Emerging Role of Short Message System (SMS) in Medical Education

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Abstract

SMS is an ordinarily used mobile phone service which allows users to communicate in short textual phrases up to 160 characters long. Widespread mobile phone technology has allowed for effective use of text messaging in many teaching activities. SMS has shown to be a powerful, cheap and easily accessible instrument for enhancing student learning. The ubiquitous use of mobile devices presents a prime opportunity to address major drawbacks seen with present-day challenges in learning, assessment, and evaluation of education activities. SMS can deliver succinct real-time information on daily teaching lessons; therefore, students can offer feedback immediately after the learning session. Proactive rating of the learning sessions will help improve the quality of student feedback and the overall assessment of the course. Widespread mobile phone technology has allowed for effective use of text messaging in many teaching programs. The recent literature in higher education has shown SMS to be a frugal and easily accessible instrument for enhancing student learning.

Keywords: Learning; assessment; text message; evaluation

Introduction

The use of Short Message Service (SMS) or text messaging in higher education and clinical care has been growing for the last decade. Medical students of today's generation are very familiar with technology and have used it to enhance their educational experiences and clinical care. Smartphones and tablets can be used to store electronic versions of medical textbooks, access classroom materials online, view recorded lectures, or access medical records while on clinical rotations. Smartphone ownership and familiarity thus provides the ability to implement SMS as a tool for learning and real-time feedback from peers and supervisors. There are two functions of SMS that should be considered. The first function is using SMS to distribute information, "pushing" information in one direction to recipients. The messages contain concise, focused material that the preparer or lecturer find important to emphasize. The second function is using SMS to help facilitate interaction. This can take the form of real time evaluation or
feedback from the recipient. The flexibility of SMS would allow for a single intervention or for continuous evaluation or feedback.

**Growth of Smartphone and SMS in Education**

The rise of SMS utilization is directly tied to the rise in prevalence of mobile smartphones. The first U.S. mobile phone service started in 1947, allowing the reality of communication without being tied to a land line. Initially, radio-based technology had limitations over distance; however, in 1977 a cellular system was implemented. Over time, as technology improved, mobile phones became smaller with more capacity, cheaper, and more efficient. The increased use of SMS was also tied to the cost. In the 1990s, younger generations would purchase pre-paid plans and use text messages instead of voice calls because it was a cheaper form of communication (Lacohée, Wakeford and Pearson, 2003). According to a Pew Research Center Study (Smith, 2019), today, SMS is widely used, with 95% of young adults using the function on their phones. Young adults aged 18-29 years old, "send or receive an average of 87.7 text messages on a normal day" (Smith, 2019). When looking at a younger age group, it showed even high rates of use, "Among 18-24 year old—95% own a smart phone and 97% of these cell owners use text messaging" (Smith, 2019). In 2018, the median age of matriculated U.S. medical students was 23 years old (AAMC, 2019). The previous statistics regarding cell phone ownership and usage relate directly to the advantages of using SMS as a tool in education. SMS does not require users to log-in, access the internet, or create additional accounts. There is no need for students to purchase or obtain additional dedicated devices and removes the need to learn a new type of technology.

**Mobile Technology and SMS in Education**

There have been studies demonstrating the implementation of SMS in an undergraduate setting, noting "Previous investigative work on the use of SMS in higher education has focused mostly on four areas: administrative support, tutor support, subject learning, and in-class use" (Brett, 2011). Administrative support refers to the logistics of the class, such as communicating changes in class times, campus closures, or the due date of assignments. However, data regarding the use of SMS in medical education revolves mostly around its application in educating healthcare providers in a clinical setting (Brett, 2011). SMS allows tutors and learner to remain in contact and provide support to each other outside of the classroom (Brett, 2011). In addition, SMS role in the classroom is used as a tool for evaluation. Websites such as PollEverywhere, allow a lecturer to display a question to the class, and then students can reply by texting their responses to a certain phone number (PollEverywhere, 2020). The responses and results can be displayed live on the lecturer's display (PollEverywhere, 2020). By directly contacting the respondent via SMS on their cell phone, barriers to entry are eliminated and participation in the poll is easy for the respondent.

**SMS in Patient Education and Monitoring of Treatment**

Hospital systems and healthcare companies such as Cleveland Clinic and CVS Pharmacy, among many others, use cell phones as a tool to keep patients informed of their care. Phone applications such as MyChart allow patients to create an account and sign-in to an app to retrieve test results, view prescriptions, and make/change appointment times. This service allows patients to directly manage an aspect of their healthcare without having to call or visit the office/hospital. However, these apps still require the patient to download an app, create an account, and sign-in to use the app every single time. SMS on the other hand allows direct communication with no additional apps or sign-in
requirements. SMS has been used for patient education in at least one setting. Patients undergoing colonoscopy must prepare by undergoing "bowel preparation", allowing the procedure to be performed with optimal conditions. In one study, patients were assigned to an SMS education group or control (Walter et al., 2018). In the control group, patients were educated on bowel preparation at the appointment closest to their colonoscopy. In the SMS education group, patients received "reinforced education" starting 4 days before their colonoscopy to explain the steps of the bowel preparation process. "The percentage of patients with insufficient bowel preparation was significantly lower in the SMS group (9%) than in the control group (19%) (P = .0013)" (Walter et al., 2018). The number of colonic adenomas detected in the right colon were also higher in the SMS group compared to control. These results are promising and suggest that SMS education is beneficial to patients in a tangible way that can directly impact patient care and health through education.

SMS in Medical Education

Medical schools also began to realize the benefit of utilizing SMS technology as well. For instance, in 2011 iPads were provided to each student from the Yale School of Medicine (Max, 2014). With this introduction of technology into medical school education, there have been endeavors to integrate SMS into the medical school experience. A study in 2018 involving third-year medical students assessed the effectiveness of SMS to deliver information during a Family Medicine clerkship rotation, in comparison to email. A post-test assessment administered after the rotation did not show a significant difference in knowledge, however a survey showed increased satisfaction with the use of SMS versus email. The study was limited as however, as a baseline level of knowledge was not established because a pre-test was not administered (Bragg et al., 2018). Similar studies have been conducted with resident physicians, demonstrating that SMS can be used to connect learners and deliver information (Hoonponsimanont et al., 2016; Mount et al., 2015). For instance, a study published in the Journal of Educational Evaluation for Health Professions stated, "Millennials are accustomed to using technology and mobile smartphones in their everyday lives, including their education" (Hoonponsimanont et al., 2016). The study involved sending text messages containing material from an emergency medicine board review book to emergency medicine residents over the course of two months (Hoonponsimanont et al., 2016). The post-test assessment did not show a significant difference in knowledge versus the control group, which had their information delivered by email. A study conducted at the Duke Cardiology Fellowship Program instead of using messaging just as a delivery tool, made it interactive by creating a group chat (Kochar et al., 2018). A group chat allows members to send a single message to all other members simultaneously, and each member can see the reply. Messages were sent to the fellows containing case presentations that stimulated discussion about diagnosis and management (Kochar et al., 2018). The study showed that a majority of the fellows participated, "66.7% of our fellows actively participated in this learning forum, and even more fellows (85.7%) believed the group-text format enhanced their educational experience" (Kochar et al., 2018).

Role of SMS in Evaluation of Learning/Teaching

Currently, replete data exists on the use of SMS for educational purposes (Gasaymeh and Aldalalah, 2013). SMS is an ordinarily used mobile phone service which allows users to communicate in short textual phrases up to 160 characters long. Widespread mobile phone technology has allowed for effective use of text messaging in many teaching programs. SMS has shown to be a powerful, cheap and easily accessible instrument for enhancing student learning (Moura and Carvalho, 2010). However, there is faint data on the use of SMS as a way capturing student feedback – much less in medical education. The ubiquitous use of mobile devices may present a prime opportunity to address some of the major drawbacks seen with present-day end-of-course evaluation surveys. Foremost, unlike
retrospective traditional questionnaires, SMS can deliver succinct real-time information on daily teaching lessons. Therefore, students will have the ability to offer feedback immediately after the learning session. Proactive rating of the learning sessions will help improve the quality of student feedback and the overall assessment of the course (Hwang et al., 2017). Student disengagement is a critical downside to customary end-of-course evaluations. Implementing SMS as a means of instantaneous feedback has the potential to capitalized on students’ emotions towards the learning session and in turn increase student participation. Real-time short messages as opposed to a long retrospective survey will also encourage students to provide more detail in their review since there is less survey fatigue.

Routine end-of-course evaluation surveys have long been the benchmark for gauging student feedback. However, this method presents a series of limitations that include discontinuous course-long evaluations, low student participation, and poorly descriptive retrospective learner feedback (Yeo, 2018). These pitfalls work restrict course directors’ capacity to use student critique to address specific curriculum shortcomings. However, implementing SMS as a complementary feedback assessment tool will help overcome these challenges. As a result, a combination between succinct real-time data in conjunction with a comprehensive end-of-course evaluation will support the design of successful education plans.

Even though SMS has been utilized in multiple ways in medical education in the clinical setting, there are other uses that should be explored. Since SMS is instant, and phone usage is high, there is value in using real-time technology for feedback. The current evaluation of learning sessions or faculty are complex and are usually conducted long after the session occurs. As such, this feedback is not obtained in real time. Because of this process for obtaining feedback, there is no possibility of actively and dynamically altering a curriculums content, emphasis, or structure as students continue to progress through it. The current, commonly used evaluation tools are lengthy and cumbersome when reviewing the sessions and faculty. Current methods for evaluating sessions offer very low response rates, putting to question their validity and usefulness unless the learners are forced to do it by school administration. The low response rate may be due to the length, complexity, and timing of the surveys that learners are asked to complete. At the same time, student evaluations from the few learners who do go on to complete these measures have an enormous impact on shaping the curriculum and learning experience.

Take Home Messages

1. With the increased prevalence of mobile phone ownership, Short Message Service technology has become a common form of communication for college aged students.
2. Short Message Service technology has already been utilized in higher education for the purposes of evaluation and administrative communication.
3. There is a lack of data on the use of SMS as a tool for obtaining real-time feedback.
4. The advantages of using SMS for feedback includes the fact that most students own a phone with SMS capability, it does not require internet, obtaining a dedicated device, or require learning a new technology, and allows for real-time feedback.
5. SMS feedback allows for active changes in a course as it progresses, and solves several issues associated with traditional end-of-course evaluations, which can be complex and long, and does not allow for course adjustments as the feedback is provided after the course has ended.

Notes On Contributors

Jeremiah Ojha is a third year medical student, Nova Southeastern University, Dr. Kiran C. Patel College of
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### Appendices

None.

### Declarations

*The author has declared that there are no conflicts of interest.*

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