



Liverpool **Community College**

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JISC infoNet Award Submission – Innovation in Records & Information Management

Innovation: Utilising SmartCARD Technology to mark/monitor and control student attendance throughout the college.

After a very short development period the college has successfully launched an initiative that collects electronic data regarding student attendance utilising SmartCARD readers in all teaching areas. The system has been operational since April and has shown a stepped change in how attendance is monitored leading to dramatic savings in academic and administrative staff time, improved accuracy of records, increases in student attendance and prompt EMA returns.

Background:

The introduction of the Education Maintenance Allowance (EMA) across the Further Education sector has caused many issues with regard to the administrative overheads required to complete weekly returns for prompt payment to students. To qualify for payment of the EMA grant students must have 100% attendance in any one given week, therefore it is imperative that accurate and up to date information is available in the following week to confirm payment. In the previous 5 years the college had undertaken a great deal of work in streamlining the collection of register data utilising Online and Optical Mark Recognition systems. Both systems however had basic flaws in that they were either user unfriendly or too latent in the speed at which information could be collected electronically. This latter issue caused great problems for the college in attempting to meet LEA deadlines for the payment of grants to students, the information being required very quickly after the previous week's attendance.

Initially the college attempted to solve this problem by introducing a tutor signed student 'timesheet' (effectively a second register) which was handed in at the end of each week as proof of attendance. Although the system worked it was apparent that it was exceedingly labour intensive, in addition to the need for academic staff to countersign each sheet they also had to be entered into the system electronically by administrative staff. This problem was exasperated by the fact that the college is large catering to over 14,000 students over 6 main centres and a multitude of outreach centres. The staffing costs associated with the system were therefore high with 14 administrators dedicated to this task alone together with programming and management staff making this an extreme drain on human resources.

The timesheet system was also flawed in the following ways –

- disliked by academic staff as it took up time and was difficult to administer.
- disliked by students as a major inconvenience in attaining tutor signatures and misplacing simple pieces of paper.
- In isolated cases open to abuse via fraud e.g. students forging staff signatures.
- did not contribute to the collection of accurate register data

It was also apparent that the OMR technology used for the collection of electronic register data was flawed. At the end of each week individual paper registers held by academic staff were to be delivered to centre administrative staff. The following week as many as 2000 individual sheets were then fed manually through OMR machines by dedicated staff which in turn would upload the data electronically to our student database. The paper registers would then be returned to academic staff in readiness for marking. As in the case of the timesheets this process is very labour intensive, in addition to the above the registers have to be printed out on a termly basis and collected at year end for archive purposes. It is also apparent that OMR technology is not 100% reliable as erroneous marks on sheets (pen marks, dirt etc) are often read in causing errors in the data held. In addition OMR readers are prohibitively expensive and have a relatively short operational lifespan.

It was apparent that another solution was required, particularly so with the onset of Adult Learning Grants threatening to pose the same problems, therefore the college investigated utilising other technologies to achieve a better more cost effective solution.

It should be noted that the college does not stand alone in facing the administrative nightmare of EMA grants, it is a sector wide problem with an ensuing financial burden due to administrative overheads that are not recoverable via LSC/LEA grant.

Solution:

The college prides itself on being at the forefront of SmartCARD technology. We have over the past 3 years switched all our identity card technology to a contactless chip base for both students and staff. We have developed all our own systems designing our own hardware and software for the following purposes –

- card Issuing – photography, card printing and network account creation
- door access control – security systems on all entrance areas to the college to prevent unauthorised access and gather MIS data for effective building management
- time management – for administrative staff, to promote effective timekeeping and satisfy H&S requirements
- network account password renewal – via wall mounted modules which enable students to renew network passwords via personal identity details, this reduced IT Support Helpdesk calls by 60%
- centralised print control – large format printers controlled by SmartCARD technology accessing print queues which reduced printing costs due to the efficiency gains of the printer.

The college took the approach of developing the hardware and software above because it was found that commercial products could not meet all the requirements of the college particularly with regard to the volume of users plus the inability for seamless integration with MIS systems.

It follows then that an obvious approach to solving the EMA related issues we have was to develop a SmartCARD based solution as the foundation was already within the college to utilise the technology.

The following parameters were set for the project before work commenced on development in December 2005 –

1. ease of use – simple to operate for staff and students
2. effective – able to cope with mitigating circumstances e.g. students forgetting identity cards
3. availability – systems placed conveniently in every teaching area across the college
4. integration – data uploaded to MIS systems instantaneously
5. cost effective – low costs of individual units a necessity as the college has over 300 teaching areas
6. Maintenance – low to nil maintenance on units and software systems

To achieve all of the above particularly with regard to numbers 4 and 5 it was obvious that an 'in-house' solution was required.

The System:

The system comprises individual reader points in all teaching areas of the college, for the time being the system is simply known in the college as 'SmartRegister'. The reader points are comprised of the following –

- SmartCARD reader, this is a low cost contactless 'Proximity' reader requiring staff and students to wave their card across the face of the unit within 50mm providing ease of use
- LCD Display – the primary means of visual communication with staff and students is a large bright 4 line LCD display providing instruction and feedback
- Ethernet Converter – this device communicates data to and from the units across the college network to a centralised server, no local PC is used.

The components are housed in a tough ABS plastic case which is wall or desktop mounted in every teaching area, the case measures 120mm wide by 150mm in height and 60mm in depth.

The practical operation of the system consists of the staff member offering their card to the reader at the onset of the lesson, the system then communicates with our main student database and looks for a register belonging to the staff member for the day and approximate time at which the card was presented. After confirmation the register is then opened and readied for use by students.

Students then in turn present their card, as they do so a mark is instantaneously entered into the central database for the register opened, if a student arrives after a pre-determined time they are automatically marked late. The register may then be closed manually or automatically after 30 minutes of inactivity. In essence and for the majority of cases this is all that is required to mark a register, however there are specific considerations and problem areas that the system is designed to overcome.

One of the major flaws of these systems is the opportunity for students to present 'friends' cards thus marking them present, the SmartRegister system overcomes this in two ways. Firstly the base line of the LCD display shows the number of students marked present as a visually indication / check, the top 3 lines scroll showing the names of students present for confirmation. Secondly at the end of the session when the register closes an email is automatically sent to the tutor giving the names of the students who attended, their attendance over the last 10 weeks (flagging any that have

been off for more than 2 consecutive weeks) and an attachment in Microsoft Excel showing the full year register plus relevant statistics.

Another major flaw is that of students forgetting cards, the SmartRegister system is designed to overcome this by a 'Scroll Mode' in which the class list scrolls through the LCD display allowing students to be marked directly by the tutors SmartCARD.

In addition to this basic functionality the system can also complete the following tasks which is achieved via simple LCD menu systems –

- create individual groups / registers for any individual course
- combines registers together to mark as a single group
- allows tutors to mark absent staff registers (for security an email is automatically sent to the manager assigned to the course to which the register belongs)
- choose registers belonging to the tutors for other time slots, e.g. if a register has been moved from Monday at 10:00am to Tuesday at 11:00
- allow tutors to change the time, day, location and duration of a register (for security an email is automatically sent to the manager assigned to the course to which the register belongs)
- automatically adding students to registers (the condition being that they are enrolled on the relevant course) by presenting the student card to the reader whilst the relevant register is open.

The system is also being expanded to control student print quotas which will be in operation during the upcoming academic year 2007/2008.

Effectiveness:

The SmartRegister system has been operational on 3 centres from April 2007 and has had a marked effect on the collection of data and returns to the EMA system, the remaining 3 centres will be operational by January 2008.

All of the original goals set for the system have been achieved, it has been met with enthusiasm by staff and students and is seen as a major success within the college.

As an example of the systems effectiveness in improving attendance the Faculty of Information technology showed a marked improvement in attendance from 74% in 2005/2006 to 78% in 2006/2007 a significant increase of 4%.

From a data accuracy and management perspective the system was responsible for reducing the quantity of missing or incomplete data across the college from 4.1% of records in 2005/2006 to 2.9% in 2006/2007.

Notably the costs of the system have been kept to a minimum, each unit being some 15% of the only other workable commercially available system that fulfils only a fraction of the functionality of this system. From another perspective the costs of implementing the system have been fully offset by the savings made in staffing costs.

In effect it has fully solved the staffing problems identified with EMA grant administration freeing up the valuable resources to assist in the maintenance of register data and actively following up individual student absences, excessive lateness etc. Register data is now more accurate and up to date is more readily accessible and

useable for academic staff and has allowed the development of Intranet resources to assist academic staff in monitoring student attendance.

By far the most beneficial element of the system has been a marked improvement in student attendance and punctuality which will translate into higher achievement / enrolment and funding, the ultimate goal of any MIS system.

Ken Ryan
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