

Instructional Scaffolding: An Experiment in Using Text Messaging to Support Distance Education in the Developing World.

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Mobile phones, in their current state, are designed to meet Western needs. Subscribers in developing countries, however, now constitute the greater part of the global 2.4 billion mobile phone users. Africa is currently the fastest growing market for mobile phones with an annual increase of 65% over the past five years. Mobile phone users in the developing world have also developed innovative uses for the mobile phone beyond simple voice communication. Even as conventional desktop computers (PCs) have not seen the diffusion in Africa that they have had in the western world, the adoption of mobile phones and for that matter SMS text, has been astonishingly rapid and pervasive, reaching even the poorest communities (Eagle, 2005).

There are particular reasons why the developing world has taken to mobile phones so readily. Unlike desktop computers, mobile phones are not dependent on steady supply of electricity and they provide the computational capabilities of the desktop from a decade ago. Mobile phones have therefore become heavily imbued in economic and social networks for both young and old people of the developing world (Eagle 2005). Because of their widespread use the mobile phone can be viewed as a liberating tool, but its potential contribution to distance education has received little attention.

As a result, the author explored the potential use of text messaging to enhance the learning of distance education students in an introductory computer class. The study had one main aim: to assess the extent to which instructional scaffolding can be provided using mobile phones and for that matter text messaging. In carrying out this aim, the author also evaluated five desktop text messaging applications for the purposes aiding faculty.

THE STUDENT EXPERIENCE OF DISTANCE EDUCATION

Becoming a long distance student is a significant challenge which involves, sometimes, full-time employment and academic work. Distance education students most often find themselves in an academic environment in which self-direction and independence in learning is a paramount approach (Klopfenstein, 2003). Distance education students can find this disorienting and motivating themselves to study can be problematic until they have developed a capacity for independent learning (Winn, 2002; Prescott & Simpson, 2004). McLoughlin (2004, 149) indicates that learners need support and structured learning experiences. Much effort has been invested in identifying strategies to help students do this. One of such strategies is instructional scaffolding (Harley, Winn, Pemberton and Wilcox, 2007).

SCAFFOLDING

The term scaffolding was first in its educational sense as a “process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts” (Wood, Brunner, and Ross 1976, 90). An expanded definition noted that “In addition to helping children complete tasks they could not otherwise complete, scaffolding can aid students by helping them to better complete a task, with less stress or in less time, or to learn more fully than they would have otherwise” (Graves and Graves 2003, 30).

Scaffolding is a temporary measure which must be removed, allowing students to take all the responsibility of completing tasks (Pearson & Fielding, 1991, 815). Five different kinds of scaffolding techniques: offering explanations, inviting student participation, modeling of desired behavior, inviting students to contribute clues, and verifying and clarifying student understanding (Hogan and Pressely, 1997, 17-36). The five techniques can either be used independently or integrated. Instructional scaffolding when implemented effectively point to a number of desirable educational outcomes (Byrnes, 2001, 34).

There are two major steps involved in instructional scaffolding: (i) “development of instructional plans to lead the students from what they already know to a deep understanding of new material” and (ii) “execution of the plans, wherein the instructor provides support to the students at every step of the learning process” (Lange, 2002).

THE EXPERIMENT

The experiment was conducted over a period of three semesters using students enrolled in a distance education introductory computer course. It was completely voluntary and students chose to participate by submitting their cell phone numbers to the author via email. The experiment was done using the free SMS text feature in Yahoo! The numbers were entered into the address book created in Yahoo! Participating students were located in Afghanistan, Chile, Egypt, Iraq, Colombia, and Panama, broadly representative of the developing world. A total of twenty-seven students took part in the experiment over a period of three semesters.

Text messages sent to students included carefully designed messages to assist the students in organizing their ideas and connecting them to related information, notification of assignment deadlines, verification of students understanding, and procedural scaffolds for clarification of specific tasks.

Text messages aimed at assisting students to organize their ideas and to connect them to related information were based on instructional plans as proposed elsewhere (Turnball, Turnball, Shank and Leal, 1999, 641-642). Each scaffolding plan was written carefully, so that new information the student learns serves as a logical next step, based on what they already know. The author relied on asking questions and providing a set of queries to prompt student thinking. The goal was to support and improve student comprehension of the topic under discussion. Timing and nature of the messages were carefully planned.

Reminder messages were sent 3 days before class start date. This lead time was chosen in order to reduce the possibility of students forgetting the start dates (Downer, Meara and Da Costa, 2005, 367). A single message was sent daily, over the three day period, to a single phone number for each student. If the student had given more than one phone number, the message was sent to the preferred number given. Notification of assignment deadlines were also "texted" 3 days prior to the due date and were repeated daily till the due date. Students were also encouraged to send a check-in message by texting "Here" to the author at the beginning of each week. It served as a roll-call and a way to ensure that students were still actively participating in the experiment.

Table 1. Examples of text messages sent

Ideas organization	
Professor:	Let's talk about Business Computer Information Systems (BCIS). What is a BCIS?
Student:	A type of computer information system?
Professor:	What is a system? Does a system necessarily have anything to do with Computers? Information? Business?
Student:	Yes. Ok. I'm not sure.
Professor:	Alright. A system is any set of components that work together to achieve something. Can you name three systems that have absolutely nothing to do with information?
Student:	Air Conditioning System, Digestive System and Cardiovascular System.
Professor:	What's an information system (I.S.)? Does an I.S. necessarily have anything to do with Computers? Business?
Student:	Absolutely.
Professor:	Not exactly. An Information System is a system designed to impart information. Can u name three information systems that have absolutely nothing to do with computers?
Student:	Calendar, Speedometer, Thermometer

Class start date/assignment reminder

Professor: Reminder, you have registered for intro to computers. Class starts in 1 wk.

Professor: Reminder! chapter 1 assignment due in 3 days.

Individual contact

Professor: Frank, I haven't received your weekly check-in message. Hope everything is fine with u.

Source: Author

Students who volunteered to take part in the experiment were asked to take part in an exit interview. Questions about the student's experience and how they felt about the text messages experience were asked.

AVAILABLE FREE SMS PLATFORMS EVALUATED

To carryout the aim of the study, five free desktop text messaging applications or platforms were evaluated. They included Yahoo! text messaging, SMSNow, Free Text Messaging, Funtonia and Texting Online. The primary consideration of the evaluation was the number of characters allowed to be "texted" at a time. Address book was a secondary consideration. The address book allowed phone numbers of the students to be stored and retrieved with a click of a button. Yahoo! text messaging was selected for the experiment because it provided the highest number of characters that could be sent at a time and also an address book with an easy to use interface.

Table 2. SMS Applications

SMS application	Web address	Number of characters	Address Book Available?
Yahoo	http://www.yahoo.com	150	Yes
SMS Now	http://www.sendsmsnow.com/	130	Yes
Free Text Messaging	http://www.onlinetextmessage.com/	100	No
Texting Online	http://www.textingonline.net	140	No
Funtonia	http://www.funtonia.com/send_free_sms.asp	110	No

Source: Author

DISCUSSION

Handheld phones are ever-present among students in the developing world as demonstrated by participants in this experiment. The background research and the findings of experiment show that text messaging is the dominant mode of electronic communication in the developing world. The results also indicate that students are willing to engage in SMS text communication with faculty for educational purposes.

Control

It has been noted elsewhere that the user must feel they are in control of the software or technology being used or else its utility is lessened, regardless of pedagogic suitability of the content and its presentation (Hoffman, 1985, 358-360). The awareness of control is very vital for the successful adoption of any system and its application or implementation. The results of the experiment show that students were particularly not enthusiastic about unsolicited messages designed to explain concepts and topics they could read and understand on their own. This limitation was surmounted by inviting students to participate in the task at hand (Hogan and Pressley, 1997, 27). Future work could explore the possibility of allowing students to initiate what topics they need help with.

Students had no problems with reminder and notification of assignment deadline messages. Providing administrative and notification messages to students aided students to complete and submit assignments on time. This was revealed by student comments during the exit interview.

Peer Support and Collaboration

One revelation of the study was the building of peer support and collaboration by participating students. Students who requested explanation and clarification on concepts and topics passed them on to their peers. It may have been as a result of such support and collaboration that students felt the experiment was useful as revealed by statements such as:

“Professor, the weekly messages you sent about assignment submission deadlines were very helpful in letting me keep up with my home work.”

and:

“Sir, I couldn’t keep up were it not for the weekly notification messages.”

Through this informal system of peer support students were able to engage in interdependent learning.

Role of SMS text messaging in scaffolding

Firstly, reminder SMS text messages provide support for students. Secondly, and perhaps more importantly, the research shows that “texting” of carefully designed messages to help students organize ideas and connect them to related information boosted their academic confidence. The challenge was to design short but useful messages within the limitation of the technology. Yahoo! text messaging, like most messaging systems, has a limit of 150 characters at a time. As noted elsewhere, designing text messages with a limited number of characters is difficult (Dickinger, Haghirian, Murphy and Scharl, 2004, 7). Breaking messages in chunks will help overcome this limitation.

Motivation

Issues in relation to student motivation in the use of SMS text messaging in scaffolding must be taken into consideration. Elsewhere, it was observed that the elderly are less likely to be motivated in the use of instructional technology (Myers, Bennett, Brown, and Henderson, 2004, 78-86). This may indicate an uphill struggle in the implementation of SMS text-based instructional scaffolding. Students need to be motivated, otherwise generation gaps may render such innovative way of teaching less useful.

CONCLUSION

Despite the proliferation of mobile phones and “sms texting” in the developing world, its potential contribution to distance education has received little or no attention. The experiment was based on the assumption that most university students in the developing world already own mobile phones and engage in text messaging. A sample of student feedback indicates that instructional scaffolding using “sms texting” can be useful in ensuring student academic enrichment. Good teachers and instructors have always used scaffolding. The mobile phone and text messaging allows some uniquely new opportunities to do it differently.

Text messaging represents the first and most basic form engaging distance education student via mobile devices. In Africa and Asia where innovative uses for the mobile phone beyond simple voice communication is a reality, more complex challenges await the implementation of sms text messaging in instructional scaffolding. Cost to students need to be explored. Future studies should explore the acceptance of and attitudes towards instructional scaffolding using sms text messaging.

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