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Joan Richardson
School of Business Information Technology, RMIT University

John Lenarcic
School of Business Information Technology, RMIT University

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SMS - Push First and Then Students Will Pull Administrative Information in Higher Education?

Joan Richardson
John Lenarcic
School of Business Information Technology
RMIT University
Melbourne, Australia

Abstract

This paper describes the pilot of a Short Messaging Service (SMS) technology in the higher education environment dynamic two-way 'push-pull' transfer of information between students and academics. Assessment results and reminders were pushed to students and access was provided to information relating to their subject schedules and assessment performance. Both qualitative and quantitative data were collected using an online student survey underpinned by the Davis's (1989, 1993) Technology Acceptance Model (TAM) and focus groups for staff and student participants. The pilot and subsequent review enabled an evaluation of the benefits of SMS in relation to supporting student services, specifically scheduling information and assessment feedback. This paper discusses student and staff uptake of the 'push-pull' SMS prototype.

Keywords: IS innovation, Diffusion of innovation, Evolutive design, Social technology, Implementation politics, Information infrastructure, Technology trends, Innovation, Innovation diffusion, Mobile commerce

INTRODUCTION

The primary aim of the pilot was to establish whether embedding Short Messaging Service (SMS) technology had the capacity to enhance the higher education environment by increasing access to University information service reminders and alerts. The project–based methodology supported fast development of the technology prototype in conjunction with the identification of innovative uses of mobile technologies and a holistic and rigorous evaluation of usage of the prototype specifically designed to improve student administrative services. Students voluntarily registered to communicate using SMS and staff input accessible information, via the Web to be blasted on a class basis. Assessment results and reminders were pushed to students and access was provided to information relating to their subject schedules and assessment performance. All messages sent using SMS technology contained information also disseminated to students using Blackboard, the Internet, and email and hardcopy handouts. Typical information included:

- Reminders for deadlines for assessment;
- Time and location information about lectures and workshops;
- Time and location information about examinations and assessment tasks; and
- Assignment and exam marks.

The 2008 Pearson Education Australia and RMIT University pilot utilised the *Trigger* Short Messaging Service (SMS) prototype in six courses and enabled dynamic two-way 'push-pull' information transfer. A restricted vocabulary of requests for information 'on-demand' enabled students to receive time-sensitive data such as assessment feedback, marks, class scheduling and location information updates at minimal cost, irrespective of geographical location. This created the potential to reduce the need for students to access University or home computer systems at peak usage times during the semester.

MOBILE COMMUNICATION

The *Trigger* prototype demonstrates fast one-to-many communication and immediate access to facilitator instructions, in real-time. (Platts, 2004) Teachers were able to engage students outside the classroom through the use of targeted SMS reminders for work to be undertaken and alerts for special events. These attributes of SMS enabled *Trigger* to be used to fulfill Agar (2003) portrayal of the mobile phone as a facilitation tool instituting a state of "constant touch" to dominate between those connected in what has become a ubiquitous social network. To some the mobile phone has distorted itself into a fashion symbol representative of the

modern impetus towards a global culture dependent on the barter of information via associations of trust (Katz and Sugiyama, 2006). They have become pervasive indispensable talismans to the masses that are vital to some as conduits for personal well-being due to the comfort that they facilitate via both emotional and aesthetic means.

Mobile phone of the Australian population is high and expected to remain that way. In 2008, 22.1 million people in Australia owned a mobile phone,, a figure that was expected to increase to 24 million by 2008. This represents 112% market penetration (IBISWORLD, 2009). The growth in general usage has exceeded expectations primarily due to the low cost of messages and acceptance in the youth culture as a means of scheduling social events.

The New Media Consortium 2007 Horizon Report stated that the higher education sector was facing a growing expectation to deliver services, content and media to mobile and personal devices (The New Media Consortium & EDUCASE Learning Initiative, 2006). Mobile technology provides the ability to deliver content, but also to efficiently provide important alerts, warnings and instructions over a greater range of times and locations than any other device, a demand of the general marketplace. For applications where information is concise and timeliness and ease of access are important, smaller capacity mobile devices will have a major role to play in education, as they do in other parts the community.

Faulkner and Fintan (2005) highlight the importance to students of the technology's assistance in the transmission and receipt of private information whilst in a public space. Both staff and students expect messages to be transmitted and responded to without the necessity for a face-to-face interaction or both parties being at either end of a telephone simultaneously. Students also expect immediate responses to questions and feedback on assessment tasks. One of the simple but attractive features of SMS is the fact that it is a "store and forward" service, meaning that if the receiving mobile phone is out of range or disabled then the network can store the message until a suitable connection is found (Dettmer, 1997; Faulkner and Fintan, 2005) the application may be useful for this unplanned activity.

In order to cultivate a sound electronic customer relationship policy within an organisation, Sands (2003) notes that a *'push-pull'* approach is deemed to be the most efficient means of exploiting the potential of e-mail in tandem with Web publishing. Direct management of the client e-mail address list forms the *'push'* component of this scheme. The ability to request administrative information on demand via mobile conduits provides a mechanism to suitably filter content into readily absorbed fragments that target customer needs. The deleterious effects of "information anxiety" (e.g. Wurman, 2001) can thus be alleviated in the user without changing what is stored on the university web site or databases.

SMS has the potential; to be used as an utilitarian tool, that provides access to information in real-time. SMS systems utilise the ability of text messages to reach their destination even when a cell phone signal may be too weak to sustain a spoken conversation (Boyd, 2008). The fact that a text message will queue if the destination is unavailable rather than requiring a redial like a traditional voice phone call enables asynchronous communication. The type of communication for the digital native generation would appear to favour short and simple messages: – urgent SMS alerts, as mentioned earlier, seem very suitable. The April 2007 case (Hauser and O'Connor, 2007) of a student shooting staff and other students at Virginia Technical University provided a graphic example of how university management could have warned students that a gunman was on campus had such an alert system been in place. *Trigger's* functionality reminds and alerts students about work requirements to be completed outside class time and also utilises the ability of mobile services to free people from committing to physical presence and commitment to a pre-determined schedule in order to be accessible to another (McClatchey, 2006).

Once a student is registered into *Trigger* the system recognised the individual and provided information tailored to them. The transaction can appear to be as personal as a natural conversation, albeit in the dialect of text. This design approach aspires to the notion of exploiting the potentially seductive qualities in an interface that entice the user through the power of persuasion (Khaslavsky and Shedroff, 1999), without creating new fragmented or marginally integrated systems. The *Trigger* prototype was intended to shift responsibility for administrative information acquisition from the institution to students irrespective of access to a personal computer and the Internet. The information made available to the students' registered into the system related to class schedules, tasks, topics and summative assessment outcomes. Students' choosing to register into the SMS system had already made the decision to purchase a phone and could be assumed to have valued the benefits SMS services for assisting them in acquiring class scheduling information, tasks and outcomes.

RESEARCH METHODOLOGY

A project based methodology was used to scope, develop, prototype, test, and review in order to establish proof of concept. This project utilised an online survey to collect data from the students involved in the pilot. The survey questions (Appendix 1) were developed based on hypothesis generated using Davis's (1989, 1993) Technology Acceptance Model (TAM). Quantitative data was gathered using a five point Likert scale. The TAM is used to explain and predict how users come to accept and use novel forms of technology. The model suggests that when users are presented with a technological system, the perceived usefulness (PU) and the perceived ease-of-use (PEOU) influence their decision about how and when they will use it. As the intent of the research was to develop a technology application that had a positive impact on the student learning experience both technology 'perceived usefulness' (PU) and 'perceived ease of use' (PEOU) were evaluated.

The use of the model enabled an evaluation of the benefits of SMS in relation to supporting student services, specifically scheduling information and assessment feedback. *Trigger* was designed to facilitate access to (*'pull'*), and delivery of *('push')*, course scheduling and assessment feedback and relevant downloads needed for learning success. The prototype was trialled in 2008. At the end of the first semester 110 online survey responses were collected and a staff focus group was conducted to collect qualitative data. Focus groups with staff and students were also conducted at the end of semester 2.

All students were surveyed to establish the 'usefulness' of the technology combinations for removing location barriers to uptake of digitised resources. This required examination of '*push-pull*' information exchange between students and teachers. '*Push*' refers to initiating information exchange by the institution and academics (sending information like reminders for work to be completed prior to class). '*Pull*' refers to students requesting information (receiving). Student responses were collected on a four point scale. Missing responses were also recorded and a quantitative analysis was conducted. Normal methods of information provision to the students were maintained. Web based access to class timetabling, location and scheduling information, as well as assessment requirements was provided in addition to the SMS. Web based access to class timetabling, location and scheduling information, as well as assessment requirements were provided in addition to the SMS.

Staff Uptake of the SMS Prototype

There were challenges involved in the provision of a new technology application functionally targeted to improve student-to-staff and staff-to-student communication, in an educational environment that has no physical boundaries. The project required dual foci. Students were encouraged to register and staff were encouraged to alter their work practice routines to use the application rather than email, oral, hardcopy or Online Learning Hub information dispersal. The SMS innovation required changes to standard communication channels, choice and upload of information to be made accessible by students and an associated marginal increase in workload during start-up appropriate training and assistance was necessary.

The business system put in place to support the *Trigger* requires staff upload course schedule information already input into the subject guide system and the Online Learning Hub to enable student access via SMS, which increases duplication of staff effort. Work practice changes for *Trigger* operation were minimal as staff typed messages into the subject web page to '*push*' information to students. However, keeping the message within the 160 character SMS word limit required an alteration to standard message construction compared to email and some academic training.

Messages Sent

During Semester 1, Phase 1 of the project staff sent messages using the Web based blast functionality. Use of the feature was minimal at the start of semester due to:

- Lack of familiarity with the application interface, functionality and SMS language constraints.
- A tendency to construct SMS in the same manner as standard emails sent to student course groups using the list facility of GroupWise. A large proportion of these messages exceeded the character limit of SMS and consequently produced error messages.
- Business system constraints imposed on project participants to:
  - assist with cost estimates
  - Enable a comparison between courses where SMS technology was used frequently and infrequently in terms of student engagement and use of *Trigger*.

A focus group held for staff at the end of semester 1 enabled staff to describe problems encountered and suggest solutions. In semester 2 the following actions were undertaken:

- A Work Integrated Learning (WIL) student was trained to provide a staff technical support role.
- Individual training sessions were provided by a (BBIS) of Business Information Systems WIL student (Jason).
- All staff were assisted with information input tasks required to provide data for student SMS access.
- Staff recorded messages to be sent by week in an Excel template.
- Messages were classified by type:
    - 1 = Reminder (Assignment and test dates).
    - 2 = Alerts (Extra material added to the DLS, multimedia, ipod downloads and special events).
    - 3 = Assessment (marks).
    - 4 = Class changes.
- Messages were translated into TXT SPK

Some academics participating in the focus groups at the end of semester 1 cited a lack of familiarity with the text messaging idioms commonly used by students as a constraint to use of the SMS application for broadcasting to their student groups. This could be an indicator that these academics were not fluent in text messaging as a mobile communications medium. Text messaging has only recently been identified as an emergent linguistic phenomenon and its syntax and semantics, though closely aligned with English in this case, is still in a transitional form at the present time (Crystal, 2008). In order to remove this constraint to trialling of the application a WIL BBIS WIL student translated, recorded and sent SMS messages in semester 2. Standard sentences, such as, "ISYS2056 - To revise for the exam start now doing the Sample Exam Question on DLS each week" were changed to "ISYS2056 - 2 rvse 4 d exm start nw doin d Smple Exm Ques on DLS ech wek". This practice was designed to encourage staff to use SMS rather than email. However, the student response provided in the focus groups at the end of semester 2 was unexpected. First as the message was sent in Week 3 (August 4) of semester it was not considered a reminder but nagging and secondly, a group of students not exhibiting common attributes like age, gender or nationality commented that the translated messages were difficult to decipher. A cohort of the students requested that SMS messages utilise proper English.

Student Uptake of the SMS Prototype
As the technology is commonly used for social networking outside the university sector knowledge of business usage prepares students for graduate employment. The impact of mobile technology adoption on students' first year experience, will underpin recommendations for use, changes to practice and uptake. The *Trigger* application demonstrates an innovative use of the technology in enhancing students' experience of administrative service. It enables organisations to support the students' capacity to manage their learning environment in an individual manner. Students were able to interact with the University remotely using mobile technology to obtain scheduling and assessment details on-demand.

Student Registration
During the pilot students were informed about the application during lectures, by email, via Blackboard and provided with *Trigger* control cards created by Pearson Education Australia. These cards enabled them to have ready access to the online registration address and possible text triggers at any time. In the 2006 pilot of *Trigger*, 180 students (which represented over half of the students) had voluntarily registered. Interestingly, 45 students or 25 % registered in the last month of the pilot which could indicate the students' positive response to fast access to assessment results as a key driver for registration to the system. Spikes in registration could be observed prior to release dates of assessment marks. This indicated that access to fast assessment results was a key driver for registration on the system. Word of mouth around the successful delivery of results for Assignment 1 in October and reminders to students that were registered that they would be receiving their results by means of SMS also explains the late spike in registrations numbers prior to the November release of the final two assessment results. The relatively slow initial uptake of the system and poor survey response rate was mirrored in (Stone, 2004) study findings at Kingston University.

Semester 1 2008
In a large undergraduate first year common core course in the Business College the project leader and steering committee members attended lectures and workshops to inform students about the technology trial and to encourage them to register. The classes where external registration assistance was provided during workshops demonstrated higher buy-in than others. This offer of assistance was not taken up by all staff volunteers with mixed results in terms of staff SMS use and student registration. The number of students registered in semester 1 was 534 which represented approximately 27% of the total cohort to whom the application had been made available. This was recorded on 14 April 2008. The proportionately low number of registrations reflects both staff and student response to change in communication channel, perceptions of the usefulness of available information and lack of initiation of the interaction by academics. Stone (2004) also reported a slow uptake of a similar SMS communication system trialled at Kingston University in the UK.

Student Survey Results
The online student survey conducted at the end of semester 1 2008 collected 110 student responses online and six in hardcopy. Student responses were collected on a five point Likert scale: Not Applicable, Very Frequently, Frequently, Infrequently and Very Infrequently or Not Applicable, Strongly Agree, Agree, Disagree and Strongly Disagree. The words *frequent, useful* and *relevant* were used. Missing responses were also recorded and a quantitative analysis was conducted. The analysis presented calculates the percentage Positive (P) and very positive (VP) responses. Not applicable (N/A) responses were included as part of the Disagree and Strongly Disagree data.

The positive response to the technology prototype provides a basis for additional testing and evaluation to build on the size and depth of the available dataset. Normal methods of information provision to the students were maintained. Web based access to class timetabling, location and scheduling information, as well as assessment requirements were provided in addition to the SMS. The prototype trialled enabled students to acquire instantaneous access to SMS messages sent from their phones, and therefore responded to cultural changes in communication style. Barriers to student and staff interactions imposed by geography, time and memory were removed. Students' access to information relating to their subject, lecture, tutorial and assessment schedules and results was on-demand.

The survey questions used to conduct the investigation are outlined in Table 1.

Questions
1. Assessment
a. How effective did you find the SMS service for the provision of assessment scheduling information?
b. How effective did you find the SMS service for the provision of assessment results?
c. Are you satisfied with the security of the message delivery for assessment results?
d. Are you satisfied with the access to assessment results via an individual message sent to you?
e. Are you satisfied with obtaining access to assessment results by sending a text message to Trigger?
f. How convenient was the ability to access assessment information anytime, anyplace?
g. Did the system improve your ability to schedule assessment task work?
2. Lectures, Demonstrations and Tutorials
a. How effective did you find the SMS service for the provision of lecture, demonstration and scheduling information?
b. Are you satisfied with the access and delivery of scheduling information?
c. How convenient was the ability to access scheduling information anytime, anyplace?
d. Did the system improve your ability to attend class?
e. How often would you use the SMS service to obtain class location information (Weeks 1 -3)?
f. How often would you use the SMS service to obtain class topic information?
3. System Usage
a. Was the SMS messaging system easy to use?
b. How useful were the responses from the SMS system for the following Triggers: lectures, tutorials, next exam, next assn, due this week, due next week, latest results, my progress
c. How relevant were the responses from the SMS system for the following Triggers: lectures, tutorials, next exam, next assn, due this week, due next week, latest results, my progress
d. Are you satisfied with your current provider in terms of messaging cost?
e. How accurate were the SMS information responses to the Triggers sent?
f. How would you rate the information quality of the SMS responses to your requests?
g. How easy were the SMS responses to understand?
h. How would you rate the system in terms of availability?
i. How often would you use the SMS service to obtain responses to the following Triggers: lectures, tutorials, next exam, next assignment due this week, due next week, latest results, my progress
4. Satisfaction
a. Was the process for registration into the SMS system easy to use?
a. Was the explanation of how to use the SMS system effective (Cards, EMAIL, communication in class?

Table 1: Survey questions

The Effectiveness and Usefulness of SMS Assessment Reminders

The popularity of SMS in the marketplace as a means of communication amongst the student population evidences the ease with which students' input triggers and exhibit positive perceptions of the relevance and usefulness of the output information quality. Questions based on the TAM model's evaluation of effectiveness as an indicator of students' potential to adopt a technology application to support assessment reminders and feedback in the form of numerical marks provided a positive response as displayed in Table 2.

Questions asking about the effectiveness of staff broadcasting SMS assessment marks to student phones received higher P+VP (90.00% & 93.33%) responses from students than the questions that asked about their initiation for their assignment mark (79.38%) through the use of *Trigger* word Latest Results. However, the student response to the use of SMS to receive marks was overwhelmingly positive irrespective of initiation source. The provision of the *Trigger* SMS service for staff to send assessment due date reminders (79.38%) and for students to access information upon request anytime anyplace (82.35%) also received a positive response from students. The students expectation that information access be mobile is supported by the literature Agar (2003), Faulkner and Fintan (2005) and Lawrence and Bachfischer and Dyson and Litchfield (2008). Whether the ease of student information access and reminders received outside traditional educational boundaries improves the capacity of students to self-organise a work ready critical skill received a slightly less positive response from students (57.78%). This response requires comparison with other modes of assessment scheduling information provision modes of dissemination eg. Web based course guides. The student cohort found the use of the technology to support assessment scheduling and feedback effective and a convenient source of information.

Assessment								
Questions	N/A	Strongly Disagree	Disagree	Agree	Strongly Agree	Agree & Strongly Agree	Rating Average	Response Count
How effective did you find the SMS service for the provision of assessment scheduling information?	14	5	15	58	19	79%	3.567568	111
How effective did you find the SMS service for the provision of assessment results?	11	3	7	41	49	90%	4.027027	111
Are you satisfied with assessment results being sent to you via an individual message?	6	1	6	38	60	93%	4.306306	111
Are you satisfied with requesting your assessment results by sending a text message to Trigger to initiate the request?	13	4	16	40	37	79%	3.763636	110
How convenient was the ability to access assessment information anytime, anyplace?	8	2	16	42	42	82%	3.981818	110
Did the system improve your ability to schedule assessment task work?	21	6	32	37	15	58%	3.171171	111

Table 2: Students' Rating of the Effectiveness of SMS Assessment Reminders

The Usefulness of the *Trigger* Words

Table 3 indicates the percentage of students that stated they would found the information provided by a particular *Trigger* word useful. This is intended to guide the information made available to students using the technology and the words available to be used by each student cohort. This indicates the students' perception of the usefulness of particular *Trigger*s which enables evaluation of PU.

How useful were the responses from the SMS system for the following Triggers:								
Answer Options	N/A	Strongly Disagree	Disagree	Agree	Strongly Agree	Agree & Strongly Agree	Rating Average	Response Count
lectures	27	11	12	39	21	72%	3.145455	110
tutorials	30	13	10	40	17	71%	3.009091	110
next exam	33	15	12	34	14	64%	2.824074	108
next assn	28	10	14	38	20	71%	3.109091	110
due this week	27	12	17	33	20	65%	3.06422	109
due next week	30	12	15	32	19	65%	2.981482	108
latest results	12	6	9	37	44	84%	3.87963	108
my progress	27	11	16	30	23	66%	3.102804	107

Table 3: Usefulness of *Trigger* Words

The data indicates that students are most interested in immediate access to assignment marks (84%). This finding is supported by the responses to questions asked specifically about assessment described in Table 6. *Trigger*s that provided location and scheduling information for lectures, tutorials and the next assignment due (72% & 71% & 71%) were considered less important than assignment marks. However, all system responses to these requests assist students with scheduling of work required in the following week or short term future. The least important trigger words were those that requested overall progress (66%), generalised due dates for the following week and further into the future (65% & 65%) and the details of their examination (64%) not scheduled until after the end of semester. Reasons for the differentiation in trigger word use relate to overlap in terms of trigger responses and the tendency for students to prefer more immediately useful information. However, this study did not enable causal linkages to be made suggested explanations include timing or the appropriateness of the trigger language or the students need for immediate access and delivery of information upon request.

The Relevance of the *Trigger* Words

Table 4 illustrates the students' perceptions of the relevance of *Trigger*.

How relevant were the responses from the SMS system for the following Triggers?							
Answer Options	N/A	Strongly Disagree	Disagree	Agree	Strongly Agree	Agree & Strongly Agree	Rating Average	Response Count
lectures	31	5	13	36	23	77%	3.138889	108
tutorials	33	5	11	39	20	79%	3.074074	108
next exam	36	8	10	38	13	74%	2.847619	105
next assn	34	9	9	36	19	75%	2.971963	107
due this week	33	7	11	33	22	75%	3.037736	106
due next week	35	9	11	33	19	77%	2.925234	107
latest results	20	6	7	38	36	85%	3.598131	107
my progress	34	9	12	32	18	70%	2.914286	105

Table 4: Relevance of *Trigger* Words

In relation to the responses to questions about assessment the students' felt more positively about the relevance of accessing information than the triggers used to elicit scheduling information. As assessment timing and feedback are critical to the students' experience they recorded the highest positive response rates for relevance. Differentiation between the student responses to their perceptions of the relevance of individual triggers were numerically smaller but followed the same pattern as the responses for usefulness described in Table 6. Assignment results were the most important information accessible by students (85%) followed by the location and topic information available for lectures (77%) and tutorials (79%). Scheduling information relating to exams (74%), assignment due dates (74%, 75%, 75%) and overall performance progress were marginally less relevant. The information provided by the My Progress trigger is a summative mark that depending on the assessment model may be uninformative eg. In Business Computing 1 the summative mark is overridden by a hurdle requirement that students must pass the exam to pass the course. The total mark achieved for the course is not relevant if the hurdle is not met.

Due this Week was perceived to be a little more relevant than Due Next week which reflects the student requirement for immediacy of information access. The student perception of the usefulness or relevance of the lecture and tutorial trigger responses was marginally higher than their evaluation of the usefulness of the actual triggers. Students supported the relevance of the information delivered using SMS to their needs.

Students' User Satisfaction with SMS – Push vs Pull

Questions based on the TAM model's evaluation of effectiveness as an indicator of students' acceptance of the technology are displayed in Table 5.

Lectures, Demonstrations and Tutorials								
Questions	**N/A**	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Agree & Strongly Agree**	**Rating Average**	**Response Count**
How effective did you find the SMS service for the provision of lecture and scheduling information?	18	11	17	46	18	58%	3.318182	110
Are you satisfied with the access and delivery of scheduling information?	15	6	13	54	22	69%	3.563636	110
How important was the ability to access scheduling information on demand at anytime, anyplace?	17	11	19	39	23	57%	3.366972	109
Did the system improve your ability to attend class?	17	19	31	32	10	39%	2.990826	109
Questions	**N/A**	**Very Infrequently**	**Infrequently**	**Frequently**	**Very frequently**	**Frequently & Very frequently**	**Rating Average**	**Response Count**
How often would you use the SMS service to obtain class location information (Weeks 1-3)?	27	20	23	29	9	35%	2.75	108
How often would you use the SMS service to obtain class topic information?	26	22	24	30	7	34%	2.724771	109

Table 5: *Trigger*'s Push vs Pull

The students' perception of the effectiveness of SMS delivery of lecture (58%) and general (69%) scheduling information was lower than their response to the same question asked in relation to assessment scheduling (79%), displayed in Table 4. This pattern was repeated in relation to the usefulness of obtaining assessment information anytime and anyplace (82%) in comparison to accessing general scheduling information on-demand (57%). Access to scheduling information provided by *Trigger* was less important as a desirable function than broadcasting to students with reminders relating to assessment. Where assessment occurs within lectures or tutorials reminders sent by academics by means of SMS were deemed more acceptable than students taking responsibility for initiation of the communication.

A minority of students (39%) were P or VP in relation to SMS information access and dissemination from academic course coordinators improving their attendance at class. This result needs to be verified by asking the question of a similar sample when the SMS service is not available. Student responses to the questions that requested their estimated frequency for using the *Trigger*s to obtain class location (35%) and topic (34%) reinforced the preference for staff use of SMS rather than student initiated information access. The students were positive about the lecture and tutorial trigger usefulness (72%, 71%) and relevance (77% and 79%), yet only a minority (35%, 34%) intended to use the service. The number of sent messages in semester 2 substantiates the preference students have shown for receiving 'pushed' messages from academics rather than 'pulling' information on-demand.

On the basis of the study, embedding the use of SMS will improve the student experience by increasing the effectiveness of 'staff to student' and 'university to student' communication rather than 'student to staff'. However further investigation is required to evaluate the impact of the micro environment on the study survey results. As the majority of the students participating in the pilot were first year undergraduates studying on-site, information details relating to class location and topic are typically consistent for the duration of a semester once timetabled and scheduled. If the application was provided to students completing off-site WIL study components the information consistency would be reduced and consequently the need to use the technology may increase.

Use of SMS mobile technology acceptance for first year experience, students was intended to support the generation of social networks, cultural communication norms and self-organisation capability development. The difference in use between on-site and off-site student cohorts was not incorporated in the initial research design.

Student Perceptions of the Information Quality

The students overwhelmingly supported the privacy and information quality characteristics of the application used to provide class and work scheduling details and assessment results. The quality of *Trigger* responses was determined by questions that ascertained the students' perceptions of the information accuracy (88%), security (88%), ease of understanding (84%), timeliness and availability of the service (85%) and general information

quality (83%). Students' P and VP responses are described in Table 6. This is an extremely positive response considering the first use of SMS technology to deliver assignment marks, timetabling and course schedule information.

Questions	N	Strongly Disagree	Disagree	Agree	Strongly Agree	Agree & Strongly Agree	Rating Average	Response Count
Accuracy - How accurate were the SMS information responses to the Triggers sent?	6	3	4	49	46	88%	4.166667	108
Security - Are you satisfied with the security of the message delivery for assessment results?	7	1	5	48	50	88%	4.198198	111
Information Quality - How would you rate the information quality of the SMS responses to your requests?	7	5	7	56	35	83%	3.972727	110
Clarity - How easy were the SMS responses to understand?	1	1	4	41	61	94%	4.481482	108
Availability - How would you rate the system in terms of availability?	4	3	10	49	44	85%	4.145454	110

Table 6: Students Perceptions of the Information Quality.

The student cohort in semester 1 found the SMS responses to triggers easy to understand (94%). *Trigger* responses were designed to be short and familiar in tone but standard words were not abbreviated and grammatical conventions were not ignored. A cultural perception that a new form of the English language was required to communicate was discussed by academics during focus groups at the end of semester 1. Although this could have reflected just the standard tentativeness towards the new technologies communication demands individual training and student translation services were provided for blast messages in semester 2. Interestingly comments received in the student focus groups stated that the blasted messages were hard to understand.

CONCLUSION

Any pedagogy that relies on explicit learning factors can only be effective if the students who experience it are reasonably free of distraction. The process of education is one that normally places a premium on concentration. However, the lifestyle of a contemporary university student is riddled with the mundane commotions often dealing with extracurricular activities such as work and relationships. These can interfere with study behaviour patterns. One distraction in the academic life of a student that is often overlooked are the details of administrative obligations that need to be dealt with in order to study effectively. Text messaging represents an opportunistic agent for the mutual exchange of information between the administrative sector of a university and its first year undergraduate clientele. The emphasis on text to interface via *Trigger* was an example of fostering system adoption through an existing persuasive channel, thus allowing technology itself to shape the behaviour of a user. The students' considered SMS mobile technology used in the the University environment to provide 'on-demand' student access to quality academic information (such as their study schedules, assessment performance, and institution's provision of information to students) to be useful. The data suggested that SMS reduced the need for students to access university or home computer systems to find subject timetables and locations, assessment schedules and feedback or marks. In addition students could use SMS to check what reading, events or tasks were scheduled whilst they were off-campus. This was reflected in the student responses to the survey where they stated that '*push*' was more important than '*pull*' with reference to the lecture and tutorial scheduling SMS information..   If this facility increased the uptake of digitised learning resources learning outcomes would improve. The SMS application changed the nature of the administrative system from primarily being seen as a dispersal apparatus that was automatic in function to that of a dynamic acquisition process that was purposely governed by students. SMS use also removed barriers for students in a new environment where accessing staff to ask questions, and information provided on the Web, could be difficult.

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