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A case study into the need for university computer laboratories

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Abstract

Computer laboratories remain an integral tool for students at university however with the high cost to provide and maintain these resources questions arise over the need for such facilities. This paper investigated the computer resources that students have access to outside their university environment at Charles Sturt University. Although the level of ownership is very high there remains a cohort of students who totally rely on the computer laboratories for their academic needs. Cost was identified as the main factor that inhibited these students from purchasing their own laptop or from having their own internet access. The university is considering alternate arrangements to support these students by providing subsidies and access to computer software and the internet.

However academic staff also need to be consulted in any decision to change the provision of computer laboratories at CSU. The research identified a perception by the academic staff that such computer laboratories are essential for the academic activities that they carry out at the university.

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1. Introduction

The provision of computer laboratories has become part of the services provided for students to complete their academic studies at university (Newby 2002). Charles Sturt University (CSU) is an inland university in Australia and is no different to many other universities in providing computer laboratories to its students. The provision of such facilities has often been justified in terms of equity of access in the information age where universities have a moral responsibility to provide adequate computing facilities to their students (cf. Solomon 2002). Often those students who are not able to afford their own computer facilities rely on the availability of computer laboratories to support their academic studies (Newby 2002). To support such students and also to provide machines for academic teaching CSU invested nearly \$AUD0.5 million into maintaining the hardware requirements of its computer laboratories in 2006. This represents a significant capital investment, however little research has assessed the effectiveness of this investment .

Currently the Division of Information Technology (DIT) and Division of Library Services provide approximately 720 and 200 computers respectively in computer laboratories and other learning areas on CSU campuses. However DIT logs for computer access show that these resources are utilized by only about 30% of all enrolled students at CSU who will typically use the facilities for an average of 17 minutes per visit. Further the computer laboratories are mainly during the term period (87%) and further that more than 90% of the utilisation occurred between Monday and Thursday (Spennemann et al. 2007). Further the utilisation of the computer laboratories has shown that the computer laboratories are, on the whole, under utilised. While the available machines cater for the peak periods near the end of semesters, and other peaks when major

assignments are due, the rest of the time these resources are largely idle (Spennemann et al 2007). Even though it is acknowledged that the provision of computer facilities at CSU is an important resource, the fact remains that it is a significant investment in a relatively small percentage of student population (Atkinson et al 2005) and the question that CSU is trying to determine is whether such resources could be better utilised.

At the same time, there is only limited knowledge on how university students and staff use computing facilities. This is particularly as CSU has adopted a 'blended' learning environment: where the traditional face-to-face (internal) and off-campus (DE) students use technology in a more transparent learning environment. There is a need to better understand how Information and Communication Technologies (ICT) are used by students and staff and to determine the most effective way for universities can deliver ICT services to their customers.

2. Methodology

The data was collected via two online surveys:

- **Survey One** - student survey was completed by internal and DE students enrolled through one of CSU's Australian campuses. The aim this survey was to determine student use and need for computer resources while at CSU. Survey one was available to be completed from the period 27 July 2006 to the 13 October 2006 where students were provided information about the research and if the student then agreed to participate they were required to complete an online survey with 23 questions. .

- **Survey Two** was completed by academic staff at CSU. The aim of this survey was to determine how important academic staff perceived the computer laboratories were to students in their academic studies at CSU. Staff were invited to participate in this survey through the CSU newsletter which distributed electronically to all staff at the university. A message was repeated every week day from 1 October to 15 November 2006 requesting staff to participate in this research. This survey consisted of 17 questions.

Surveys were deemed to be the most effective way to collect data where both large numbers of students and staff are dispersed geographically across inland Australia. The data was collected through online surveys which were protected through password access allowing only one survey to be completed per login name.

3. Results and Discussions

3.1. Survey one – Student survey

A high response rate was possible because advice about the survey was made through the university's official electronic communication channel, the Ebox. This resulted in a total 8998 messages being posted to students' Eboxes. Students were invited to complete a series of questions on their use and access to Information and Communication Technologies. A total of 5191 people looked at the survey questionnaire, while 40.9% completed the survey (table 1).

	No. of responses	% of respondents
Total Students	8998	100
Students who viewed the survey	5191	57.7
Students completing the survey	3682	40.9
Students who declined to participate	1430	15.9

Table 1 - Response rate

3.1.1. Computer Ownership. Nearly 94% of all students at CSU own either a laptop and / or a desktop computer, which represents a very high percentage of all CSU students (table 2). Interestingly, over 60% of these respondents actually own a laptop (45.4% own a laptop only plus another 16.8% owning both a desktop and a laptop) and if the majority of these students are on-campus students then they could potentially use them to access the CSU on-campus intranet. Further if such students were able to freely access all of the university's licensed software applications using their own laptop while on campus (through thin client or similar arrangements) then this would reduce the demand for on-campus machines in the computer laboratories.

Computer type	% of total responses
Laptop	45.4
Desktop	31.8

Desktop and Laptop	16.81
I do not own one	6.3
N	3100

Table 2 What kind of computer do you own?

This data also shows that the level of computer ownership is much higher in the CSU student population compared to the Australian average where in 2004 – 2005 only 65% of the Australian population had access to a computer in their home environment (ABS 2006). The reason for this higher level of computer ownership among CSU students can be attributed to the university requirement that students must now be able to access their online academic resources.

Of concern is that just over 6% of students indicated that they did not personally own a computer. Although this appears to be a relatively small percentage of the total student population it does represent a large number of students (approximately 180 of the respondents to this survey). This cohort of students would be disadvantaged if they were not able to access the facilities in the computer laboratories at CSU.

3.1.2. Reasons for not owning a computer. Those students who could not afford a computer cited cost as the main reason that they did not own one (table 3). This is despite the fact that the relative cost of technology continuing to fall however it is acknowledged that many students are faced with many other significant financial pressures. Students without their own computer access could be disadvantaged academically compared to their fellow students who have such access.

If the percentages in each cohort are translated to the total CSU student population then the physical number of students (table 3) who do not have access to a computer becomes significant (CSU 2005).

Reason	%	No. of internal FT	No of internal PT	No of DE
I cannot afford it	3.45	273	87	798
I don't see the need	0.16	13	4	37
I can use someone else's	0.86	68	22	199
I rely on CSU labs	1.61	128	40	373

Total	483	153	1407
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Table 3: Extrapolated numbers of students without access to a computer

3.1.3. Mode to connect to the Internet. The majority of students (42.3%) who responded to this survey access the internet using a broadband connection (table 4). Even though 19.3% of CSU students still use dial-up as their main means to connect to the internet this is relatively low compared to the 2004-2005 national Australian average where nearly 70% households still use dial up access (ABS 2006). Of these 19.3% some may have utilized the free CSU dialup facilities however this service was recently removed and therefore students will have to either move to their own ISP or to rely on the on-campus computer laboratories. Of significance, is the fact that over 35.5% of the students indicate their main means of access to the internet is through the computing laboratories at CSU. This finding demonstrates that the internet facilities provided through CSU computer laboratories play a very important service in providing students with fast and reliable access to the internet.

Mode of internet connection	%
Broadband	42.3
Dial-up	19.3
Other	3.1
Through computers at CSU	35.5
Total (N)	3100

Table 4: What is the main way you connect to the internet?

3.1.4. Reason for no internet access. A significant percentage of respondents to the survey (11.7% of respondents) also indicated that they cannot afford access to the internet and rely on the CSU computer laboratories to connect to the internet (table 5). This is not surprising when in a recent study found 40.2% of all university students reported their yearly finances were in deficit (AVCC 2007). Any suggestion to reduce the number of machines available through the CSU computer laboratories will need to be cognoscente of the financial status of many students who do not have the financial means to afford their own internet access.

Reason for not owning an internet access	%
I cannot afford it	11.7
I do not see the need for one	0.8
I can use someone else's machine	1.1

I rely on CSU computer labs	13.4
I have the internet	72.9
Total (N)	3100

Table 5: What is the main reason you do not have your own internet connection?

3.1.5. How often do students access the computer laboratories? Students who do not own either a laptop or a desktop computer are the most likely cohort to use the machines provided in the computer laboratories at CSU. Over 50% of this cohort will access the computer laboratories daily and nearly 90% will access them at least once a week. However, those students who own a laptop are also regular users of the computer laboratories with close to 80% of these students also using the machines in the computer laboratories at least once a week (table 6).

Table 6: Use of the computer laboratories depending on computer ownership

However students currently only have restricted internet access when they use their own machines connected to the CSU intranet. If these students were provided with the ‘equivalent’ of full laboratory internet and software access when connected through their laptops to the CSU intranet, then their need to access the computer laboratories would decrease. This would be a practical option to be able to reduce these facilities at CSU.

3.1.6. Difference in student use for computer laboratories over time. A substantial decline in the weekly access to the computer laboratories was noted among internal students, from 88.5% in the first year of their study to 70.7% in their second year of study. There are two possible explanations for this: either second year students are less diligent in their study and less reliant on CSU-provided computers, or they increasingly use their own machines. However the utilisation by students rises again in the third year of student study at CSU (to 77%) which could be explained in terms of a need for specialised software, or an increased requirement for collaborative work. This decline in second year access was also observed in previous studies of students at CSU (Spennemann, Atkinson & Cornforth 2006).

	Laptop	Desktop	Both	None	N
more than once a day	11.1	10.1	9.6	25.7	354
once a day	17.7	13.5	12.5	26.2	496
more than twice a week	34.2	31.0	28.0	31.0	991
once a week	15.6	13.5	13.2	5.4	431
once a fortnight	5.5	4.6	5.2	1.6	153
once a month	3.3	4.2	2.9	0.0	103
once a session	4.2	3.8	5.8	2.1	130
Never	8.4	19.4	22.8	8.0	443
N	1407	986	521	187	3101

3.2. Survey two – Academic survey

The survey consisted of a series of questions to determine the perceived importance that academic staff members have for the use of machines in the computer laboratories. The responses to the survey and recommendations are made below however it

highlights that academic staff believe there is a critical need for computer laboratories at CSU (table 7). In particular academics at CSU believe that the computer laboratories are essential to allow them to run computing classes and also to allow students to access specialised software.

Perceived importance:	Important	Neutral	Not Important
to academic staff to run classes with computer access	78.3	5.1	16.2
for students to have access to specialist software.	75.3	8.9	15.8
for computer laboratories to provide access to specialise hardware	60.4	21.8	17.8
for computer laboratories to allow students to collaborate on group assignments.	44.5	27.7	27.7

Table 7: Academic perceived need for computer laboratories

3.2.1. Comparison of academic staff and student response to the surveys. As the same questions were asked in the student survey (survey one) and the academic staff (survey two), t-test calculations were used to determine if there was a significance difference between the responses from these cohorts.

A statistical difference was noted in the responses given by students and academic staff regarding the perceived importance to student of internet research and checking personal email in computer laboratories. This statistical test is not able to determine the direction of this difference but anecdotal evidence would suggest that academic staff under underestimate the importance that students place on internet research and checking personal e-mail. Further research is required to confirm this difference.

	Staff	Students	t-test
Participate in classes requiring computer access	95.3	72.4	0.961
Have access to software they do not have access to elsewhere	93.0	76.6	0.896
Have access to hardware they do not have access to elsewhere	85.3	69.9	0.892
Work on assignments	94.6	83.5	0.797
Carry out internet research for study	96.1	87.0	0.749
Check CSU e-mail	89.1	81.4	0.648
Print out documents	92.2	84.9	0.708
Check forums	91.5	86.6	0.643
Collaborate with other students on group assignments	69.0	68.3	0.524
Access my.csu	89.1	90.6	0.455
Carry out personal internet research	45.0	65.6	0.0256 *
Check personal e-mail	48.1	71.4	0.0166 *
TOTAL	129	1652	

Table 8: comparison between academic staff and student responses to accessing computer laboratories.

4. Conclusion

The underlying question that this research attempted to address the importance of the computer laboratories to its students at CSU. In addressing the issue it found that over 90% of students own their own desktop or laptop, with 45% owning a laptop. The majority of these students will still access the university's computer laboratories on a regular basis although their use would decrease if they had high speed internet access via their laptops while at CSU. However there is a large number of students who cannot afford to purchase either a laptop or the cost to access the internet. To overcome this equity issues the university is planning to offer subsidies to all students to purchase their own laptop machine. This would be a cash payment that the student could use to assist in the purchase of a new laptop. Further the university is investigating using special licensing arrangements to provide students, who own laptops access, with the full suite of software that is currently to them through the computer laboratories. In addition students would be able to gain the same level of internet access that they currently have when connected through the computer laboratories. The university is confident that the cash subsidy and the access to software and the internet will allow them to reduce the number of computer laboratories currently in the university.

The one issue that will need to be carefully addressed is the perception by academic staff members that computer laboratories are essential for academic activities at CSU. This research has found that academic staff place a high importance on students accessing the computer laboratories. It is clear that any changes to the current access to computer laboratories will need included a managed change management process.

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