What's a Mac really cost?

The answer has only now become clear for the University of Melbourne, which commissioned analyst firm Gartner to compare the total cost of ownership of its Macintosh environment with that of its Windows systems. The results may surprise you.

TAFE design goes digital

The Western Australian School of Art, Design & Media, a part of Perth's Central TAFE, is restructuring its entire curriculum after a massive upgrade of aging Macs has given students access to some of the latest and greatest multimedia production gear known to man.

Murdoch thinks different

Perth's Murdoch University spent a decade watching as other unis enjoyed the AUC's benefits. But with Mac OS X helping bridge the technical and philosophical divide between Mac and Wintel advocates, Murdoch's Mac faithful are finally enjoying the benefits of full AUC membership. We find out how the university is benefiting, and talk to a Mac-touting Murdoch professor who's been named Australia's University Teacher of the Year.

Parlez-vous QuickTime?

There's nothing like immersion to teach students proper language techniques. Yet while University of Queensland language students have long enjoyed live overseas TV feeds in eight languages, it's only recently that U of Q has found a way to take those shows out of the language lab and into the classroom.

PRODUCT Round UP

A DRIVE FOR ALL REASONS

There's been no small amount of competition between makers of solid-state storage cards now common in digital cameras, notebook PCs, video projectors and other multimedia devices.

This competition has, of course, led to a preponderance of storage standards: SmartMedia, CompactFlash, IBM's MicroDrive, Sony's Memory Stick, DS Memory Cards and MultiMediaCard (MMC) media. In the past, each of these has required its own interface into a computer, with its own set of protocols.

Aiming to take the pain out of multimedia storage, La Cie now offers its Hexa Media Drive, a USB-connected device that supports all six major storage formats. Plug any of them into the drive, and you can read whatever's on the cards on both Macs and Windows PCs; no drivers are required. That makes it indispensable in departments such as graphic design and photography, where lots of different formats may be in use.

LaCie's Hexa Media Drive costs $159. For more information, contact LaCie Australia on 02 9669 6900 or www.lacie.com.au.
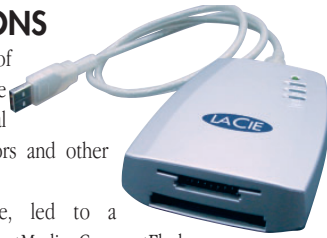
STORAGE AT YOUR FINGERTIPS

If storage on any kind of card seems too bulky for you, take a look at Trek 2000's ThumbDrive, an all-in-one storage device that's the size of, well, your thumb.

ThumbDrives, which are available in storage capacities from 8MB to 512MB, weigh just 30g and measure 5.7 by 1.7 cm. They take their power from the USB port and automatically configure themselves for use when plugged in. The result is a plug-and-play storage space that can fit on your keychain. Use it for storing personally important files, or just for moving information between computers in a lab extremely quickly.

Now compatible with Mac OS X, the ThumbDrive costs $106.70 for the 8MB model, $137.50 (16MB), $182.60 (32MB), $289.30 (64MB) and $499.00 (128MB). For more information, visit www.thumbdrive.com. To buy one, contact AdNet on 1300 366 369 or at www.ad-net.com.au.

SEE HOW IT RUNS

Frustrated after trying to use a full-sized mouse with your notebook PC? Check out IOGEAR's latest innovation, a pint-sized mouse that features all the latest optical technology. That means it doesn't require a mouse pad, can be run on virtually any surface, doesn't have to be kept flat when in use, and has no moving parts to clean.

IOGEAR's Optic Mini Mouse uses light pulses to track movement 1500 times per second, helping ensure smooth movement and quick response to your motions. The device measures just 8.9x3.8x4.3 cm, plugs into any free USB port, and can save you endless aggravation by finally giving you accurate cursor control no matter where you travel. For more information, visit www.iogear.com.

DEPTH OF FIELD

If you've been shying away from three-dimensional presentations because of kludgy technology and reliance on oversized 3D glasses, one of New Zealand's latest technologies may be just the thing.

ActualDepth monitors, made by Kiwi company Deep Video, include two LCD screens layered in such a way as to provide an image that gives the impression that it's displayed in three dimensions. They're compatible with existing hardware and software and designed to eliminate the eye strain that has traditionally gone part and parcel with 3D graphics.

Exactly how you might use this capability is up to you, but the company is claiming that the new monitors do everything from improving productivity to saving desk space and enhancing applications' user interfaces.

ActualDepth LCD monitors purportedly have over 250 percent more pixels than traditional monitors. But they don't come cheap. They're available in 13.3- and 15-inch models with prices starting at around $6900.

Contact Deep Video on +647 843 2560 or www.actualdepth.com.

QUICKER THAN A FLASH

Macromedia's Flash Web page interactivity software has quickly come into its own after bundling agreements put it on virtually every Internet-connected desktop in the world. It's become the de facto standard for sending interactive graphical presentations to Web site visitors, and the fact that many Web sites are completely written in Flash speaks volumes for its flexibility.

But how do you beat a worldwide success?

For Macromedia, the answer has come in the form of Flash MX, a turbo-charged version of Flash designed to add considerably more interactivity and document control than ever before. Improved workflow, creative design tools, text manipulation, application development and other features should quickly become entrenched at any uni doing a large amount of multimedia creation for the Web.

The new environment, Carbonised to run natively in Mac OS X as well as Mac OS 9.x, leverages the spoils of Macromedia's merger with Web content building company Allaire in March 2001. By combining the best technologies from both companies, Flash MX allows developers to build applications using templates, manageable scripting tools and interface components and standards like ECMAScript, HTML, MP3s, H.263 and XML.

This, Macromedia believes, will pave the way for far more functional Web and intranet sites than ever before - particularly those requiring interactive Web video.

Flash MX costs $1295 or $499 for an upgrade. Contact Macromedia on 1300 654 754 or at www.macromedia.com.au.

ADOBE SYSTEMS REVAMPS HIGHER-ED SOFTWARE LICENSES

Adobe Systems in Australia and New Zealand have recently announced the Contractual Licensing Program (CLP), a new offering for higher education that offers significant benefits over the existing TLP. As well as providing better pricing, CLP offers simpler administration through a single licensing agreement.

Members get the benefit of a large-purchase discount while getting the option to spread license fees over the agreement's duration. CLP allows you to mix and match products to reach the 1000-point (approximately 500 licenses) entry over a 2-year period.

Upon joining the program, members receive a master set of media as well as serial numbers. You can then immediately deploy licenses to faculties and departments, but are not billed for the licenses you have deployed until the end of each month. A full reconciliation of your installations is recorded on the Adobe web site for the program administrator's reference.

The program also offers maintenance at very competitive prices. This lets you enroll any new or upgraded licenses, shrinkwrapped products, and licenses in the maintenance program, and use the points you accrue through maintenance towards the 1000 point entry (maintenance carries the same point value as full licenses).

Contact John Paull on (02) 9907 8500 or go to www.edsoft.com.au.

editorial

FROM THE EDITOR'S DESKTOP

Australians may be getting ready for the chilling autumn and winter months, but things are hotting up across the Pacific as Apple once again prepares for springtime and its annual WorldWide Developers' Conference.

The AUC are again sponsoring 32 staff and students from member universities, each one receiving significant funding to attend the popular San Jose event. Applications close at the end of March, so if you're interested turn the page right now to find out how to apply (and then come back to read the rest of this).

Welcome back. Whether you're one of the lucky thirty two or not, there's lots for everyone in this issue of Wheels. On pages 4 and 5, we cover two programs that the AUC is promoting in order to get members thinking about ways they can utilise Apple's latest music and application development technologies.

Our cover story, on page 11, highlights a recent total cost of ownership study, conducted by respected analyst firm Gartner, that confirmed that the University of Melbourne's Macintosh environments are cheaper and easier to run than comparable Windows systems. That's little surprise for Mac Users, but having it independently verified is a great shot in the arm for university departments defending their choice to back the Mac.

One of those universities is Perth's Murdoch University, which is the subject of our member profile this issue. Although it had piggybacked on the University of Western Australia's membership for many years, in 1999 Murdoch became a full member of the

AUC. Turn to page 12 to find out how it's paid off. We've also profiled Professor Duane Varan, who beat 18 finalists to win two prestigious nationwide teaching awards. Find out which ones, and how he's using the acknowledgement to break new ground in his new role at Murdoch, on page 7.

In this issue, we debut what we expect will become a regular column, The Digital Ceiling. In this section, we will be inviting staff at AUC member universities to share their thoughts on the challenges they face integrating technology and education. Please e-mail me if you'd like to write an upcoming column.

Apple released some great new gadgets this year, and on pages 8 and 9 AUC Program Manager Andrew Jeffrey takes the iPod MP3 player and iPhoto software for a spin. Talking of great Apple technologies, on pages 14 and 15 we find out how several AUC members are using Macs for cutting edge video streaming, content management, and lab administration.

I hope you enjoy this issue. As usual, I welcome your feedback and invite you to regularly visit the AUC web site, http://auc.uow.edu.au, for updates and back issues of Wheels.

Peter Sharpe, Editor
p.sharpe@its.unimelb.edu.au

contents

AUC MEMBER UNIVERSITIES

AUSTRALIA

Australian National University
Central Queensland University
Charles Sturt University
Curtin University
Deakin University
Edith Cowan University
Flinders University of SA
Griffith University
James Cook University
La Trobe University

Macquarie University
Monash University
Murdoch University
RMIT University
Southern Cross University
Swinburne University of Technology
University of Adelaide
University of Melbourne
University of Newcastle
University of New England

University of New South Wales
University of Queensland
University of South Australia
University of Southern Queensland
University of Sydney
University of Tasmania
University of Technology, Sydney
University of Western Australia
University of Western Sydney
University of Wollongong
Victoria University of Technology

NEW ZEALAND

University of Auckland
University of Canterbury
Massey University
University of Otago
Victoria University of Wellington
Waikato University

AFFILIATED UNIVERSITIES

Australian Defence Force Academy
University of Canberra
Dr Mahalingam College of Engineering
    & Technology, Pollachi, India

WWDC 2002: Developer time again

By Andrew Jeffrey, AUC Programs Manager

Apple's 2002 Worldwide Developers' Conference (WWDC) is coming up quickly, and the AUC is gearing up to finalise the list of Australian staff and students that will be awarded scholarships to attend this year.

Held annually, WWDC is the major forum where Apple discusses the future of the Macintosh. Attendees can speak directly with the engineers that create the hardware and software, gaining valuable insight and knowledge that helps them plan their own software development projects. This year, the AUC will fund 16 staff and 16 student attendees to the conference, which runs from May 6 to 10 at the San Jose Convention Center outside San Francisco.

Scholarship recipients receive a funding subsidy to help cover the cost of airfares, seven days' accommodation and registration fees to attend WWDC. Those AUC Universities who are not in this currrent list will receive a staff scholarship in 2003.

To be considered for a WWDC scholarship, you should be a full time staff member or student of an AUC member university.

Individual recipients will be chosen by the AUDF co-ordinator at each eligible university. You should also have some background in programming – whether on Mac, Unix or Windows systems – and be familiar with some of the latest technologies such as QuickTime, Java and Mac OS X.

Apple is very eager to have students attend WWDC, and student scholarship recipients will receive a free registration voucher courtesy of Apple Computer's Worldwide Developer Relations group. Student attendees will be selected based on merit and students are required to apply for one of the 16 scholarships via the AUC web site. The AUDF Committee will review the applications and award the Scholarships by the end of March.

The timeline for WWDC is very short, so please check the AUC web site for the latest details.

Student applications close on March 31, 2002. Students must apply by completing an application form available on the AUC Web site, http://auc.uow.edu.au. WWDC's official web site is **http://developer.apple.com/wwdc2002/**

The following 16 universities were selected as recipients of WWDC Staff Scholarships for 2002:

- Central Queensland University, Rockhampton, Queensland
- Curtin University of Technology, Perth
- Flinders University of South Australia, Adelaide
- James Cook University, Townsville, Queensland
- La Trobe University, Melbourne
- Macquarie University, Sydney
- University of Melbourne, Melbourne
- Murdoch University, Perth
- University of New England, Armidale, NSW
- University of Newcastle, Newcastle, NSW
- University of South Australia, Adelaide
- University of Southern Queensland, Toowoomba, Queensland
- Swinburne University, Melbourne
- University of Tasmania, Hobart
- University of Technology, Sydney
- University of Wollongong, Wollongong, NSW

AUC joins UEF for iPod Project

As part of a worldwide project instigated by the University Executive Forum, Apple Computer has allocated the AUC two iPods (see review on following page) to encourage exploration of iPod's potential uses within higher education.

The project's goals include exploration of obvious uses, for content such as music, by extending the breadth of content and developing appropriate databases that can be shared across education. It will also explore potential uses of the iPod to store audio content and data for use in other areas of education, such as language, biology, health science and other courses.

In late January, the AUC called for iPod project submissions from University staff. After a review by the AUDF Committee, the following allocations were made so that interested staff could use an iPod for one month and report on their trials.

Kate Foy, University of Southern Queensland
Foy will use the iPod for training professional actors in voice and speech skills. Actors are required to develop and enhance their performative vocal skills on a continuous basis. Foy will organise her existing database of speech files into playlists via iTunes, then give students access to the iPod for standard and customised speech exercises, for remediation, and dialect training.

Jake MacMullin, University of South Australia
MacMullin sees the iPod's capacity and interface as a great tool for improving delivery of post-event audio lectures. He will demonstrate the iPod's suitability for this task by recording a series of lectures, organising them into a play list, and transferring them in the iPod.

Steve Martin, University of Melbourne
Recognising that students are often overloaded with reading materials, Martin wants to explore delivery of spoken material, such as lectures or interviews, to iPod users. Using digital files instead of textbooks will reduce eye fatigue, and speed the delivery of updated content to students.

Greg Nelson, Victoria University
Nelson will investigate ways that the iPod can student exposure to lectures. Students will download MP3 files of lectures and report on their usage of those files with the iPod – even, potentially, looping lectures while they sleep for some subliminal learning. VU's Alternative Therapies Unit, attached to the Health Sciences area, is also interested in researching the use of iPod music as a healing tool for diseases such as childhood autism.

James Lowe, Central Queensland University
Lowe will explore the iPod's capabilities as a mechanism for updating CQU's Macintosh standard operating environment. Using the iPod as an external hard drive, desktop computers can be quickly upgraded or reset simply by plugging the device into each system. CQU's Department of Music is also keen to test throughput rates from their G4s in their music studios.

A second round of iPod submissions will be sought soon via the AUC web site.

Cocoa training runs hot

Apple's Cocoa application environment has been gradually winning converts as universities around the country warm to its many benefits.

An object-oriented application environment for Mac OS X, Cocoa provides a large palette of tools for building Mac OS X applications. Given its strong integration with the Aqua user interface, Cocoa is also proving extremely successful at facilitating the porting of applications from other Unix environments to Mac OS X.

To increase awareness of its capabilities, Apple Computer Australia and the AUC recently ran a series of Cocoa workshops for AUC members across the country. More than 60 developers and other interested parties attended the seminars, which were held during January and February at facilities kindly donated by Edith Cowan University in Perth, the University of Queensland in Brisbane, the University of New South Wales in Sydney, and RMIT University in Melbourne.

AUC subsidies reduced the cost of the two-day workshop for AUC members, from a retail price of $995 to just $350. Topics included an introduction to object-oriented programming, the structure of Cocoa's object-oriented frameworks, creation of Aqua user interfaces using Interface Builder, controlling applications using Project Builder, and more.

"These developer training courses are targeted at people interested in learning programming and how to create applications with Mac OS X," says Andrew Jeffrey, AUC programs manager. "We're keen to kick-start Cocoa development in a number of universities, and this was a way for people who had heard of Cocoa, or know about it, to get started with it in a serious way."

Attendees received a copy of O'Reilly's book *Learning Cocoa*, a copy of MacOS X 10.1 and the MacOS X Development Software kit.

Response to the course was extremely positive overall, with attendees reporting that it gave them a good overview of the Cocoa environment and its structure.

"There was never a moment when you were wondering what you should be doing," says Stephen Martin, a research fellow in online learning within the University of Melbourne's School of Physiotherapy, who wants to use Cocoa to build Mac OS X versions of inhouse teaching tools such as his Java-based Jymnast PDF authoring program.

"It really enforced those very basic ideas about object orientation, and didn't go straight into how do to do things with the software without establishing an understanding first. I feel more ready to explore things on my own now, and feel more confident to whip up a few little things."

Many students wished they had had more time for hands-on examples and experience, but with the amount of content packed into the two days this proved to be quite difficult. Among those noticing the rush was Simon Plint, a technical officer with the University of Newcastle's TUNRA Bulk Solids commercial division, who was nonetheless happy with the Cocoa course he attended at the University of New South Wales.

In the past, Plint and his peers have relied heavily on a variety of programs including Microsoft Excel, with its Visual Basic for Applications scripting language, to model the flow of bulk coal, wheat and other materials through bins and hoppers. Aiming to consolidate that largely ad hoc process into a single application, Plint is currently weighing up his options and says the Cocoa course helped him begin seriously considering how the new application would be built.

"As a result of doing the course, I now see that I would benefit greatly from doing a design and analysis course and others to give me more grounding in the object orientated side of design," Plint says. "All the tools are there for free with Mac OS X, and I can see how [Cocoa] differs, for the better, from straight function calls and procedures. I just need to come up with the design, and work out what the objects will be and how they look."

TUNRA's Simon Plint

Technical support from your AUC peers

One of the most common things we hear from the technical support staff at AUC member universities is how much knowledge they gain by networking with their peers around the country.

Aiming to bottle that knowledge, the AUC recently launched the University Macintosh Technical Forum (UniMacTech), an e-mail mailing list that will allow technical support staff to discuss issues of importance, look for help resolving sticky problems, and share their experiences using Macintosh computers to develop innovative solutions within higher education environments.

Lab management, software licensing, Mac OS X – whatever you're doing, you'll probably find someone else who would like to hear about it or may be able to contribute valuable knowledge.

A number of key Apple Australia technical staff have agreed to monitor the list, and will provide information and feedback to the forum where appropriate.

To join the UniMacTech mailing list, send an e-mail to requests@auc.uow.edu.au with the words **subscribe unimactech** as the body of the message.

The Digital Ceiling

By Roland Sussex,

School of Languages and
Comparative Cultural Studies
University of Queensland

At the AUC Conference in Townsville last September, one of the sessions was a Round Table called "The Digital Ceiling". Speakers tackled a range of questions about what is holding us back in educational technology, and where we would like to be – in the best of all possible worlds – in five years.

The session was just warming up to its task when the timetable took delegates away to other events, but a number of delegates suggested that we need a more regular forum to discuss the Digital Ceiling. That forum will be *Wheels*, which will publish articles examining the Digital Ceiling twice a year. Here, Sussex presents some of the ideas from the Townsville round table.

People who work in educational technology need to ask questions about the way ahead: not of the crystal-ball variety, but seriously, within a time frame of about five years:

- what is currently holding back educational technology?
- where would we like to be in five years from now?
- what will it take to get us there?

These questions need to be anchored in the present, to avoid enticing but speculative wish lists in an unknown future.

The list of shortfalls which follows is a personal list, some of which are frankly prejudices on my part. It reflects some of my own involvement with the application of technology to language learning and research. Since language teaching and learning tend to raise questions of interactivity and communication, this area of EdTech is strategically well placed for our purposes. The issues highlighted here, however, are mainly at the macro level, and need elaborating into more concrete questions.

Hardware

For language-related work, available hardware is still expensive, fragile and limited in functionality. Input/output lags much of the other technology: the keyboard is neither portable nor easily usable away from the screen. It's clumsy for non-alphabetic writing systems, and the screen itself is hardly usable in many lighting conditions. Bandwidth and access are still limited, especially when we are away from home base. Voice input and output are still primitive, and multimedia is imperfectly integrated.

Courseware

There is a poor fit between pedagogy and EdTech. Thinking and theorising in education and cognitive science have not interacted enough with courseware. That's meant that we are way behind in thinking, for instance, about constructivism in courseware conceptualisation, design and realisation.

The hypermedia and bells and whistles of the Web have tended to deflect serious attention away from research in intelligent learning systems. The roles of EdTech as a tool, tutor, tutee, resource or other learning resource are poorly theorised, and we have not thought enough about conceptualising multimedia.

Information on EdTech

Information supply is poor, sporadic, indiscriminate and unreliable. Information on EdTech – theory, practice, models, resources, hardware, software, and courseware – is often hidden or hard to discover. As a result we are reinventing many wheels. We are beset with a colossal overload of information, most of which is irrelevant or unsuitable for our purposes, and it takes us a disproportionate amount of time and effort to find what we need.

The learning imperative

Too often it is assumed that overworked teachers will somehow extend their hours to become experts at EdTech. Staff development lags far behind EdTech, which lags far behind technology itself. In expecting that teachers will make use of this technology, universities need to give more attention to training.

EdTech environment

EdTech tends to piggyback on operating system and software architectures which weren't designed specifically for teaching or learning. Technology is not just a delivery tool, but a new way of thinking about teaching and learning and research, and here, we are way behind.

So where would I like to be in EdTech in five years? Here are some wish-list items:

- **Hardware** should be portable, cheap, durable, robust, stable and waterproof, fast, universally networkable, and built with massive, of cheap, expandable memory. Input/output should allow reliable speech management in major languages, though this will have a major effect on literacy, both general and technological.
- **Software and operating systems** should be inter-communicative, secure, inoculated, stable, with open or accessible architecture, and with an ergonomics which is intuitive and open-ended – not dictated so much by the architecture itself.

- **Courseware** should be cheap, modifiable, malleable and open to incorporating intelligent components.
- **EdTech environments** should be accessible, flexible, and with intelligent tools for managing information overload.
- **Information** on EdTech should include compendious accessible databases of software, courseware, and libraries of data, templates and routines easily accessible to developers.
- Organisational environments should incorporate **new models** of expertise, where EdTech thinkers and practitioners are recognized as fountainheads, honeypots, resource hubs, mechanics and in other roles. Such environments should also provide a proper track for existing staff to grow their thinking and applications in the direction of EdTech.

Overall, we can dream about an environment which encourages us to think creatively about EdTech teaching, learning and research. It will be supported by a cadre of people with a sense of collective purpose, and by administrative structures to encourage and enable both individual EdTech work – and computer-supported collaborative work and learning – with significant and expertly organised collaborative learning spaces.

Readers are invited to respond to the issues raised here, and to submit articles on their own views of the digital ceiling. E-mail Roland Sussex at **r.sussex@mailbox.uq.edu.au**.

Awards validate Murdoch professor's **iTV agenda**
By David Braue

Professor Duane Varan, Foundation Chair in New Media at Perth's Murdoch University, had only been in his current position for a week when he beat out 18 finalists to win a pair of prestigious national teaching awards.

Now underway in his first term as chair of New Media, the newest department on Murdoch's School of Media Studies, Varan won both the $35,000 Prime Minister's Award for University Teacher of the Year and the $40,000 Australian Award for University Teaching in Economics, Business and Related Studies. Both were sub-categories in the annual Australian Awards for University Teaching.

The wins make Varan, who came to Murdoch five years ago to teach marketing after lecturing on media studies at the University of Hawaii, the most successful recipient in a competitive field that initially consisted of 90 qualified nominees.

They also sound a ringing endorsement for the massive changes that Varan has been working to introduce as he oversees a major restructuring that includes the consolidation of Murdoch's advertising, communications and media studies courses into a single academic program.

Focused on exploring the potential of new technologies like interactive TV (iTV), the new program is aiming to give students a foot in the door of what is eventually expected to become a massive business opportunity.

Allied Business Intelligence, for one, recently projected that iTV would grow at 59% per year to reach 244 million households worldwide by 2006. By that time, revenues from iTV services will have increased from $US300 million ($A588 million) in 2000 to $US19.2 billion ($A37.6 billion) in 2006.

"When iTV works, it just completely blows away traditional TV," Varan explains. "It's a very powerful multiplier; if consumers don't like it, they're very vocal about not liking it. But if they do, it's very powerful. The Web experience is much more functional, but the type of experience we're after is much more emotionally engaging. It's a lot more complex than it sounds."

Previous students have responded favourably to Varan's work to involve them with real-world companies such as Saatchi & Saatchi, Nike and Pizza Hut. Now that iTV is emerging over the technology horizon in Australia, Varan is building on those skills and teaching techniques to turn students on to iTV's myriad

possibilities for interactive advertising.

This novel field of study presents a major new opportunity for the Department of New Media to position itself at the global forefront of a steadily emerging industry. The students have already build some proofs of concept to demonstrate how iTV advertisements might work, and Varan has been discussing potential partnerships with as-yet-unnamed advertising agencies in the US and UK. The program will also involve Murdoch's School of Business, helping combine creative discipline with commercial reality.

"Our ambitions are to be a world-class institution, and I think that when you're able to attract major clients globally, that's one way you demonstrate that you've achieved that," he says.

A long-time advocate of the Mac platform, Varan has remained a staunch supporter of Apple technologies despite university pressure to standardise on Windows machines. Among the applications he uses are Final Cut and DVD Studio Pro, which previously helped Murdoch become Australia's first university to train students in DVD production.

"Everything we do is always at the cutting edge of technology," Varan says, "and the Mac is an environment which continually positions itself at the cutting edge. A lot of our work goes into DVD authoring, for example, and Apple has dominated that environment. From an educational point of view, what Apple offers at its cost point is a very, very powerful proposition."

Professor Duane Varan

Varan's new tack is a change of pace for the industry diehard, who has spent past years teaching business students how to be creative. In his new position, he'll be doing the opposite: teaching creative types the business skills they need to work effectively in advertising and new media roles.

As Varan settles into his the role, he says the two awards he's received "validate our agenda. They make it a lot easier for us to continue building the types of things we've been building. This helps a lot with the due diligence exercise when we're trying to attract international partners for student projects."

"We live in a world which is constantly changing, and that's very much the case when you're at the cutting edge. That means we have to redesign what we do every year. We have a huge amount of learning to do."

Peas in an iPod

Apple tech update by Andrew Jeffrey, AUC Programs Manager

After Apple announced last year that they were going to release a new product and "it isn't a new Mac", the world of Apple enthusiasts was set abuzz. Rumours about its identity flew across the Internet, and hype reached its usual pre-Macworld peak until Steve Jobs sent us all home scratching our heads. MP3 players have been around for many years, after all, and were still a toy mainly for the geeks among us.

The iPod has changed that with a revolutionary design, large capacity and easy syncing that makes the whole MP3 experience a pleasure.

Designed to play back all the common audio formats - including MP3 (up to 320Kbps), WAV and AIFF (audio CD native format) - the iPod is the size of a cigarette packet and weighs 185g including a Lithium Polymer battery offering 10 hours of play time. It also includes a 32MB skip protection buffer that preserves battery life by only spinning up the 5GB hard disk when it needs to read the next song.

The body of the iPod is white plastic and chrome, with a layer of transparent, Lucite-like material covering the front. Although it looks great, the surface is susceptible to scratches and finger prints, so try to keep it in a soft holder of some sort.

iPod's clear LCD screen has a 160-by-128-pixel resolution, with a white backlight that's so bright it could double for a mini torch at nighttime. The screen is big enough to display a good amount of information about current songs, with the "Now Playing" feature providing a quick indication of the current track's details.

Unlike most players, which are covered with lot of little buttons and switches, the iPod has a no-nonsense interface that includes an innovative jog dial and five buttons for selecting menu options and navigating through the stored songs. The dial is accelerated, which makes it easy to navigate through hundreds of songs – which you will probably have after a while.

You can reboot the iPod by holding down Menu and Play/Pause simultaneously for ten seconds, which you may need to do if your battery gets very low.

Data transfer is blazingly fast, relying on the 6-pin FireWire port to automatically sync songs between iTunes (version 2.0.4 or greater is required) and the iPod. Using the FireWire port, it takes about half a second to transfer a three-minute song onto the player; filling the hard drive takes just ten minutes. The FireWire cable also carries power, which recharges the battery whenever the iPod is plugged in.

Apple's latest iPod upgrade allows the device to store up to 1000 contacts

If you download a free software upgrade (available at **www.apple.com.au/ipod/download.html**), you can upgrade the iPod so that it not only transfers music from iTunes, but moves up to 1000 contacts from your Entourage, Palm Desktop or Mac OS X Address Book. That patch also provides additional 20 equaliser presets that can be applied to improve the quality of your music.
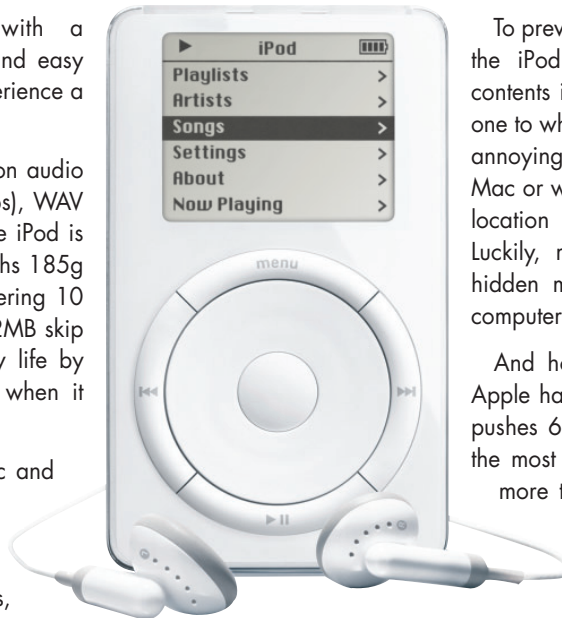
To prevent sharing of MP3s between computers, the iPod automatically wipes the hard disk's contents if it's plugged into a Mac other than the one to which it's registered. This can be incredibly annoying for those of us who have more than one Mac or want to play their music at more than one location without having to rip multiple copies. Luckily, many shareware tools can access the hidden music structure and copy files between computers using the iPod.

And how does it sound? In a word, terrific! Apple have included a 13-milliwatt amplifier that pushes 6.5 milliwatts to each ear. While it's not the most powerful player on the planet, there is more than enough power for most users. You can, of course, connect it to your home hi-fi if you want to listen to your music with a much bigger sound.

Apple bundles a pair of earbuds with the iPod and they actually sound good. The headphones come with 18-mm drivers using Neodymium transducer magnets. While not suitable for jogging or working out in the gym – get wrap-around ones if you're the active type – they are more than adequate for general listening.

Don't forget that the iPod can also be used as a generic FireWire drive. If you want to move files, including MP3s, between computers, drag them onto the iPod and then copy them off on another computer. This opens up myriad non-musical applications for educational environments: for example, research data, multimedia presentations or new applications can be easily moved between computers or sites. Some AUC members are even looking into the iPod as a way of rapidly distributing new applications and standard operating environment configurations.

In March, Apple announced an updated iPod, which increases the device's capacity to 10GB. The 10GB model retails for $1095, while the 5GB iPod costs $895.

Could it be better? Probably, but not much. The lack of an equaliser has had some people complaining, and it doesn't handle long MP3s very well. It also lacks an FM tuner, which would be a nice addition. Nonetheless, with its massive capacity and easy-to-use design, the iPod is still the best MP3 player on the market. The iPod Web site is at **www.apple.com.au/ipod.**

Worth a thousand words

January's MacWorld San Francisco saw the release not only of the new iMac G4, but of the final piece in the digital hub story: a comprehensive application for editing and managing digital pictures.

iPhoto is a Mac OS X only application that lets users of digital cameras, and those with large graphic libraries, manage, edit and share collections. Images can be pulled straight from a digital camera or media card reader: just plug in your camera, and iPhoto will start up if it recognises the camera. With a single click, it downloads the images.

iPhoto uses a film metaphor, with each import session represented as a 'roll' of film and individual pictures represented using adjustable thumbnails. By organising images in a way that almost anybody understands, this approach makes the application extremely user friendly.

Images can be grouped into new albums, indexed by keyword, printed, or displayed as a slide show complete with iTunes music and smooth OpenGL transitions. Slideshows can be saved as QuickTime movies for easy sharing.

iPhoto also includes basic editing tools – rotating, cropping, redeye reduction, and greyscale conversion – and interfaces with applications like Adobe PhotoShop 7. Unfortunately, there are no features for adjusting brightness/contrast or sharpness.

In the US and Canada, iPhoto also includes the ability to publish a hardcover paper book, with high-quality printouts of your photos

iPhoto's album metaphor makes it easy to organise groups of digital images by content or theme

organised using templates. Books are printed on acid-free paper and bound with a linen cover, and cost $US30 for 10 pages and $US3 for each additional page. Apple Australia are working on replicating the service here, but have no firm dates for availability yet.
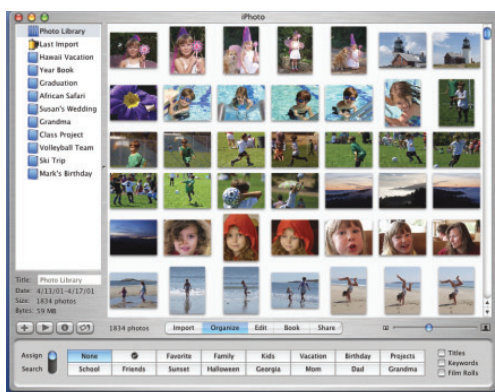
Using a variety of built-in presets, digital images can be printed at a variety of standard photo sizes. Apple's ColorSync technology retains colour fidelity in printing. For large-sized prints, iPhoto can also send prints to Kodak, which will mail you a printout for a fee (a 20" x 30" poster-sized picture costs $US20). This feature is also pending in Australia.

iPhoto's HomePage function lets you create limited photo galleries using Apple's iTools web site. The galleries must be hosted on mac.com, use standard layouts and adhere to character limits for captions, but it's nonetheless a quick, easy way to get your photos online. Apple has also released AppleScripts to let you email images, create multimedia audio cards, and build slide shows right on your desktop. Search for 'iPhoto' at **www.versiontracker.com** for more third-party extensions.

iPhoto is a very impressive effort, and a great tool for beginning and intermediate digital photographers. It has a few bugs to work out and could do with a few more features, but for a version 1.0 product, it's one of the best and easiest to use.

Download iPhoto for free from **www.apple.com/iphoto/download**

Looks like a lamp, runs like a rocket

Unless you've been living under a rock (and maybe even then) you've heard talk about the new design of Apple's latest iMac G4, launched to considerable success in January. Shaped by Apple design guru Jonathon Ive – working on Steve Jobs' vision that the new system "should look like a sunflower", the new system has been likened to a desk lamp. Many even suggest it owes its shape to the Luxo Jr animation produced by Pixar, Jobs' own Hollywood animation shop.

Despite its cute exterior, the new iMac packs a real punch. The base model includes 700MHz G4 processor, 40GB hard drive, 128MB RAM and CD-RW drive. The midrange system adds more memory and a DVD-ROM/CD-RW combination drive, while the top-tier system includes 800MHz processor, 60GB of storage, 256MB of RAM and DVD-R capabilities thanks to the Pioneer DVR-104 Superdrive.

Networking the new iMac is simple thanks to the included 10/100Mbps Ethernet port and OS X's native support for TCP/IP, AppleTalk, Windows SMB and more. Although it comes without built-in stereo speakers, Apple supplies a set of external stereo

speakers with mid and top-range systems. Their sound quality is good but not great; serious music lovers would need to add a sub-woofer.

The LCD screen is the focal point of the new iMac, and Apple has gone to considerable lengths to make it distinctive. Surrounding the active-matrix display area is a frame of clear plastic nearly a centimetre wide on each side, giving a 'halo' type effect. The chrome neck supporting the 15", 1024x768 resolution LCD display can be tilted through 180 degrees of motion, and the output looks great thanks to the 100% digital setup that eliminates digital to analogue conversion.

Bundled software includes iMovie 2, iTunes 2, iPhoto, iDVD 2, and both Mac OS X 10.1 and 9.2.2.

With a G4 processor that outpaces a high-end Pentium 4, these machines are fast – while maintaining Apple's trademark simplicity and elegance. Steve Jobs wants the computer to become "a digital hub, a computer designed to simplify our lives", and from all indications the new iMac is just the ticket.

WA TAFE goes digital

Cutting-edge Macintosh equipment and software is helping the Western Australian School of Art, Design & Media (WASADM) restructure its entire curriculum around digital techniques for design, video and photography.

A part of Perth's Central TAFE, WASADM's computer capabilities had evolved over the years in stages. By last year, it had gotten to the point that its students were working on Mac systems up to 12 years old.

Recognising that a complete refresh was long overdue, the school began reassessing its multimedia strategy and kicked off the restructuring by installing three labs full of brand spanking new 867 MHz G4 systems. Each has a 17-inch LCD screen and 640MB RAM, making them suitable for all manner of visual work.

WASADM has also set up a fourth new computer lab filled with dual-processor 800MHz models decked out with modern video editing systems such as Final Cut Pro 3.1 and Maya. All systems have a broad suite of graphic design programs including Adobe Photoshop, GoLive, AfterEffects, and Illustrator.

Also installed are large-screen data projectors, an A3-size Xerox PhaserText 7700 colour printer, 21 A3-size Waycom digitising tablets, and DVD burners in every computer. KeyServer license control software helps share application licenses between the various computers. All told, there are 84 new systems spread across the four labs, including one located in the school's Webley Print Annex.

Bill Carrigan, an Advanced Diploma of Animation student, shows an onscreen example of his 3D modelling and Multimedia INterface Design

This academic year marks the first time students in the school's courses – including the Certificate, Diploma of Graphic & Multimedia Design, and the upcoming Advanced Diploma of Animation – have access to the new technologies. The systems are so powerful that WASADM is using them as the focal point for reconsidering its entire philosophy about digital media and teaching.

"It's all part of a bigger plan for not just having the technology, but actually using it within our design facility," explains Mark Bryce, program manager of graphic design, multimedia and photography at WASADM. "Film and Television are dispensing with most of our mainstream analogue editing facilities, and we're really trying to push the envelope in the way they develop."

For example, traditional photography darkrooms are being de-emphasised. Instead of fiddling with the vagaries of chemical-based colour printing, students will develop negative strips and use high-resolution film scanners to bring their images straight into Photoshop for manipulation. High-quality printers will produce photorealistic output.

"We're completely revamping the way photography works here," says Bryce. "There's a recognition that people need to do manipulation of the image after they've shot it."

DVDs have become the destination media of choice for many student projects. Television editing is being transferred into the digital sphere with computers specially configured with high-end Matrox video editing cards.

WASADM has also purchased a number of iBooks to help staff access online resources in their classrooms. Supporting those iBooks is a small but rapidly growing network of AirPort base stations, which will gradually be expanded to provide wireless networking coverage to the entire school. Students will also eventually gain access to the wireless network, which Bryce envisions could ultimately grow to serve more than 400 concurrent users at a time.

The renewal of WASADM's commitment to the Macintosh platform comes despite what Bryce calls "incredibly strong pressure" from government organisations to standardise on Windows PCs. Although the school had to weigh up that option when planning the upgrade, Bryce says it quickly became clear that Macs were by far the better platform for the kind of work WASADM students are doing.

Sticking with the Mac also helps the students gain experience in similar environments to those they'll find in the real-world design companies where they will work after graduating. "Our students become the industry once they graduate from here," Bryce says, "and the digital underpinnings of the industry are something that will become standard practice. It's all about integrating those traditional skills, which are very strong in everyday design, into a digital context."

Contact Bryce on **BryceM@perth.training.wa.gov.au**

Daniel McKeating, pursuing an Advanced Diploma of Graphic Design, holds a freshly printed design

Murdoch thinks different

By David Braue

MURDOCH UNIVERSITY
PERTH, WESTERN AUSTRALIA

After years sitting on the sidelines, Murdoch University's recent move to take out full membership in the AUC is starting to pay off dividends as staff members and students alike warm to the benefits the organisation provides.

Covering 227 hectares some 15 km south of Perth's CBD, Murdoch's main campus and satellite sites in Mandurah and Rockingham are home to some 12,000 students. Its areas of study are split into four main divisions: Business, IT and Law; Science and Engineering; Social Sciences, Humanities and Education; and Veterinary and Biomedical Sciences.

One of Australia's smaller universities since its founding in 1975, Murdoch had just a few thousand students when it first became interested in the AUC, but its small size meant it couldn't summon the resources necessary to become a full AUC member. Instead, Murdoch piggybacked on the membership of the University of Western Australia, which allowed it to become an affiliate and fostered cooperation between the two institutions.

After remaining in that situation for most of the 1990s, Murdoch finally joined the AUC in its own right in 1999, when it became a full member of equal standing to its peers. This gave it access to the full range of AUC benefits, including WWDC scholarships, AUDF funding, AUC conferences and other resources.

Since then, Apple enthusiasts at Murdoch – who have persisted in their interest despite the university's push to standardise on Windows systems – have remained heavily involved in the AUC's activities. For example, four Murdoch staff and students have already attended Apple's WWDC after winning AUC scholarships.

"The main benefit of the AUC is going to conferences," says Frank Salleo, technical supervisor at Murdoch's School of Environmental Science, who last year attended Apple's WWDC, and AUC's Mac OS X Administration Basics course, and in 2000 went to the AUC Academic & Developer's Conference in Wollongong.

"We're one of the schools that's mainly Macs, and we don't have many IT support people," says Salleo. "The main problems we have are with networking, losing connections, and things like that. We're getting good information from Apple on how hubs and switches should be set up, and through the new UniMacTech mailing list [see page 5] we get access to more lab administrator people, at other universities, that have experience running labs."

Last year, the university further deepened its AUC involvement by receiving its first AUDF grant – a Major Grant awarded to Rob Phillips, an educational designer within Murdoch's Teaching & Learning Centre (TLC).

That grant covered the cost of a G4 Macintosh, Virtual VR Authoring Studio software, and an A3-sized scanner that's played a pivotal role in a project Phillips led on behalf of Murdoch's School of Veterinary Clinical Science.

Photos: Brian Richards/Murdoch University

Macs have retained a strong following at Murdoch

Aiming to improve the delivery of a particular external master's degree that involved extensive use of animal x-rays, the TLC team developed an alternative that involves a high-resolution scan of each x-ray. That scan is rolled into a QuickTime VR environment, allowing students to pan through every part of the digitised x-ray and zoom in on details. An upcoming enhancement will allow the x-rays to be shared through a virtual whiteboard.

"Some things are easy to teach on paper, but learning how to interpret x-rays is hard to do on paper without anybody else being there," says Phillips. "They used to send out a pile of 200 x-rays that was a foot cubed and cost $300 to post; the students then had to take those x-rays to practicing veterinarians' surgeries and stick them on the wall."

"That's when we thought of using QTVR to stitch the individual images together into one large image they can navigate through. Now we can send students a single CD full of images that are significantly smaller – some are 1MB and others just 200KB. Students have found it quite useful."

Phillips, who previously worked at AUC members the University of Tasmania and Curtin University, finds the AUC to be a great resource for innovation. "You get more buzz ideas out of AUC conferences, learning about the technology Apple brings out and the ways people can use it. That's of value to me."

Edmond Englebrecht, a network technician at the Murdoch Business School and Bachelor of Multimedia student, is finding the university's stronger ties to the AUC to be extremely beneficial as he expands his Unix knowledge on the way to a bigger involvement with Mac OS X.

"Going to the WWDC gave me tremendous knowledge in being able to set up Unix and OS X," Englebrecht says. "There's a big difference growing up on the classic side of things and moving straight into OS X for someone who hasn't got a Unix

background. The AUC helped me to do that, and I wouldn't have gotten anywhere without them. I'm not the strongest programmer in the world, but it's given me more credibility and I feel as though I know a lot more."

The AUC's promotion of Mac OS X has helped restore the profile of Macs on campus after several years in which the push for homogeneity drove an official policy of elimination of Apple systems and standardisation on Windows PCs. Despite those efforts, however, pockets of Mac enthusiasts remained loyal and actively lobbied the university management to retain the freedom to choose Macs.

With the release of Mac OS X now bringing Macs in line with other standards, once anti-Mac technology strategists have learned to live with them. "At long last, Apple has made its peace with Microsoft and we can have software standards that get rid of the need to have a hardware standard," says Peter Sumner, Murdoch's director of IT services.

"In a small place like Murdoch, we can't afford to have lots of different standards, but we had separate (Windows and Mac) groups separated by religion. Now we're learning to work together without letting the technology get in the way. I eventually accepted that I had to do some Apple support, and hired some people with skills. Now, I don't care what you've got on your desk as long as you use the same basic set of software."

A key element of this reconciliation has been the use of the Citrix MetaFrame client, which allows Macintosh users to view and interact with server-based Windows applications. But there are also a growing number of Mac-only services making their way into the mainstream: Mac servers support the university's Filemaker-based online handbook **(http://handbook.murdoch.edu.au)** and Web cam sites **(http://webcam.murdoch.edu.au).** They're also behind the recently implemented Callista student administration system, which is based on FileMaker and runs on Macintosh G4 servers.

As the benefits of Mac OS X's Unix roots become more widely appreciated, Rob Osborn, Murdoch's AUC and AUDF co-ordinator, believes the system will gain even more legitimacy.

"I'm looking forward to more training, and I think it will be interesting in the way that we can engage students to get excited about programming on the Mac," he says.

"OS X does make mainstream programming in the Unix world available to students, and we're finding Computer Science and Business people are starting to take a real interest (in Macs) again. That's very exciting – particularly if we can get AUDF seeding grants more widely available. OS X will make a huge difference."

Murdoch Business School's EM2 lab features high-end multimedia tools

Horses for courses at **QUT**

By David Braue

If you thought course catalogues were mundane, static documents, think again. Developers within Queensland University of Technology's (QUT) Department of Publications and Printing have spent the better part of a decade evolving that university's catalogue, and its latest iteration has more in common with sophisticated corporate databases than with simple Word documents.

Now available online at **www.studyfinder.qut.edu.au**, the system began its life eight years ago as a floppy disk based HyperCard handbook called Coursefinder, which helped prospective and current students learn more about the courses QUT had on offer. In later iterations, Studyfinder was moved to CD-ROM and built using PDF documents, and in its next version was fuelled by a FileMaker database.

In its latest incarnation, Studyfinder has grown into an online system built around an Oracle database (running on a university-hosted Windows 2000 server), WebObjects 4.5 Java application server, and Mac OS X Server running on a dual-CPU 500MHz G4 server with 1GB of RAM.

QUT's course database includes more than 100MB of detailed data about every undergraduate, postgraduate and other course the university offers. Content is administered using in-house built Profile Manager, News Manager, and Studyfinder Admin applications that let departments across the university update details of their own courses.

The decision to use WebObjects initially came as a result of the department's long-time commitment to the Mac platform, according to Wayne Oswin, manager of the department's Web Solutions Unit.

"We've been learning how to handle course information in a digital format," he says. "We're very much Mac-oriented, and WebObjects was the first Java-based application server we got our hands onto. We were looking for techniques and started experimenting with a WebObjects prototype, and it worked so well that we went live with it."

Studyfinder is also helping QUT learn more about the type of people that are interested in its offerings. Users are requested to enter simple non-identifying information such as their country of origin, which helps Studyfinder customise search results to best suit their needs. With a bit more information, it can also build personalised content pages suited to each of its more than 10,000 registered users' interests.

Those registrations generate mountains of data, such as the students' country of origin or current educational situation. By comparing this information with the types of courses that the users request, Studyfinder gives the QUT executive demographic profiles that are proving invaluable as it continues to expand its student base and geographical scope.

The recent launch of WebObjects 5.1 added new capabilities such as support for Web application archives. Recognising the new version's many improvements, the five-person department's programmers are once again stretching out their fingers, ordering pizzas and stockpiling Coke as they prepare to completely rebuild Studyfinder.

"The kind of stuff we do is very specialised content management systems," explains Oswin. "[Internal QUT customers] take the systems away to enhance their roles, and we often administer the systems for them as well. The university takes its Web development very seriously."
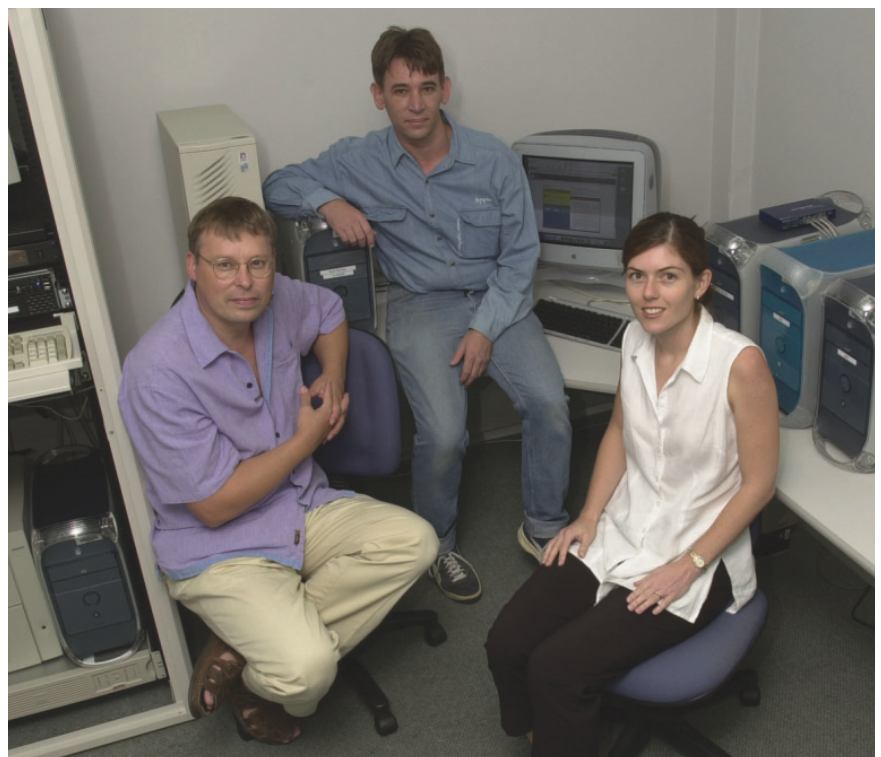
QUT Web Solutions develops advanced content management systems for other QUT departments. Pictured (from left) are Wayne Oswin, Manager; Simon Bourne, Systems Support; and Katherine McDonald, Web Designer

Parlez-vous QuickTime?

By David Braue

When you're learning a language, it's best to go straight to the source. At the University of Queensland, that idea has propelled a significant investment in a bank of satellite receivers. The dishes have rested in a nearby paddock for many years, continually pulling down all manner of foreign television programming for language students to watch.

With a varied schedule that would make even SBS green with envy, the setup delivers channels in eight of the languages taught at U of Q: French, Spanish, Chinese, Japanese, Indonesian, Korean, German and Russian. Students in the university's language labs can sit at TV monitors and flick through available channels to get a taste of the languages and goings-on in the country they're studying.

Recognising that the relatively small reach of the TV monitors limited the channels' usefulness, last year the Faculty of Arts' Arts Learning Centre (ALC) decided an alternative solution was called for. Thanks to an innovative combination of video capture cards and streaming video servers, staff - and the more than 2000 students taking language courses – can now use the U of Q intranet to access the channels from computer labs, offices, lecture theatres and other sites around campus.

In the setup, two video signals from the satellite dishes are fed into a pair of G4 Macintoshes with Aurora Fuse video capture cards. The digitised video is then fed into Sorenson Broadcaster software, which resizes and shapes the video stream for various video quality settings.

Sorenson Broadcaster servers at U of Q's language laboratory rebroadcast foreign-language TV for students and staff
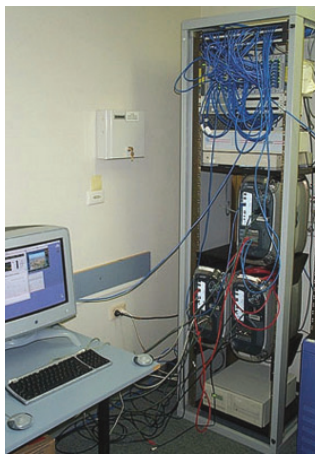
This video is then sent to another G4 server running QuickTime Streaming Server (QTTS) on top of Mac OS X Server. The QTTS system has currently run out of Ethernet ports, limiting the system to two simultaneous video streams, but this may be upgraded in the future with the addition of additional Ethernet ports.

"Lecturers are able to get the video in their offices on campus, and they can dial in daily to get a quick look at what's on," says Patrick Jewell, manager of the Arts Learning Centre. "Sorenson gives us the chance to select whether video or audio is more important for our needs; we've chosen to go for audio, since language students need to hear the speech as clearly as possible."

Because the setup is limited to two feeds, ALC staff rotate through the various languages, with an intranet page showing students what they can currently watch. Using Sorenson Broadcaster, ALC staff insert appropriate copyright warnings that are displayed to students when they watch the streams.

"We've found the QuickTime/Macintosh/Sorenson setup to be simple to install and manage," says Jewell. "By using it, we've improved student access to valuable learning resource with a cost-effective and reliable solution."

UNSW NetBoots out Physics lab dramas

Power and ease of use have made Macs ubiquitous within computer labs at many university departments. In every environment with lots of computers, however, manageability has been a chronic problem for administrators keen to minimise disruption from misconfigured systems.

Aiming to reduce the time they spend rebuilding computers, lab managers at the University of New South Wales School of Physics have turned to Mac OS X's NetBoot feature to simplify management of 44 lab computers used by more than 2500 students every year. Those students use the systems in conjunction with their own laboratory work, conducting data analysis using Microsoft Excel and collecting some data from physical instruments connected to the iMacs.

The decision to use NetBoot came as the school recently began upgrading its computers. Anticipating the inevitable problems that creep into any lab environment over time, the school's IT planners considered what would be involved in using OS X's new feature to position the iMacs as terminals accessing a central application server.

"We wanted a PC experience, but the problem was maintaining them," explains Gabriel Caus, the school's IT director, who plans computing strategies and manages the systems along with systems engineer Anthony Frith. "

NetBoot was installed with a 466MHz G4 system as the central application server, and each iMac loads a fresh image of MacOS 9 – customised with the student's individual preferences – whenever a student logs on. The iMacs' hard drives have been disabled to force students to store data in shared central repositories.

With up to two dozen people typically logged on in the labs, the system has dramatically reduced the administration burden and increased the availability of reliable workstations for students.

"It is a massive improvement over normal models," says Caus. "Students get a normal (MacOS 9) Macintosh experience and don't realise they're logging into a server that's running Unix. That's important, because I don't wish the students to waste any time on the learning curve. Yet we get all the administration facilities of Unix and have only one image to maintain. We've had a good experience and will definitely be considering expanding the lab more using NetBoot."

The new iMac.

15" LCD flat screen. 800-MHz G4. CD/DVD-burning SuperDrive.™