Keeping it flexible: integrating technology into distance education in the South Pacific

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ABSTRACT
At the University of the South Pacific, a regional university serving twelve Pacific island nations, pressures for using technology and the rapid rate of technological change are sharply contrasted with the realities of limited resources for development and lack of student access to technology. This paper describes a courseware development project within the University's distance education section in which the needs of these competing factors were successfully addressed. The two key decisions—to separate the courseware development medium (computer-based) from the delivery medium (videotape), and to use familiar and available software (Microsoft PowerPoint) for development—could be useful to others working in settings with similar conflicting pressures and constraints.

Keywords
Access, Course development, Distance education, Multimedia, PowerPoint, Technology, Video

Introduction
Effectively integrating new technologies into learning environments is challenging under the best of circumstances. However, when distance, lack of student access and lack of resources are added to the equation, this integration task can seem nearly impossible, even when the perceived benefits of using technology are clear. This challenge exists at the University of the South Pacific (USP), a regional university serving twelve small Pacific island nations.

Constraints can sometimes drive creative solutions. In a recent USP distance education project, a team was given the responsibility to introduce technology into the development and delivery phases of an existing course by developing a multimedia component for a print-based economics statistics course (ES project). The ES project succeeded despite the realities of the USP environment due to two key decisions that can be instructive for others: separating the technologies of development and delivery, and using a simple, familiar development environment instead of a specialized one. While the technologies involved were well-established, the challenges faced and the solutions reached may be applicable to those integrating the newest technologies into existing learning environments.

Realities of using technology at USP
One of the most important realities to using technology at USP is the issue of student access. While no comprehensive study of access and barriers to technology has been carried out for the USP distance student population, enough has been written to paint a broad picture of the situation. For example, Table 1 shows the relatively small numbers of computers and Internet users in the USP region during the years 1998 and 1999. (The information in the table was gathered from several sources: ITU, 2000; Parsons Galloway, 1998; United Nations, 1998. Where two estimates differed, the table displays the highest number.) On average, there were roughly 2.5 personal computers and one Internet user for every 100 people in the USP region. By contrast, the corresponding numbers for the United States during the same period were approximately 50 personal computers and 40 Internet users per 100 people (ITU, 2000).
Other potential barriers to student access to technology have been enumerated elsewhere (see, for example, Cleland et al., 2000; Davison, 1996; and OECD, 2000). These include basic issues faced by many in developing countries such as lack of electricity or telephone service, the impossibility of travel to the nearest technology center and the prohibitive cost of owning and/or using a computer and the Internet. They also include perhaps less obvious issues such as lack of proper training and technical support. All of these are relevant in the USP region. Primo (2001), Va’a (2000) and Williams (2001) provide some discussion of these issues in the Pacific context. Williams (2001) found that “85 percent of the respondents [to her study of women distance learners at USP] indicated that they could not have access to computers as and when they needed them, and close to 98 percent do not have access to computers at home” (p. 10).

Another reality at USP is a scarcity of resources for developing technology-based materials. The high costs—in terms of time and money—associated with developing computer-based multimedia components have been well documented (see, for example, Golas, 1993; Kirkwood, 1998; and Smith and Teague, 1998). At USP, as in many institutions throughout the world, those responsible for creating distance education materials have a very limited budget for new hardware and software, additional training or outside expertise.

A final reality at USP is the relative inexperience of the distance education staff when it comes to technology. An independent review team that did its research during the time of the ES project found “that very few of the …[distance education] staff…are at present very familiar with web based course design or the pedagogic implications of sophisticated computer conferencing systems” (Lockwood et al., 2000, p107). This remark could be expanded to include any computer-based course design because, since its inception in 1971, distance education at USP has been overwhelmingly print based. Despite the realities, technological progress affecting USP is being made, and there are many indications this will continue at an accelerated rate.

### Continuing change

On a worldwide level, for example, growth in information and communication technologies is continuing unabated. One measure of this is the exponential growth in the number of Internet users over the past few years; one source cites the figures of 119 million in July 1998, 185.2 million in July 1999 and 407.1 million in November 2000, the most recent numbers available (Nua Internet Surveys, 2001). As technology continue to transform and shape the economies and societies of much of the world, USP, like others in its situation, are very conscious of the need to not be left on the far side of the **digital divide**.

Change is also occurring at USP itself. The ES project took place between December 1999 and June 2000 and in March 2000, the USPNet 2000 was launched, providing a private voice, data and video satellite transmission link between all twelve USP member nations. In February 2001, a pilot project involving the use of WebCT, a web based course management system, was begun for distance education students. During the period 2000–2001, USP Centres in all twelve USP member nations received new computer equipment and technological training. Many of the course development staff also have received such training and more changes along these lines are likely to occur in the future. In a March 2001 report, USP accepted fully the recommendations of an

<table>
<thead>
<tr>
<th>USP member country</th>
<th>Estimated personal computers (PCs)</th>
<th>PCs per 100 inhabitants</th>
<th>Estimated Internet users</th>
<th>Internet users per 100 inhabitants</th>
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<tr>
<td>Cook Islands</td>
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<td>N/A</td>
</tr>
<tr>
<td>Fiji</td>
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<td>5</td>
<td>7500</td>
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<td>1.22</td>
<td>1000</td>
<td>1.21</td>
</tr>
<tr>
<td>Marshall Islands</td>
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<td>4.82</td>
<td>500</td>
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</tr>
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</tr>
<tr>
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<td>500</td>
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<td>Solomon Islands</td>
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<tr>
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<tr>
<td>Vanuatu</td>
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<td>0.1</td>
<td>3000</td>
<td>1.61</td>
</tr>
</tbody>
</table>

*Table 1. Personal computer and Internet statistics for the USP region*
external review board (Lockwood et al., 2000) that “USP should consider making information and communications technology one of its key stated priority programme areas in the next version of the USP strategic plan” (USP, 2001, p2). The same report also emphasized the need to find additional ways to increase student access to technology.

A way forward: the ES project

How, then, does one proceed, given competing and contradictory pressures and realities and the prospect of rapid change? Obviously the question does not have a definitive answer, but here are some suggestions in the context of the ES project.

Prior to the ES project, an entirely print-based economics statistics course was available in the distance mode at USP and it had recently been revised. Along with the institutional pressure for technological change, there were pedagogic reasons for adding an audio-visual component. Some were unique to the USP teaching/learning situation, such as, the fact that “reading and writing are difficult for Pacific island students for whom print as a medium of information and instruction is culturally and relatively new” (Tuimaleali‘ifano, 1999, p2). Others were more universal. Research has shown that audio-visual presentations are appropriate for subjects, like statistics, where the student needs to be guided in extremely small steps in order to understand a complex abstraction (Peters, 2000; Laurillard, 1993). Harman and Gorman (1998) have argued that visual explanation is essential to the successful teaching of mathematics and technological subjects by distance.

The ES courseware development team consisted of members of USP’s Economics Department, Distance Education Unit, and Media Centre. The diversity of the team mirrored that of USP as a whole; the nine people who worked most closely on the project represented six nationalities and five first languages. The official language of USP, English, was at least a second language for five of the ES team members.

An earlier attempt to create supplementary videos for the course had failed due to lack of resources. This, together with the increased pressures for using technology, led to strong feelings within the group for abandoning video and making the project computer-based. However, the realities of lack of student access to computers, lack of technical expertise within the group and a deadline six months hence loomed large. Ultimately, the ES team overcame these constraints with two key decisions that resulted in both immediate solutions and flexibility for the future.

The first decision was to separate the technologies of development and delivery. Given that it was important to move forward technologically, the team opted to develop computer-based multimedia components for the course using audio, video, graphics and animation. However, given the reality of student access to computers in the USP region, the team ultimately decided to deliver the end product to students via videotape. The use of videotape has been increasing as a mode of distance instruction at USP (Matthewson, 2000). USP students without a VCR at home typically have one available to them somewhere in the community.

This decision was made with an eye to the future. By developing the course materials in a digital format, options for delivery remain extremely flexible. When computers become relatively ubiquitous in the USP region, for example, the same materials can be delivered on CD-ROM. When Internet access is available to most students, they can be delivered by this means. This decision allows future course development teams at USP to focus their efforts on adding enhancements such as interactive components, rather than on replicating the existing materials in different formats.

There are others who have begun to see the possibilities inherent in separating the media of development from that of delivery. In the commercial creative and publishing world there is a term for this separation: “cross media” (Trendwatch, 2000). In education, Vermeer (1999) enthusiastically states that digital resources “can, with varying degrees of difficulty, be transported, transcribed and sometimes transformed into an infinite variety of shapes or vessels [because] they are portable, reproducible and malleable in ways traditional printed texts or face-to-face lectures can never be” (p. 172). The ES project is an excellent example of the feasibility of this in practice.

The second key decision made by the ES team was to develop the multimedia component using a familiar development environment rather than specialized, expensive, and unfamiliar software. Given the realities of the USP region, this development environment was the common business application Microsoft PowerPoint. The team got away from the fallacy that specialized tools are necessary to create good educational materials with the
realization that PowerPoint contains some key features that can be used to create sophisticated high-quality education materials, including the ability to import, order and synchronize graphics and audio.

The benefits of the decision to use PowerPoint transcended the technology used and provided flexibility that contributed to the project’s success. Every one on the team already had a copy of PowerPoint, so there were no added software costs. By using familiar software, training time was kept to a minimum and the group could remain focused on pedagogy and on pushing the application to its limits. This familiarity meant that there was also maximum flexibility in assigning people to tasks. This reduced potential bottlenecks such as integration.

This decision had other benefits given the cultural context of USP. Specifically, by starting with a familiar development environment with low barriers to access, the members of the team were able to gain technological expertise together in the context of a real project. This fits into the wisdom about characteristics of how those in the Pacific learn best: through “learning by doing…learning in real life situations…[and] learning skills and understanding for specific contexts” (Thaman quoted in Va’a, 1997, p95). It also makes sense given the highly multicultural environment at USP to avoid concentrating knowledge of specialized tools in the hands of a few.

**Conclusion**

At the end of the six-month project, the ES team produced nine PowerPoint multimedia programs that were edited together with small segments of live video to create over two hours of professional-quality videotape for delivery to students. These received an enthusiastic response from the target students (Bolck, 2000). The goal of adding audio-visual explanations to enrich existing print materials was achieved. The material was delivered in a form that was accessible to students, yet it was produced within a limited time and budget constraints in a way that furthered USP’s progress towards maximizing the benefits of computer technology for its distance education courses.

The direction taken in the ES project reflected the situation at USP. However, the circumstances surrounding the project—the pressures for using technology and the rapid rate of technological change on the one hand, and the limited resources and lack of student access on the other—are common in many other educational settings. The technologies in question may be different, but the conflicts described here are not. The solutions of the ES project, the separation of development and delivery technologies and the use of a familiar development environment, therefore, might also be applicable.

The specific solutions may also be interesting. For educational multimedia presentations, those who have been deterred by the high costs and training time necessary for programs like Macromedia Authorware and Director may want to take a close look at the option presented by PowerPoint. Likewise, those in developing regions especially may find videotape an attractive solution to delivering computer-based presentational materials. The next step is to build on the flexibility this provides and to start transferring the materials to other digital media as they become feasible, adding interactive enhancements rather than replicating work already done.

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