



The ECU Advantage Project: Research outcomes advising the future.

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The use of communication and information technology as both an administrative tool and a support mechanism for instruction has been relatively widely used since the 1960's. More than 40 years later C&IT has become ubiquitous and considerably more sophisticated particularly with e-learning and m-learning options.

In its precursor format Edith Cowan University began using computer based training in 1975 using a time sharing minicomputer and text based screens. Thirty years later ECU has a sophisticated communications network in place and a T&L strategy to provide the infrastructure necessary to gain the benefits from an e-learning model supporting conventional University learning paradigms. In 2003 ECU began a project known as "The ECU Advantage" and it centered on expanding e-learning to a particular m-learning model for trial in 2004. Preparation included lecturer training, updating the ECU network, ensuring curriculum materials were available in a satisfactory electronic format and of course selecting and providing a mobile environment (in this case IBM laptop computers). Other mobile options are still under consideration but the creation and development of appropriate learning materials has taken precedence over expanding technological options.

The first part of the ECU Advantage trials were undertaken in 2004 with a second iteration commencing in 2005. The outcome of the 2004 research has focused changes for the 2005 implementation. The ECU Advantage Project planned for an independent evaluation which was undertaken by Queensland University of Technology (2004). Some of their findings and data from a sample of students are included in this paper along with ECU's interpretation of the project outcome to date. The paper also outlines the differences in the 2005 version of the project over the 2004 version after lessons learned and the findings of the evaluation team. In this section we look at further opportunities and difficulties in expanding the ECU Advantage Project further.

Keywords e-learning; mobile computing; m-learning

1. Introduction

This paper reports on a pilot project at Edith Cowan University (ECU) which saw students being issued with laptop computers for use within and without the classroom. The use of computer technology at ECU for teaching and learning purposes dates back to 1975 when we began using a time sharing minicomputer and text based screens. It was a common university technology at the time but the quality of the instructional software was very limited. The first administrative systems delivered the payroll and student enrolment and records capabilities. Thirty five years later if an important computer application is off line for 5 minutes the helpdesk is busy and half day outage is grounds for a student protest. The dependence of our 20 000 students on C&IT support has changed but fortunately so has the service provided.

In the 1990s ECU focused on improving the learning environment by way of our C&IT infrastructure. The largest initial gains were made with the creation of learning systems and curriculum activities based on microcomputers and LAN technologies. Teaching about computers and teaching computer programming with computers was particularly effective. Student expectations were born in this era leading to what has been referred to as "flexible online learning" where students want access to learning materials anytime and anywhere. It took ECU a decade to be able to meet our own expectations in this regard moving from a model with large numbers of desk bound computer laboratories on campus, lighthouse curriculum development areas, limited curriculum delivery options and limited IT connectivity to the creation of a mobile ubiquitous computing environment with an extensive base of curriculum materials, and extensive wireless and Internet connectivity. The advent of the microcomputer, colour graphics, high speed networks, remote access, sophisticated software applications, mobile computing, other technolo-

gies, and informed users all contributed to change the nature of computer based support in the university systems. The users expectations also changed as many students have their own computers and graphics machines at home and ask the question “why can’t my lecture support materials be this entertaining?”.

ECU students now expect to re-enrol, to submit changes of enrolment, to check their student record, to determine course options, to submit assessment items and to undertake learning experiences all via the Internet. The use of ubiquitous mobile computing is changing the access expectations of students and the teaching styles of lecturers. IT also changes the quality assurance expectations as lecturing staff are under greater scrutiny where teaching materials are digitized and broadcast to ECU students. Students are also under increased scrutiny as electronically submitted assignments are automatically checked for plagiarism. Assignment deadlines are real as each assignment is digitally time stamped.

2. The ECU Advantage Project

Until recently the adoption of online support for teaching and learning has been based on assumptions of access from either an on campus computer laboratory or from the students’ resources off campus. In 2004 it was decided to trial the use of laptops with complete cohorts of students in selected classes using a wireless environment. Specifically each student would be provided with a wireless laptop for their sole use during a complete semester of study. The aims of the trial were to [1]:

- Support the use of notebook and wireless connectivity to assist students to achieve successful learning outcomes in an exciting and stimulating fashion
- Develop students’ confidence, knowledge and skills in the selection and application of technology appropriate to their field of scholarship (Technology/Information Literacy – graduate attribute)
- Achieve an institutional advantage by adding value to the teaching and learning experience
- Expand students’ use of online resources and information at ECU
- Enhancing flexible delivery options for staff and students
- Make better and more efficient use of space
- Develop new teaching and learning models utilising mobile computing technologies
- Integrate technology into the university experience for academic staff by providing educational design opportunities, infrastructure and support.
- Gather staff and student feedback before attempting to develop further in this direction.

The three pilot groups involved in the trial were composed of: 13 ‘digital media’ students familiar with the technology; 50 Education students of limited computer literacy skills in year 1 of their degree (teacher training); 27 post graduate MBA students who were regular users of laptop computers.

2.1 The Digital Media class

These students explored the theoretical and practical activity of designing multimedia interfaces and environments, particularly for e-learning. The laptops were primarily used for on-line activity and for completing assignments and creating design documentation. The specific technology based strategies involved: Accessing lecture and workshop notes, examples etc (Electronic Delivery); Engaging in on-line learning activities (E-Learning) using an on-line learning environment called Mark-UP which requires students to articulate solutions to design problems; engage in activities based upon theoretical readings using forum discussions, annotate texts, post and review URLs; summarise, generate and review their portfolios of work.

2.2 The Education class

The pre-service teacher training unit provides an introduction to the Technology and Enterprise Learning Area. It aims to develop students’ confidence and competence in the use of a range of resources to solve

1 problems, and resolve issues in an enterprising manner. The provision of the laptops for this unit com-
2 plemented the computer laboratory tutorial tools giving students the ability to access the suite of software
3 programs used at their convenience. The laptop was also to facilitate the students' creation of their e-
4 folio. The e-folio was selected as a method of recording the students understanding, knowledge and
5 skills associated with the unit. Laptops also provided opportunities to collaborate on line in small teams.
6

7 2.3 The MBA class

9 This class explored e-Learning making in-class use of the internet to take advantage of the 'immediacy'
10 and 'individuality' offered by wireless capability. E-learning in this unit took advantage of the rich
11 resources of economic data available on-line, and the capacity provided by the laptops for students to
12 use material relevant to their own chosen project firm. Working individually, students accessed the
13 Australian Bureau of Statistics (ABS) site to download data relating to the industry in which their
14 chosen project firm was located. They were required to prepare a graph of their data, then contribute
15 their judgement about the current level of activity in that sector to the rest of the class. Another
16 task required students to access a 12 month history of exchange rate trends for any two currencies; to
17 describe these; to analyse movements in respect of factors suggested by economic theory; then to
18 suggest a hedging strategy which a company could take to protect themselves from any exchange
19 losses which could affect their firm' 'payables' or 'receivables' over the course of the year.
20

21 3. Evaluation

22 ECU commissioned an independent evaluation of the trial by researchers from Queensland University of
23 Technology. The report says [2], "Laptops in themselves are perceived by most students to constitute a
24 valuable and desirable addition to their university life. The laptop constitutes a 'workspace' for students
25 that they can identify with, that houses all their resources, helps them organise their university life and
26 offers flexibility in terms of where they engage this workspace – anywhere, anytime. Laptops are a
27 portable workspace/identity mechanism".
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29
30 The survey findings indicated that the pilot project was a positive experience for most students across the
31 three groups. Education and Digital Media students consistently provided more positive responses to
32 most questions than the MBA students. Generally, students felt that the experience: assisted learning;
33 helped them to be more productive and independent ; facilitated communication (primarily between staff
34 and students); increased access to resources; made learning more realistic and stimulating.
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36 Education and Digital Media students in particular felt that the laptop assisted learning and enabled
37 better organisation and communication with other students. Almost half of the students mostly from
38 Education and the MBA units considered the use of the wireless laptop to have increased their workload
39 and more than half reported frustration at using the laptop for tasks set by the lecturer.
40

41 4. Pedagogy

42 In the view of the evaluators the issue of pedagogical innovation emerged as the sustainable advantage in
43 the longer term, by introducing classroom practices that exploit and add value to the 'laptop culture'.
44 Student responses to the learning outcomes of the trial were generally very positive. Observation of class
45 activity and interviews with the instructors and staff research reports suggested unique opportunities for
46 pedagogical innovation, including:
47

- 48 1. activities that capitalise on the immediate and compelling access to a rich exemplification palette via
49 in-class access to internet resources
- 50 2. enhanced group work outcomes because the informality of 'anywhere/ anytime' means group
51 experiences can be more 'authentic'
- 52 3. democratisation of classes through access to multiple sites of learning in the classroom

1 4. creation of holistic authentic learning environments that integrate wireless laptop computers.

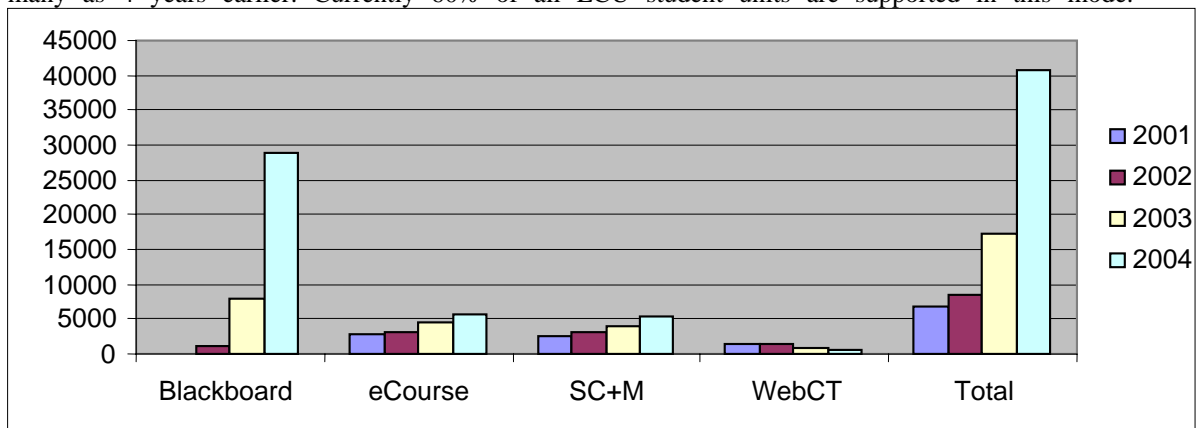
2
3 Feedback on the effects of laptop access from a student's perspective included 78.4% of students
4 agreeing with "The laptop enabled me to become better organised as a student in this unit." and amongst
5 the Education students this figure was 90.5%. Students who had significant exposure to computer access
6 previously appeared less influenced by having their own laptop.
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8 Also 93.9% of students agreed that "The laptop enabled me to complete learning tasks as an independent
9 learner" and 90.8% agreed that "The laptop increased the resources available to me as a learner in this
10 unit". Also 95.4% of students agreed that "The learning activities involving the use of the laptop, were
11 usually exciting and stimulating" suggesting that overall efforts to modify curriculum delivery processes
12 had been successful and offered students something extra.
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14 5. Technology

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16 Analysis of the data gathered from the pilot confirms that a comprehensive and reliable learning man-
17 agement systems (LMS) is essential for successful integration of wireless as part of the learning envi-
18 ronment. Staff and students reported frustration when they could not access the LMS or other online
19 resources. Students reported that the pilot provided them with increased access to online and digital re-
20 sources. Similarly staff were including greater LMS components into their units. Furthermore, the ex-
21 perience provided Education staff with the resources, support and motivation to make increased and
22 more sophisticated use of the ECU LMS with plans for further expansion for subsequent offerings. Even
23 though the units included in the pilot were not purported to be developed for "flexible delivery" the
24 qualitative and quantitative data on the location of usage showed increasing usage off campus (i.e. home,
25 friends/relative houses) indicated that wireless computing supported more flexible and independent
26 studying opportunities.
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28 Unfortunately 58.4% of students indicated "I have experienced frustration in using the laptop for tasks
29 set by the lecturer." The project experienced establishment problems as some academic staff, whilst
30 enthusiastic, were short on technical skills. The level of IT support was modified during the project and
31 Blackboard experienced some delivery problems. The fact is that student demand for online access to
32 learning materials exceeded our capacity to deliver in 2004. Figure 1 shows the student units registered
33 on the 4 LMS in use at ECU over the period 2001-2004. The SCAM Site and eCourse systems were
34 created at ECU and are seen by the authors to have some advantages over the commercial Blackboard
35 system. The total adoption of online supported units more than doubled in 2004 and will be 9 times
36 as many as 4 years earlier. Currently 60% of all ECU student units are supported in this mode.
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Figure 1 Number of student units for each LMS

1 The evaluation report [2, p7] says, “The education students reported that they only brought their laptops
2 to University for this class and left it at home at other times. It should be noted that the laptops assigned
3 to Education students were bulkier than those provided to the “digital media” students” and “It was
4 interesting to note that in contrast to the Education students, the “digital media” students reported that
5 they generally brought their laptops to University for most classes”.

6
7 A finding at ECU which is consistent with the experience reported verbally from the University of
8 Strathclyde was [2,p22] “Users have described the robustness and reliability of the IBM laptops as an
9 important feature for the pilot”. The number of machines requiring repair or field assistance was less
10 than estimated based on experience with previous suppliers of laptop computers at ECU.

11
12 At the end of the student survey was a question designed to “test the degree of commitment“ to using a
13 laptop in the form of “After the experience of using a laptop, I would now like to purchase my own lap-
14 top”. A quite large 78.5% of students agreed with this statement and a further 9.25% said it was “not
15 applicable” presumably because they already owned a laptop or had ready access to a laptop computer.

16 17 **6. Next Steps**

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19 The continued development of curriculum materials is essential both in terms of unit coverage and
20 maintenance of currency of existing units. ECU has approximately 60% of its units (or courses in some
21 educational cultures) in an online supported mode it is likely this number will grow to 80% during 2005.
22 The University has a very strong Teaching and Learning Committee with a PVC(T&L) driving this
23 project and the quality agenda at ECU to ensure there is appropriate follow up based on our experiences
24 and research. The Australian Universities Quality Agency (AUQA) released its quality assessment of
25 ECU saying [3]“ The history of ECU is one of strong commitment to teaching and to students ... and is
26 well supported with resources... designed to mainstream best practices.” [3,P3].

27
28 The University as already approved funding for a trial video streaming project where conventional
29 lectures will be recorded and made available to students via our LMS. They keys to success will depend
30 upon being able to record lectures and include presentation material without significant support staff to
31 operate the equipment and secondly to ensure the network infrastructure can carry the student demand
32 load for video streaming.

33
34 The success of the 2004 trials has encouraged ECU to continue down this path and arguably teaching
35 with mobile computers has been a positive learning experience for students. More detail can be found at:
36 <http://abell.lift.ecu.edu.au/WEBDEV/ECU/ADVANTAGE/data/recommendations.htm>

37 38 **7. Outcomes for 2005**

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40 The 2005 trials were modified as a consequence of the 2004 experiences as outlined above.
41 Recommendations on pedagogy, technical support, staff training and the expansion of the Nortel
42 wireless environment all contributed to change. In the latest trials adjustments have been made to include
43 different student groups, an additional discipline, and some new teaching staff.

44 The 2005 semester 1 outcomes will be available on the ECU website.

45 46 **References**

- 47
48 [1] R. M., Quin., *The ECU ADVANTAGE IBM Thinkpad project*, ECU Advantage Project V8.doc, ECU, 2004.
49 [2] S. Tower, G. Hearn, *ECU Advantage Evaluation Report, No 2*, Queensland University of Technology, 2004..
50 [3] Australian Universities Quality Agency, *Report of an Audit of Edith Cowan University October 2004*.