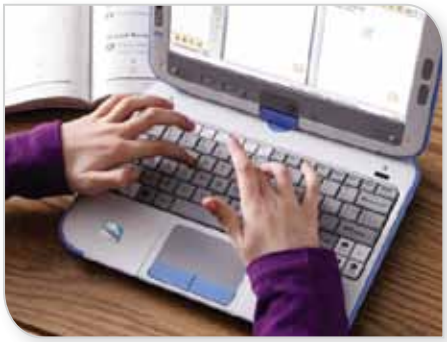
CASE STUDY
Learning technologies, teaching learners
Intel-based laptop PCs
Education
Mobile learning

Laptops Prove Invaluable Tools of the Trade for Teachers

A successful trial of teacher laptops in Queensland, Australia has led to the Department of Education and Training (DET) providing more than 40,000 laptops to nearly every educator in the state under the Computers for Teachers project. The project has resulted in some noticeable improvements to both teaching and learning as teachers gain proficiency with the use of online resources both in and outside of the classroom.



CHALLENGES

- **Improve teaching and learning in Queensland schools.** The department identified information and communications technologies (ICT) as a key enabler for better teaching and learning. Improving access to computing and online resources was a critical first step.
- **Boost familiarity with technology.** With a range of demographic situations across an area three-times the size of Texas, teachers fell along a broad spectrum of technology experience and competence, from complete novice to skilled professional. Improving teachers' skills to a common standard was identified as a high priority.
- **Improve teacher professional development.** DET Queensland wanted to ensure all teachers could access online teaching tools and professional development resources, supporting both conventional skills and the integration of ICT into classroom teaching and learning.

"The Queensland Office of the Government Statistician noted significant changes in the levels and patterns of usage for the laptops. On an anecdotal level, students were engaging with the technology better, and teachers were engaging better with the way kids like to operate."

Michael O'Leary
Executive Director, Web and Digital Delivery
Queensland Department of Education & Training

SOLUTION

- **Support DET Queensland's 'Smart Classrooms' vision.** The department adopted a broad Smart Classrooms strategy to foster ICT-led teaching and learning. http://education.qld.gov.au/smartclassrooms/
- **Laptops for all teachers.** DET Queensland purchased Intel® processor-based laptops for all 40,000 educators that teach least two days a week full-time in a permanent position.
- **Invest in teachers.** By covering the full cost of the laptops, instead of pursuing a shared-contribution model, DET Queensland positioned the project as an investment in its teachers. It could also better manage laptop fleet refresh cycles in the long-term.
- **Deliver enabling infrastructure.** With so many devices in the field, the department implemented a range of supporting tools for identity and access management, a centralized service center, and wireless LAN improvements to facilitate access anywhere within the state's schools.
- **Encourage professional development.** As well as enabling access to a broad range of teaching tools, teachers are also supported with a broad range of professional development resources. The department also encourages its collaborate with other teachers across the state - providing a deep base of support and expertise that all teachers can draw from.

Fostering teacher skills with Intel-based laptops has increased computer literacy and facilitated new teaching methods, online and offline

"Collaboration with colleagues in their school and others is helping teachers learn how they can use new ideas in their classrooms. You don't have to spend big bucks on professional development when your teachers can tap into the knowledge base of the whole school from their laptops."

Steve Lang,
eLearning Head of Department,
Kedron State High School

Assessing the Situation

Queensland is Australia's third most populous state and its second-largest, with 4.4 million residents in an area nearly three times the size of Texas. The state's 490,000 students are spread across 1245 public schools, split almost evenly between large schools in the capital, Brisbane and small schools in rural and remote areas - hours from the nearest town. Schools are managed by the Queensland Department of Education and Training (DET), which co-ordinates their technology and learning strategies according to the requirements of Australia's new national curriculum.

In 2005, the department began implementing a far-reaching pedagogical strategy called Smart Classrooms (http://education.qld.gov.au/smartclassrooms/), which focuses on the use of new information and communications technologies (ICT) to improve teaching and learning within the state's classrooms. A major focus area for this project was the provision of appropriate classroom learning technologies to teachers. As front-line employees, they were seen to be ill-equipped to help students make the most of online learning resources.

"As our major knowledge workers within the state government, teachers did not have a tool of trade," explains Michael O'Leary, Executive Director, Web and Digital Delivery with DET. "We really needed to drive the delivery of 'tools of trade' to allow them to engage with students and be right up there in the information stream."

In this case, 'tool of trade' meant laptop PCs. Although many teachers had their own laptops, there had previously been no formal way of putting laptops into entire school populations. O'Leary suspected this would be critical to maximize the effectiveness of a rollout. His team was given the go-ahead to conduct a limited trial of teacher laptops under the auspices of the state's Office of the Government Statistician, which monitored the program's effectiveness.

Trial Program

During the initial 12-month pilot known as the Computers for Teachers Trial, nearly 1500 Intel® Pentium® M processor-based Acer* TravelMate 3232WXMi laptops were rolled out to three different regions of the state. This included a complete rollout across the Moreton West Education District, five schools in the northern city of Cairns, and one school on the Sunshine Coast, an hour northeast of Brisbane.

These areas were chosen to evaluate whether saturating an entire school district with teacher laptops would produce better learning results than rolling them out to just one school in isolation. A control group, comprising 441 teachers from 24 schools within the Moreton East Education District, was also included for comparison purposes.

The initial trial, monitored closely by the state's Office of the Government Statistician (OGS), was designed to evaluate laptop usage against five key objectives:

- daily access for administration, teaching, and learning
- experimental use of ICT within teachers' pedagogical framework
- direct communication with parents, students, administration and colleagues via email
- teaching and learning planning using appropriate technologies and tools of trade
- use of digital folios of student achievement to provide consistent individual reporting and assessment.

All told, 1137 teachers carrying a 0.4 full-time equivalent (FTE) or higher teacher load were provided with individual laptops. In addition, they received professional training, support and resources. The Office of the Government Statistician's involvement included structured discussions with teachers, regional technology staff and school principals.

Results

At the conclusion of the trial, it was clear that the laptops had made a significant difference to learning within the tested areas. Surveys of staff showed teacher use of laptops for administrative and, teaching and learning purposes increased by 12.3% (compared to 3.5% in the control group). In addition, use of the systems for the same purposes at home increased 14.2% (compared to a 1.4% decrease in the control group).

Similar results confirmed the provision of the laptops meant teachers were more likely to use them for accessing professional development information; doing administrative tasks; demonstrating subject content to staff or students; encouraging student-led exploration, research and discussion; and teaching lessons.

Broad availability of teacher laptops not only facilitates specific tasks, but drives the creation of richer collaboration between colleagues and the creation of entirely new support networks.

"Teachers aren't just seeing their laptops as a way of sending and receiving emails," said Steve Lang, eLearning Head of Department, Kedron State High School, who emails teachers a new idea for utilizing technology in their classrooms every day of the school year.

"Collaboration with colleagues both in their own schools and in others, is helping them learn to use new ideas," Lang continues. "If they only use one idea per week, that's 38 new ideas per year. You don't have to spend big bucks on professional development when your teachers can tap into the knowledge base of the whole school from their laptops."

The survey also found that teachers were more likely to use complementary technologies such as a wireless LAN (usage of which increased by 31.3%), data projector (12.9%), online learning exchanges (6.4%), digital camera (6.0%), animation tools (5.7%), and Atomic Learning* educational resources (3.3%).

Confidence in performing a broad range of computer-related tasks increased consistently with exposure to the laptops. "The Queensland Office of the Government Statistician noted significant changes in the levels and patterns of usage for the laptops," said Michael O'Leary. "On an anecdotal level, students were engaging with the technology better, and teachers were engaging better with the way kids like to operate."

SPOTLIGHT: QUEENSLAND DEPARTMENT OF EDUCATION AND TRAINING

- Queensland is Australia's second-largest state, with around 4.4 million people spread across an area three times the size of Texas.
- Manages 1245 schools teaching over 490,000 students from grades K to 12.
- Manages more than 240,000 desktop computers and 2700 servers in schools.
- In 2005-6, Computers for Teachers trial program evaluated adoption of 1500 teacher laptops to evaluate their effect on teaching and learning.
- Success of Computers for Teachers trial led to full-blown laptop rollout in which over 40,000 Intel® Core® processor-based laptops have been purchased for all teachers with a 0.4 full-time equivalent position.
- Complementary investments in wireless communications and related technologies, as well as an ongoing commitment to technical support and training, have embedded the laptops as basic teaching tools.

KEY TECHNOLOGIES

- Intel-based laptops from Acer, Apple, Dell, HP, and Lenovo have empowered teachers to improve their ICT skills and develop technology-enhanced teaching strategies
- An investment in supporting WiFi ensures teachers can get online wherever they happen to be

INTEGRAL ANSWERS

- Were third parties involved?
- 3Com (now HP Networking)
- CDM

Expanding the Solution

The resounding success of Education Queensland's initial Computers for Teachers trial paved the way for broader adoption of laptops across the state's schools. In 2007, the department embarked on a three-year program to roll out laptops to every teacher in Queensland that works least two days a week full-time in a permanent position.

To keep up with current technology, it was decided that a number of vendors would be invited to submit competitive bids for each year's laptop purchases. In 2007, an initial tranche of 12,500 Intel® Core® 2 processor-based Apple* MacBook* and Lenovo* ThinkPad* R61 laptops were delivered to the first group of teachers. In 2008, a second contract was awarded, for 18,000 units of Lenovo's Intel processor-based ThinkPad R400. In 2009, the third part of the rollout was completed, as the HP* 6035B Intel processor-based laptop was delivered to the remaining teachers.

Whereas laptop programs in many other jurisdictions have adopted a co-payment model to encourage teacher buy-in, DET consciously decided to forego this model and retain ownership of the devices for the teachers. "We value teachers as individuals, and wanted to show them we valued them by owning the device for them," said O'Leary.

Maintaining ownership and control of the laptops served another important purpose: it allowed DET to build out a comprehensive device management framework and managed operating environment (MOE) that provided for easy re-imaging of remote computers.

In a state the size of Queensland, this capability is essential to improve responsiveness and minimise physical staff visits to often-remote locations. The initial rollout of the MOE required installation of Microsoft server and desktop management tools across 140,000 desktops, all 40,000 laptops, 2500 servers, and 15,000 network switches in a project that itself took more than 18 months to complete.

This project was tied with a number of other major initiatives, including a centralized service center, supporting wireless LAN infrastructure, a centralized student management system and an identity and access management framework that controls user identification from a central point.

More Results

As the rollout progressed, ongoing monitoring showed that widespread introduction of teacher laptops was producing the same positive effects observed during the initial Computers for Teachers trial. Teachers were more engaged with their work and their students. They also more actively explored the benefits of DET initiatives such as the OneSchool student and curriculum management environment (http://education.qld.gov.au/smartclassrooms/oneschool.html) and OneChannel professional development resources.

"Access to laptops has been a real confidence builder for our teachers because they can now talk with authority about using electronic resources in the classroom," said Andrew Morrison, Head of Department, ICT and Information Services, Corinda State High School. The school has found that moving its roll-call online has improved visibility of truants; online scheduling of meetings and regular communication to parents has sped collaboration; and ready access to online teaching resources has changed teaching dramatically.

Departmental ICT staff encouraged teachers to push the online systems to their limits, recommending changes and identifying weak points. "We always told teachers we wanted to milk our online learning environment, and wanted it used so much that it was going to fall over," said O'Leary.

"Gone are the days of showing a 30-year-old school film about a topic like human development; now you can download relevant videos, interviews, and even live feeds of relevant events. This has quickly brought a lot of authenticity and relevance to the classroom, and changed the way teaching is done. It's more engaging now – and it has to be, because the kids have a different form of information literacy than they did 20 years ago."

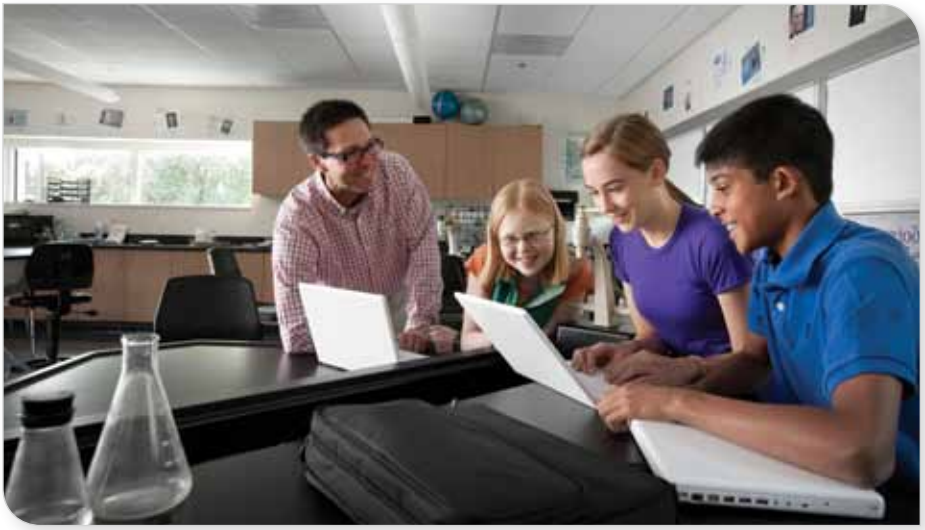
Andrew Morrison,
Head of Department, ICT & Information Services,
Corinda State High School

On average, it has taken teachers around 18 months to get fully comfortable with their new laptops – building their skills, and figuring out how to best use ICT resources to engage students and improve learning.

As teachers' familiarity with the technology grows, the department's ICT staff are exploring new options. One side project has given every school principal full-time wireless connectivity, using Intel processor-based Dell* laptops with built-in 3G wireless broadband modems. Principals have been recruited to assist in network performance testing and evaluation of learning technologies such as video conferencing.

Over the course of the rollout, teachers' progress in redefining teaching has been tied to the overall goals of the Smart Classrooms Strategy first articulated half a decade ago. And while there is still a way to go, the ubiquity of full-featured laptops has been recognized as a critical agent of the change that DET, Queensland wants to introduce.

"We've seen absolutely massive growth in teacher engagement through online learning, and in the creative ways they engage their students in the classroom," O'Leary explained. "We've seen them engaging with OneChannel and seen them more mobile, with an improved work/life balance in that they can take the device home and finish up their work if they want. All the pieces are falling into place."



Summary

Long ago, DET Queensland recognized how critical it is for teachers to have access to modern learning technologies and educational resources. After a preliminary trial of teacher laptops proved that better access empowers teachers, a statewide rollout has brought the benefits of online teaching and learning to every corner of the massive, heavily rural state.

Results to date have been significant, and teachers continue to find new ways to capitalize on the technology they can now access. Through its laptops program, the department has raised the bar for communicating with and supporting its teachers – who are now turning the state's educational system into one of Australia's most forward-thinking. And it's all thanks to a proactive, productive educational technology program that ranks amongst the world's best.

RETURN ON INVESTMENT

- Access to laptops has given 40,000 Queensland teachers a way to improve their own ICT skills, and to improve the classroom use of online educational resources such as the department's eLearning environment, the Learning Place.
- A flexible Managed Operating Environment (MOE) has proved invaluable in reducing the cost of support across the massive distances between population centers in the large, rural state of Queensland.
- Involvement of teachers has encouraged realization of new benefits and identified new opportunities to improve teaching and learning.
- Broad availability of laptops has increased collaboration between teachers, improving the flow of new teaching ideas and reducing the need for – and cost of – top-down professional development.

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