

Meeting the challenges of distance education in a regional university through the development of multimedia resources

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Charles Sturt University (CSU) is a regional, multi-campus university with over 60 per cent of its 32,000 students studying through distance education. This presents challenges for staff in teaching and providing access to appropriate resources, varied learning experiences and support for their students. Materials-based learning in the traditional print format remains an important part of CSU's distance education offering, both regionally and internationally, although all CSU subjects are fully online supported. CSU's Centre for Enhancing Learning and Teaching (CELT) has a team of over twenty school-based educational designers, across several campuses, that support academic staff in the development of DE subject resources. Along with supporting other teaching needs, CELT has established three campus-based Learning Media Laboratories that provide a unique opportunity for academic staff to work individually with trained instructional (educational) designers to design and develop multimedia and online resources to support their teaching. Three case studies of the development of CD-Rom resources and print materials highlight the pedagogical considerations and instructional design principles fundamental to the development of multimedia resources for distance education subjects and the integration of these into the student learning experience as a whole. In order that CSU remain at the forefront of distance education, this type of multimedia development needs to be accessible to more academic staff. To this end, the university is developing an integrated management plan for sustainable and scaleable production of online and multimedia resources to support learning. Importantly, this initiative is grounded in pedagogical considerations and takes cognisance of previous work that has been done in this area at the university.

Introduction

Charles Sturt University (CSU) is a regional, multi-campus university with over 60 per cent of its 32,000 students studying through distance education. This presents challenges for staff in teaching and providing access to appropriate resources, varied learning experiences and support for students. Materials-based learning in the traditional print format (Rowntree, 1997) remains an important part of CSU's distance education offering, both regionally and internationally, with all CSU subjects fully online supported.

University teachers take the responsibility for what and how their students must learn and 'teachers create the choices open to them' (Laurillard, 2002, p.1). So, if it is the teacher's responsibility to create the conditions in which understanding is possible, and the student's responsibility to take advantage of that (Newby et al., 2000), how do teachers provide the best possible learning experience for the student? Delivering learning by distance education (DE) places constraints on the students. With no face to face contact, no classroom community, no benefit of the visual or practical resources shared in the lecture theatre and an infinite opportunity *not* to interact with the study materials provided, they may be disadvantaged in comparison to on-campus students. To overcome these problems CSU is

enhancing the distance education (DE) learning experience through technology (Frayer & West, 2002) and by developing multimedia resources and integrating these into the total learning experience of the DE student through sound pedagogy and educational/learning design (Oliver et al., 2002). While these are by no means new ideas, (Frayer & West, 2002; Ireland, Tarricone & Luca, 2002; Mehotra, Hollister & McGahey, 2001) the case studies shared here demonstrate how appropriate learning design and use of multimedia is having a profound effect on the learning experiences of DE students.

Designing learning

No matter what the educational environment, learning starts with the learners and their previous experiences, background knowledge and learning styles (Hutton, 2002). A challenge in the delivery of distance education in the regional university context is to provide students with an appropriate learning environment and access to learning experiences to enable their learning and to achieve the desired learning outcomes. At CSU this is being done through sound learning design.

There is a variety of different approaches to the design of learning: instructional design (Gagne, Briggs & Wager, 1992; Tennyson & Elmore, 1997), instructional technology, learning design (AUTC, 2002; Oliver et al., 2002), designing instruction (Newby et al., 2000), and educational design (Oliver et al., 2002) among others. An integrated, problem-solving approach to the design of learning was employed at CSU that is most accurately described by the term 'educational technology' (Rowntree, 1982).

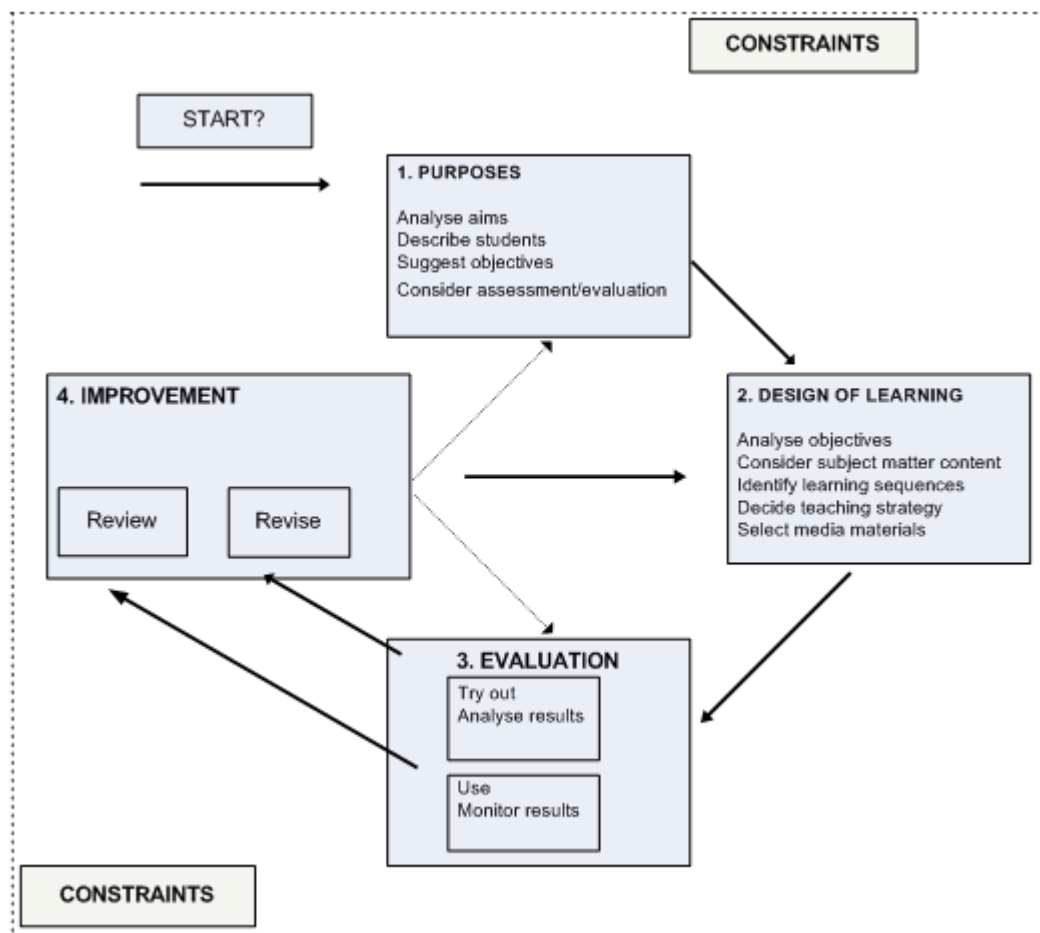


Figure 1 Educational technology in curriculum development (after Rowntree, 1982, p.21)

'Educational technology is a rational, problem-solving approach to education, a way of thinking sceptically and systematically about learning and teaching' (Rowntree, 1982, p.1). The approach emphasises a four-phase process of planning and evaluation (Figure 1) and can be employed at a variety of levels, from management at the university level to single

problem instances. These four phases are used throughout this paper as a framework for the discussion of the development of the multimedia resources in each case study. Here the focus will be on its application in the development of individual multi-media resources, although one cannot separate development of an individual resource, such as a supporting CD-Rom, from its integration into the entire learning experience.

Background to multimedia development at Charles Sturt University

CSU's Centre for Enhancing Learning and Teaching (CELT) has a team of over twenty school-based educational designers, who support academic staff in the development of DE subject resources, along with supporting other teaching needs. In addition, in 2000 CELT established three campus-based Learning Media Laboratories (at Bathurst, Albury and Wagga Wagga) to support academic staff in designing and developing multimedia and online resources for their teaching.

When development of a multi-media resource is considered in the Learning Media Laboratory (LML), a detailed project proposal is drawn up that includes a description of the project/resource, the aims, analysis of the target audience, details of technical issues to inform choice of media, the proposed evaluation methodology, implementation and timelines, and the budget (Figure 1, Step 1). Where multimedia resources are being developed for existing subjects, much of the analysis in curriculum development (Rowntree, 1982) has already been done at the subject level (Figure 1, Step 2) when a new subject is proposed and the official subject profile drawn up for faculty approval. However, in developing the multimedia resources, each step is revisited to integrate the new resources into the learning experience as a whole. This ensures that the problem-solving approach emphasised through educational technology is embedded early in the project.

In order to apply the concepts and theories learned in the subject, to think critically and problem solve, students are required to build up a body of general knowledge appropriate to the subject or discipline area. This is done through life's experiences and for on-campus students appropriate experiences are provided by their lecturer through lectures, practicals, field trips or guest speakers. A common barrier identified for the DE students in these case studies is the limited availability of access to such learning experiences. A common aim of the multimedia resources described here is, therefore, to provide examples of real-life experiences for students with a view to increasing their exposure to aspects of 'general knowledge' in their chosen fields. All three subjects use a combination of tutorial-in-print and a reflective action guide (Rowntree, 1994).

Case study 1: Interpretive Guiding

Interpretive Guiding (REC301) contributes to several of the Bachelor of Applied Science degree courses offered by the School of Environmental and Information Sciences at Charles Sturt University. The subject deals with the planning, organisation and implementation of guided interpretive tours and programs and aims to provide and develop the skills and knowledge for students to become effective interpretive tour guides. The subject is offered to third year internal and distance education students who are mainly individuals working in the ecotourism and adventure ecotourism industries.

The DE delivery of the subject was initially by means of print materials, that are updated each session as needed, and a residential school. As the subject focuses on personal communication, lecturer Dr Rosemary Black saw a need to develop a multimedia resource that could demonstrate guides' roles and skills in communication, interpretation, and group leadership and to provide examples of interactive guided tours to demonstrate the principles and concepts learned through the study materials.

The CD-Rom is aimed at helping students develop basic interpretive guiding skills and stimulating ideas and discussion on how interpretive guiding techniques can be best applied in natural and cultural heritage settings. The CD-Rom is designed to demonstrate the four basic stages of planning and implementing a tour and providing visual demonstrations of the

key stages of a guided tour using scenarios that illustrate practices associated with guiding in the natural environment and focus on interpretation and communication. Each scenario demonstrates a mixture of good and poor guiding techniques, with corresponding reflective questions designed to help students gain an understanding and appreciation of good guiding practice. In addition, interviews with the tour guides provide some insight into the roles, challenges and benefits of being a tour guide. Images of tour guides and locations of tours enhance the students' sense of what it is like to be a tour guide. For those students who may not have access to real guided tours, the two 'virtual' guided tours can also be used by the students for their first assignment that involves critiquing two guided tours.

A teaching strategy employed in this subject is facilitating learning through modelling and reflection on action (Rowntree, 1997; Steiner, 1997). This was achieved using real-life video clips of two guided tours and a photo album of a third tour to illustrate the interpretive guiding process.

As the concepts behind developing an interpretive guided tour were new to the students, it was important that students develop their own *schemata* for understanding and learning the new information. A schema can be defined as a framework or cognitive structure into which new knowledge can be organised (Steiner, 1997). In this case the schemata are the theories and processes of interpretive guiding. These theories and processes are described in the print materials and reinforced through the design and content of the CD-Rom, as well as through the authentic assessment activity of developing an interpretive guided tour. The CD-Rom was designed with a simple web style navigation to allow students to navigate the CD-Rom as they wish, exploring the interviews with the 'expert' guides or the tours. However, careful instructional design of the print and multimedia resources ensures students' study progress is formally 'guided' through the CD-Rom.

From a technical point of view, it was necessary to develop the CD-Rom for both PC and Macintosh platforms, as well as for older computer systems and this involved a significant input of time. For access and equity reasons a VHS video of the CD was produced for students who may not be able to access the CD-Rom, however to date this has not been required.

A draft of the CD-Rom was peer-reviewed and evaluated by three tour guiding experts prior to finalising the CD-Rom and their feedback was used to modify and improve the final product. Formal student evaluation was completed through the CSU CELT Evaluation Unit using a customised teaching evaluation survey. The majority of students who responded to the survey considered the multi-media resource assisted in providing practical examples of aspects of tour guiding; respondents indicated that they had frequently referred to the CD-Rom while studying; and they considered that the interviews with the tour guides had helped them understand the subject. The evaluation has been used to look at the assessment items for the next offering of the subject, and to make changes to the print materials. Feedback on technical aspects of the CD-Rom has informed the development of new resources in the LML.

Development of multimedia in this subject provided a steep learning curve for both the lecturer and learning media laboratory coordinator involved in the project, partly because it was the first time both had been involved in such a sizable project. Although the development of the CD-Rom was time consuming, the resulting resource has proved to be highly successful in supporting the print materials and meeting the learning needs of the students.

Case study 2: Introduction to Leisure and Health

The subject, Introduction to Leisure and Health (LES101) is offered by the School of Community Health at CSU and is a foundation subject in two courses in the school. The target audience is mostly mature-aged students from diverse backgrounds, both rural and urban, who are currently working in the aged care or disability services sectors. Many have not completed secondary schooling, and face multiple demands from work, family and other areas. This particular student cohort presents certain challenges. These challenges include maintaining student retention, reinforcing their initial commitment to study in the context of high alternative demands, responding in a positive and supportive way to anxiety that emerges as a result of study at a distance (NCVER, 2002), and keeping students engaged

and motivated to study in this context. Another challenge is to help students achieve the subject objectives. These focus not only on content, but also attempt to introduce students to higher order skills and concepts such as critical thinking, and sociological thought (Kandlbinder, 2004).

The existing subject piloted new territory in 2002 with a CD-Rom developed to support the student learning experience (Mehotra, Hollister & McGahey, 2001). In 2004, after a change in staff and subject focus, Marie Macklin and Ilena Young rewrote the subject and a new CD-Rom was developed.

The subject materials, both print and multi-media, have been carefully designed to take account of particular student needs, providing both social as well as academic support (Rowntree, 1997). A primary aim of the CD-Rom was to orient students to the course (Leisure and Health) and to introduce them to the academic and personal student support infrastructure that the University provides and show how these might be accessed by DE students. Video clips of the lecturers introducing the subject and its content were used to provide the 'personal contact' and to engage and motivate the students. Similarly, campus images, a campus map and short audio clips from relevant staff members provide a personal aspect to the online support available from different sectors of the university namely: the lecturers, the School of Community Health, Student Services (study skills) and the Library. With over 32,000 students at CSU, the CSU website caters for a broad audience, and for those new to computers and to CSU, finding appropriate support online can be challenging and can provoke anxiety. The CD-Rom was designed in an attractive and accessible web format to help students engage with computer technology in a non-threatening and enjoyable way. It was hoped this would prepare them for the demands of using computers in study which, in turn, would empower them in the workplace.

As a learning tool, the CD-Rom provides activities (reflections, tasks etc.) for students to work through with the purpose of providing opportunities for students to apply what they have learned, thus reinforcing new concepts (Rowntree, 1997; Steiner, 1997). Students are free to browse through the CD-Rom as needed, but the print material provides directed study by referring students to relevant sections of the CD-Rom.

Introduction to Leisure and Health focuses largely on situated, or apprentice-oriented learning (Steiner, 1997). It is important that students are able to situate the theoretical aspects of the subject within the context in which the ideas will be used, that is, in the leisure and health industry. 'Learning is seen as an interaction in a situation, with its challenging features or conditions that trigger problems locating and formulating, thus motivating learning' (Steiner, 1997, p.89). As many of the concepts and terminology introduced in this subject are new to students, it is important that students develop their own 'schemata' (Steiner, 1997) for understanding, learning and then applying the new information. Therefore, when students are introduced to new information in their print materials they are asked to reflect on it and the schema is then reinforced as students use the CD-Rom with its visual aspect to relate theory to real life (Raider-Roth, 2004).

The original (2002) CD-Rom developed was evaluated at the end of the 2004 first semester offering. Feedback from this evaluation was used to plan the redesign of the multi-media resource, and to integrate the CD-Rom into the new print materials. The CD-Rom was redeveloped using Macromedia Dreamweaver™ (previously development had been in Macromedia Director™) for equity of access by students and ease of updating.

The use of multimedia in this subject has been valuable in meeting the objectives of the subject, notably, introducing students studying at a distance to the university community, and is an excellent educational resource that reduces isolation (see sample email from a current student below). It reinforces the development of new concepts and, when used in conjunction with traditional and online forum based ('discussion boards') teaching strategies, enhances student outcomes. Since the inception of the CD-Rom in 2002, attrition rates in LES101 have fallen from almost 72 per cent in 2000 to 41 per cent in 2004. The attrition figures for 2005 are not yet available.

Hi there Marie,
I am a 20-year-old student from Canberra enrolled in LES101 (DE). I just thought I'd send you a quick note to introduce myself and to say how much I

am enjoying the subject. The CD-Rom was a great way to kick-off the course (a great stress reliever!) and now as I start module 2, I'm feeling confident that I can take the things I'm currently learning in Sociology to make sense of our upcoming assignment forum. I've just been so surprised at the amount of support shown by both yourself and the University. Last year I studied for a short time at [other institution deleted], and not meaning to be narky, but I felt as if I was on my own. It's just been really wonderful and positive to be studying amongst people who actually care and support you along the way. Kind regards, L.

Case study 3: Catchment Management through Community Development

The subject 'Catchment Management through Community Development' (GEO360) forms part of several of the B.App. Science courses at Charles Sturt University. The subject focuses on the social dimensions and institutional frameworks surrounding ecologically sustainable development in Australia. The DE target audience is usually mature-aged students requiring the knowledge in order to be able to work with local communities to resolve environmental issues. The learning is thus very much 'situated learning' (Laurillard, 2002) with students applying what they learn to real-life situations.

Lecturer Jonathon Howard describes one key challenge faced by the students in this course as the lack of familiarity many students have with rural Australia. While students may have a good knowledge of environmental processes, their knowledge of agricultural practices, the impacts of these and how to address them is poor. In addition, while they may have a good background in the physical sciences, they often have little experience of social processes such as group development and leadership.

As the students cannot be expected to have experienced a wide range of rural environments and conducting an excursion would be cost prohibitive, the lecturer saw a need to develop a multimedia, interactive resource designed to provide students with a range of visual media on social theory associated with the subject, 'best-bet' practices and poor agricultural practices. The main aim of developing the CD-Rom resource was, therefore, to contextualise the theoretical aspects of the subject through visual, real-life examples of people in action. This was achieved by providing video and audio samples of live interviews with different stakeholders (farmers, government and council representatives and catchment management board members) involved in the catchment management process. In other words, the CD-Rom was designed to bring the subject to life.

The existing print materials provide a comprehensive study guide. The teaching strategy employed here was to facilitate learning through modelling good practice, both through the CD-Rom as well as the opportunities provided in the residential school. The supporting print materials were then rewritten to integrate the video, audio and images of people and practices shown in the CD-Rom into the theory and assessment tasks. An example of this is in the way the CD-Rom prepares students for the role play exercise which forms part of their assessment. Students are given a stakeholder's role on a fictitious catchment management board, and are asked to prepare a position paper for discussion at a board meeting. This 'meeting' is held at the residential school, and in a live role play individuals have the opportunity to experience as close to authentic as possible, a catchment management meeting. They then have the opportunity to put into practice the techniques and theories they have studied.

The use of the CD-Rom within the subject was evaluated using a customised survey administered to students by the CELT Evaluation Unit at the end of the 2004 second semester offering. Around 70 per cent of the students found the CD-Rom useful in giving examples about community development in rural Australia and said the interviews of people involved in catchment management and landcare helped them understand the topic. Qualitative responses included comments such as, 'Listening to experiences was a powerful learning experience for me' and, 'Interviews with people involved were very useful'. The main technical problems students reported were loading and listening to the interviews. Many

stated they tried to use the CD-Rom in public libraries etc. and these computers often did not have the software (Quicktime®) or the memory to play them properly. Students are also now sent more explicit details about the CD-Rom at the start of each semester to help them make the most of the resource.

One of the aims of the CD-Rom is to provide a broad range of examples of rural practices, and to do this on-going development will be required. Having used the resource for a year, the lecturer is now restructuring the CD-Rom to address changes in subject focus and to provide more snapshots of the issues being discussed. In a project of this scope it is difficult to have access to all the resources that might be desired. Because the subject itself is dynamic and changing, and the CD-Rom was designed to bring the subject to life, it was important for the lecturer to make a start, realise the 'vision' and to then make modifications to the resource as feedback is obtained.

Multimedia at CSU: the big picture

CSU's Learning Media Laboratories (LML's) provide academic staff with a perhaps unique opportunity to develop customised multimedia resources to support the student learning experience. The return from investment of time and money into the development of multimedia resources showcased here is demonstrated through the positive learning experiences for students as well as staff. However, production of multimedia resources on such an individual basis is not sustainable in the long term and does not cater for the growing demand and future directions of the university (Online Learning Strategy Working Party, 1999; Learning and Teaching Technology Plan, 2002; Charles Sturt University Strategic Plan, 2003; Rebecchi, 2003). This limitation has been recognised by the university. 'Beyond Print' was a CELT initiative (Palaskas, 2004) that introduced a long term, scaleable and sustainable solution to multimedia development in line with Charles Sturt University's long term commitment to the online environment.

This solution is two part: first, to provide the mechanisms to increase physical production and revision of new and existing multimedia resources. Second, to provide academic staff with access to appropriate learning designs and pedagogical applications of multimedia and online resources in their teaching.

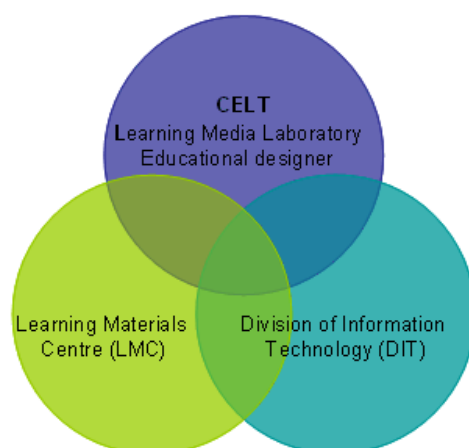


Figure 2 Interdivisional cooperation in the development of multimedia resources at Charles Sturt University

Figure 2 demonstrates how cooperation between the key players in the production of multimedia resources is addressing the production of multimedia on a large scale at CSU. The actual production of multimedia is being taken up by the Learning Materials Centre (LMC), which is the unit currently responsible for all print and online material production in the university. The LMLs along with CELT's educational designers will thus be largely responsible

for the design of learning and individual multimedia resources. Important links are being made with the Division of Information Technology to ensure access to technical support in multimedia and online initiatives.

Both CELT (CELT Triennial Plan, 2003) and the Learning Materials Centre have recognised the direction the university is taking in its online environment. They have committed to appropriate staff development to improve the skills of their staff for the broadening roles in multimedia production (LMC) and assisting academic staff to design appropriate learning environments to make use of the available online resources and, where necessary, to develop multimedia resources (CELT).

In the second part of sustainable multimedia production, CELT is spearheading the Learning Materials Design Subgroup (LMDS) that has as an aim: 'to develop and document learning frameworks and, where needed, templates that will assist academic staff in developing non-print materials and CELT and the LMC in their design and production. These frameworks should be underpinned by a pedagogical and not simply technical rationale' (CELT, 2004). The development and learning design analysis (educational technology) that has gone into the development of many LML resources including those showcased here is being used to develop a systemic and strategic learning design approach to different types of learning (LMDS working group meeting conclusions, 2005).

Conclusion

The use of technology in learning and teaching is well documented (Naidu, 2003; Hutton, 2002; Laurillard, 2002; Rowntree, 1982) and the case studies presented here are not necessarily groundbreaking. However, they do illustrate good practice and, we consider, an *appropriate* use of technology. CSU's strong commitment to quality teaching grounds us in the reality of our regional students' needs (Charles Sturt University Strategic Plan, 2003). We have shown how CSU staff are meeting the challenges of distance education. These staff are committed to their disciplines and to providing a truly student-centred learning environment (Ireland, Tarricone & Luca, 2002). It is their initiative in developing multimedia resources that benefits not only their students, but is also helping to support the university's move to increased and sustainable use of multimedia and online learning (Towards the enhancement of the CSU virtual learning environment, 2004).

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