2007

Trigger iz gr8 4 Gen Y: Mobile Student Administration via a Text Messaging System

Joan Richardson
RMIT University, Melbourne, Joan.Richardson@rmit.edu.au

John Lenarcic
RMIT University, Melbourne, John.Lenarcic@rmit.edu.au

Trigger iz gr8 4 Gen Y: Mobile Student Administration via a Text Messaging System

Joan Richardson and John Lenarcic
School of Business Information Technology
RMIT University
Melbourne, Victoria, Australia
Email: Joan.Richardson@rmit.edu.au John.Lenarcic@rmit.edu.au

Abstract

This paper describes a case study of an innovative application of SMS technology in the higher education sector. The Trigger application piloted at RMIT University enabled students to access administrative and assessment information and staff to send class groups reminders and assessment feedback in the form of results. A questionnaire was developed underpinned by Davis's (1989) Technology Acceptance Model (TAM). The survey of student participants was conducted at the end of the pilot and an analysis of the students' perceptions of the usefulness, effectiveness and information quality of the system are outlined in this paper. It was concluded that this type of pilot usage of mobile technology can provide guidance for universities' deployment to staff and students in order to improve administrative service.

Keywords

Mobile telephone, text messaging, emerging technology application

Introduction

Mobile phones have transcended the utilitarian limitations of a mere technological device and have arguably become the fashion icon of a new kind of global culture based on the communication of information via conduits of trust (Katz & Sugiyama, 2006). The implications of this emergent trend are that incoming generations will view mobile phones as more than just hardware. They are ubiquitous personal items that are essential to aesthetic well-being. This mobile use, particularly among those who will be entering universities over the next few years, has generated considerable interest in applications technology in the higher educational context. The New Media Consortium 2007 Horizon Report states that *"higher education is facing a growing expectation to deliver services, content and media to mobile and personal devices"* (The New Media Consortium & EDUCASE Learning Initiative, 2006, p. 5). Mobile technology provides the ability to deliver content, but also to efficiently provide important communication over a greater range of times and locations than any other device. 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 higher education, as they do in other parts of student life. Whilst the potential of mobile technology has been demonstrated, ways to effectively deploy it more broadly in higher education have yet to be established.

Students already access a wealth of learning information through existing systems. Learning management systems are pervasive and course content and information is available though the web, students can listen to lecture material on their iPod, and timetabling, enrolment, assessment schedules and grades are all available online. Access to these systems is by "pull" (ie. by students actively seeking the information), typically using a desktop with wired access to the Internet. Students may have to access multiple systems and a frequent request by students (e.g. Platts, 2004) is that they would like to be proactively informed of important announcements and significant events by e-mail or SMS, rather than have to "log on" to a variety of systems. Mobile technology extends connectivity to almost 100% of the time for those students who carry a mobile phone, and provides a simple source of important messages from the disparate university systems. Specifically, SMS technology can be used to increase the speed of delivery of important times, physical class locations, availability and web addresses of iPod resources, and assessment feedback by "pushing" information to students that helps them manage their time and learning experience.

There are challenges in effective integration of SMS technology with university systems. Business systems that reflect an understanding of '*what*', '*when*' and '*where*' information is delivered are required. For example, immediate access to an assessment topic and to the due date reduces stress. The fact that the information requested is all that is delivered to their mobile reduces the impression of 'information overload' without changing what is stored on the university web site or databases. *"The acquisition and exchange of data and information is designed to be as simple and efficient as possible, prompting the user for decisions only when*

necessary, and exchanging only information that is determined to be relevant to the user" (Huang, Pulli, Rudolph, 2005, p. 142).

Students themselves need to control the use of this technology, so as not to impinge on what for them is primarily a cheap social networking device. Further, accepted and desirable use may vary from student to student. Perceived "junk" messages will devalue the utility of SMS. The focus of this project will be in identifying ways of providing valuable SMS for each individual student.

An application called *Trigger* was designed and developed to pilot SMS usage in the higher education sector. The application required that students register to communicate using SMS and that staff input available information, via the Web. Assessment results and reminders were pushed to students and access was provided to information relating to their subject schedules and assessment performance to improve student 'on-demand' and institutional provision of information to students. The software application was developed by Pearson Education Australia and Avidity Software Pty. Ltd and trialled in a large undergraduate subject at RMIT University in 2006.

Surveys were conducted to investigate the uptake and usage of the technology by the student body. Student adoption of the application of the SMS technology and the associated impact was underpinned by the quality of the information provided as well as its timeliness. Whether the provision of 'just-in-time' information to the student body, 'on-demand', improves the students' transitional experience in the first year was investigated in a similar study undertaken at Kingston University and reported on by Stone (2004). The ability of the communication tool to assist in the creation of virtual community boundaries and social networks built in first year undergraduate classes was supported.

Rationale

Changes in the global and corporate nature of educational organisations have impacted on the cultural environment that includes social usage of new mobile technologies. Student expectations have altered. *"The learning area need not necessarily be enclosed within the school premises."* (Stone, 2004) The effective implementation of mobile technology in the higher education sector supports improved student mobility, development of a global skill set and improved relationship networks within the community. Katz (2006) notes that mobile phone usage amongst the present generation often generates spiritual networks as communities of mutual reliance are linked by the omnipresent handhelds.

Embedding the SMS communication tool in the student experience prepares them to operate effectively as graduates in a global environment. SMS provides the means for students to take responsibility for their choices in relation to participation in the teaching and learning interaction. Control of communication initiation is a characteristic of the use of SMS technology that is expected to improve the first year student experience. The application of the 'push-pull' SMS technology in the educational environment will assist students with their time management, self-organisation, information management and communication, all of which are critical, work-ready skills. A need for development of these capabilities has already been validated by industry and academia as *"… lists of the generic skills include interpersonal relations ('interpersonal skills'), written and oral communications, problem solving, analytical thinking, teamwork; and often self-organisation, information management, flexibility, responsiveness, the capacity to take initiatives and sometimes critical thinking."* (Marginson, 1998, p. 238) Innovative technology usage, designed to enable the development of personal management skills in the students, embeds e-Learning in the higher education context. The intersection between the cultural expectations of the workplace, the internal university demands and the students' behaviour is re-enforced.

The cost of mobile technologies is minimal compared with desktop computing facilities, which increase accessibility to information for students. Purchase of hardware, such as kiosks and networks that enable information access in corridors and cafes is also more expensive to institutions than uploading information using existing Internet infrastructure that then becomes available for students, to access using SMS technology. *"The choice between kiosks and mobile technologies can be represented by the choice between ownership (of the Internet access device) and access on demand. The relative price of each of these options for different levels and types of use might be a significant factor in determining the respective roles of each channel."* (Slack and Rowley, 2002, p. 251)

Studies of SMS applications in the higher education sector at RMIT and Kingston Universities, and Huang *et al's* (2005) Kimono information kiosk and phone knowledge sharing system, built and evaluated at the MIT and Nokia research centre have illustrated the potential impact of SMS technology in higher education. For example, "…feedback is generally positive and lab members note that they find the information presented on the kiosk useful" (Huang et al, 2005, p. 143).

The application of SMS technology to students' requests for administrative assistance and assessment result provision has the potential to make a fairly ordinary request for information extraordinary. Once a student is registered the system recognises the individual and provides information tailored to them. This exhibits Khaslavsky and Shedroff's (1999) seductive qualities whereby the technology transforms routine activities.

SMS – The Connection of Students to the Higher Education Context and Culture

The effective use of mobile technology in higher education is intended to mirror technology already commonly adopted in the social and business arena. SMS use for the purpose of communication is evidenced by *"the 20.5 billion messages sent in the UK in 2003."* (Faulkner and Fintan, 2005, p. 169) According to a study by Markett et al (2006), 80% of students send an SMS every day. *"SMS has been called the 'killer' application of mobile phones, as its usage exceeded all expectations. Reasons contributing to the growth include low cost, the asynchronous nature (users can reflect before sending a reply at their leisure), and potential for quiet/private use"* (Markett et al, 2006, p. 282). *"We view the mobile internet today as entering an era where the PC-based Internet was in '96 or 97," said Steve Boom, Yahoo's senior vice president for broadband and mobile"* (The New York Times, 9/01/2007). Mobile phone penetration of the student population is high and expected to remain that way. *"In 2006, 950 million phones are expected to be sold in contrast to 234 million PC's"* (Arvind, Hicks, 2006, p. 78).

Innovative utilisation of available technologies such as the Internet, email and iPods has enabled Universities to respond to generation Y, fee-paying student expectations driven by the marketplace. Students' as clients are the change-drivers with reference to technology usage and changing expectations that indicate a need to provide immediate responses to questions asked and a shift towards mobile technologies. 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. *"I tried to call you but you weren't there so … and of course your message does not include a call back number"* (Reisman, 2006, p. 62), is not an excuse for late submission of assessment tasks. Students also expect immediate responses to questions and feedback on assessment tasks.

The Trigger application enables students to acquire instantaneous access to SMS messages sent from their phones, and therefore responds to cultural changes in communication style. Barriers to student and staff interactions imposed by geography, time and memory are removed. Students' access to information relating to their subject, lecture, tutorial and assessment schedules and results was on-demand. Requests for scheduling information were not accessing the academic but a database of information specifically generated for the subject. Academic communication was not required in 'real-time'. Using SMS to request University information means that the Trigger application functions as if there was an invisible client on the student's mobile phone, even though no software was required on the student's mobile phone.

The application is not limited to on-demand, one-to-one information transactions. An academic course coordinator using the application, for example, could provide a 'blast' service and send assessment feedback and reminders to the entire student cohort when required. *"Consider instructor-initiated e-mails to an entire class. Often some students misunderstand that the e-mail was simply a mass mailing about some class issue, and not a personal e-mail to them from the instructor. The consequence is a personal student response"* (Reisman, 2006, p. 64).

Marcus (2004) has described how technology has complicated the understanding and use of time as information is available any-time and any-place. Information has to be available for access and delivery using a range of modes depending on the technology available to students. SMS technology, according to Faulkner and Fintan (2005), reflects attributes of Email in that it is asynchronous and enables automatic reply without having to recall an address or phone number.

SMS enables students to become more responsible for their own time management, based on the acquisition of scheduling and assessment information on-demand. The ability to 'blast' students is also available. The 'on-demand' nature of the technology application and the evaluation of the impact on students' social network construction are important factors in the assessment of the persuasive nature of the application. The technology provides an opportunity for staff to remind students about tasks required immediately prior to the class. Engagement of students can be assisted by the technology, as it is a fast way to get important information about the students' university life and workload without booting computers or logging into a Content Management System. The system enables dynamic information transfer, with live updates, and potentially allows students to better schedule and organise themselves.

Students will understand and will use the SMS technology to support their learning in a business environment. The acquisition of this knowledge, complemented by their social involvement with the technology, should be

easily transferred to whichever business context and profession they enter following graduation, enhancing their learning experience and improving their ability to adapt to the current rapidly changing work place.

The Pilot

A completed pilot of the Trigger SMS application at RMIT (2006) provided an opportunity to not only send time-sensitive information to students but also allowed them to access information 'on-demand'. Students could control the *'who'*, *'why'* and *'what'* of the interaction and the '*where*' was unimportant. The emergence of SMS technology in the higher education sector has been primarily used to push information to students. This innovative use of the technology enables two-way, 'push-pull', information access to the students. The university academic plan discusses the development of infrastructure to provide *"a single point of access to student support services, learning content, interactivity with peers and networks, course and program information, learning content and student administration"* (Academic Plan 2006-2010, 2006, p. 8) in the form of an e-portal. This study enables multiple modes of access for students. Roschelle (2003) stated that wireless technology used as a tool in educational settings does not control the learning interaction. This study extends previous work by investigating whether the students' control over mobile information access tools impacts on their engagement with the learning environment.

Stone's (2004) study at Kingston University in the UK identified SMS as a technology that students already used. This influenced the choice to utilise it, *"to support first year degree students towards appropriate resources and procedures in a timely manner, to assist completion of assignments on a first semester module"* (Stone, 2004, p. 1). Information made available to students using the SMS learning management system at RMIT provided time-sensitive information that was also disseminated using Blackboard, the Internet, email and hardcopy. The information sent 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.

Unlike electronic mail, the Trigger application does not enable academic to individual student discussions. The application is a predominantly student controlled SMS application which allows for student initiated requests of information to be served back to students instantly. For example students can send text "MY PROGRESS" to the Trigger application, to which the student will receive a response like "11.25% (with 75% of assessments still to be released)".

The design of the survey questions was underpinned by concepts drawn from Davis's (1989) Technology Acceptance Model (TAM). 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. The use of the TAM model enabled the evaluation of benefits and costs of SMS used to support student services, specifically scheduling information, tasks and outcomes.

SMS technology usage has increased the communication channels between the University and students and changed the associated relationships. Cultural acceptance of SMS impacts on students' acceptance of the service technology within the university context as *"… there are circumstances in which behaviour might be expected to result in positive consequences (or net benefits), yet not be undertaken due to a perceived lack of ability to control the execution of the behaviour"* (Compeau, D., Higgins, C., Huff, S., 1999, p. 146).

Survey Results

Data collected informed an understanding of the impact of the mobile technology application's functionality on the students' transition into the higher education social network, overall impact on the learning experience and individual time-management capacity. The initial pilot used a large undergraduate subject delivered to the entire business cohort of students to trial the application of SMS technology. The survey response dataset used to evaluate the application of the technology was relatively small. Of the 180 Trigger registrations only 25 responses were collected. Student responses were collected on a four point scale. Missing responses were also recorded and a quantitative analysis was conducted. The overwhelming positive response to the technology application provides a basis for additional testing and evaluation to build on the 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 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.

Student Uptake of the SMS Application

In 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" (i.e. command initiators) at any time. At the end of the trial 180 students (which represented over half of the students) had voluntarily registered with Trigger. 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's (2004) study findings at Kingston University.

Student Use of the SMS Application

Table 1: *Triggers Used in the Pilot* illustrates the recorded number of messages sent to Trigger by the students. As the application was only used for one subject rather than all of the subjects in which a student was enrolled it is postulated that some of the figures are lower than expected. The application was piloted for one semester. Students were sent a welcome message by Trigger when they registered and *blasted*' information pertaining to results and assignment due dates.

An increase in the number of subjects will increase the amount of information available to students. For example if a student used the 'lectures' trigger and was enrolled in MATH001, ECON001 and PHYS001 they could receive the following response:

> Your lectures are: MATH1001 Tuesday 9am, City Campus, lower level, Room 201. ECON1001 Thursday 9.30am, City Campus, Clancy Theatre. PHYS1001 Monday 4pm, City Campus, CLB5 (*Trigger*)

All of the triggers available to the student body, the content of database responses and the number of requests for information during the pilot are detailed in Table 1*: Triggers used in the 2006 pilot.*

An online student survey was conducted at the end of the pilot. Although the response rate for the initial trial was disappointing (13%) the results affirmed findings identified in the literature and at other universities. At Orange University 62% of students surveyed were in favour of getting their grades sent directly to their mobile phones. 96% of student respondents in the trial agreed or strongly agreed when asked "are you satisfied with assessment results being sent to you via an individual message?'. Students were also satisfied with the ease of use of the application as 92% of survey respondents agreed or strongly agreed that the application was easy to use**.**

Table 1: Triggers used in the 2006 pilot

Triggers	**Information available on the database**	**No. of *Trigger* requests pilot 2006**
Lectures	To receive the next lecture time, location, topic and required reading	106
Latest results	To receive latest assessment results	37
My progress	To receive an update the current percentage score towards final results	22
Next assignment	To find the topic and date due of the next assignment	10
Next exam	To find the date, time and venue of the next scheduled exam	3
Tutorials	To receive the next tutorial time, location, topic and required reading	8
Due this week	To find out what assessments are due this week	3
Due next week	To find out what assessments are due this week	5
Results	Incorrect request	36

Student Perceptions of the Effectiveness and Usefulness of the SMS Application

On the basis of the study, embedding the use of SMS will improve the student experience by increasing the effectiveness of 'student to student', 'student to staff', 'staff to student' and 'university to student' communication. The impact of mobile technology adoption on students' first year experience, will underpin University system and process 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. *"They are the most technologically sophisticated generation, they're educated, highly employable and they know it. … Yers won't be clocking in and out. Nine to five was dispensed with a long time ago"* (Fragiacomo, 2005, p. 56). Questions based on the TAM model's evaluation of effectiveness as an indicator of students' adoption of the technology provided an overwhelmingly positive response as displayed in Table 2: *Students' Rating of the Effectiveness of SMS.*

Table 2: Students' Rating of the Effectiveness of SMS

Survey Question	Extremely ineffective	Ineffective	Effective	Extremely effective	N/A
How effective did you find the SMS provision of assessment scheduling information?	4%	8%	44%	44%	0%
How effective did you fin the SMS service for the provision of assessment results?	4%	12%	36%	44%	0%

Although the response rate for the initial trial was disappointing the results affirmed findings identified in the literature and at other universities. The student cohort found the use of the technology effective and a convenient source of information as illustrated in Table 3: *Students' Perception of the Usefulness of SMS for Assessment.*

Table 3: Students' Perception of the Usefulness of SMS for Assessment

Survey Question	Extremely ineffective	Ineffective	Effective	Extremely effective	N/A
How convenient was the ability to access assessment information anytime, anyplace?	0%	4%	48%	48%	0%
Did the system improve your ability to schedule assessment task work?	4%	24%	44%	28%	0%

The students' response to the survey also demonstrated a positive correlation between 'on-demand' access to lecture and tutorial location and topic information as 88% found SMS to be effective or extremely effective to obtain this information. More general questions asking students if they were satisfied with access and delivery of scheduling information using SMS also received a positive response with 88% of students agreeing or strongly agreeing.

Student Perceptions of the Information Quality of the SMS Application

Students overwhelmingly supported the privacy and information quality characteristics of the application used to provide class and work scheduling details and assessment results. The student response is displayed in Table 4: *Students Perceptions of the Information Quality of the SMS Application.*

Table 4: Students Perceptions of the Information Quality of the SMS Application

Survey Question	**Very Inaccurate**	**Inaccurate**	**Accurate**	**Extremely accurate**	**N/A**
How accurate were the SMS responses to your SMS requests from *Trigger*?	0%	5%	90%	5%	0%
	Very Poor	**Poor**	**Good**	**Very Good**	**N/A**
How would you rate the information quality of the SMS requests from *Trigger*?	0%	0%	73%	27%	0%

Conclusion

This application of mobile telephone technology enables students to access information, at a minimal cost, irrespective of geographical location, using a limited vocabulary of requests. Text messaging is an innovative vehicle to disseminate and provide access to information transferred between universities and first year undergraduate students as it enables communication through the vernacular of a generational cohort. The intention was to alter the students' behaviour in relation to access to timetabling information. In this manner the technology use could be defined as persuasive according to Fogg's (1999) description that requires a technology application to intentionally alter client behaviour and make an activity easier.

The value of a SMS mobile technology to student academic learning through the provision of 'on-demand' student access to quality academic information (such as their study schedules, assessment performance, and institution's provision of information to students) was validated.

The SMS application 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 can check the reading or work expected to gain the best learning outcome from a class, at any time before the scheduled occurrence. The SMS application changes the administrative system from primarily information dispersal TO students, to an information acquisition initiated BY students. SMS use also removes barriers for students in a new environment where accessing staff to ask questions, and information provided on the Web, can be difficult.

In spirit, the Trigger study extended the work undertaken in the MIT-based Kimono student information kiosk and phone knowledge sharing system project (Huang et al, 2005). *"The acquisition and exchange of data and information is designed to be as simple and efficient as possible, prompting the user for decisions only when necessary, and exchanging only information that is determined to be relevant to the user."* (Huang et al, 2005, p. 142) The system piloted at RMIT University was ubiquitous in that once a student was registered the system recognised the individual and provided information tailored to be relevant to them, *"Only information that is selected to be of interest is then transferred to a handset"* (Huang et al, 2005, p. 143). The Trigger system extended the use of the current Internet infrastructure and usage by enabling receipt of web-based information on mobile phone devices in an on-demand manner.

Survey data collected in the initial pilot combined with a literature survey indicated that the use of the technology in the sector would potentially improve student administrative service. Engagement of students can be assisted by the technology as it is a fast way to get important information about the students' university life and workload without booting computers or logging into a Content Management System. The system enables dynamic information transfer with live updates and potentially allows students to better schedule and organise themselves. The cost to students is minimal as all that they require is a mobile phone.

References

Arvindt, Hicks, J., (2006) A Mobile phone Ecosystem: MIT and Nokia's Joint Research Venture, IEEE Intelligent Systems, IEEE Computer Society

Compeau, D., Higgins, C.and Huff, S., (1999), Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study, MIS Quarterly, Vol 23, No 2, pp. 146-158

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), pp. 319-340.

Davis, F. D. (1993) User acceptance of information technology: system characteristics, user perceptions and behavioural impacts, International Journal Man-Machine studies, Vol 38, 1993, pp. 475-487.

Faulkner, X. and Fintan, C., (2005) When Fingers do the talking: a study of text messaging, Interacting with Computers, 17 (2005) pp. 167-185

Fogg, B., (1999) Persuasive Technologies, Now is your chance to decide what they will persuade us to do- and how they'll do it. Communications of the ACM, Vol 42, Number 5, pp. 27- 29

Fragiacomo, L., (2005), Capturing the Y, Managing Information Strategies, Australia, WWW.MISWEB.COM, Summer 2004/2005, pp. 54-59

Khaslavsky, J. and Shedroff, N., (1999) Understanding the seductive experience, Extraordinary products seduce the casual user, as well as the paying customer. Software is no exception, as long as it fulfills its promises. Communications of the ACM, Vol 42, Number 5, pp. 45- 49

Huang, A., Pulli, K. and Rudolph, L., (2005), Kimono: Kiosk-Mobile Phone Knowledge Sharing System, Massachusetts Institute of Technology, Nokia Research Centre, HIT Lab NZ, University of Canterbury, Christchurch, New Zealand

Katz, J. E. (2006). Magic in the Air: Spiritual and Transcendental Aspects of mobiles. pp. 201-223 in K. Nyíri, K. (ed.). Mobile understanding: The epistemology of ubiquitous communication. Vienna: Passagen Verlag.

New York Times, (2007) Yahoo Introduces Mobile Service Software, late Edition New York Times, New York, N. Y. (9/01/2007)

Marcus, A., (2004), It's About Time, Interactions, New Visions of Human-Computer Interaction, The Association for Computing, New York, USA, Volume X1.6, November + December 2004, pp. 16-21

Marginson, S., (1998), Value Creation in the Production of Services: a Note on Marx. Cambridge Journal of Economics, p.22 (5), pp. 573-586

Markett, C., Sanchez, A., Weber, S. and Tangney, B., (2006), Using Short Message Service to Encourage Interactivity in the Classroom. Computers and Education, 46 (2006), pp. 280-293

McCrindle, M. (2006). New generations at work: attracting, recruiting, retraining & training generation Y. Retrieved on December 01, 2006 from www.mccrindle.com.au

McCrindle, M. (2006). Bridging the gap: generational diversity at work. Retrieved on December 01, 2006 from www.mccrindle.com.au

Mohammad, M,A. and Norhayati, A., A Short Message for Campus Wide Information Delivery, 4th Conference on Telecommunication Technology Proceedings, Shah Alam, Malaysia

New York Times, (2007) Yahoo Introduces Mobile Service Software, late Edition New York Times, New York, N. Y. (9/01/2007)

Resiman, S., (2006), The Ivory Tower – Failing to Communicate in an Educational Environment, IT Professional, IEEE Computer Society, New York, Jan / Feb 2006

Slack, F. and Rowley, J., (2002), Online kiosks: the alternative to mobile technologies for mobile users, Internet Research: Electronic Networking Applications and Policy, Vol 12, Number 3 pp. 248-257

Stone, A., (2004), Mobile Scaffolding: An Experiment in Using SMS Text Messaging to Support First Year University Students, School Of Computing and Information Systems, Kingston University, UK., IEEE International Conference on Advanced Learning technologies (ICALT'04)

The New Media Consortium & EDUCAUSE Learning Initiative, The Horizon Project 2006

The New Media Consortium & EDUCAUSE Learning Initiative, The Horizon Project 2007

Copyright