UCISA Award for Excellence 2009 – Application Form

Institution Name
Canterbury Christ Church University

Originating Department
Joint project between Computing Services Department (CSD) and the Learning and Teaching Enhancement Unit (LTEU)

Contact Name (and email address)
Dr Ian Ellery, ian.ellery@canterbury.ac.uk, Head of Computing Services

Objectives of the iBorrow Project

The iBorrow project had two clear objectives:

1. To make available 200 laptop computers for self-service loan for use within a new £35M library and learning centre. With the creation of flexible learning spaces containing different types of furniture these would allow students to work in ways and places of their choosing.

2. To use Wi-Fi positional tracking and anonymous user data to collect a range of empirical information relating to how mobile technologies are being used within a learning centre. To then analyse this data to determine how a diverse student corpus (incorporating mature, part-time, work-based cohorts) engage and interact with different spaces and technologies as part of their learning within the building.

Description of the iBorrow Project

During 2008/09 Canterbury Christ Church University embarked on the single biggest building project in its history. The aim was to create a large £35M new library and student support centre and key to this was provision of innovative ICT for student use. The building – Augustine House – is a huge success and opened on schedule for start of term in September 2009.

As part of the design process, the University was keen to provide as much mobile IT as possible, as well as normal fixed PCs. This was because an important feature of the building was the creation of flexible learning spaces to allow students to work in ways and places of their choosing. We were also aware that many of our student population were part time or returning to Higher Education and who would not be able to afford their own laptop.

It was also clear during the design process that there was little or no empirical data on just how students use learning spaces and therefore how they might need to be configured. We realised that if we had a large and well used laptop loan scheme, and we could use the latest WiFi positioning software to track location we would be able to gather significant amounts of data to help inform future learning space design.
However existing laptop loan schemes come with significant administrative overhead and operational burden. Other schemes rely on staff issuing and collecting laptops and are for fixed and usually short periods. They may have fines for late return, have only a few laptops available and at least one University demands a £50 credit card deposit. All of this seemed unnecessarily complex and bureaucratic in a building designed around self service and flexibility. It was also clear that manual administration of a loan scheme holding perhaps several hundred laptops would have a massive staff overhead.

Traditional laptop loan schemes rely on recording and knowing who has taken each device to ensure it is returned. With all operating system and applications installed on each laptop there is also a need to constantly check that nothing has been corrupted or changed – either deliberately or accidentally. We wanted the loan system to be entirely self service – so that borrowing a laptop to use within the building was no more complicated than borrowing a book. This meant that the laptops had to be robust and the system and software locked down so that they would always work.

Our plan was to combine a “thin” laptop with application virtualization to create a far more robust system. We tested various dedicated thin client laptops but none were ideal for our purpose – they were all either poorly built or heavy and expensive. They also needed specialist servers and could not always be easily upgraded. We therefore decided to look at small netbooks based on the Atom processor which were cheap, light and had good battery life.

After evaluating several devices we chose an ASUS 1000 as it came with a solid state disk (SSD) which meant that the laptop would be physically robust as well. Unfortunately, the SSD version was discontinued just as we were about to purchase as it was not sufficiently popular. We therefore bought 160Gb hard disk versions of ASUS 1000H and swapped out the hard disk for a small 8Gb SSD.

Although we had migrated all student PCs to Windows Vista, this would not run on the Atom chipset so instead we engineered a very lean version of Windows Fundamentals for Legacy PCs (WinFLP) which fitted into the 8Gb SSD. On power-on a local account is automatically logged on, and a shell entry in the registry launches a CCCU written script. This script automatically gains a connection via an RDP client to Microsoft Terminal Server 2008. The laptop uses a stored digital certificate to authenticate to the secure wireless system (Eduroam).

Once connected to the Terminal Server (TS) the student logs in as usual using their normal Active Directory account and is provided with a full student desktop. We already store all profile data on the student’s network storage area so the experience was identical to using a normal fixed PC. In order to reduce the installation complexity on the TS, we used Microsoft App-V to stream the applications. This lowers maintenance costs and makes it easy to update applications, or even deliver multiple versions of the same application. It also means that the TS image is simpler and allows us to rapidly scale up the TS farm as required to meet demand.

To provide a seamless experience we developed a programme to pass information on the netbook battery life to the TS session so it could be displayed. We also developed a programme to automatically log off from the TS when the netbook lid was closed – this prevents another user being given access to another student’s files and email. Finally we pass
USB functionality through to the TS via RDP, so that media devices or memory sticks work as expected.

The iBorrow laptops are deployed in cabinets of 20, with a charger on each shelf. There are 10 cabinets, distributed evenly throughout the building. A device is simply pulled out, disconnected from the power cable and taken away to use. Any device can be returned to any cabinet and is simply plugged back in to recharge for the next user. We have observed students gathering up netbooks left around and returning them, but any left lying on tables are gathered up by security staff at the end of each day and put back in the cabinets. This also allows us to check that none have been lost or stolen.

Obviously theft or accidental removal of the laptops was a major concern. Like any academic library Augustine House has periphery security gates which alarm when an un-issued book passes through. This is based on small passive tape tags in each book. We have tagged all of the iBorrow devices with 3 pieces of the same tape. Two are on the device itself fixed at right angles to maximize detection, and another on the battery in case anyone tries to remove just that (eg as a spare for their own netbook). We have also publicized widely that the iBorrows do not work outside the building. By not having a hard disk and just a very small SSD even those technically adept students realise that they would need to spend both money and effort to make them work. Finally, due to their low purchase price they are of little interest to professional thieves who are looking for high-value easy-to-sell items. So far, after four months of operation we have not lost a single laptop.

Within days of the system going live, the laptops were being widely used. Over a 4 week period (9/11-7/12/2009) the graph below shows the average and maximum number in use at various times of day – with a peak of 155 out of 200 (77.5%).

![Graph showing average and maximum number in use at various times of day](image)

Students are gathering in groups to work and each taking an iBorrow to make notes or research information. Academic staff are encouraging their students to meet and work together
in the new building, and scheduling formal and informal tutorial groups there as well. There are also indications of their use as social tools – with students being observed sitting reading books with an iBorrow at their side linked to Facebook to keep in touch with friends. Informal feedback from students is very positive, for example: “… thought it was a brilliant little piece of technology and a really good idea […] being able to go anywhere and chill out rather than being tied to a desk was a really good way to work.”

The research aspects are also looking very exciting. Data is being collected every 5 minutes on approximately where each netbook is, and anonymous demographics on who is using it. The research team will start analysing the data in February/March prior to final project report being published in April. Some simple graphs using interim data are shown in the appendix.

As can be seen, this project has delivered significant benefits to our students. The overall capital costs were very reasonable and with netbooks becoming increasingly popular replacement costs should remain low. Importantly, the iBorrow concept is easily repeatable by any other institutions who want to gain the same benefits. It could be deployed in any bounded large learning centre as long as some sort of perimeter tag alarm system is available. We used almost exclusively Microsoft technologies, as these were those with which we had experience and licence costs were not excessive. However, the concept could be replicated using many different netbook and application virtualization methods. A full technical report on how we implemented will be available from our website.

This project is, as far as we know, unique. No other University has ever implemented a large, fully self-service laptop scheme. This alone is totally innovative and has given significant improvements to our new learning centre and library. The usage data being collected and research potential of this data is also going to give significant understanding of how learning spaces and technology are actually used.

Name of Staff involved (including job titles and email addresses)

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ian Ellery</td>
<td>Head of Computing Services</td>
<td><a href="mailto:ian.ellery@canterbury.ac.uk">ian.ellery@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Phil Poole</td>
<td>Director of Learning and Teaching</td>
<td><a href="mailto:phil.poole@canterbury.ac.uk">phil.poole@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Wayne Barry</td>
<td>Learning Technologist</td>
<td><a href="mailto:wayne.barry@canterbury.ac.uk">wayne.barry@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Chris French</td>
<td>Network Analyst</td>
<td><a href="mailto:chris.french@canterbury.ac.uk">chris.french@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Geoff Kimmons</td>
<td>User Technology Development Manager</td>
<td><a href="mailto:geoff.kimmons@canterbury.ac.uk">geoff.kimmons@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Lynne Graham-Matheson</td>
<td>Principal Research Fellow</td>
<td><a href="mailto:lynne.graham-matheson@canterbury.ac.uk">lynne.graham-matheson@canterbury.ac.uk</a></td>
</tr>
<tr>
<td>Adrian Wheal</td>
<td>Technical Consultant</td>
<td><a href="mailto:awheal@lincoln.ac.uk">awheal@lincoln.ac.uk</a></td>
</tr>
</tbody>
</table>

Support of Institution UCISA Representative

Name:........Dr Ian Ellery.................................................................
Appendices
1 – Photographs
Examples of use taken from http://www.flickr.com/photos/heywayne/sets/72157622488906510/ All photos © Wayne Barry, 2009
The iBorrow laptops in a trolley ready to be taken and used. Four have already been removed from this trolley. When a device is returned, then almost without exception the power cables are plugged back in to charge the laptop ready for the next student. (photo © Wayne Barry, 2009)
2 – Research Data

While the data collection is ongoing and full research results are not yet available, some simple analysis of just a single day (7th December 2009) shows the potential value of the research – as well as the popularity of the service. Data is collected at 15 minute intervals.

Breakdown between Male and Female use:

The same data broken down by year of study (0 is foundation year)

Averaged over the same day, the numbers of students in different age brackets:
3 – User Information

The user guide displayed on all iBorrow trolleys, showing the logo and the “borrow – use – return” strap line.

Quick guide

- **Borrow**
  - Help yourself to a laptop from the charging rack
  - Please take care when unplugging the power cable
  - Use the laptop anywhere in Augustine House
  - The laptops will not work outside the building

- **Use**
  - Open the lid, switch on, login and start to work
  - Access the internet, email, Microsoft Office and other applications
  - The battery should last several hours
  - If the battery is low, there are iBorrow power cables in many of the desk clusters

- **Return**
  - When you have finished, logout and return the laptop to any charging point and plug the power cable back in
  - Please remember to plug back in so the laptop can charge up for the next person

For help, please contact the i-zone
Call 01227 782222 or email i-zone@canterbury.ac.uk

**Please note:** By using these laptops you agree to the terms and conditions at: www.canterbury.ac.uk/iborrow