Facilitating design & technology education for distance education students in Australia (teaching audiographically)

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Facilitating design & technology education for distance education students in Australia (teaching audiographically)

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Abstract
The Learning Materials Production Centre (LMPC) is part of the Open Training and Education Network (OTEN) which is a joint initiative amalgamating Open Learning and Distance Learning facilities from the New South Wales Department of School Education and Technical and Further Education. The LMPC provides learning materials for students from Kindergarten to Year 12 who are studying by Distance Education.

The study of Design and Technology (years 7-12) by Distance Education in NSW is via Distance Education Centres (DECs), Access Clusters and the Open High School.

This paper focuses on the facilitating and teaching of Design and Technology via audiographics delivery. This mode of delivery is being implemented in rural areas throughout NSW. LMPC is closely involved with teachers on DECs and Access Programs who are engaged in mixed mode and flexible delivery. As the use of communications technology for education grows, teachers increasingly need assistance in preparing screen ready materials. Materials are being designed specifically to support the changing delivery modes, and consultation and trialing relationships have been established.

As well as having an audio link with their teacher and other students via a Voicepoint or telephone and a document link, a visual link is provided around the use of a computer to provide an interactive “blackboard”. The teacher and student are provided with a common “blackboard” with word processing and graphics facilities.

Background
The Learning Materials Production Centre (LMPC) is part of the Open Training and Education Network (OTEN) which is a joint initiative amalgamating Open Learning and Distance Learning facilities from the New South Wales Department of School Education and Technical and Further Education. The LMPC provides learning materials for students from Kindergarten to Year 12 who are studying by Distance Education.

Distance Education in NSW
The study by students of Design & Technology (Years 7-12) by Distance Education in NSW is via Distance Education Centres (DECs), Access Clusters and the Open High School.
Client Base: Learning Materials Production Centre

The client base for the LMPC includes K-12 students studying via distance education either full time or part-time, students studying through an access program where one teacher is linked with students in other schools via the telephone, fax and computer (audiographics) and mainstream schools.

Isolated students working through Distance Education Centres, include:

Full time students who:
- are geographically isolated
- have medical problems
- are travellers- within/ outside Australia
- belong to various religious groups eg Brethren
- attend schools for special purposes eg physically handicapped
- are students in care - eg detention centres, prisons, study centres
- are talented students - eg dance, sport, music.

Part-time students due to:
- small class sizes
- change of schools, clash of timetables
- teachers of a particular subject not being available.

Classroom students include those in:
- Access programs eg Riverina Region
- Small group work- materials for sale
- Catch up and acceleration programs
- Independent Learning Centres.

Teachers:
- to provide reference materials for experienced teachers
- to increase programming options for teachers of composite classes.

Current direction of LMPC materials: Audiographics delivery

LMPC staff are closely involved with teachers in DECs and Access Programs who are engaged in mixed mode and flexible delivery. Materials are being designed specifically to support changing delivery modes, and consultation and trialing relationships have been established.

As the use of communications technology for education grows, teachers increasingly need assistance in preparing screen-ready materials. The graphic representation of concepts, and the devising of strategies and activities to take advantage of interactive technologies while coping with their restrictions is a major part of the instructional design work being done at LMPC.

Learning materials are now being designed ready for audiographics delivery. These materials will be immediately useful in videoconferencing situations. They can be readily adapted to use with audio teleconferencing and fax or mail hard copy. A paper-based version of materials, which assumes that students cannot attend school at all and have no access to telephone or computer technologies, is also provided. LMPC staff have been developing expertise relating to computer based learning, interactive television, videoconferencing and audiographics.

National Element Country Area Program: (NATCAP) Design & Technology Project

The NSW Board of Studies 2 Unit Design & Technology course became available for implementation in 1993. The syllabus is concerned with the study of technology through design. It involves practical experiences in a process of designing and producing. The course involves a broad based study which will be applied to the development of a Design Project in an area of interest selected by the student.

The funding from NATCAP has enabled materials to support this course to be developed for Distance Education students and to provide support for teachers in designated Country Area Programs or Access Cluster schools who will be presenting this course.

The National Element Country Area Program: Design & Technology is funded by the Department of Employment Education and Training (Commonwealth Government). The production of learning materials for students studying Design & Technology via Distance Education brings with it unique challenges. The major challenges being:

- Design & Technology (2 Unit Design & Technology Stage 6 Syllabus, NSW Board of Studies) has a large practical component and
- the necessary teaching/learning strategies involved in successful implementation of the syllabus require constant negotiation with the supervising teacher, small group work and problem solving activities with other students studying the subject.

The materials to support this 240 hour syllabus are presented as topic modules, because this will increase the flexibility of use within NSW and will facilitate their use by other states to enhance the
materials support for their syllabuses. The topic modules of learning materials are being designed for telematic (audiographics) delivery, for traditional Distance Education paper and audio cassette based delivery and face to face teaching. Topic selection takes account of syllabus content in other states.

The following overview represents the outline of topic modules which has been developed for the 2 Unit Design and Technology course.

**Program Overview**

**2 Unit Design & Technology**

Interstate, Cross-system and Inter-school

<table>
<thead>
<tr>
<th>Units (Modules) of Work</th>
<th>Duration (Weeks)</th>
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<tbody>
<tr>
<td>Yr 11 (Preliminary)</td>
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<tr>
<td>1 Introduction</td>
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<tr>
<td>Concepts of the course</td>
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<td>2 Design Project 1</td>
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<td>Designing and Producing: Landscape Design</td>
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<td>3 Design project 2</td>
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<td>Using Resources: Systems</td>
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<td>4 Design project 3</td>
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<td>Marketing, Management &amp; Communication</td>
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<tr>
<td>5 Comparative Case Study</td>
<td>2</td>
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<td>Investigative Component</td>
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<td>6 Design project 4</td>
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<tr>
<td>Mini Design Briefs</td>
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<tr>
<td>7 Introduction to Major Design Project</td>
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<td>Proposal and Start</td>
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<td>Yr 12 (Higher School Certificate)</td>
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<tr>
<td>8 Comparative Case Study</td>
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<tr>
<td>Comparative Component</td>
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<td>9 Major Design Project</td>
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<tr>
<td>Project Management</td>
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<tr>
<td>10 Major Design Project</td>
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<tr>
<td>Evaluation Methodology</td>
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<td>11 Major Design Project</td>
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<td>Project Development &amp; Realisation</td>
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<tr>
<td>12 Major Design Project</td>
<td>3</td>
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<tr>
<td>Project Evaluation</td>
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</table>

Communication technologies in varying degrees, from telephone teaching to graphics transmission will be incorporated in the materials. However not all potential students will have access to audiographics technology, so alternative pathways will be provided in all modules.

**Audiographics and the use of Electronic Classroom**

The modules produced for the 2 Unit Design and Technology project incorporate the design and development of prepared graphic screens for use by teachers and students in Access Clusters or audiographics learning environments.

As well as having an audio link with their teacher and other students via a Voicepoint or telephone and a document link, which uses a facsimile machine for the transfer of documents, a visual link is provided around the use of a computer to provide an interactive ‘blackboard’. This is via a computer software program titled ‘Electronic Classroom’. The teacher and student are provided with a common ‘blackboard’ with word processing and graphics facilities.

For example, the teacher can draw a triangle, type a question, then ask the students to estimate and label the angles. Transfer of data in this mode is virtually instantaneous and prepared files or screens can also be transferred before or during the lesson. The computer screen provides a focus for students’ attention.

The first module in the course involves students learning about the nature of the design process and the many ways in which it can be represented graphically. Screens were developed which enable students to both view and interact with a variety of representations of the design process.

**Audiographics (telematics) demonstration**

Components

- a fax machine
- a Macintosh computer and Electronic Classroom Software
- a modem
- 2 telephone lines
- a graphics tablet (optional)

The establishment of these links allows the teacher in the Access Cluster to speak to students at a remote site, to use the Macintosh computer as an electronic blackboard, and the fax for document transfer to another school.
an Audiographic Telematic Schematic – MULTIPoint
Teaching Design & Technology

When using audiographics in teaching it is important to remember that the lesson is replacing the normal classroom situation and the teacher is using the computer screen instead of a blackboard or the overhead projector. Individual exercises and assessment are probably best done on paper or computer and faxed to the teacher. On line time can be expensive and could be wasted if it is only used for transfer of text data for students to read.

Some degree of interactivity can be built into prepared lessons for electronic classroom. However, the skill of the teacher using electronic classroom can be a lot more interactive with the students.

Since audiographics teaching began teachers have found the use of computer technology has significantly increased amongst the students involved. It has become a part of their everyday life.

Electronic Classroom

Developed around a paint program (refer figure 1 blank screen E/C.) There are many strategies which can be implemented when teaching using Electronic Classroom including:

- specific question and answer
- cover and reveal (as with o/h)
- processes (design process figure 2)
- problem understanding
- understanding verbal instructions
- sequencing information

Use of pre-prepared lessons, a chalk (computer pencil/graphics tablet) and talk lesson or the importing of graphics and text stored in a computer scrap book, hypercard file, drawing, paint or word file, (version 2 CD ROM) are all possible.

Supervising teachers of Design & Technology receive a teaching/learning program, print based lessons, instructions and suggestions for teaching the audiographic aspects of the course as well as audio tapes, videos, teaching kits and other resources such as specifically written pop culture magazines.

Evaluation of materials developed

Design & Technology is being taught via audiographics in two Access Clusters for the first time this year. The teachers and students participating in the trial have been very positive in their comments about the 'screens' which have been developed. At this stage no research has been published on the teaching of Design & Technology audiographically.

Open Training and Education Network (OTEN)

A joint initiative

The NSW Minister for Education recently announced the formation of a new OTEN. This formation will bring together the two specialised, professional distance education/open learning areas of TAFE and the DSE.

The DSE's role in Distance Education has been addressed earlier in this paper. OTEN is already a major educational publisher and supplier of educational materials to TAFE and Industry. It is engaged in the implementation of appropriate technologies to support distance education and open learning.

Amongst its many other services OTEN provides advice on training technology applications and alternative delivery systems, forms of educational technology communications including computer-based training, state wide satellite broadcasts, videoconferencing, teleconferencing and electronic mail.
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