

The project aims to produce a video series (with accompanying workbooks), based on experiments carried out under actual flying conditions, which will help bridge the gap between the theory and practice of aircraft performance for students studying flight mechanics and related subjects and will complement existing courses in flight mechanics.

The project will enable each experiment to be recorded under ideal flying conditions and thus avoid the weather-related difficulties which often occur with flying programs scheduled to run at fixed times to fit in with student timetables. Students will benefit from experimental results that clearly demonstrate the accompanying theory without excessive scatter caused by environmental effects. A second advantage of the series is that presenters will be free to stop videos for comment as required, a task which is impossible with ground- or flight-based experiments. Each video will address a different aspect of aircraft performance and begin by explaining why that particular aspect of aircraft performance is important in aircraft design and operation. Relevant in-flight manoeuvres and experimental sequences will be recorded from within the cockpit and outside the aircraft as appropriate. Views showing the cockpit instrumentation will allow students to record their own data in workbooks for later analysis. Workbooks will also include a review of the material covered in each video and a series of questions for students to answer as they view each video.

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59. Development of a computer-aided package 'air conditioning fundamentals'

The main aim of the project is to improve the learning and teaching-delivery process of an introductory-level undergraduate module, Principles of Air Conditioning.

The project will achieve the necessary learning objectives of the module with the use of a computer-aided package, incorporating revision and expansion of basic fundamentals in an applied context through interactive learning, active student participation and experimentation via simulation exercises, progressive assessment of students through staged tests and feedback exercises, inclusion of 'vignettes' exploring everyday experiences in relation to basic air conditioning processes to which all students will be able to relate, and a 'needs-based' approach. The use of appropriate hyper-media software will allow for the inclusion of cross-referenced definitions, additional examples, reading material, figures and graphs, as well as for the launching of other applications allowing 'scenario analyses'. It will also allow students to pursue an individually selected learning path.

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60. Developing critical thinking skills in environmental engineering

The project will address the teaching processes and learning outcomes for fluid mechanics-based subjects in an environmental engineering program.

A number of modules will be developed that expose students to realistic complex problems presented in the form of a sophisticated numerical model of the flow. The problem being addressed will be developed in such a way that the key elements of fluid mechanics theory are covered. The assignment modules will not only replace traditional lecture/tutorial laboratory format; assessment will be ongoing throughout each module culminating in the development of a consultant's report. This problem-based learning approach centred on the simulation of real-world problems with complex numerical models is expected to help students develop critical thinking skills that allow them time to make use of the tools (both theoretical and practical) required to solve a problem. Students will achieve this through a more independent investigation of the context in which fundamental principles of flow behaviour are incorporated into the computer models that are now an integral part of the practising engineer's toolbox.

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HEALTH SCIENCES

Dentistry

61. Oral rehabilitation: interactive multimedia solutions to learning denture design

The project leaders have already developed a pilot program for the teaching of denture design, targeting second-year dental students and aimed at giving students the confidence to adapt basic design guidelines to the needs of individual patients.

This project encompasses the development, implementation and evaluation of an interactive multimedia program for denture design based on the successful pilot program. Its aim is to simplify the complex process of designing dentures, using *Quicktime VR* to simulate a three-dimensional perspective. Students will be able to practise in their own time, and at their own pace, on a variety of virtual cases and thus learn the craft behind the art of designing removable partial dentures. With this grounding, discussions with experts in the field about the patients they treat in senior years and as graduates can be conducted at a higher and more productive level. The problem-based design principles embodied in the pilot software will be continued in the multimedia version.

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Medicine

62. Improving student learning and decision making in clinical ophthalmology

The project will develop a problem-based learning program using multimedia delivery technology to improve ophthalmology students' ability to formulate integrated patient management plans. When confronted with an ophthalmic problem, students will be able to integrate basic science knowledge with the clinical signs of disease to develop a strategy for managing eye problems in relation to systemic illness and impact on life. The use of multimedia technology will enable students to adopt, share and reflect on detailed simulations of clinical problems in individual and group settings, and allow exploration of the problem in a non-threatening situation without risk of injury to the patient.

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63. Normal delivery: the hidden story. Computer-based interactive multimedia learning package for students of medicine and midwifery

The project aims to develop a computer-based interactive multimedia package, incorporating video and animation, which will convey the sights, sounds and movements of birth from perspectives the eye alone cannot explore. This will accelerate cognitive correlation between abstract ideas and concrete realities difficult both to teach and to learn. Simulations will enhance clinical decision-making skills by giving students an opportunity to practise assessment/management of normal delivery and to learn by making mistakes in an environment that does not compromise or intrude upon women giving birth.

As well as better equipping students to gauge the physiological processes of birth, the package is expected to address problems associated with using women as 'clinical material' for training. Students will explore issues of consent/communication and be shown the importance of the psychological state of women giving birth.

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64. Improving transcultural mental health education for medical undergraduates through use of interactive multimedia-based computer-aided learning (IMMCAL)

By developing an interactive multimedia-based learning package which uses case-based clinical vignettes on digital video, the project aims to fill the need for medical students to have ready access to clinically-based instruction material in transcultural mental health issues. Medical students in their early clinical years will be exposed to a variety of clinical vignettes taken from transcultural doctor-patient encounters which will simulate natural clinical interviews. The program will be structured in such a manner that the computer-based experience will assist students to learn clinical techniques that are appropriate and effective when confronted with patients from different cultural backgrounds.

The project is expected to increase the student's awareness of cultural issues, to promote an attitude of respectful enquiry in relation to cultural difference, to improve knowledge, and develop clinical skills in transcultural mental health assessment and treatment. Such teaching is expected to contribute to the development of competency in the provision of general clinical services to the increasingly multicultural Australian population.

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65. Diagnosis and management of skin disease in childhood

The project aims to help overcome the educational problem arising from the limited access which medical students have to children with skin diseases.

Because of the visual nature of skin disease, computer-based instruction using video and photographic images provides an effective way of allowing students access to a much wider range of experience. The 1997-98 project, which has grown out of an NTDG-funded project producing computer-based video simulations of sick children, will develop programs with simulations based on actual patients and incorporating video, sound and still photography in an interactive format. Students will be able to work through cases where they are not told the disease and be guided interactively along a logical sequence of history-taking, examination and clinical assessment before dealing with management issues. They will also be able to select specific diseases to explore clinical features, appearance and management. It is anticipated that this approach will help students to become confident and competent in the area of children's skin diseases.

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66. Integration of theory and practice in learning: an interactive tutorial approach to the cardiovascular system

The project, which aims to address student learning difficulties arising from reductions in both animal experiments and small group classes, will produce an interactive computer-based virtual experiment from an existing teaching video by digitising the video and replaying pre-recorded cardiovascular responses.

Students will be responsible for making their own measurements of cardiovascular system (CV) parameters. They will develop their own comprehensive model of the key control mechanisms from the animal data while integrating the information in simpler models they have developed from two earlier, related CV experiments on their own blood pressure, ECG and heart sounds. The computer-based concept-mapping techniques of these models will use tools and approaches developed in a 1996 NTDG-funded project that addressed more constrained examples of physiological mechanisms. An important aim in the current project is that students take away their own comprehensive model of CV control and be able to use this to improve their predictions of changes in the CV system under normal conditions and stress.

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67. Bridging the theory-practice gap with a collaborative learning strategy for senior nursing and medical students

The project will develop a multidisciplinary learning model that addresses the theory-practice gap which is of concern to employers of new nursing and medical graduates.

Senior undergraduate nursing students at Edith Cowan University and medical students at the University of Western Australia will be provided with structured, contextual learning opportunities that allow them to use their collective knowledge and skill to explore their own level of competence for a range of essential skills to predetermined levels of expertise and work as teams on set tasks (eg resuscitation from cardiac arrest). Learning is expected to be enhanced since students will be specifically targeting the application of knowledge to clinical practice, developing professional skills in context, albeit simulated, and collaborating in active, self-directed learning groups. It is also expected that the roles and responsibilities of each group will be better understood.

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68. Development and evaluation of a problem-based course in epidemiology

The project features the development of a problem-based curriculum in epidemiology and offers this as an alternative to the present lecture/tutorial program at the University of Western Australia for a maximum of one-third of the second-year undergraduate medical class in the second semester of 1997. Students will be asked to choose one or other program, with the outcomes to be assessed and compared by overlap in the examination process at the end of the semester, and by feedback collected using the University's *Student Perceptions of Teaching* (SPOT) system.

The project will involve the development of a group of new exercises in which students have to discover, assess the quality of, and apply relevant evidence in order to solve a clinical problem, as well as the development of suitable assessment tools. Problem-based teaching in epidemiology will require students to be more self-directed, enhance their research and critical skills and provide greater integration with other aspects of the medical course than does the present system of topic teaching. The learning experience will be consequently richer and more 'active', adding to students' enjoyment while obliging them to develop skills in self-education and self-assessment.

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69. Development and testing of a tool to allow use of computer-assisted learning with student-directed problem-based learning

The project aims to address the conflict between pressures on staffing, which are causing institutions to look for ways of modifying the PBL process, and the need to retain the student-directedness of PBL.

The project will use the free-text capability developed for the computer program, *PathPots*, to provide students with individual guidance as to how well they understand concepts fundamental to a PBL case they have studied. Cases will be developed that parallel a case the student has studied in SDPBL mode. Each such case will highlight two or three specific learning issues, identified by the teacher as central to the PBL case. From analysis of the student's answers, the output of the belief network will indicate the probability that the student is competent in relation to each learning issue. If performance is inadequate, the student will be given feedback that more study of particular issues is required and advice on the potential resources for this. Competent students will be reassured. The project will test and analyse student responses and reactions to the program and modify the model in the light of these. A case-writing tool will be developed to allow teachers to develop cases.

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70. The virtual head: a conceptual and reconstructive approach to learning the anatomy of the head and skull

The interactive computer-assisted learning program, *The Virtual Head*, is aimed at helping users to conceptualise the three-dimensional organisation of the head. The target group includes undergraduate medical and science students as well as postgraduate students of radiology, ophthalmology and ear-nose-throat surgery.

The program will use three-dimensional models which are assembled and disassembled by the computer to demonstrate spatial relationships of the major anatomical structures of the head. Users will be able to turn the models in 3D space and assemble them in order to gain a complete understanding of the spatial anatomy of the head. The simplified and stylised models will be 'morphed' into images of actual anatomical structures to help users relate the concepts to the actual head. The program will also include review and quiz modules to assist revision.

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71. Teaching the topic "Child growth and development"

The project will develop an interactive computer-based program to improve the teaching of the topic, Child Growth and Development, to medical students.

Using a number of children as examples, the project will incorporate video footage, photos and relevant charts/diagrams into a computer program aimed at demonstrating child growth and development as it would be observed if a child were to be followed for a number of years from birth. The program will be used in conjunction with the *Child Growth and Development Study*, a piloted program in which medical students follow individual babies from birth to four years of age. The program will be interactive, enabling students to identify whether they want to follow the progress of one child, focus on a particular age, or focus on a particular aspect of child growth or development (such as language development). The program will also allow students to assess the knowledge they have gained through the provision of questions, depending on which parts of the program are accessed. As part of their overall assessment, the program will record when students log on and their performance in answering the questions.

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72. Paediatrics procedures

The project will produce a multimedia CD-ROM title for all Australian medical students about procedures which are performed in paediatrics. Computer software will be created which describes and illustrates important paediatric procedures, with specialists experienced in the techniques demonstrating how to perform the procedures correctly and how to interpret the results. Videos of procedures will be digitised at high quality along with text, animations, diagrams and specialist vignettes from around Australia.

Exposure to important diagnostic and therapeutic procedures, with the best specialists in Australia explaining techniques and providing helpful comments, is expected to increase student knowledge about procedures. This should result in enhanced ethical education and the performance of more efficient procedures with minimal pain to children. Educating and reinforcing life-saving procedures should give students more confidence and skill in emergencies.

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Veterinary Science

73. Turning expert knowledge into teachable knowledge: linkage templates to bridge preclinical and clinical units in professional courses

This project will develop a framework (or template) that can be used to link disciplines normally taught separately in preclinical and clinical areas. The production of a manual which guides teachers through the process of linkage and the application of linkage templates to other discipline areas should have an immediate impact on student learning in a wide variety of professional courses. The learning of principles in prerequisite subjects will be more focused and relevant through the establishment of collaborative learning, concept mapping and joint assessment tasks in groups composed of students from both areas. In addition, students in higher years will be able to reinforce their understanding of deeper scientific principles in clinical years and develop preclinical discipline-based skills and knowledge at a more advanced level through their interaction with students and teachers from preclinical subject areas as well as graduate veterinarians now working in preclinical areas.

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Nursing

74. Wound care multimedia project

The project will develop interactive multimedia materials which facilitate the teaching-learning of wound assessment and management by pre-registration nursing students.

Video and photography of various wounds and associated wound management protocols collected in actual clinical environments will be used to represent clinical scenarios in the nursing laboratory where initial instruction in wound care occurs. Using a computer with appropriate software as the primary information resource will enable students to pace their learning to their individual needs and encourage them to engage in multiple sessions to rectify perceived and identified weaknesses. This should eliminate the 'hit and miss' associated with the learning of technical procedures using traditional teaching-learning strategies and better equip students to transfer their learning into the clinical setting.

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75. Clinical pharmacology in nursing practice

The project will develop and evaluate a board game learning package designed to enhance the application of pharmacological knowledge and principles to medication administration and patient education. The package will initially be structured around pharmacological intervention in the treatment of cardiovascular and renal disorders but will also be designed to allow its application to other areas of pharmacology and patient management, such as neuropharmacology and pain management. The board game will explore the site and mechanisms of drug action as well as side effects and toxicity, drug interactions, overdosage and therapeutic drug levels. Associated nursing responsibilities will be integrated into the scenarios developed during the game.

The game will allow students to integrate their study of pharmacology in science subjects with the study of nursing which will improve the ability of graduate nurses to contribute to the quality of medication usage, particularly in the areas of safe drug administration and patient education. The package will be structured in such a way as to enhance group-based problem-solving with interaction between teams during the various sessions.

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76. An interactive multimedia approach to teaching the administration of medication

The project aims to develop an innovative strategy for teaching the administration of medications. This will enable nursing students to achieve the competency required by registering authorities for safe practice. A pilot module of an interactive multimedia (IMM) program has been completed and is available for review. Three more modules are planned so that the package will provide a comprehensive and cost-effective teaching tool, simulating drug administration in a number of different clinical settings.

The use of IMM as a teaching medium in nursing education is supported by evidence which suggests that learner involvement through interaction can maximise the achievement of learning outcomes (Beach, 1994; Jeucher, 1993; Young, 1993). It has the potential to be integrated into the current teaching plan thus complementing traditional methods of nursing education.

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77. Facilitating graduate nurses' transition into the workforce with interactive multimedia in a computer supported collaborative learning environment

The project, which aims to improve collaboration between employing organisations and universities which offer nursing education programs, seeks to present critical aspects of workplace-related issues on a multimedia CD-ROM for use by final-year nursing students and graduate nurses entering the workforce.

The material presented on the CD-ROM will attempt to simulate the complexities of life in a typical hospital environment and, in so doing, make the education of graduate nurses and students problem-based and authentic. Learning activities incorporated in the courseware will require users to make decisions about the best course of action and source of information in respect of each problem. In addition, users will be able to discuss the problems presented to them on the CD-ROM and reflect on how they addressed the assigned learning tasks on a computer-mediated conferencing environment. By being self-instruction-based and independent of time and place, the multimedia courseware will relieve much of the pressure that is currently faced by university lecturers and hospital staff in the preparation of nursing students and graduate nurses for a successful transition into the workforce.

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Other Health Sciences

78. Interactive computer package for the teaching of magnetic resonance imaging to medical imaging students

The project aims to address difficulties arising from lack of student access to magnetic resonance imaging (MRI).

The package will interactively simulate an MRI unit, allowing students to input MRI factors and analyse the images while progressing at their own rate. This will enhance student understanding of MRI principles and enable external students, who are currently limited to text-based material, to visualise interactively changes in the image that can only be pictorially described. The software will be developed for IBM PC computers, a readily available and common platform in other educational institutions.

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79. Towards the support and orientation of health professionals and students on rural and remote areas health placements

The first aim of the project is to enhance the orientation of medicine, nursing, nutrition, occupational therapy and social work students to communities and clinical health facilities in selected rural and remote locations where clinical placements will occur. The second aim is to provide support for students while they are on placement.

Profiles of communities and clinical health facilities in the selected locations will be developed. The profiles, which will be available to students and teachers on an Internet database and in the form of videocassettes and workbooks, will be used to orient the students to their clinical placements. They will, in addition, provide a variety of contextual backgrounds against which students will work through a variety of prepared case-scenarios. This strategy will enable students to learn, before they undertake their placement, about the technical aspects of health care and their application in rural/remote locations.

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80. On-line, inquiry-based learning in environmental health

The purpose of this project is to design, produce and pilot-test an inquiry-based learning (IBL) unit, Lead in the Community, which will be delivered on-line, via the Internet, to graduate public health, environmental health and environmental management students at three universities.

The project is expected to achieve three goals. Firstly, it will strengthen the environmental health component of the graduate public health and environmental management curricula at the University of New South Wales, the University of Sydney and the University of Western Sydney, Hawkesbury. Secondly, it will pilot the application of inquiry-based learning (IBL) in the graduate public health, environmental health and environmental management curricula at these universities. Thirdly, it will pilot the use of on-line multimedia technology in delivering IBL courses and facilitating cooperative learning among graduate students who are studying independently.

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81. The development of a health care game

The project will develop a *Health Care Game* which gives students opportunities to interact with the health care system and provides them with realistic hypothetical situations for problem-solving, as well as for developing knowledge and skills about how to obtain up-to-date information about the health care system.

The *Health Care Game* will be based on the lives of six Australian families, each of whom is from a different cultural, socio-economic and demographic background. Students will work in groups to investigate how a series of health events and changes to health policy will influence the lives of these six families. Paper and computerised versions of the game will be developed, allowing it to be used with a range of class sizes and by educational institutions with different levels of computer resources.

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82. Problem solving in applied epidemiology using multimedia tools on real-life data

The project aims to allow postgraduate students of public health and related disciplines to tackle frequently occurring problems in their total complexity.

The computer-based package, which is concerned with applied epidemiological problems, will enable students to choose from a wide range of options, some of which are wrong, many of which are not. The package will contain the case study of a public health official being faced with the problem of large-scale soil pollution. The task is to clarify the impact of the pollution on health of residents in the affected area. There will be many stages in this process with the total package covering an entire subject (14 weeks teaching). Students will have to make decisions based on technical knowledge and within time and budgetary constraints. They will be required to report on the outcomes of their investigations in all the usual ways (press, written reports and in front of a 'virtual' critical public), design studies and analyse the data gathered from real data sets.

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83. Improving clinical reasoning skills in physiotherapy students

This two-year project will develop a multimedia interactive package aimed at developing the clinical reasoning skills and knowledge a student needs to manage orthopaedic patients as their rehabilitation progresses. The package will provide students with the opportunity to manage the patient in different stages, to ask for information and to make management decisions based on that information. At each stage, students will be able to access feedback to evaluate the effectiveness of their decision-making. If they make ill-informed or unsafe decisions, explanatory text will prompt them to look for additional information and make a better management decision.

Using a computer simulation avoids judgement errors, made by inexperienced students, that adversely affect patient outcomes. Students will be able to achieve in one session a process which might otherwise take months.

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84. Bleeding and clotting - an interactive laboratory teaching program

The project, which aims to address the shortcomings of conventional approaches to teaching in this area, will develop a self-paced interactive multimedia package that teaches, reinforces and enhances skills by the use of simulated case studies for the diagnosis of disorders of blood coagulation. Extensive discussions with a national reference group, senior medical scientists in industry and other academics in Australia and overseas have identified several major strategies to be incorporated.

The package will integrate the use of clinical images and the availability of a detailed history, interactive sets of laboratory tests/protocols, access to theoretical background knowledge through 'help' buttons, a navigation tool to enable the student to locate points of interest in flow charts of clotting factor interactions, as well as an option to interact with and test the validity of selected results.

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85. An interactive multimedia program to enhance student learning regarding the care of birthing women

The project team will develop a computer-based, interactive learning environment which explores the normal physiological processes of labour and birth and the principles of midwifery care. The program, which will be structured to meet individual learning needs, will create case scenarios elucidating the physiology of labour and birth.

Students of midwifery, nursing, medicine and allied health will be able to learn in a controlled, self-paced, non-threatening environment. Users will have the opportunity to assess, choose appropriate care, and provide reasons for their clinical decisions. The scenarios generated will develop in complexity, thus making the program suitable for the beginning and advanced student. This could be a tool employed by registered midwives to maintain their knowledge and competency when working outside the birthing unit.

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86. Learning the dynamic swallow via animation and interactive multimedia application

The project aims to address the limitations of currently-available teaching resources by producing an interactive multimedia package which integrates text, graphics, voice-over, video and animation sequences to highlight various aspects of the swallowing process. Students will be able to manipulate selectively parts of this process in order to understand the normal swallow and to simulate different aspects of dysfunction and their effects on swallow safety and efficiency. The animated segments will enhance understanding of the links between the outward signs of swallowing dysfunction seen during clinical assessment and a representation of internal function.

This delivery of material should greatly facilitate students' understanding of the complex normal swallow as well as the links between related aspects of course content, such as aetiology, assessment and treatment techniques, by offering a way of investigating the swallowing mechanism in a safe environment. The multi-dimensional nature of the program will also allow students to employ the learning style which is consistent with their own.

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LAW

87. Multimedia teaching of interviewing and negotiation skills in the law of torts

The project aims to overcome existing problems of teaching undergraduate law students the legal skills of interviewing, negotiation and the drafting of dispute settlement agreements. Using multimedia technology, the project will produce a multimedia self-learning package designed to teach these skills within the context of a compulsory course, Tort Law. A major feature of the project will be the creation of a simulated interactive client interview exercise, complete with multimedia critiquing capacity.

Students using this problem-based program will progress through stages, learning and practising skills within the context of a central accident-related problem. Their work will also draw upon legal knowledge gained in the host subject, Tort Law. They will engage in self-directed learning, working through the program outside normal class hours. The program will be designed to ensure its usefulness for the teaching of skills in other law schools.

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BUILT ENVIRONMENT

88. Simulated site visits

This project will develop a computer framework so that the information gained by students when visiting sites can be recorded, ordered and related to other data. The information will also be available via the Internet so that students can revisit the sites recorded by other students. The computer framework will provide an interactive learning tool where students can choose how they wish to view the information: whether by date, product, process or location. The slides will be supplemented by written explanatory notes and related to cut-away axonometric drawings of the building and other information such as trade literature, standards, definitions and the architect's working drawings.

Observation of site works will clarify for students concepts of structures, detailing and site management. Students will see the connection between design and detailing and begin to comprehend both the skills required to build and the need for architects and builders to communicate clearly via the documentation process.

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1998

NATIONAL TEACHING DEVELOPMENT

GRANT PROJECTS (INDIVIDUALS)

HUMANITIES

Non-English Languages

89. Assessing oral proficiency in foreign language learning

This project aims to provide consistent and reliable procedures to assess oral proficiency of learners across the range of languages (French, Italian, Modern Greek, Spanish and Portuguese) taught in the School of Languages at Flinders University, and thus to lead to an improvement in student learning outcomes.

At a broader level, the purpose of this project is also to draw attention to the level of language proficiency obtained by learners in an academic setting, which often goes unrecognised by an employing agency or company.

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90. Learning Japanese through visualised language functions

This project proposes the use of video to create simulation utilising its versatility as an educational tool in terms of ease of use, cost, flexibility of delivery and availability of hardware.

The project aims to develop a databank of segments of video-taped interaction in Japanese, which focuses on selected communicative functions, such as expressing likes and dislikes, and comparing people and things, all of which take place in a range of settings. The databank will be built in such a way that it will enable students to have easy access to any of the functions at any level and will be useable virtually in any type of Japanese learning environment.

It is expected that higher language proficiency levels will result from students having exposure over a long period of time to language which is more representative of a paralinguistically-rich natural speaking environment rather than the inevitably restricted environments of text and classroom simulations.

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91. Instant Anglo-Saxon

The project will provide distance access to an already existing course in early English. The project proposes the development of a new educational process of E-mailed 'instant feedback,' which greatly enhances student learning, and the development of existing CU-SeeMe* software to provide communal learning and class bonding, which many educators feared would be lost to electronically-provided language education. Further outcomes will be three products to enhance student learning: a directory of 'road-tests' which students will apply to a comprehensive range of electronic, textual and multimedia resources for the teaching of Old English and Anglo-Saxon studies; a feasibility study to a leading publisher for the conversion of an internationally-acclaimed textbook to a CD-ROM version; and the development for future submission to CUTSD of a fully-articulated needs analysis and project feasibility outline to produce a significant software development.

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92.Ach, so war das! [Oh, so that's it!]: an interactive multimedia program for intermediate German students to promote aural comprehension

The project proposes to develop an interactive multimedia program with video, sound and text components for intermediate level students of German. The film clips will be taken from recent television series (eg *Unser Lehrer Doktor Specht*). In the software students will have guided access to authentic language and the completed program will develop the students' passive (listening and reading) and active (writing) skills.

The team has already produced six modules of interactive programs for beginners. It is now proposed to produce modules on topics appropriate for the intermediate level. A significant educational benefit will be the improvement of students' ability to understand authentic language, especially for the University of New England's distance education students who do not have regular access to face-to-face teaching or to German speakers.

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English and Literature

93. Interactive literary criticism and the World Wide Web

The study and teaching of literature often raise a sense of historical, cultural, and critical distance from primary texts which can restrict students' interpretations and responses. The project seeks to overcome this problem by developing an interactive software shell that allows students to research and analyse literary texts through using hypertext technology and resources, collaborative research and self-directed learning. Using a metaphor of a centuries-old manuscript, the shell comprises a focal literary text, print and electronic references, and a discussion group. It leads users to produce a hypertextual archive of historical and critical viewpoints that frame and annotate the focal text. Students will gain insight into both the historical-cultural complexity of texts and the critical value of using contemporary approaches and technology in literary studies.

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History

94. Development of videos to use in teaching South Asian history

The aim of the project is to improve the learning skills, and the motivation to learn, of first-year South Asian history students. This will be achieved by producing and incorporating into the curriculum and course delivery of a core first-year unit at Curtin University three 40-minute videos on three major themes of South Asian history. Improvements in learning will include a better understanding of the geography and history of South Asia, a greater appreciation of the past achievements of South Asia and a better understanding of some of the more difficult concepts of Indian religions. The videos will include maps, video footage, slides, music and a commentary scripted by the applicants drawing upon the latest historical research.

The videos will be unique in that they will be based upon an edited selection of professional quality video footage (nine hours in total) and a selection from over 200 slides. Another innovative aspect of the videos is that they will be produced by history discipline experts to meet the specific requirements of South Asian history teaching.

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95. Multimedia role playing simulation game in South-East Asian history

Trade Winds: A 17th Century Adventure in South-East Asia is a multimedia role playing simulation game in South-East Asian history which will be developed from an existing pilot project. This simulation will be incorporated into teaching and assessment of undergraduate subjects, and will enable students to understand how South-East Asia's relationship with the rest of the world has been affected by economic and political changes in the region. In this unique simulation students assume the role of a Dutch trader in seventeenth-century South-East Asia. Students reproduce the experience of travel to the region and of seventeenth-century social, political and economic conditions. The project, which aims to stimulate a desire to develop knowledge of the societies and major states of South-East Asia, will include a substantive database on South-East Asian geography, history and society.

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Classics and Archaeology

96. Teaching archaeological field survey techniques using a virtual archaeology internet site

This project will construct an interactive virtual archaeology site on the Internet, providing students with a realistic understanding of the processes involved in undertaking archaeological surveys in arid areas of Australia and an opportunity to gain an understanding of the nature of the research process in these regions through the design and implementation of a realistic 'virtual' research project.

Within the virtual site students will be provided with the resources needed to design and implement a research project, obtain realistic results, and undertake the interpretation of these sites. The virtual site will be structured around the Coongie Lakes region, in the far north of South Australia. Realistic 'results' for the student's 'surveys' will be generated using a predictive model built on a GIS platform, using field results obtained from existing surveys of the region. Students will then provide a research report analysing and interpreting their 'results'.

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Design

97. User-trialing products: an undergraduate project

User-trials in product design are traditionally an area covered in postgraduate studies, largely because of the requisite time required to undertake this work. A short undergraduate project has been formulated which addresses an industry-oriented need for competency in user-trialing. This involves students conducting several trials based on their own design work within a typical nine-week long project. Students will be asked to re-design a small component of an existing product and to trial their prototypes with a relevant user-group. Students will develop several prototypes in succession, each one a development of the last on the basis of feedback offered by users.

Used as part of undergraduate studies, this resource will help to demonstrate how the theories of user-feedback are applied in practice thus allowing students to become familiar with a design process more responsive to feedback, and in a manner which simulates a more professional, responsible and user-centred design practice.

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Other Humanities

98. Teaching journalism on the Web

The project will develop and implement a co-ordinated and comprehensive strategy for the use of the Web, for the teaching and learning of journalism and media studies, the production and dissemination of professional journalism by students and staff, and the production and dissemination of scholarship above journalism by staff and Students.

The project will build upon a series of discrete initiatives successfully developed and currently being tested. Early indications are that these initiatives have enabled a marked qualitative improvement in student comprehension and implementation of ideas and debates in the curriculum. By integrating these discrete elements into a co-ordinated, systematic approach which can be tested and delivered flexibly in a variety of face-to-face and distance modes, the project will enable a radical restructure of teaching and learning practices to enable effective learning interaction between local and distant students in a variety of social and cultural contexts, more focussed use of self-directed learning in small groups by students, and the development of advanced skills among staff and students in using the Web as a research and publication tool for professional practice as journalists and scholars.

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SOCIAL SCIENCES

Economics

99. Learning to think critically about economics: international case studies over the Web

This project will develop Internet-centred resources in the form of international case studies in first year Macroeconomics. Students will be allocated to designated syndicate groups and will be required to conduct critical inquiries that involve accessing, analysing, discussing and reporting on the case study information sources. The interlinked objectives are to involve students in team learning, both inside and outside normal class contact time, to provide Web-based resources that tap into primary sources, and to introduce contemporary economic issues relevant to the Asian region which require high-level skills of analysis and criticism.

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100. Measuring student learning in economics - a quantitative and qualitative approach

The project aims to build on work already developed in the fields of engineering, mathematics and medicine, to develop a discipline-specific instrument by which to measure students' own perceptions of their attitudes to learning.

The project team will develop a measurement instrument, specifically, a learning inventory, which is purpose-designed for detecting and categorising students' perceptions of their approach to learning. The measurement instrument, to be effective, must be discipline-specific. Over four semesters (two years), the project will develop, trial, modify and evaluate a learning inventory which by accurately identifying students at high, moderate and low risk of failing, will serve as the basis by which to modify student counselling, teaching methods and assessment.

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Accounting and Management

101. Writing critically in commerce

The project builds on the earlier work of the Nepean Critical Thinking and Writing Network, reusing much existing material to produce a single-user interactive resource, a manual with Web documents and CD-ROM. The package will enable first-year commerce students to understand the generic and discourse specific components of critical thinking and writing as they are expressed in the subjects they are studying. It will give these students the opportunity to develop practical skills in critical writing within the discourse of the subjects being studied. Within a self-access, self-paced environment, commerce students from varying backgrounds will be able to develop their critical writing skills with the support of student models and the feedback mechanisms built into the program.

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Sociology and Anthropology

102. Personal reflexive instruments for monitoring expertise development (PRIMED)

The project aims to develop and evaluate an integrated suite of self-reporting, reflective instruments for senior students to assess their learning and attainment of professional competencies. Reflexive journals, focussed essays on engineering process, and critical assessment of self and peer communications will be core elements of this suite. Through it students will acquire the critical analysis skills to form emergent understandings of their educational and professional experiences. The project will be conducted in the context of substantive, capstone design courses across two engineering Departments. The unique, multi-discipline approach will produce metrics that are self-revealing of students' attainment of the attributes recommended in the recent REVIEW OF ENGINEERING EDUCATION. These attributes include not only technical competencies but also 'soft skills' such as communication, team-working, social and environmental awareness, professional and ethical values and life-long learning.

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Education

103. Exploration of 25 years of religious education - CD-ROM

The project will develop a resource bank of textual, graphic and video material on CD-ROM which will give lecturers and postgraduate students flexible access to a wide range of historically relevant materials that would otherwise be not available for postgraduate teaching on each of the University's campuses. The CD-ROM would have search capacities as well as glossary and research databases. This innovation will give form to historical material which otherwise could be neglected in teaching and provide postgraduate religious education students with a framework for their study and a model of systematic analysis to follow in completing specified learning and assessment tasks for units within their program.

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104. Professional learning from case records

This project will create, test and implement a series of real and simulated tasks for students who are training in a range of human service professions (urban planning, nursing, social work, police studies and teaching). The aim is to engage students in planning co-operative action in the face of complex social concerns that call for inter-agency responses.

Building on a series of intensive student workshops, the project will develop and establish task-based materials for use in cross-disciplinary flexible learning units at undergraduate and postgraduate levels.

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105. A network of support for preservice teachers on school practice

This project will use computer and communication technology to enable preservice teachers to support each other's endeavours when genuine human support has been withdrawn in serious financial cutbacks.

The project aims to use the Internet to provide a network of support for students, a site offering ready channels of communication with lecturers and other preservice teachers, pedagogical advice and a dynamic source of lesson plans and ideas that students can use, contribute to and apply in their classrooms. It is envisaged that such a resource will promote learning outcomes in the areas of planning for teaching, applying appropriate teaching strategies, and employing on-line information-processing strategies.

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106. Improving the ethical reasoning of students

This project aims to improve the quality of students' ethical reasoning pursued through the design, development, implementation, evaluation, and refinement of a teaching manual and a student workbook. The focus on student reasoning concerns both their thinking about their own ethics and values as educators, as well as their understanding of ethics and values education. The project attempts to break ground in two ways. Firstly, it seeks to emphasise the link between these two points: between the content focus of student learning (i.e. ethics and values education) and the process focus on students' own ethics and values as these become activated by the teaching and learning approach taken. Secondly, this approach, known as the community of inquiry, will be adapted in a novel fashion from its most common setting in elementary schools.

Because the project will involve the teaching of groups of pre-service teacher education students, the practical spin-off for these students will be learning about the community of inquiry approach, from the 'inside', so that they will be in a better position as professional teachers to use this same approach in their own school classrooms. However, the design of the project also allows for the wider application of the project outcomes within many other professional preparation courses that are concerned about educating students in applied ethics.

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107. Academic/professional skills package for tertiary vocational degree courses

The project seeks to integrate the teaching and development of academic and professional skills into tertiary vocational degree courses. The DEET-funded *Graduate Labour Market Survey* (July, 1994) asked graduate recruiters about the generic skills and attributes that graduates are generally expected to display. A set of four broad attribute and skills groups was established: cognitive; communication; interpersonal; and work organisation/situation attributes and skills.

The project will produce a package of four graduated and inter-connected teaching modules based on these and able to be embedded in an entire course of study. These modules will be effective not only in terms of improved learning outcomes for all students and better retention rates in undergraduate courses but will also result in graduates more suitably equipped for the workforce in these times of change in the nature and organisation of work, and consequently better links between the higher education system and the industries and professions which recruit university graduates.

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108. Mainstreaming special education: Including all faculty staff in a compulsory undergraduate subject

The increasing move towards educating students with special needs in regular educational settings at early childhood, primary and secondary levels has resulted in teacher-employing authorities requiring that all university students receive a compulsory one-semester unit in special education as part of their training. The emphasis of the training has been on catering for the learning needs of students with special needs in the regular class through adaptation of curriculum requirements, instructional strategies and classroom management and layout. Within universities, this subject has been provided, either by special education lecturers as a specialist subject similar to teaching content in mathematics or physics, or by a staff member(s) identified to teach it. Involvement of lecturers in curriculum content areas is uncommon.

This project will develop an instructional manual for staff as well as sample tutorial teaching materials based on one of two teaching approaches: the inclusive approach or the disability category approach to meet the needs of specific universities. The manuals and tutorial materials will be developed using teachers from exemplary integrated teaching positions as well as special education and curriculum specialist lecturing staff. The outcomes of the project will be a more cohesive, generalisable presentation of special education information that will be inclusive in teaching and outcomes.

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109. Automated assessment and marking management package

This project aims to produce a software tool that will generate and manage the assessment of computer literacy concepts associated with practical application packages presented an introductory information systems subject at the University of Newcastle and a comparable subject at Deakin University.

This tool will be a complete software package that will generate multiple tests and produce, with each test, its associated automated marking program. Substantial student benefits, including mark standardisation, comprehensive and timely feedback of results and clarification of course learning objectives, will result. The package will also solve many of the logistic problems associated with large class numbers. It will manage the assessment results, providing detailed result breakdowns to students and tutors and generating summary information for the tutors and subject coordinator. It will coordinate the merging of individual tutorial class marks into a combined subject set and provide reporting functionality for both tutors and the coordinator. A standard for the package will be developed that caters for future extension by provision for the addition and maintenance of question modules. The assessment package will coordinate and manage all student assessment marks.

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110. Developing a Web-deliverable virtual classroom for primary school teacher education in science

Research at UTS and elsewhere shows that school students are capable of profound philosophising about the nature of things, and are proficient at generating stories to make sense of what they see and think. From that empirical research, there is now a database of exemplary teaching episodes available for use in education courses. This project will create a virtual classroom in which to present those recorded episodes in ways which illuminate sophisticated teaching. Here, education students will observe on-screen video, develop and record in an archive their own responses and have access to responses accumulating from others.

As a result of this project, education students will experience the power of new teaching methods by observing their use in the virtual classroom. Students will abandon the simplistic methods of their own science education and achieve deep understanding both of key scientific ideas and how they can best be learned.

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111. Enhancing practice-based learning through critical dialogue

The major aim of this project is to apply and evaluate the use of critical dialogue as a framework for practice-based teaching in education, engineering, and nursing. More specifically, the project aims to develop strategies for teaching students and facilitators about the effective use of critical dialogue in practice settings, and to create a systematic and reliable instrument for evaluating the effectiveness of critical dialogue in enhancing learning in practice settings.

The project will achieve several major outcomes. Facilitators and students will demonstrate: the use of critical dialogue to explore and explain their practice-based learning; a capacity to challenge their assumptions; enhanced critical thinking skills; confidence to take control of their practice; and the ability to participate in collaborative sessions and share the experience of critical dialogue and active practise-based learning.

The project will also produce learning resources, eg video and workbooks, designed to assist academic staff, students, and work-based facilitators to acquire and practice the theory of critical dialogue in practice based settings.

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112. Taking it to them: the integration of self-directed learning packages with video-conferencing for rural based students

This project aims to increase teaching and learning opportunities for rural Aboriginal students attending the University of Western Sydney in a part-time block-residential mode.

The project will develop self-directed learning packages, integrated with on-campus teaching and learning, and video-conferencing support sessions between residentials. As well as providing more opportunities to interact as a group, the inter-residential support proposed will provide long-needed clarification and reinforcement of assessment items and give students the opportunity to re-engage with the learning process and language of the university. This type of support is always available for on-campus students.

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Other Social Sciences

113. Reasoning and the broadcast media: developing critical responses

The project aims to teach students to be critical about television product and, in the process, to develop reasoning skills. The project will produce a set of model materials in the form of WWW pages, incorporating brief extracts from television in a range of genres, together with discussion plans and critical commentary on the excerpts, identifying fallacies, non sequiturs and avoidance strategies in interviews. There will be links to glossaries, and to a bank of logic exercises which have already been extensively trialed.

The project uses television commercials, news stories and serials as the basis of training in logic and reasoning skills. Thus the project teaches both reasoning skills and a critical approach to television. It does so through the examination of what is increasingly the way most people find out about the world-television itself.

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SCIENCES

Physical Sciences

114.TCUP - Testing conceptual understanding in physics

This project will assemble a set of question banks designed to test and enhance students' mastery of physics concepts. The delivery method to be used (Computer Managed Learning) will provide immediate feedback to students during the course with minimal commitment of staff time. This formative approach to assessment will encourage students to perform independent evaluation of their learning.

Teaching staff will also receive feedback on how well the student group is mastering key concepts, with the option of adjusting their teaching emphasis accordingly. The TCUP question banks will allow teaching staff to do pre- and post-course concept-mastery testing. This will aid individual staff in judging the degree by which their existing courses are successful in transferring basic physics concepts.

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115.Development of a studio course in physics

In this project, a studio program will be developed for the second semester of the first-year mainstream physics course and a pilot study will be conducted with a group of about 30 students selected without regard for previous academic performance. The objectives of the program are to reduce the dependence on lecturing, integrate the theoretical and laboratory parts of the course, introduce cooperative learning techniques and make students more responsible for their learning.

The program will be based on the model developed at the Rensselaer Polytechnic Institute in the United States, but will be adapted to retain strengths of the present program which include an emphasis on experimental design in the laboratory, an experimental project, and the enlivening of the course that results from the context of a department with a strong research program.

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116. Modelling and analysing real-world physics

The tendency of students to quarantine the physics understanding they gain during formal instruction from their everyday lives is a continuing challenge to physics educators. This approach of students not only prevents them from perceiving the relevance of physics but can also lead to a shallow understanding of physics principles and applications. This project continues the development of a learning package to address these issues by developing students' understanding within a real-world context. The original project comprises computer-based modules in which students view closely, and analyse, short video segments of real-world events or key lecture demonstrations. They have the opportunity to observe the video record of the event under varied conditions, prompted by their own 'What if ...?' questions about these events. This activity is coupled with 'virtual interviews' with people to whom the physics under examination is important.

The extension of this project will refine the software package and add two new components important in helping students develop robust models of the real world. These components are: a sophisticated spreadsheet-based modelling environment tightly integrated to the video analysis features of the software; and the ability to carry out analysis, modelling and visualisation of vectors in three dimensions.

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Chemical Sciences

117. Demonstration experiments in the lecture room environment

The goal of this project is to improve the teaching of third-year level undergraduate courses in quantum chemistry and chemical spectroscopy at the University of Queensland.

The project will develop: a portable laboratory consisting of a notebook computer with miniature video capture and spectrometer cards; the computer control, monitoring and analysis of an experiment which can be displayed on a lecture theatre projection screen; the ability to integrate a wide variety of existing research instruments using a common instrumental computer interface; and the real-time video capture of experiments and data analysis of results.

As learning outcomes it is expected that the students will see the relevance and gain a deeper understanding of the lecture material by observing a concurrent experiment, witness scientific method in progress, see 'real' experiments rather than simulations or animations, and gain knowledge of the technologies and methodology used.

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118. CoChem - An innovative approach to interdisciplinary advanced chemistry teaching

The primary objective of this project is to develop an innovative modular laboratory kit, CoChem, for senior undergraduate students. It will combine new technologies at the chemistry/biology interface, i.e. combinatorial chemistry (synthesis), biological testing and computer-aided molecular modelling.

The CoChem laboratory kit will be developed using the expertise of chemists and biologists in academia and industry and an educational consultant. Iterative evaluations of senior medicinal chemistry, chemistry and biotechnology students will be conducted to determine the module's educational effectiveness and begin the first step in the production of a high quality interactive instructional package.

The final CoChem laboratory kit will be readily integrated into senior chemistry courses of teaching institutes and will increase student understanding, knowledge and practical skills in the interrelated fields of chemistry and biology and promote an interdisciplinary outlook in chemistry.

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Earth Sciences

119. Implementation of simulation and visualisation modules into 200-level physical geography

Physical Geography is a visual science both in terms of research and teaching. Traditional teaching technologies largely preclude a full exploitation of the visual nature of a spatially and temporally dynamic discipline. This project seeks to utilise the newer technologies for the visualisation of four dimensional simulated and observed data, coupled with a changed model of delivery via the Internet, to fundamentally shift the methods used to deliver key elements of a 200-level undergraduate program. By choosing specific aspects of *Natural Hazards* and *Climate Impacts* teaching within the discipline, this project allows students to see the changes in the state of a system, appreciate the impact of a change in a system, and understand the uncertainties in the prediction of a system via manipulation of parameter sets through a netscape interface to computer packages and via a netscape interface to the visualisation of results.

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120. Enhancing learning of Quaternary Geology: virtual field trips in the Murray Basin

This project will develop *Virtual Field Trips* in the Murray Basin through which students are encouraged to explore data sets linked to a recently-developed multimedia interface. The data sets, all drawn from the Murray Basin, relate to many subjects in undergraduate earth sciences and related courses.

The project relates to two educational challenges: strengthening the field trip experience in earth sciences; and responding to a major change in emphasis in earth science and geography curricula where there is an urgent need to teach and learn about modern environments. Thus, university geology and geography is placing much more emphasis on the major changes to Australian landforms, sediments and soils over the past 2-3 million years, the period covered by Quaternary Geology, and changes which are best presented to students in the field.

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Biological Sciences

121. Building and evaluating a collaborative learning kit for open and flexible delivery of human biology to distance students

This project will provide an integrated learning kit which will allow students studying by distance mode to work collaboratively with other distance students and eliminate the need for an on-campus component of the unit Human Biology. The kit will provide students with mechanisms to set up contact and collaborative working groups with other distance students in the unit and computer courseware, plastinated specimens, and audiovisual material which will allow them to learn independently of campus-based resources. Students will work with each other through discussion groups by e-mail or phone. The project aims to:

- (i) provide a challenging unit which will require students to work in teams to develop their understanding of essential concepts;
- (ii) help students develop deeper learning strategies than has traditionally occurred;
- (iii) remove the isolation which all students presently enrolled in the unit report; and
- (iv) reduce the differences in the learning experience for internal and distance-mode students.

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122. An ocean in the classroom: practical methods in marine conservation biology

This project will produce a CD-ROM teaching resource which aims to bring the experience of major field-based research to marine science students, in a motivating and accessible format, which can realistically be applied to teaching practice in a laboratory situation. An initial tutorial product has been developed and part-funded by the Department of Marine Biology, and is in use this year. This product uses a spreadsheet-based program which enables students to gain an understanding of methods for analysing and presenting data from an Environmental Impact Assessment.

The CD-ROM production will be an extension of this learning strategy, providing students with a rich and realistic learning experience that is not possible using traditional teaching methods.

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123. Development of a computer-based multimedia rat dissection

This project proposes to develop a computer-based multimedia rat dissection for first-year biology students. Dissection has traditionally played an important role in the teaching of biology, showing students the structure of various organs and how they are connected to each other. Recently, however, there has been increasing concern over the ethical considerations of using animals in teaching. With recent advances in computer and multimedia technology, we are starting to see a move away from the more traditional 'live' experimentation, using animals, to multimedia-based interactive forms.

Aside from ethical considerations, the use of computer-based teaching has a number of clear advantages. In past studies, students that have been taught using alternatives to dissection have learnt as much, if not more, than those taught using real animals. Also the ability for self-paced study and revision make a virtual dissection an attractive alternative. The dissection will be modular and students will be able to 'dissect' male and female rats and trace different systems, such as the reproductive, digestive and skeletal systems. At each stage of the dissection they will be able to review their knowledge, gain information about structures and start to compare different stages of development.

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124. Collaborative peer group teaching in large classes - a faculty-wide second-year biochemistry initiative

This project will have a major impact on the student learning experience in biochemistry at RMIT, for a group of approximately 150 students. The didactic teaching of the subject via lectures will be severely cut (by 50%) and substantially modified. New materials in the form of subject notes and study questions will be written to complement the 'new' lectures. The time gained by reducing the lectures will be used for peer learning activities focusing on student-identified areas of difficulty/misconceptions and on the key concepts of the course. The group activities will be facilitated by the students, with several groups conducting their activities at the same time, while the lecturers move from group to group, and assist with identified student difficulties. Each peer group will present a teaching seminar, based on their collaborative work on a study topic, to the rest of the class.

A large number of positive learning outcomes for students, which include a more thorough understanding of biochemistry and related applications, and enhancement of communication skills and teamwork, are expected to be achieved through this new initiative. A resource kit consisting of biochemistry-related materials, together with guidelines and procedures adopted in the implementation of the peer group program will be developed, and will form an important project outcome.

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MATHEMATICAL SCIENCES

Applied Mathematics

125. Worth a thousand pictures: animations for mechanics

If a picture is worth a thousand words in most branches of mathematics, a good animation is certain to be worth a thousand pictures when one is studying the motion of objects in space. This project aims to produce a series of animated diagrams to be embedded in WWW pages explaining various aspects of mechanics. Their purpose will be to elucidate the theory, rather than to provide illustrative 'real world' examples. As such they will be diagrammatic, rather than photographic in nature and will make extensive use of colour to code the various quantities and vectors describing the motion.

Although the animations will be chosen specifically to fit in with the mechanics course at La Trobe, they will be available (and useful) to university-level mechanics students elsewhere. All pages will, from the outset, contain sufficient explanation to enable them to serve as stand-alone presentations and the site organisation will not refer to the lecture program.

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126. Web-interfaced array-based mathematics

The goal of this project is to develop the materials and tools to deliver the innovative USQ array-based first unit in mathematics over the WWW. The materials will consist of Web pages with embedded executable lines of mathematics, which may be modified, and re-executed, by the user, and which return results to the page. Links to related and pre-requisite pages will ensure that the student is continually initiating actions rather than reading. Static Help pages, which may later be enhanced with material in other media, will be provided as necessary.

The benefits will be for students taking the USQ first course in mathematics off-campus (over 50% of the enrolment). The development will provide an alternative approach tied closely to concrete arithmetic operations and the extensive use of graphical representations. It will afford an opportunity for students who have difficulty with abstract symbolism to succeed in mastering the basic concepts of the calculus and cater for a different learning style.

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Other Mathematical Sciences

127. Concepts in discrete mathematics

The aim of this project is to develop teaching materials to enhance learning of several key concepts in discrete mathematics. The project output will consist of five interconnected *Mathematica* notebooks with accompanying print materials. *Mathematica* is a powerful symbolic programming language that was initially developed for research purposes but which has now become a standard tool for learning and teaching. In this context a *Mathematica* notebook is an interactive source file which can contain text, graphics, animation and computational tools.

Because *Mathematica* is the standard software tool used in many universities around Australia, the materials can be readily adapted by mathematics, computing and engineering departments.

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ENGINEERING & PROCESSING TECHNOLOGY

Mechanical and Manufacturing Engineering

128. Development of interdisciplinary teamwork skills for information technology and engineering students

This project aims at preparing students of information technology, mechanical and electronic engineering for work in multidisciplinary problem-solving teams in technology intensive industries. By participating in a multidisciplinary problem-solving team, students will pursue seven learning objectives identified as highly desirable by employers. Each team will have members from all the three disciplines. The objective for each team is to build a set of mini-robots capable of playing a game of soccer against the mini-robots of another team. The best team will represent QUT in national and international robot soccer championships. Designing and building mini-robots for a soccer game is an activity ideally suited for mimicking the conditions in real, technology-intensive, industrial enterprises where competition and resource constraints play an important role.

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129. Teaching by errors: automated peer marking of misconceptions in engineering dynamics

The traditional view of engineering and science tutorials is that students will discover their misconceptions about taught material through solving a series of problems. This project examines ways of getting students to reflect directly on how subjects can be misunderstood, that is, to enumerate and study his or her own misconceptions, and also the possible misconceptions of fellow students. It is believed this can be done by having students examine traditional problems in a new way: instead of giving simply an answer, students will be encouraged to give a list of the errors that students might make while doing the problem. A way has been devised of automating this process of 'error-list' creation and also of awarding marks based on this list, within the context of an existing computer-based tutorial system.

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Electrical and Electronic Engineering

130. Flexible learning modules for fundamental concepts in electromagnetics

This project will develop two flexible learning modules addressing key concepts of distributed circuit theory and electromagnetic radiation from electrical circuits which have proven over the years to be extremely difficult for undergraduate communication engineering students to understand.

The modules will comprise an integrated and structured learning program using 'crucial' experiments, laboratory exercises, problem sets, small yet focussed interactive computer simulations, industry-based assignments and video demonstrations. Students will navigate through the modules with the support of a text-based learning guide.

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131. Computer-assisted laboratory instruction in engineering courses

The primary aim of this project is to demonstrate how the learning processes in laboratory instruction can be improved by introducing a computer-based laboratory instructor to complement the supervision of the human tutor using computers and multimedia. The demonstrator, referred to as Computer-Aided Laboratory Instructor (CALI), will be developed for the unit, Control Systems Laboratory.

The CALI will attempt to move away from current laboratory instruction to a more problem-solving experience and 'discovery learning' supported by continuous tutorial interactions. The balance between these two objectives will be maintained so that the students can learn from their mistakes while being instructed and rewarded via constructive and objective assessment for efficient and enhanced learning. The outcome of the project is a modular software package running on an IBM compatible PC.

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Information, Computer and Communication Technologies

132. An Internet environment for learning software testing processes

This project will develop an Internet-based interactive multimedia environment for students to learn the process of software testing in an object-oriented (O-O) system. O-O is considered as the most promising software development technology by both industry and academia. This developed Internet environment will include programs that provide facilities to display interactive lessons on teaching O-O software testing, animate changes to a program undergoing test, and simulate test-cases of varying complexity.

The use of multimedia facilities incorporating colour, sound and animation can enhance the learning process by providing an audio-visual environment. The proposed system will highlight the behaviour changes of the components that make up the software-under-test. It will allow visualisation of complex software testing process. Students can interact with the system and gain a better understanding of how to test software systems.

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133. An interactive self-paced program to teach the elements of map projections

The development project will produce a computer-based simulation teaching package for students of mapping. It will use visual methods to depict properties of map projections usually specified using mathematical formulae. One of the major stumbling blocks in teaching map projections has been the inability of students to visualise the shape of world outlines mapped using certain projections. This package will allow students to view graphic portrayals of various map projections and to explore how the continental shapes distort as projection variables are altered in equations.

After using the package, students who previously had little or no knowledge about map projections should have a much greater appreciation of map projections and their use to depict the earth (3D) on a plane (2-dimensional) paper map or computer monitor.

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134. A flexible, student-centred learning environment for pattern-based computer systems engineering

This project aims to develop a flexible, student-centred learning environment on patterns of computer systems that follows a format successfully developed and trialed at RMIT. In the environment, the students encounter a series of problems in computer systems, in order of increasing complexity. Patterns are not rules of thumb; they are fully motivated solutions. As such, the learning experience involves first developing an awareness of the forces impinging on each problem, and the students experience these forces firsthand by attempting to solve each problem. Once the students have produced solutions, the pattern solution that satisfies the forces is presented, along with its benefits. The students clarify their understanding of the pattern by re-engineering their solution so that it features it; they also utilise the pattern in a new application. After each pattern is introduced it is added to a student's repertoire so that familiar patterns can be identified and applied to subsequent problems.

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135. The software engineer's apprentice

This project involves the development of an integrated package, including a multimedia CD-ROM, providing a complete case study of object-orientated software development, as 'exemplar product'. This case study will provide a learning experience to the student, with the associated major assignment being structured around the material presented in the case study. Students will learn good professional practice by firstly observing good practice and then applying this practice to add small-scale additional functionality to the product. This approach to teaching takes, as metaphor, the apprenticeship model with the neophyte learning from a master of the trade, learning by observing, reflecting and putting into practice.

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136.TLC: Building a teaching and learning community in information systems

This project will build a cross-campus electronic teaching and learning community in the subject area of Information Systems (IS). This is a strategic project which will provide both students and staff with access to a wider pool of expertise than is available at any one university and will help the IS community deliver the best quality teaching and learning. It will provide an operational model for electronic teaching and learning communities for IS and other disciplines.

This project will face the difficult issues of articulation: how learning events are designed for inclusion in a variety of units; what types of learning events are manageable in this model; how the unit coordinator is assured of the relevance of material supplied by 'visiting lecturers'; how cross-campus student participation is assessed; how assessment is accommodated to the various course rules of the participating universities. These issues will be collaboratively addressed by the design team and by participants.

Host Institution

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137.Improving the teaching of female computer science students by borrowing teaching techniques from other disciplines

The preliminary work carried out for this project suggests that teaching in computer science can be improved for female students by simply borrowing established teaching strategies and techniques from other disciplines. This project is to identify, implement and evaluate such techniques. A sample of female students similar to the target students (with good marks in science and mathematics at school) will be tracked through their first year of university study with recorded interviews and focus group sessions. Techniques identified as being positive by the female students will then be applied in the teaching of a large first-year computing subject and their effectiveness carefully evaluated.

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138.A Web-based tutoring system for teaching and learning intelligent information modelling and management

The aim of this project is to develop a computer-based tutoring system which will provide the necessary software support for modelling and managing intelligent information systems. It is expected that the following learning outcomes will result from the use of the system:

- (i) an understanding of the issues involved in modelling and managing intelligent information systems;
- (ii) an understanding of the methodologies that support the development of intelligent information systems;
- (iii) an understanding of important intelligent information management processes;
- (iv) a well-developed practical ability to map conceptual models to concrete problems; and
- (v) a well-developed ability to choose the most appropriate technique for different aspects of a particular application.

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Other Engineering & Technology

139. Development of ship dynamics demonstration models

The aim of this project is to improve the teaching of the basic principles of ship stability in waves, achieved by providing students with access to two physical models specifically developed for investigating ship motions when operating in beam or quartering seas.

The first model will be of a ship fitted with instruments to measure the effects that any variations in the vessel's ballast condition has on the stability of the vessel. The second model will simulate the operation of an anti-roll tank, which is a commonly-used roll motion reduction device.

Exercises from each physical model can be combined so that the student can investigate, using physical experiments, the effect that their own basic design of an anti-roll tank has on the motions of the ship. The proposed ship stability and motions models will increase the ease by which the basic principles of ship stability in waves can be taught, give students more practical experience in the operation of reducing undesirable ship motions, and increase the effectiveness of the AMC Towing Tank as a learning tool.

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HEALTH SCIENCES

Dentistry

140. Functional and applied anatomy of cranial nerves: development of video tutorial modules for undergraduates in health disciplines

This project follows on from a successful 1996 pilot project and aims to produce 12 hours of 'video tutorial' modules on the human cranial nerves using integrated video, student workbook and tutor guide. The modules will encompass neuroanatomical, topographical and functional considerations, clinical examination, and common deficits arising from damage to the relevant cranial nerve. They will be suited to small group or individual use, will be problem-based, and will lead students to self-assessment and self-directed learning.

Improvements in students' conceptualisation and understanding are expected together with an improved sense of the relevance of neuroanatomy to the daily clinical practice of medicine, dentistry and allied professions.

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141. Enhancing teaching and learning for dental students by simulation

This two-year project will address current educational problems in the preparation of dental students for clinical practice, i.e. the need to improve the acquisition of clinical skills in the transfer from preclinical training to the clinical setting, and the need to improve competence in clinical education. The project involves support for development of educational materials for use in the recently developed and installed dental simulation laboratory which includes four anatomically contoured and positioned manikin heads, multimedia equipment and state-of-the-art dental equipment. Simulations based on 'real-life' cases will be developed for students to practise on in this setting.

Improvements in dental student learning expected from the project will be increased clinical competence in treating patients with simple and complex dental problems, up-to-date methods of infection control and more effective use of all members of the dental team.

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Medicine

142. The patient under the microscope - an interactive multimedia program integrating histology and pathology

The aim of this project is to integrate the teaching of histology (the study of cells and tissues) and pathology (the study of the causes and effects of disease) in such a way as to provide a framework of basic principles which will aid students in assimilating new knowledge in the context of problem-based learning, particularly advances in cellular and molecular biology. By relating cell and tissue structure to function and malfunction, the synthesis of histology and pathology provides an unparalleled insight into how the body is adapted to carry out its essential functions, how it responds to the environmental stresses that result in disease, and how this is influenced by genetics. It is intended that this program will achieve an unprecedented degree of integration of basic and clinical sciences by allowing students to understand how disturbances at the fundamental cellular level are manifest as disease in the patient as a whole.

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Veterinary Science

143. CaseMaster: the development of a template for interactive flexible learning and assessment

The purpose of this project is to develop further a computer program used in teaching, learning and assessment in the distance education Masters of Veterinary Studies (MVS) program. The current version of this program (CaseMaster) is a simple DOS-based program which was developed to overcome some of the difficulties involved in teaching an applied subject in the distance education mode. Problem-based case studies written by the teacher are used as the basis of ongoing dialogue between the students, who are practicing veterinarians, and the teacher. Students are able to relate the learning material to their own experiences as professionals and work collaboratively with their teacher in investigating and solving the problems posed in the case studies.

The new version of CaseMaster will include a tutor template program which will allow teachers in the MVS program to set up case studies appropriate to the component that they are teaching.

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144. Improving student learning and critical thinking in avian medicine

There is a challenge for universities to teach in a way that encourages and enables graduates to enter rapidly diversifying streams of the veterinary profession. At Murdoch University a series of computer-based problems and an e-mail discussion list have been developed which has replaced much of the traditional didactic avian medicine lecture course. The aim of this teaching method is to equip graduates with the confidence to diagnose and solve unfamiliar bird medicine problems and to convince students that they can integrate their extensive 'mammalian' veterinary knowledge. The main thrust of the teaching is learner-oriented rather than teacher-oriented.

This project will create a shared e-mail discussion list and computer-based problem-oriented course between Sydney and Murdoch Universities, where fifth-year veterinary science students can present, discuss and solve specific problems with each other, their teacher and avian veterinarians in private practice acting as external tutors. This collaborative learning environment will improve student learning in both student groups by enhancing their communication and analytical skills within their vocational focus.

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145. The human side of veterinary medicine

This project aims to enhance professional communication skills for veterinary students to better prepare them for more effective interaction in the workforce. This will be achieved by presenting and discussing brief video sociodramas of stressful events in veterinary practice, accompanied by documentary style comments from selected veterinarians and a clinical psychologist. The students will have access to a comprehensive study guide which will provide an explanation of the relevant principles of communication, together with exercises to be done individually or in groups.

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Nursing

146. Physical assessment - chest auscultation

Auscultation is acknowledged as an integral part of physical assessment along with inspection, percussion and palpation of the human body and is arguably the most difficult of the physical assessment skills to master.

This project is part of a proposed comprehensive multimedia learning package on physical assessment for health professionals. It offers a practical solution for pre-service and practicing health professionals to access real clinical sounds in an authentic, purposeful and low stress learning environment. The multimedia package to be developed as a result of this project has the potential to develop both confidence and health assessment skills to a higher degree in students before they practise on real patients.

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147. Simulated patient care management skills for student nurses using an interactive multi media case study approach

The aim of this project is to develop an experiential educational package for teaching nursing students patient care management skills using interactive multimedia. This package will provide simulated management case studies assisting students to gain an awareness of and experience in patient care management issues in a practical and realistic interactive multimedia environment.

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148. Collaborative primary health care nursing education: industry and the higher education sector

This project entails the production of four short videos and a resource manual to be used in the teaching of a one semester subject studied by final (third) year students undertaking the Bachelor of Nursing course at La Trobe University. Problem-based learning (PBL) provides the educational framework for this subject.

Each video will highlight a practitioner telling a 'practice' story; this story and the issues raised by it will become the focus for tutorial work and lectures. The production of a manual to accompany the videos will provide a primary health care theoretical framework and most pertinent readings for critical exploration of the themes/issues raised in the stories.

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149. Promoting holistic nursing care of patients with Alzheimer's disease, and their families, using problem-based learning embedded in computer-based education

This project involves the design, installation and evaluation of a computer-based education module that utilises principles of problem based learning (PBL) as a teaching strategy. Presentation and organisation of content will be directed toward developing and/or enhancing the clinical problem-solving skills and knowledge of students of nursing, both under graduate and postgraduate, as they face the challenge of holistically caring for clients with Alzheimer's disease in the community.

Host InstitutionQueensland University of
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150. Collaborative education for senior undergraduate students of nursing and undergraduate students with disabilities

This project aims to prepare and implement a collaborative education program for senior undergraduate students of nursing and students with disabilities enrolled at QUT. The project will be significant in providing nursing students with learning experiences that will enable them to develop the knowledge, skills and attitudes required to work with people with disabilities in ways that empower rather than demean them. The students will gain insight into concepts of positive disability that will provide a foundation for working cooperatively with clients in all health settings where nursing is practised. This development will be significant in encouraging students to see and appreciate the strengths rather than the deficits of people with disabilities. Students will also come to appreciate people with disabilities as people in their own right rather than as the victims unconsciously portrayed in the nursing literature. The project will also be significant in involving students with disabilities as full participants in the development and implementation of a unit that will be directly relevant to ensuring their success at QUT.

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151. Flexible delivery: providing different learning access tracks for registered nurses in rural and remote areas and internationally in human health sciences

This project proposes to develop two human health science units for flexible delivery for post registration nursing students. There is recent evidence to suggest that the relational model of learning which combines behavioural (environmental) and cognitive (perception) learning is an effective model for teaching in the health sciences. The essence of this approach is to generate a relationship between the student and a variety of information inputs in an environment that is conducive for motivating the learner. Clearly in the nursing context relevance of science data to the clinical setting is a major influence in information retention and student active participation in the learning process.

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152. An interactive multimedia tutorial to teach the examination of the thorax, lungs and abdomen

A physical examination provides nurses with the foundation by which information related to a patient's physical condition is collected and incorporated into their nursing care plans. However, nursing students frequently lack the appropriate practice opportunities with 'real patients'. This project entails the development of an interactive CD-ROM tutorial program that will provide a comprehensive resource for the teaching of the physical examination of the abdomen, lungs and thorax, which are the most commonly-examined body systems across the spectrum of nursing practice. It will include relevant theoretical background, step-by-step demonstrations and simulated practice opportunities. These will require students to perform an examination and identify and interpret the significance of a range of normal and abnormal patient signs and symptoms from a selection of patient case studies. The program will make full use of the multimedia capabilities of the compact disc, being self-paced, highly interactive and offering immediate feedback on performance.

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Other Health Sciences

153. Development of an interactive computerised report writer

This project will create an interactive computerised report writing program (CRiSP: Computerised Reporting in Speech Pathology) specifically designed to assist speech pathology students with writing assessment reports. One of the most effective ways to obtain improvement in report writing is through the development of an interactive computerised report writer. Students will be able to use the program to enter their findings and generate interpretations and conclusions. It will be interactive in that the computer will alert the student to inconsistencies for clarification and elaboration and to the omission of important assessment data. Online help will be made available so that the student does not have to search through textbooks and lecture notes to ascertain how to report findings. They will be able to search for the information they wish at the touch of a button while still in the program. Consequently, CRiSP will allow the student to write more complete and accurate reports on their clients while simultaneously learning the intricacies of assessment report writing.

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154. Virtual Machines: interactive simulations in exercise physiology

The project leaders have been developing an interactive simulation program, *Virtual Machines*, to be used with senior undergraduate and postgraduate students in human movement, exercise science and sport studies courses. The program as it currently exists generates virtual subjects, information constructs endowed with realistic characteristics, including height, mass, age, gender, and even a name and photograph, as well as almost 100 physiological and psychological variables.

This project aims to extend *Virtual Machines* by: expanding the range of virtual machines available; creating 'virtual training', where virtual subjects acquire a history and are subject to fatigue, training effects and ageing; and improving the interface and delivery.

The major learning outcome of the *Virtual Machines* project will be to provide students with an effectively unlimited number of subjects to test, using a range of equipment, in lifelike settings. Their professional competence and confidence will thereby be enhanced.

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155. The TCM virtual clinic (Stage 1)

The traditional chinese medicine (TCM) approach to health and disease is unique and its diagnostic system, and techniques, differ from Western medical diagnosis. This project, an interactive multimedia Virtual TCM Clinic on CD ROM, will assist second-year TCM students to construct flexible mental prototypes of disorders of the twelve *Zangfu* (organs) by presenting twelve patients (Stage 1) in a situated learning simulation.

The virtual TCM clinic will not replace real-life clinical training but will extend it to provide second-year students with a range of patient *exemplars* (patients with classical patterns of disharmony and without an overlay of secondary symptoms) that are seldom encountered, in authentic clinical settings, and to which, even when they do present, there is limited student access. The program will provide immediate 'case discussion' that the ethics of actual patient care prohibit.

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LAW

156.A learning package - investigative interviewing

This project seeks to develop supplementary materials which will enhance student learning in the area of investigative interview techniques.

The project aims to ensure that an integrated package is developed which more effectively meets student learning needs. It involves three linked strategies: materials to render planned Australian-based video clips (already supported by the Faculty) as realistic as possible in relation to statements, crime reports and complaint reports; a similar video, with associated materials, as part of the distance package, to provide a clearer picture of the processes described in education packages, to enable students to practise at home prior to attending the residential and to undertake some formative assessment; and, finally, teaching support material including suggested exercises and modes of delivery to ensure educators within Charles Sturt University and other institutions, including police academies, follow experiential small-group work principles integral to effective learning in this sphere.

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157. Student self-assessment in interviewing and negotiation exercises in legal education

The primary goal of this project is to develop explicit, structured student self-evaluation as an integral part of interviewing and negotiation programs in law, enabling students to develop their own self-reflective and critical capacities. As part of achieving this goal, this project aims to develop a better understanding of the ways structured self-critique can be used in the wider context of skills activities in legal education, which will inform future teaching and learning developments.

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158. Developing the reflective, client-centred legal practitioner: improving the legal interviewing practices and techniques of law students through the use of videos and instructional manuals

The main aim of this project is to help law students develop an understanding of the model of the reflective, client-centred legal practitioner by focusing on the initial lawyer-client interview. The use and mastery of skills and techniques, such as those involved in effective interviewing, require more than the acquisition of text-based theoretical knowledge. This project seeks to complement the texts and articles available in Australia on client-centred interviewing. Two structured and sequenced videos that depict the progress of client-centred interviews and two accompanying manuals will be developed.

Information about effective interviewing practices, questions which probe student learning, and prompts to help the students learn to review, reflect on, and evaluate their interviewing abilities will be included in the videos. A teachers' manual and a learners' manual will be developed to accompany the videos. The instructional package will be designed for self-paced, group-based and teacher-directed learning.

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159. Teaching contracts law using simulated contract project teams

The purpose of this project is to develop innovative methods for the teaching, learning and assessment of the law of contract. The project involves three major features: (a) the development of supportive, structured learning will allow independent research, analysis and learning without the presence of an academic; (b) the focus of the teaching process will be the use of student project teams (firms) in developing a staged process from negotiating contracts through to dealing with contract breaches and dispute resolution. Student groups will simulate the giving of legal advice on a real life contract problem; and (c) the process will incorporate negotiation and dispute resolution components.

This project will lead to the enhancement of various learning outcomes including: independent learning through students taking responsibility for their own learning using structured course materials; oral skills, interactive skills and team work through the meeting of firms and from the negotiation process; analytical and critical skills, through an examination of the law, and a discussion of the law amongst the members of the firm; and problem-solving and the application of the substantive law to a real life simulated contract situation.

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160. Civics education: the Australian Constitution

The project addresses a clear need for better civics education as identified by the National Civics Survey commissioned by the Department of Prime Minister and Cabinet in consultation with the Civics Expert Group (1994).

The project will produce a series of learning modules based around existing video material and the project will enhance the quality of teaching by making new educational content and methods of learning more widely available to others. The modules will be made available to teachers in law, history and politics to enhance their teaching of a contemporary, highly complex and often misunderstood topic.

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