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Executive Summary

Many institutions recognise challenges in making their administrative processes accessible to students increasingly portrayed as confident with a range of personal communication technologies, and influenced by service expectations set by an increasingly e-enabled society. The Researching Emerging Admin Channels (REACh) project has developed open-source software to enable announcements placed on a Virtual Learning Environment (VLE) to be delivered via web 2.0 feeds and through text messaging to a student's personal mobile device. In addition the project has delivered a number of research outputs which evaluate both student and staff attitudes to these newer forms of communication channel.

The approach of the project was to develop open-source software which could use news and enrolment information stored within an enterprise Virtual Learning Environment (Blackboard/WebCT Vista) to deliver personalised text messaging and RSS (Really Simple Syndication) web feeds. The approach to the project research was to look at two issues via online survey and interview:

- How do students currently use existing communication channels and what will their reaction be to these emerging channels?
- What institutional issues will be encountered when attempting to embed these technologies in normal working practices?

The main outputs of the project have been as follows:

1. Open Source software which has been successfully trialled in Manchester Metropolitan University and has been provided to one other site with two other sites likely to trial it within 2009. This has been made available under a GSR2 licence.
2. Over 1600 students were invited to take part in the trial of these new services with a diverse range of courses – the original coverage of Law, Biology and Computing was extended during the study to cover students in Business & Sociology.
3. Research on the project which has been disseminated via the project website, at the JISC Conference, at Blackboard World Europe 2009 (a trade show around the Blackboard VLE) and has been submitted as a contribution to mLearn 2009.

Although the project has exceeded its original set of deliverables, introducing these new channels to students and institutions is not as simple as it would appear. Whilst its is true that students have a favourable reaction to these new services when described to them, they don't necessarily engage with them in large numbers – about 15% of students at MMU signed up. Many still prefer to rely on traditional methods of word-of-mouth to find out about information and events on their courses and these new channels still appeal to a minority. Furthermore some students may see their own mobile phone as their space and not want it utilised by the university.

It is also clear that there are a number of areas of university administration which might want to use these channels including administrators, tutors, finance people and librarians. Each of these audiences has subtly different requirements and unless these are mapped into a clear strategy there is a danger that solutions will proliferate within a single institution leading to confusion amongst staff and students. Like any other new IT-based initiative there needs to be a clear institution-wide strategy which encompasses these new channels if their potential is to be realised fully.

Background

E-Administration has joined e-Learning and e-Research in the spotlight of JISC assisted activity to reflect growing recognition that education institutions, like other large organisations, can use IT to make business process efficiency gains that enable:

- *resources to be deployed more effectively to enhance the core business, in this case: learning, teaching and research; and*
- *administrative services to be transformed to meet stakeholder service expectations set by an increasingly e-enabled, self-service society.*

Members of the REACh project team are actively involved in e-Administration projects that have demonstrated the:

- *value of action-research interventions designed to enhance processes within and across institutions;*
- *importance of an acute sense of audience when contemplating administrative interventions as change can be interpreted differently by different groups; and*
- *opportunities for using blogs, special interest groups and development forums to build communities focused on ensuring interventions deliver maximum institutional benefit.*

The REACh project extended MMU's capacity-building work, blending existing JISC experience with specialist expertise in Java development, mobile learning and student experience evaluation, in a university-wide multi-disciplinary team, comprising both staff and students. Project team members had already established a provisioning service from MMU's Student Records System to its (Blackboard Vista) enterprise Virtual Learning Environment (VLE). IMS Enterprise messages posted to the System Integration Application Programming Interface (SIAPI) enable areas to be created within the VLE for learners from one or more courses or modules. Over 1,200 staff use the VLE regularly to interact with over 26,000 learners, and many make use of its announcements feature to communicate administrative information, such as reminders of submission deadlines and timetable adjustments. When the project commenced, learners could only read these announcements by logging in to the VLE.

The REACh project built on this work, using database tables exposed by the VLE to develop open source software to publish personalised RSS feeds and integrate with MMU's SMS (text messaging) gateway to push urgent messages to mobile numbers that learners supply through a web-based subscription management service.

The e-Framework's Messaging Service Genre has not yet considered SMS messaging, so there is a clear opportunity for contribution from this work and the project will publish research on how diverse student groups respond when administrative information is made available via these new "emergent technology" channels. Exploratory work already undertaken with MMU's Computing students confirmed interest amongst students in accessing administrative announcements using emerging technologies. The work also alerted the REACh project to practical issues deserving of further through action-research and dialogue between learners, tutors, service providers and university administrators, such as the frequency with which students change their mobile number, privacy agreements and the importance of charging mechanisms that fit with institutional cost centres. The research dimension of the REACh work is mutually informing with a current PhD study on m-Learning innovation in UK HE that will ensure rigorous and sustainable knowledge outcomes, which will extend the depth and scope of the findings well beyond the JISC-funded activity.

The work is aligned not only with the JISC's high level e-Administration goal of promoting creative, community-informed standards-based solutions to institutional process problems; the prototyping and evaluation work fits directly with MMU's drive for user-centred assembly of institutional information resources within its Managed Learning Environment (MLE).

Aims and Objectives

The aims and objectives of the project were as follows:

1. To develop a piece of open-source software that would allow announcements from the Virtual Learning Environment to be made available to students via text message and RSS feed.
2. To make the software available under a suitable open-source licence and publicise its existence to the wider UK university and college community, so that other institutions might trial the software and give feedback.
3. To evaluate the new service within MMU using three different subject cohorts and run the service over two academic terms, offering the service to at least 800 students.
4. To conduct research with the student cohorts to both evaluate the service and measure attitudes to these new forms of information delivery.
5. To conduct research with university staff to see whether these new services would embed easily into existing processes and working practices.
6. To disseminate the research outputs at both JISC meetings, external events and conferences.

In the majority of respects these objectives were met or exceeded. Because of stability problems in the core Virtual Learning Environment (NOT the code developed under the project) it was not possible to launch the service until January 09 as opposed to the original target of October 08. Usage was thus limited to about one and a half terms, rather than the two terms originally planned. However, the trial was extended to over 1600 potential students and encompassed five separate subjects, almost double the coverage originally specified.

Methodology

There were two aspects to the project – a software development strand and a research strand. The methodologies for both are described as follows:

The Software Development Methodology

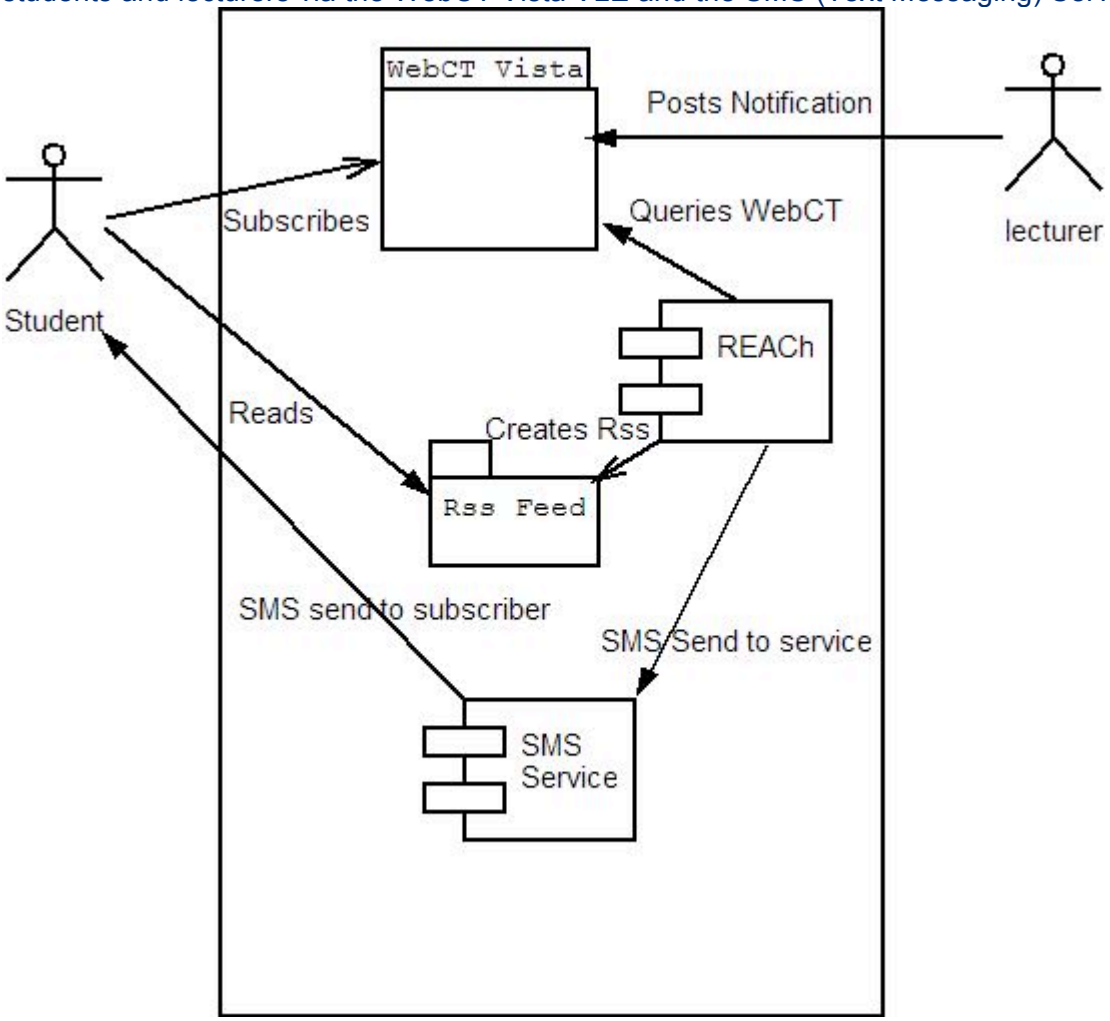
An agile, 'least effort to produce working subsets', development methodology was chosen. The advantage of this over a traditional 'waterfall' approach was that we could prototype various components of the REACh system and have them interact with the live system to prove all the basic design assumptions before creating the full production version. In other words, a series of sub-component prototypes were worked up into an overall production version with the aim that the initial complete version of the system would be reasonably stable having anticipated and proven potential problem areas during the development.

This development was split into four phases, which are described as follows:

Design and Prototype Phase

In this phase a number of proof of concept activities were undertaken which would verify the proposed design. A prototype was developed to show that inbuilt quiz features of the Virtual Learning Environment could allow users to complete and update their answers to a questionnaire that included mobile phone number and any subscription preferences. As the service would be embedded within the VLE, it was important to show that user subscription information could be input and utilised as a design goal was not to have any separate interface for users. Another key feature of the design/prototyping phase would be ensuring that we could access the VLE and student record databases so that students only received announcements via text or RSS that were for courses they were attending. The following

design of the REACh system, shows how the REACh component would interact with students and lecturers via the WebCT Vista VLE and the SMS (Text Messaging) Service.



We adopted the use of UML notation in the design to provide clear description of the REACh work that would be valuable not only to the Synthesis Project when comparing the six projects, but also to the e-Framework in developing its messaging service expression.

Following the design phase, the deliverables would be as follows:

- A external database to provide RSS and logging
- A JSP-based XML feed by student ID
- A Java Servlet based system to scrape the WebCT Vista database for announcements for delivery as SMS messages.
- A Java Servlet to scrape update info and produce the RSS database feed.
- An interface for users to manage their subscription to the SMS and RSS feed.

The Development & Test Phase

In this phase the software was developed and tested on a test server so that the university production servers would not be affected. To test out the text messaging service and RSS services, a course (called REACh) was set up on the VLE and members of the project were

enrolled on this course as testers. Once the project team were happy to sign off that the services were operating correctly, we could then move onto the deployment phase.

The Deployment phase

In this phase the software was run on live production servers and made available to staff and students for use. The system was monitored and any problems found were fixed.

The Release and Beta Test Phase

In this phase any remaining production problems were fixed, the code and design were inspected by an experienced code/design reviewer from the faculty of computing and the final version of the software (incorporating an open source licence) was placed on the project blog. In addition, universities who were existing Vista customers were told of the software availability and a beta test site was sought.

The idea behind the beta test site was to test the code for portability into a different environment and find out any problems before the project closed.

The Research Methodology

The research design of the evaluation of the REACh project aims to use a number of different qualitative and quantitative methods in order to triangulate the findings. There are four areas of evaluation that the evaluation team plan to undertake.
The aims of the evaluation are to:

- inform the implementation of the REACh project;
- provide evidence of the impact of the project;
- highlight lessons learned from the project;
- analyse the sustainability of the REACh implementation model.

User-needs survey

A baseline survey was undertaken with all students from the three participating subject areas. This was administered online during November and December 2008 as a way of analysing current student access to technology, acceptability of the project to the student groups, and student preferences for the types of information received. Descriptive statistics were generated and a comparative analysis undertaken across the five disciplines.

Analysis of system data

A variety of existing system data was used at the end of the project to provide quantitative data on student and staff usage of the system. Two areas of system data were used:

- analysis of numbers of students registering for the system and any subsequent withdrawals.;
- analysis of the numbers of messages sent over the trial period and categorisation by content..

Evaluative questionnaire

At the end of the project a second questionnaire was administered in a similar fashion to the user needs survey, with students in all participating disciplines. This focused on the student experience of the REACh project, the impact of the information received on students, and potential improvements to the system. The following questions were addressed:

- How appropriate was the timing and content of messages sent?
- How acceptable were the numbers of messages sent?
- To what degree were RSS feeds used?
- Were there any technical issues that can be identified?
- In what ways could the system be improved both technologically and administratively?

Sustainability evaluation

The overwhelming majority of mobile learning research focuses on the impact of the technology on students. However there is widespread evidence of issues in embedding the use of mobile technologies within universities, largely steeped in fixed-point computer access and wedded to a transmission style model of teaching and learning (Bird and Stubbs, 2008[i]). This area of the evaluation aims to address how the technology will get the support it needs from various groups within the university organisation and be sustained after the REACh funding finishes.
A number of interviews were conducted to establish what the issues are and what practices are in play. Interviews were conducted in the following areas:

- Lecturers using REACh and their department managers to understand the level of support both in principle (i.e. attitudes towards the concept of REACh) and in practice (i.e. budgeting for the ongoing service)
- Interviews with IT services management to see how they will sustain technical support for REACh
- Interviews with central teaching and learning to understand their strategy for promoting REACH across all faculties not just those in the trial.

Implementation

The previous section told the story of how the project was implemented. This section reflects on that methodology and describes some of the issues which caused us to change what we are doing or discover unexpected outcomes to the project. It is told from the perspectives of the two major strands of the project, the software and the research.

The Software Story

If anything we were able to develop the software ahead of time so we would have been able to get the service launched in the autumn term of 2008 as originally planned. We were hit by two issues ironically both arising from issues surrounding two of our project partners, Meercat and Blackboard Vista. These were as follows:

1. The universities current text messaging gateway provider (Meercat) was unable to provide us with an open Application Programming Interface (API) which was compatible with the goals of the project to produce an open-source solution. We had to find a different SMS provider in edutxt who had a suitable interface. Whilst this was a change from the project plan it didn't have a major impact on our development.
2. At the start of the Autumn term the number of students using the Virtual Learning Environment (Vista) had risen to 22,000, a significant increase on the 16,000 students using the system when the REACh bid was constructed. As soon as term began in earnest, we began to experience stability problems with the Vista VLE resulting in student/staff activity sessions hanging which inevitably led to much frustration and anger from the user base. Vista is now owned by Blackboard who

have made it clear that their longer-term strategy is to migrate all of the Vista customer base onto a new Blackboard platform. The university was continually frustrated in its attempts to get the Vista problem resolved with staff working many long hours and external contractors being employed to try to find a solution or workaround. Eventually by the end of the Autumn term (December 2008) the system became more stable although some problems persist and it is more likely that we have worked around the problem rather than resolved it completely. Because of this instability in the core Vista VLE, IT management had no option but to prevent any additions in functionality to the core VLE system for fear of creating instability. Thus we were unable to add the REACh software to the live system until January 2009, a delay of one academic term. This has inevitably impacted on the amount of usage of the system as once we arrive in summer term, most students are revising for exams and thus announcements and interactions with the VLE substantially diminish.

There was however a significant benefit from one of these changes. Changing our text messaging provider from Meercat to Edutxt gave us a greater exposure to the UK Vista user base. Edutxt had several customers who wanted to link their Vista VLE's to the EDutxt software so they encouraged them to make contact with us. As a result, we were able to identify several potential beta sites for the software and carry out at least one trial at Edinburgh University. This was a major benefit to the project and to JISC in that it added significant value to the quality and robustness of the software produced.

The Research Story

The research aspect of the project was also impacted by the problems with the VLE and the resultant one term delay. We were faced with a shorter period of REACh service to evaluate and so we considered what we could do to compensate for this and generate new added value. We made the decision to do a survey of students before the launch of the REACh service to gain an understanding of requirements. This led to some interesting outcomes:

- More than 50% of students still rely on traditional word of mouth methods of finding out about announcements on their course e.g. from the tutor directly or through course colleagues. A large body of students don't engage with the VLE or see the student email system as an information channel for communicating course changes.
- Students don't change their mobile phone numbers frequently. In any one year more than 90% of the students would keep the same number.
- Students put a lot higher value on announcements relating to sudden course changes (e.g. a room change) and assessment information (e.g. assignment deadline reminders) then they do on regular course announcements (e.g. preparation for next week's tutorial). This supports the idea that using text messaging needs to be limited to announcements that students see as important rather than all announcements.
- About 15% of students are aware of RSS as a technology (e.g. using web news feeds) which tells us that this isn't a platform for mass distribution of information to students at the current time, unless it appears within a more familiar, well-used environment, such as a university portal.

The initial delay also impacted the research that would take place at the end of the project. Originally the plan had been to run focus groups with students who had used the service but as the research couldn't now be undertaken until the summer term, the project team thought it highly unlikely that students could be attracted to attend focus groups during their revision/exam period. Instead another online survey was conducted with results highlighted as follows:

- The vast majority of students were happy to use their mobile phones to be contacted by the university, but they valued the privacy of their mobile phone numbers and would expect the university to ask permission before sending messages. The attitude to use of other social networking sites outside the university was more varied, with roughly equal numbers of students being for and against the use of the university using external social networking sites.

- The majority of students who signed up for the service received no text messages at all. Of those who did receive messages, the most common were reminders of assessment deadlines, and notifications that additional resources or assessment details were available.

- The majority of the students did not find the text messaging service really useful and didn't particularly feel that it saved them time, but the vast majority felt that they didn't receive enough messages to be able to judge the usefulness of the service.

- On a more positive note, the majority of students who signed up for the service would like to see its more widespread use and would subscribe again in the future

- Students didn't sign up for the service for a variety of reasons, the main being lack of awareness of the service and timing of the service introduction.

- The majority of respondents did not use RSS, with only eight students saying that they used it. The readers used were Google reader (2), iGoogle (1), Bloglines (1), via a mobile phone (2) and other (2). Five of these students said that the found the feed really useful and 5 felt that it saved them time. None of the respondents felt that there was too much information coming via RSS.

- Of those students who did not use RSS, the majority were still positive towards the system saying that they would like to see it introduced more widely. The majority did not use the feed because they were not familiar with the technology, because they were not aware of the service or because the timing was wrong.

Staff usage was also looked at with the following issues highlighted:

- Staff are confused by having at least two ways of sending messages to students (see institutional issues). They would prefer to have messages sent via the VLE but some messages are sent (e.g. exam timetable notifications) by administrative staff and they are not familiar with the VLE. A strategy is needed in terms of what should be sent by text message and what is the unified interface for doing this.
- Staff have mixed views on whether students should supply their mobile phone number as a conscious subscription to the service or whether the university should just use the mobile phone number supplied by the student at registration. Some staff believe that it should be a conscious 'opt-in' service for ethical reasons but others think that they would rather use the enrolment data because then they know the messages are reaching the majority of students.
- It seems clear that RSS could be quite an effective way forward as it puts control of receiving messages in the hands of the student. However staff did not publicise RSS to the students as it is a technology that the majority are unfamiliar with. If the university wants to use RSS as a channel then a significant educational campaign would be required for both staff and students.

The other dimension of the research was to look at the institutional issues in using these sorts of technologies in student communication. One of the most interesting discoveries was

that the university had a number of competing solutions for sending text messages to students. Although it is expensive to develop a service such as REACh, which requires significant software development investment, it is relatively easy to obtain packages/services which will allow messages to be sent to list of mobile phone numbers. Hence without a clear strategy in place, it is very easy for a university to end up with many different text messaging offerings and hence create confusion for students and staff. This caused us to extend our research beyond those staff involved with the trial and talk to IT services, the Students Union and the University Executive. This added a new dimension to the research which was not in the original proposal and provides important research output which is applicable to any university engaged in using these new communication channels. A paper will be published at mlearn 2009 which discusses these issues.

For more details on research results, please see the project blog at reach.mmu.ac.uk

Outputs and Results

The project outputs have already been described in some detail in the sections above. Rather than re-describe the software and the research, the outputs and results can be simply described in four bullets:

- A piece of open-source software which allows announcements from a VLE (WebCT/Vista) to be delivered to students via SMS or RSS feed.
- An administrative interface to monitor the SMS/RSS service and UML style documentation on the open- source software.
- Research which looks at the student response and attitude to receiving information via SMs and RSS.
- Research which looks at the institutional response to using these new technologies

Outcomes

The project has achieved or exceeded its original outcomes in terms of deliverables and their applicability to the wider academic community.

The following table shows the original outcomes and says what the project achieved and how this might be applicable to a wider audience.

Project Deliverable	Outcome	Wider Applicability
Open-Source software which allows Vista VLE communalisation via SMS and RSS	Source code released under a GSR2 licence which is available from the project weblog http://reach.mmu.ac.uk	Of immediate interest to all universities using Vista as their VLE. Some are already beta-testing the software. Parts of the software could be re-used with other VLE's: e.g. connecting RSS/SMS into Moodle.
Contribution to E-framework	Description of service for SMS and RSS in E-Framework	Covers gaps in the existing E-framework
6 month trial of service to 850 students in three subject groups	Five month trial to over 1600 students in five subject groups	Research findings (see below)
Research on student attitudes to SMS and RSS channels and students feedback on the REACh service	Research outputs in the form of survey results and conclusions. Papers presented at BBWorld 2009 and submitted to mlearn 2009	Research findings disseminated to UK and international audience. These can be used to help plan the introduction of these new technologies into other institutions.
Research on the institutional impacts of these technologies	Research outputs in the form of reports on the project weblog and papers submitted to Mlearn 2009. Research outputs will be further developed by a PHD study due to complete in 2010.	Identifies key issues in introducing these technologies into HE institutions and gives input to institutions in developing a strategy for embedding this into their student communication services.

Conclusions

The main conclusions actually originate from the research. The software development shows that it is possible to develop services in an open-source compatible form

The research demonstrates some issues which need careful consideration by universities:

Enrolment to personalised communication services. Although students appear enthusiastic about these new forms of communication, the sign-up rate is relatively small at around 15%. Text messaging and RSS is not a panacea in terms of student communication and the majority of students still use traditional methods to find things out.

Confusion over which service? Some departments who participated in the REACh trial were also experimenting with the alternative university services. There is a conflict here between the requirements of tutors whose world is course-unit based and administrators who may have notices to communicate to students which are not specific to individual course-units or even groups of course units. For example tutors will want to remind students of unit assessment deadlines whereas administrators may want to tell the entire student body in their faculty of events such as exam timetable changes. Clearly whilst

communication to students enrolled on a course-unit fits neatly into the VLE based announcement system, announcements to the whole faculty do not (unless VLE groups have been set up for this purpose). An institution needs to recognise that there may well be the need for these two types of service and develop a strategy and resulting policies which give clear guidelines on which service to use.

Ethical/Data Protection issues. The REACh service relied on subscribers providing their mobile phone number so it is a conscious decision by the student to opt-in to receiving messages. The text-messaging system used by MMU's administrators takes the mobile phone numbers from students' enrolment forms. Whilst the student knows that they are supplying their phone number for contact purposes they may not be aware that this will be used to send text messages to them. Although this is not breaking any data protection legislation, best practice would suggest that the students should be given the opportunity to opt-out of receiving text messages from the university if they so wish (Riordan and Traxler, 2005). There are also issues of accuracy in terms of this method in terms of up-to-date mobile phone numbers as many students do not supply a number and others may change them during the three or four years of their course without updating their university records - this issue links back to enrolment above. Enrolment by choice may lead to low subscription rates, whilst enrolment by default may lead to an inaccurate mobile phone number list.

Different interface requirements. At first glance, it may appear somewhat inefficient that the university is using more than one provider of text messaging software and services. The original system procured by administrators was designed to run as a desktop application and did not have an interface which could be called from within a program. The REACh text-messaging system needed an application programming interface (API) to embed the text-messaging facility and had to procure a solution from a different supplier. The university needs to recognise that there are different methods of accessing a text-messaging facility and this is borne out by previous research (Riordan & Traxler, 2005). It is then purely a case of whether this can be efficiently achieved through one product. After all, mobile telephony is a commodity and it is not unusual for organisations or even individuals to use different providers for different services.

Implications

The implications of this work are two-fold:

1. The use of SMS and RSS as a channel to students has the potential to be effective but is still only appealing to a small subset of the student population. Anecdotal evidence suggests that other universities have also had mixed response to these new technologies. There is a need for further research across the UK base to identify how institutions are using these technologies and what constitutes the most effective form of use.
2. Without a clear strategy for introduction and monitoring, these services could easily proliferate across a single institution leading to confusion amongst staff and students. Even these simpler forms of mobile learning need a strategy driven from the centre of the institution once initial trials and experiments have been completed.

References

Bird, P. and Stubbs, M. (2008) 'A Bridge too far – Embedding Mobile Learning in UK Higher Education' in *Proceedings of the mLearn2008 Conference*, Wolverhampton, UK: University of Wolverhampton