Computers for Teachers Trial

2006
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EXECUTIVE SUMMARY

As part of the *Smart Queensland: Smart State Strategy 2005-2015*, the Department of Education, Training and the Arts (DETA) undertook a Computers for Teachers Trial during the 2006 school year. The Trial enabled over 1,500 teachers in selected schools to receive laptop computers for their professional use.

A design feature of the Trial was to ensure a whole school immersion strategy ensuring all teachers, who worked two or more days per week, participated. A further design feature was to ensure a whole District strategy ensuring all schools within a particular District participated.

All 55 schools in Education Queensland’s Moreton West District were selected. One school in the Sunshine Coast District and five schools in the Cairns District also participated in the Trial to assess any broader geographic issues.

The Trial had five objectives relating to how teachers use their laptops for

1. **administration**: daily access available for the purposes of administration, teaching and learning;
2. **experimental purposes**: experiment with the use of information and communication technologies (ICT) within their pedagogical framework;
3. **communication**: progressively communicate more directly with parents, students, administration and colleagues by email;
4. **planning for teaching and learning**: plan for teaching and learning using appropriate technologies and tools of trade; and
5. **assessment and reporting**: provide consistent individual reporting and assessment of a student’s progressive achievement through using digital folios of student achievement.

During the first semester, the Trial concentrated on personal productivity to build teachers personal knowledge, confidence and competency in using the computer. During the second semester, the trial progressed into a professional productivity phase where teachers integrated ICT more and more into their professional teaching practice.

The Queensland Office of the Government Statistician (OGS) was engaged to conduct an evaluation of the Trial. The evaluation was designed to measure changes in access, usage and attitudes of teachers towards computers between a baseline survey administered in January 2006 when the teachers received their laptop and September 2006 when OGS completed the final survey.

The findings from the OGS evaluation conclusively demonstrated improved confidence, frequency of use and positive impact upon teachers’ skill levels and on teaching. The Trial was very well received by teachers, participating in the Trial. The Trial had a positive impact upon teacher engagement with learning technologies in the classroom as well as on teacher morale.
OGS findings also concluded that it was the additional components of the Trial, such as professional development, that were considered particularly critical to the Trial’s overall success.

The successful outcomes from the trial were able to inform the requirements for the roll out of the Queensland Government’s Computers for teacher initiative from 2007-08 onwards.
TRIAL OVERVIEW AND OBJECTIVES

As part of the Smart Queensland: Smart State Strategy 2005-2015 the Queensland Government considered supplying teachers with a dedicated computer similar to other public servants. As part of the 2005-06 budget, a trial was approved, to demonstrate value for money. $3.5million was committed to provide approximately 1,500 teachers with laptop computers in 2006 as a trial to inform future considerations.

The Trial evaluated the effect of providing a dedicated laptop computer to a teacher and assessed ways of helping teachers achieve better learning outcomes and equip them to meet students’ and parents’ expectations of schools in the Information Age.

The Trial focused around three major components: hardware; professional development and training; and support.

As well as improving teacher skills, it was expected that the laptop computers would provide easy and mobile access to teaching tools such as digital curriculum resources, assessment records and achievement records. It was further expected to encourage enhanced interactions between parents, teachers and students. This access provided classroom teachers with the same opportunity to access the information and communication technology (ICT) ‘tools of trade’ that are readily available and accepted by knowledge workers in other industry sectors.

The Trial allocated 1,523 laptop computers (1,480 Acer Travelmate 3230s and 43 Apple iBooks) to Education Queensland teachers in the Trial districts. The laptops were supplied to 611 high school teachers, 855 primary school teachers and 57 special school teachers.

The Trial was not simply the deployment of 1,523 computers, as 10 times this many computers are purchased and deployed into Queensland schools each year for students. The Trial sought to identify the professional development and technical support required to be deployed with the computer, if teachers were to take full advantage of individual access to a dedicated computer similar to all other public servants.

During first semester 2006, the Trial focused on personal productivity. In this phase, teachers were typically using the laptop with basic knowledge and understanding of its functionality and application. This phase was primarily to build teachers personal knowledge, confidence and competency in using the computer.

During second semester the Trial sought to progress to a professional productivity phase where teachers were typically using the laptop with more advanced knowledge and understanding of its functionality and beginning to integrate it into professional teaching practice.

A diversity of approaches were used by schools in the provision of professional development within the Trial, catering for diversity across schools and clusters.
Each school was required to have at least one teacher as the key Computers for Teachers change agent for the school. Their role was to encourage and facilitate the adoption of pedagogical practices consistent with the effective use of ICT in the classroom.

The Trial had five objectives relating to how teachers might use their laptops for

- **administration**: daily access available for the purposes of administration, teaching and learning;
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- **assessment and reporting**: provide consistent individual reporting and assessment of a student's progressive achievement through using digital folios of student achievement.

**DETAILS OF THE TRIAL**

**School Selection Process**

Teachers engaged in directly teaching students as a core duty for 2 days per week (0.4 FTE) or greater were selected. Many Queensland schools employ teachers for 0.4 FTE or more as part of a productive shared teaching partnership.

Laptop computers were made available for other categories of school staff such as Principals, Deputy Principals, Guidance Officers and Advisory Visiting Teachers who predominately work in schools but not necessarily as direct classroom teachers.

The district was selected using data including: preparedness of the District and Regional Leadership teams, total number of schools, mix of schools (urban & rural/remote), size of schools, number of teachers above or equal to 0.4 FTE, number of schools with a standard computer operating environment and technical support ratios.

The Trial took place in 61 schools – 49 primary schools, 8 high schools, 3 special schools and 1 state college. The schools were situated in West Moreton education district (55 schools), Cairns Coastal education district (5 schools) and Sunshine Coast North education district (1 school).

In selecting the Trial schools it was important to DETA that a whole district (Moreton West) was trialled so as to reflect the impact of a total school immersion strategy. The Cairns Coastal district was selected to ensure that a far north Queensland component would also be assessed, while the Chancellor State College was selected to leverage DETA's ICT Learning Innovation Centre situated at the University of the Sunshine Coast campus.

The laptops were supplied to 611 high school teachers, 855 primary school teachers and 57 special school teachers.
**Hardware Deployment**

Following a competitive tender process, Apple and Acer were selected as vendors for the supply of laptops. Acer supplied 1,480 machines (97.1%). Apple supplied 43 machines (2.9%). This is merely indicative of the dominance of Windows based devices that exist across Queensland state schools.

The 1,523 laptop computers for the Trial were deployed in 3 phases:

- **Phase 1** was an initial deployment of 114 (7.4%) computer laptops in December 2005. These laptop computers were issued to the Key Teachers from each of the 61 Trial schools to give them the opportunity to familiarise themselves with the equipment and the software included in the Standard Operating Environment (SOE).
- **Phase 2** saw the deployment of 1,328 (87.1%) laptop computers to classroom teachers in January 2006.
- **Phase 3** deployment of 81 (5.3%) laptop computers was delayed until February 2006 when the finalisation of teacher numbers was completed, ensuring laptop computers were available for all new and eligible teachers in the Trial schools.

In addition to the laptops, DETA delivered a wireless infrastructure to each of the Trial schools. In many cases this infrastructure was not fully in place until well into term two. As wireless is a relatively new technology, there was a great deal to learn about its deployment, capabilities and restrictions.

**Professional Development**

Professional development is viewed as a major contributor to the successes of the Trial.

Each school was required to have at least one teacher who was the key Computers for Teachers change agent for the school. Their role was to encourage and facilitate the adoption of pedagogical practices consistent with the effective use of ICT in the classroom. The Key Teacher was assigned to the role by the principal based on proven pedagogical skills, rather than on technical expertise.

Some aspects of the Key Teacher role included facilitation of student-centred learning, collaborative work, active inquiry-based learning, and critical thinking strategies. The intent was to achieve an increase in the capacity of schools to conduct at least some in-house professional development and training. To this end, a ‘train the trainers’ approach was used.

The Key Teachers from each of the 61 Trial schools were given training in the use of the laptop computer, connectivity procedures for the school networks, change management and technological leadership.

A key strategy for professional development was the utilisation of a just-in-time approach that delivered a range of online tutorials covering all of the software provided on the laptop computers. This allowed teachers to access software skills and knowledge bases anytime, anyplace. Access to and usage statistics for these tutorials was recorded as being in high demand.
A diversity of approaches in the provision of professional development within the Trial was used, to cater for the various ways in which schools operate, including:

- Key Teacher train the trainer model – these teachers were trained in the particulars of the hardware and software;
- Centrally provided – to cover big picture change management and leadership topics and some specific software training;
- Cluster Based – school clusters developed programs to meet their cluster needs and
- School based – for schools that were not part of an operational cluster.

Professional development focussed on three key drivers:

- Personal and professional productivity – (developing skills with the hardware and software)
- Teaching and learning – (application of ICTs in the classroom), and
- Communication and collaboration – (working smarter).

**Technical Support**

Technical support was managed in a 4-level process of escalation;

- Self-help (FAQs, Key Teachers – ICT, online community)
- Service Centre (Help Desk – Level 1)
- Central IT (Level 2) and school technicians (if available)
- Regional System Technicians.

The help desk was available for the duration of the Trial 8am – 8pm, Monday to Friday, to help solve home connectivity and operating environment related issues. Access to and utilisation statistics for these help desk services was very low.

An online community was set up in DETA’s eLearning environment, the Learning Place. The online community operated as the major communication and support mechanisms between the team and the Trial teachers. This was to help teachers engage with the department’s eLearning environment and to enable engagement with the Curriculum Exchange - the department’s online eLearning resource facility.

**Evaluation Process**

To undertake the evaluation, the Queensland Office of the Government Statistician (OGS) administered three surveys to Trial participants, referred to as the baseline, interim and final surveys. These were the primary quantitative measurement tools used to assess the status of the objectives throughout the 8 months for that group.

The surveys were administered:

- prior to the teachers receiving the laptop to gain a pre-intervention snapshot of the position of teachers’ ICT skills (Baseline: January 2006)
- at the mid-point of the evaluation period, in order to give an interim position to allow DETA and OGS to check tracking (Interim: May 2006)
- at the end-point of the evaluation period, in order to gain an insight into the distance travelled by those involved in the Trial (Final: September 2006)
In addition to the three surveys, OGS facilitated qualitative structured discussions with selected teachers and principals participating in the Trial to provide supplementary data to develop a deeper understanding of survey responses and to construct descriptive summaries of views and experiences on topics of interest to the evaluation.

The OGS baseline survey was administered to all Trial participants. The OGS final survey was administered to all in-scope Trial participants who completed the baseline and interim survey. A total of 1,006 valid responses to the final survey were received out of a total of 1,074 in-scope teachers, giving an overall response rate of 93.7%.

At baseline and final, a shorter survey was administered to teachers from schools not participating in the Trial. This Control Group comprised 24 randomly-chosen primary and secondary schools in the Moreton East education district. At final, 325 valid responses were received out of a total of 338 in-scope teachers, giving an overall response rate of 96.2%. In-scope teachers at final represented 76.6% of the control group of 441 participants.

**EVALUATION RESULTS**

The OGS final report noted increases in the development of personal and professional productivity of teachers from baseline to final.

There were more improvements in confidence and frequency of computer use with the intervention (Trial) group than with the control group. This was able to be completely attributable to participation in the Trial.

The findings across the Trials five objectives indicated that the introduction of the laptop had a positive impact upon teacher and student engagement with appropriate learning technologies in the classroom, and on teacher morale.

OGS Evaluation findings suggested that the introduction of the laptop had a significant, quantifiable and positive impact upon teachers’ skill levels and on teaching and learning.

**Administration**

Teachers reported an increase in frequency of using a laptop computer to perform administrative tasks across the period of the Trial. Teachers used their laptop computers to take and access meeting notes, to access timetables, calendars and schedules, and used email to update and receive information on school news or student issues.

OGS reported that:
- the proportion of teachers who use a computer for administrative tasks once a week or more rose from 78.1% at baseline to 83.2% at final
- many survey respondents were using a computer for administrative and learning purposes on a daily basis

Teachers indicated an increase in frequency of using a computer at least once a week or more from baseline to final of:
• 16.8 percentage points when recording student assessment, from 29.8% to 46.6%
• 15.5 percentage points when accessing professional development details, from 48.4% to 63.9%
• 14.0 percentage points when communicating with administration, from 52.7% to 66.7%

**Experimental purposes**

Teachers reported an increase in use of a computer to allow student-led exploration, research or discussion, which is a form of pedagogical experimentation. The proportion of teachers who were using a computer for this type of task at least once a week or more increased 12.6% from baseline to final.

Items experimented with included wireless networks; data projectors; digital video cameras; interactive whiteboards; PDAs and digital microscopes.

In the OGS final report, teachers indicated an increase in frequency of using a computer at least once a week or more from baseline to final of:
• 24.9 percentage points when accessing information from the Learning Place or Curriculum Exchange, from 27.3% to 52.2%
• 23.2 percentage points when linking the computer to other teaching aids, from 15.9% to 39.1%
• 12.6 percentage points when developing curriculum materials, from 64.7% to 77.3%

Teachers reported that since receiving the laptop computer, they had experimented with the following ICTs for the first time:
• 87.4% of teachers using a wireless network
• 54.6% of teachers accessing a data projector
• 54.4% of teachers accessing the Learning Place

**Communication**

Access to a laptop computer allowed teachers to communicate with a variety of audiences more effectively.
• Teachers reported that the laptop had instigated an overall cultural shift within their school from hardcopy to electronic communication and output e.g. the use of email and Intranets.
• Teachers began to promote and facilitate electronic means of communication over hardcopy methods
• Some teachers also found that, as their confidence increased, they were increasingly collecting and sharing resources and work plans electronically with other teachers

Teachers indicated an increase in frequency of using a computer at least once a week or more, over the eight month period from baseline to final of:
• 13.2 percentage points when communicating with students, from 19.3% to 32.5%
• 14.1 percentage points when communicating with colleagues, from 55.7% to 69.8%
• 10.9 percentage points when communicating with parents, from 28.1% to 39.0%

Planning for teaching and learning
Benefits to Trial participants for the purpose of teaching and learning was evidenced by:
• an average increase from baseline to final of 8.3% in using a computer at least once a week or more for class planning purposes was observed
• the Trial enabled teachers to plan for teaching and learning using appropriate technologies and tools of trade

Qualitative evidence, as well as professional development and training reports from all schools, indicated that many teachers moved from the personal productivity phase and had begun engaging with ICT in the classroom as part of the professional productivity phase of the Trial.

Some teachers recognised the benefit in being able to work on tasks such as lesson preparation and student assessment in locations external to the school.

OGS reported a 24.9% increase in frequency, from baseline to final, of use of a computer to access information from the Learning Place or Curriculum Exchange, and a 12.6% increase in frequency, from baseline to final, of use of a computer to develop curriculum materials. Feedback indicated that some teachers were using these resources for developing lesson plans and curriculum materials.

In the OGS final report, teachers indicated an increase in confidence when using a computer from baseline to final of:
• 18.7 percentage points when developing simple Power Point presentations, from 53.9% to 72.6%
• 18.1 percentage points when developing complex Power Point presentations, from 24.9% to 43.0%
• 14.2 percentage points when downloading information from the internet, from 80.4% to 94.6%
• 13.6 percentage points when using simple spreadsheet functions, from 41.4% to 55.0%

Assessment and reporting
OGS reported that overall, with the exception of using a laptop computer once a week or more to record student assessment, the majority of respondents were not assisted to meet this objective during the period from baseline to final reports.

Nevertheless, OGS data indicated that the increase from baseline to final, when using a computer at least once a week or more for tasks related to reporting and assessment was greater for the intervention (Trial) group than the control group. For instance:
• Teachers reported an increase in frequency of using a computer to record student assessment
• The proportion of teachers who were using a computer to record student assessment at least once a week or more rose from 29.8% at baseline to 46.6% at final
• At final, 17.6% of teachers were already using their computers to compile digital folios of student work, although no formal systemic requirements had been made

Teachers indicated an increase in frequency of using a computer at least once a week or more from baseline to final of:
• 16.8 percentage points when recording student assessment, from 29.8% to 46.6%
• 3.8 percentage points when recording student attendance, from 13.2% to 17.0%
• 1.6 percentage points to write term or semester reports, from 8.2% to 9.8%

It should be noted that the nature of some of the assessment and reporting tasks is that they may be performed several times a term but not necessarily on a weekly basis as surveyed.

**Barriers to Using Computers in Teaching**

Teachers were also asked to describe the types of barriers that they perceived would affect their use of a computer for teaching.

All barriers decreased in significance from baseline to final survey. The greatest decrease in significance was for:
• inadequate training and development, reduced from 46.8% to 24%
• inadequate technical and administrative support, reduced from 43.9% to 26.1%
• inadequate or inappropriate computer software for teaching tasks, reduced from 41.3% to 24.6%

From baseline to final survey, lack of time to incorporate ICTs into teachers' workloads and inadequate infrastructure decreased in significance as barriers to using a computer for teaching. However, these did remain as the most significant barriers with almost half of the teachers reporting them as being somewhat or very significant barriers.
OUTCOMES FROM PARTICIPATION IN THE TRIAL

**Improved Confidence and Frequency of Computer Use**

In focus group discussions, some teachers indicated that being able to take the laptop home meant they could practice and generally build their confidence. They also indicated that using the laptop had improved their confidence towards using ICT in general.

Final survey findings indicated that the large majority of teachers were increasingly using their laptops for overall administrative, teaching or learning, at home (92.3% at least once a week or more) and at work (97.6% at least once a day).

**Change in Teaching Practices**

Teaching practice progressively changed as ICT became more integrated throughout the Trial.

Teachers noted that connecting their laptop to a projector and using PowerPoint (for example) to teach their lessons had changed the way that they were teaching and facilitated a teaching approach that catered for students needs.

Teachers explained that they were also using ICT as curriculum tools to improve student engagement and to share information electronically between students and colleagues.

During conversations with students in Trial schools, DETA recorded the following statements about the change in their teachers since receiving a laptop in the Trial:

- We don’t use books as much as before
- The teacher now uses the computer and projector to explain maths to us
- The teacher prepares better worksheets for us
- The teacher is better organised and uses the laptop to manage our timetable and results
- The teacher uses the SmartBoard for teaching and demonstrations
- We have more electronic projects than before
- The teacher has better access to resources for us

**Attitudinal Shift**

Principals of some schools believed that the enthusiasm, attitude and initiative of the teachers had improved rapidly since receiving the laptop. They stated that these were benefits and value gained from the Trial on which they could not put a price.

School administrators reported that during the course of the Trial there had been a change in attitude amongst their teachers towards professional development and ICTs in general. Some teachers were starting to drive professional development in the school, which was something that did not occur prior to the Trial.
The proportion of teachers who were using a computer for accessing professional development at least once a week or more increased from 48.4% at baseline to 63.9% at final.

It was considered significant that many schools explained that teacher-driven professional development for using the laptop had fostered a more supportive and collegiate attitude and culture amongst teachers. These teachers often dedicated time and resources to support other teachers, promoted knowledge sharing, and fostered an overall supportive culture.

TECHNICAL AND INFRASTRUCTURE

Reliability of hardware proved to be extremely high, with the average monthly failure rate, calculated from January – November 2006, of the ACER computer laptops being 0.71%, compared to ACER’s national average failure rate for the same time period of 1.5%. Apple reported a single machine failure.

Security procedures were put in place and proven to be highly effective, as evidenced by the loss of only five laptops (0.32% of Trial total); two being stolen from a single school and three from teachers’ private homes. One laptop was subsequently recovered.

The Help Desk was available for the duration of the Trial 8am – 8pm, Monday to Friday, to help solve home connectivity and operating environment related issues.

Feedback received from focus groups indicated there were no major issues with the transportation or security associated with the laptop

Commonly encountered issues reported by teachers at final survey included:
- 14.7% reported various hardware issues during the Trial
- 17.4% reported issues with accessing the software provided on the Trial laptop computer included as part of the SOE.
- 42.0% perceived their inability to access both the curriculum and administration networks as a problem. This was attributable to issues with wireless networking and policy issues regarding access to administration networks

FINANCIAL CONSIDERATIONS

**Trial Funding**

The project was allocated $3.5m in the 2005-06 budget. This was fully expended on:
- Hardware - $2.12m
- Software - $0.026m
- Support - $0.096m
- Professional Development - $0.617m
- Research - $0.004m
- Evaluation (OGS) - $0.287m
- Non State Schools component $0.35M supplied (basket nexus)
CONCLUSION

It was important to trial such a significant initiative to definitively show that computers could make a difference to teaching and learning.

By having their own laptop computers, teachers who participated in the trial
- were more enthusiastic about their teaching;
- enjoyed a more supportive and collegiate attitude and culture with their colleagues;
- used computers more frequently for a range of tasks, including demonstrating subject content to staff and students, and accessing resources and online tools;
- enjoyed the flexibility of working from different locations with a laptop computer; and
- underwent a cultural shift from pen and paper to electronic communication and work.

The successful outcomes from the trial were able to inform the requirements for the rollout of the Queensland Government’s Computers for Teachers initiative from 2007-08 onwards.