ENHANCING THIRD-YEAR MEDICAL CLERKSHIPS: USING MOBILE TECHNOLOGY FOR TEACHING AND LEARNING

Janette R. Hill[1], Michelle A. Nuss[2], Ronald M. Cervero[1], Julie K. Gaines[2] and Bruce Middendorf [3]
[1]*University of Georgia, Athens, GA USA*
[2]*AU/UGA Medical Partnership, Athens, GA USA*
[3]*St. Mary's Hospital, Athens, GA USA*

ABSTRACT

The third year clerkship is one of the most exciting and challenging times for medical students (Cooke, Irby, & O'Brien, 2010) when students spend significant time in clinical settings (e.g., hospitals) assisting in the care of patients on a daily basis. Getting information and resources just-in-time and at point-of-care (Author, 2009) is one challenge faced by supervising doctors and students. Technology has long been used to assist in point-of-care decision-making (Burke & Weill, 2008); mobile technology has added value to this activity. In this study, we explore how mobile technologies (e.g., iPads) were being used to support supervising doctors and medical students. After completing full data analysis of year one of two, results indicate that the faculty and students benefitted from the use of the iPads during the third year clerkship.

KEYWORDS

Third year clerkship, mobile technology, point-of-care, decision-making.

1. INTRODUCTION

The third year clerkship is one of the most exciting and challenging times for medical students (Cooke, Irby, & O'Brien, 2010). This is often the first time that medical students are spending a significant amount of time in real-world clinical settings – hospitals, clinics, and private offices – assisting in the care of everyday patients. A challenge that medical students and their supervising doctors face is one faced in many educational settings: how to access just-in-time resources and information (Author, 2009) to inform evidence-based decision-making while interacting with the patient.

Various computer and information technologies have long been used to assist with patient care (Howell, 1995). Doctors and medical students and interns have made use of technology to guide decision-making. The use of technology to assist with evidence-based decision-making gained traction in the 1990s as medical professionals embraced the use of mobile technology (e.g., laptops). This movement progressed in the last decade as mobile technologies have become more powerful and accessible (Ducut & Fontelo, 2008). Smart phone technology and other tools such as Palm Pilots and iPods have helped medical professionals access information just-in-time to facilitate patient care (see, for example, Embi, 2001). Recently, iPads have gained widespread attention in the medical field as a tool to assist medical professionals in decision-making. The iPad, replete with hundreds of apps accessible literally at the fingertips, has enabled exponentially more opportunities for accessing information, thus increasing the ability to provide evidence-based decision-making just-in-time at the point of care.

Initial reports of iPad use by medical professionals have been promising (see, for example, Patel et al., 2012). That said, there are not many formal research studies that have been completed exploring the use of the iPad by third year medical students during clerkships. Further, our review of the literature indicated that even fewer studies have explored the use of mobile technologies (e.g., the iPad) as a tool to assist or hinder the teaching and learning process as supervising doctors and medical students interact and engage in patient care. We designed a multi-year study to explore the use of the iPad during three important teaching and

learning processes: 1) as supervising doctors learn the practice of academic teaching, 2) as medical students learn the practice of doctoring, and 3) as supervising doctors enhance their clinical decision-making process. In the context of this study, the iPad was used in the teaching and learning interactions between physicians and students in the context of seeing patients, by physicians in their own clinical practice, and by students throughout the third year.

The purpose of this longitudinal study was to understand how mobile technology supports supervising doctors' and medical students' learning and professional practice. There were three research questions that guided the study:

1) How does mobile technology support faculty preceptors learning the practice of academic teaching?
2) How does mobile technology support medical students learning the practice of Internal Medicine in third-year clerkships?
3) How does mobile technology support clinical decision-making for faculty preceptors, (i.e., internal medicine physicians)?

2. RESEARCH DESIGN, METHODS, AND PROCEDURES

This exploratory study used a collective case study design. Collective case study enables the researcher to study multiple cases to explore a phenomenon (Stake, 2000). A collective case study is an instrumental study involving multiple cases. As described by Stake, an instrumental case study is used to provide insight into a particular phenomenon. In this study, there are multiple phenomena (teaching, learning, decision-making, use of technology) involving several types of participants (supervising doctors, students). The primary context was the hospital in which the supervising doctors and medical students were working and learning during the Internal Medicine rotation.

Participants in the study included 9 supervising doctors and 36 third-year medical students during their Internal Medicine clerkship rotations at a hospital in the southeast. The students participated in 9 clerkships during the 12-month period, with 8 weeks devoted to the Internal Medicine clerkship. The 4-6 students who were involved in the Internal Medicine clerkship in July and August were involved in additional weekly interviews of 15-30 minutes throughout their other clerkships (e.g., emergency medicine, surgery) to explore if the availability of the iPad changed their learning processes in those clerkships. The 3-4 supervising doctors in the hospital who agreed to more in-depth participation were interviewed for no more than 30 minutes at regular intervals throughout the year (beginning, middle, and end) to get more detailed information related to how the iPad was used to enhance clinical decision-making.

All students and supervising doctors were given a third generation iPad for this project that has been pre-loaded with a variety of applications that allowed them to access medical knowledge resources and productivity tools for clinical decision-making. All students and supervising doctors were provided with initial training in how to use the iPad (30-60 minute sessions respectively). Additionally, a guided overview was provided for each app pre-loaded on the iPad to enable practice with use of the iPad and the apps.

Data was captured in a variety of ways by the research team throughout the year (July to June). Data was gathered via email as well as face-to-face and phone interviews. Weekly observations of the supervising doctors and students as they completed rounds with patients was also captured. All data was kept secure during capturing and analysis, with processes implemented to keep the identity of the participants confidential.

Data analysis was ongoing throughout the study (Merriam, 1988; Miles & Huberman, 1994; Wolcott, 2001; Yin, 2003). A constant-comparative approach (Charmaz, 2006; Glaser & Strauss, 1967; Strauss & Corbin, 1990) was used to analyze the data. Interviews and observations were transcribed as soon as possible following the interview and observations to enable initial analysis. An in-depth analysis was conducted at the conclusion of the year. A cross-year in-depth analysis is on-going; therefore for this paper, only the first year of the study is reported.

3. RESULTS

The first year of the study concluded in June when students completed their third year clerkships. During the 12-months, we completed hundreds of hours of data collection, including interviews and observations, of the medical students as they engaged in the learning process as well as the supervising doctors as they engaged in the process of teaching – some for the first time. It was an exciting year of growth for the medical students as well as the supervising doctors.

Results from year one indicate that the majority of the supervising doctors and medical students made wide and varied use of the iPad during the 3rd year Internal Medicine clerkship. More details are provided in the following paragraphs.

The majority of the supervising doctors used the iPad in a variety of ways to support them in the process of becoming an educator, particularly in their teaching practices. For example, almost all of the supervising doctors modeled the use of the iPad for patient care. One doctor in particular indicated he could not do his work without it. Some supervising doctors also directly asked the student(s) to look up a particular resource or to access information on the patient to help guide decision-making.

The majority of the medical students used the iPad in a variety of ways to support them in the process of becoming a doctor. Like their supervising doctors, most of the students used their iPads during rounds to assist with accessing information on specific patients as well as to gather information for the attending physician. Several students reported regular access to the Electronic Medical Record (EMR) as they gave their daily reports to the supervising doctors. The medical students also reported using the iPads at other times – while working on the hospital floor as well as when they are at home and need to access information related to a particular patient as well as for studying for exams.

The supervising doctors also indicated they used the iPad to support clinical decision-making. For example, almost all of the supervising doctors reported used their iPads while doing rounds with the students so that they could readily access information to help guide patient care. Information accessed included the EMR, x-rays, and lab results.

The additional students interviewed across the year while in other rotations beyond Internal Medicine reported using the iPad to assist with point-of-care decision-making. They also reported using the iPad for patient education. For example, one student reported accessing various apps during his OB/GYN (i.e., women's health) rotation to provide additional information for patients.

While there was a lot of use of the iPads, there was not 100% use – and not everyone found value in the technology. For example, one of the supervising doctors rarely used the iPad while on rounds, reporting that he did not find it to be enough of a value-add to warrant carrying it. Some students shared a similar perspective, reporting that they worried they may lose track of it while going from patient room to patient room.

4. SIGNIFICANCE AND LIMITATIONS OF THE WORK

This study is significant for several reasons. First, there is limited research looking at the interactions of supervising doctors, particularly as they are learning the practice of academic teaching. This study sought to provide insight into this process so to provide suggestions for improving practice.

Second, exploring how students learn the practice of doctoring provides medical educator with insights into how to better support students in this critical activity in their medical education. Finally, there is little research on how mobile technology supports the teaching and learning processes during 3rd year clerkships. This study sought to provide guidance for using mobile technologies to support medical students during their rotations.

There are limitations to the study. First, the data presented is only for one year. Additional analysis of the two years may provide additional insights into how mobile technology can be used more effectively for evidence-based decision-making at point-of-care. Secondly, only one setting was used for the Internal Medicine rotation. Including other hospitals and supervising doctors may also provide additional insights into effective practices for teaching and learning. Finally, the mobile network used by the supervising doctors and medical students was not always running at top efficiency due to overload. Ensuring that a robust wireless network is operational may enable even more use of mobile technology for point-of-care.

5. CONCLUSION

There has been, and the foreseeable future indicates there will continue to be, an exponential growth in the use of technology in clinical medical settings. This study provides some initial insights into the advantages of using mobile technology for both supervising doctors and medical students as they engage in just-in-time, evidence-based decision making at the point-of-care. While promising, there are challenges with the use of the technology (e.g., training, motivation to use) that need to be addressed throughout implementation to help ensure the effective use of the technology. The overall results from this study provide some indication that the benefits of the use of mobile technology in clinical settings outweighs the challenges that may be encountered.

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