Implementing a Simulated Electronic Medical Record System for Undergraduate and Graduate Interprofessional Healthcare Education

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Abstract

The traditional standard of educating healthcare professionals separate from one another is no longer conducive to the nature of healthcare delivery. Interprofessional healthcare education has emerged and is quickly gaining acceptance as the standard framework for educating healthcare professionals. Studies show that the traditional structure of educating a healthcare student in "silos" can lead to the development of assumed perceptions of their colleagues in other health professions (Ateah et al., 2011). Interprofessional healthcare education fosters the communication skills necessary for the student's success in their chosen career path. In addition to the development and implementation of an interprofessional healthcare education seminar, the addition of an electronic medical record system to this seminar will add a layer of realism to the experience. Through the seminar, students will utilize modules of the electronic medical record system to complete documentation and tasks responsible of their job role while developing therapeutic care plans for weekly patient cases.

Implementing a Simulated Electronic Medical Record System for Undergraduate and Graduate Interprofessional Healthcare Education

Interprofessional healthcare education in the Unites States is far from a standard practice at academic medical centers or in higher education institutions specializing in graduate and undergraduate healthcare education. While developing a course specifically for interprofessional healthcare education is a challenge in and of itself, there are higher education institutions that have successfully achieved this goal. Institutions such as the University of Texas or Western University of Health Sciences, have implemented interprofessional healthcare education but lack a major component that is federally mandated for hospital and healthcare provider organizations to have – the electronic medical record. Integrating the electronic medical record into health professions education will give those students an advantage when they are ready to enter the workforce. They will already possess an enormous skillset pertaining to the usage of electronic medical record systems that students graduating from other programs may not. The integration of an electronic medical record system delivered via an interprofessional healthcare educational experience would be on the forefront of graduate and undergraduate healthcare education. Integrating electronic medical records into an educational setting actively teaches the student essential skills such as effectively managing a patients private healthcare information, basic understandings of electronic medical record system frameworks, as well as working with longitudinal patient information (Adibe & Jain, 2010).

The need for interprofessional healthcare education is apparent; the current, traditional structure for educating a healthcare professional in the United States is not conducive to the evolving team based approach of healthcare today. Undergraduate and graduate health profession students today typically will not interact with other health professions students during their

professional education (Ateah et al., 2011). Current research shows that students studying a health profession often complete their education with predeveloped connotations about the roles and purposes of other health professions before even entering the workforce (Ateah et al., 2011; Bennett et al., 2011; Parsell, Spalding, & Bligh, 1998). By having interprofessional courses through the healthcare curriculum, students are forced to work in collaborative teams effectively disrupting their developed connotations about other health professions allowing the student to develop more accurate views. It is apparent in healthcare delivery today that a certain tension often exists when healthcare professionals are asked to work collaboratively on a team. More often than not, all that is actually expected from the healthcare professionals is reasonable level of cooperation with one another (Carlisle, Cooper, & Watkins, 2004). By implementing interprofessional education while the student is still building and developing their professional skill set, educators can embed the knowledge that the delivery of healthcare today requires an interprofessional team with complimentary roles working toward a common goal of ultimately helping their patient. Students should understand that working in interprofessional teams is the direction in which healthcare is heading today and will remain in the future.

Institutions across the country have been actively exploring and piloting new ways to integrate health informatics education into their curriculum but many have had little to no success (Hammoud et al., 2012). Many factors, such as costs involved with implementing of electronic medical record systems, institutional policies, or the administration or faculty resistance to change the existing curriculum often halt these types of projects at smaller academic institutions. Educators are quickly realizing that electronic medical record systems are here to stay and new advances in health information technology will always be on the horizon (Spencer, Choi, English, & Girard, 2012). Institutions that specialize in educating healthcare professionals

know that the greater the breadth of experiences they can provide for their students, a better, more well-rounded healthcare professional will be formed at the end.

It is possible that with interprofessional healthcare education becoming the standard, smaller institutions at a county or regional level could begin exploring avenues to pool resources regarding the implementation of an electronic medical record system for the purposes of interprofessional healthcare education. For example if a ring of smaller higher education healthcare institutions joined together to create a consortium, they are in a better position when speaking with vendors and the like. If all of the schools in the consortium are moving toward the same goal of implementing an electronic medical record system, they can leverage their buying power together and negotiate as a whole. The advantages of forming a consortium do not stop after the implementation is complete either; if one school is interested in a certain product or service, say moving to a colocation center, leveraging buying power is always advantageous.

Another major concern hindering the advances of health information technology in an educational environment is simply the lack of qualified individuals available to develop, plan, implement, pilot, and support an initiative as substantial as implementing an electronic medical record system. Outside of larger academic medical centers, healthcare information system administrators are not prevalent in the higher education sector. The majority of trained health information technology professionals often time do not consider educational institutions as viable employers unless, of course, an educational institution was their previous employer. Universities tied to academic medical centers, such as the University of Texas or the University of Massachusetts Medical School, have an enormous advantage over smaller higher education medical institutions looking to implement an electronic medical record system. Said institutions are tied to operating medical facilities and already have an electronic medical record system in

place. If the institution wanted to utilize the electronic medical record system for other educational purposes, they could simply branch off existing infrastructure. These larger academic institutions also have teams of healthcare information system administrators already employed and can easily develop a new environment for the purposes of an interprofessional healthcare education class.

Currently, there is no literature available that shows the development of an interprofessional healthcare education course with an electronic medical record component or the integration of an electronic medical record system into the curriculum of a preexisting interprofessional healthcare education course. While some higher education institutions, mainly large, multiprofessional academic medical centers such as the University of Minnesota, have successfully developed and implemented a homegrown electronic medical record system for its educational aspects, this example is missing the interprofessional educational component (Keenan, Nguyen, & Srinivasan, 2006; Speedie & Niewoehner, 2003). The simulated electronic medical record system in the virtual clinic at the University of Minnesota exists for educational purposes, but the primary user group is their Doctor of Medicine students. The manner in which they use their virtual clinic is not intended for interprofessional use with other health professions at the University. While there is very limited public information available regarding the simulated system the University of Minnesota has developed and implemented, their efforts prove that it is possible to successfully integrate an electronic medical record into the curriculum of a single cohort of students.

At the other end of the spectrum, there are institutions that have successfully designed and implemented interprofessional courses and activities for healthcare students. Institutions such as MCPHS University and Western University of Health Sciences have developed and

effectively integrated interprofessional programs into the curriculum of their health profession majors (Hsu, 2014; Western University of Health Sciences, 2014). At these institutions, interprofessional healthcare education exists only as a seminar style activity without any integrated electronic medical record components. At MCPHS University, Worcester, MA and Manchester, NH campuses, students receive weekly case studies and are grouped in smaller interprofessional teams to develop an effective, evidence-based treatment care plan. The challenge still exists – how can health information technology bring institutions to the middle of said spectrum and introduce interprofessional healthcare education courses with an integrated electronic medical record system?

Building the Groundwork for Interprofessional Healthcare Education

Beginning the integration of an electronic medical record into an interprofessional healthcare educational experience has many difficult challenges. The first being, if the institution does not have an interprofessional healthcare course already established, what are the initial steps the institution should take to begin the development? What are the resources needed by the institution to develop and sustain an interprofessional healthcare course? Does the institution need to bring in outside consultants or do they already have qualified faculty and staff members available willing to work collaboratively to develop the course framework? Following the development of the interprofessional healthcare course, what is the ideal way to integrate an electronic medical record system into the course curriculum? Often times seminar facilitators are working professionals recruited from outside the institution; these highly knowledgeable professional resources can offer invaluable insight on how electronic medical record systems are used at their practice site and ways to integrate their use into the course. Finally, how can an interprofessional healthcare course effectively utilize all of the functionality of an electronic

medical record system? Careful consideration should be given to all of the available modules and functionality of an electronic medical record system and identify which ones are applicable for use in an educational environment.

At MCPHS University, the proposed interprofessional healthcare seminar structure would combine two already existing elements at the University and add the integration of an electronic medical record system. Currently an interprofessional simulated patient case activity occurs via video conferencing technology between their two satellite campuses (Worcester, MA and Manchester, NH) as well as the existing framework for the uniprofessional seminar classes. Each of the three majors participating in the interprofessional simulated patient case activity has their own individual seminar class where they are given weekly clinical cases to work through and create evidence-based treatment care plans. Taking the two existing frameworks will require the creation of new interprofessional clinical cases or the modification of the clinical cases already in use to make them interprofessionally focused. Once the case studies have been redesigned to meet the new interprofessional nature of the seminar course, the overall design of the course should be examined as to where an electronic medical record system can best be integrated for use by the students as a learning tool.

Faculty should design case studies to thoroughly maximize the use of any available functionality in the electronic medical record system to its greatest potential while still fostering the underlying goals of interprofessional collaboration. The cases should utilize the electronic medical record systems ability to offer clinical decision support and other clinical information tools, such as UpToDate, to a level that still allows the student to think critically about the patient case at hand. While writing and developing the cases, faculty should work with the seminar facilitators to gain their input on the best points where the electronic medical record should be

used as well as identifying times where the student should need to research clinical information on their own outside of the prompts of the electronic medical record system. The advantage that non-faculty facilitators have over the University faculty is that they are actively working with electronic medical record systems each and every day. Their input can help take a patient case and truly make it lifelike, giving students a real clinical experience without needing to leave the University grounds.

Design of the Interprofessional Healthcare Seminar

During the first week of the seminar, students would meet with the course coordinators and seminar facilitators to discuss and understand the need for interprofessional healthcare education. Students should also understand why they are being asked to apply their clinical knowledge and skills they've acquired as part of an interprofessional team rather than with a group of their peers. It is essential that the faculty have the student's buy-in during the first session for the seminars' continued success. Many articles and case studies about student and medical resident use of electronic medical system have shown that students are more likely to embrace the available functionalities of the system with a formalized training session during their orientation (Rouf, Chumley, & Dobbie, 2008). Therefore, it should also be proposed that the interprofessional healthcare seminar also have an introduction and orientation to the electronic medical record system during the first class meeting. Many students at this point in their educational career may have little to no history of using an electronic medical record system; providing all students with the same orientation can increase the comfort level of the students utilizing the system for the first time and level the playing field when it comes to its continued usage.

The interprofessional healthcare seminar class would occur weekly with a series of formalized group discussions led by a medical resident or local area physician who either volunteered or was recruited to act as a seminar facilitator. Each section of the interprofessional healthcare seminar would be given a weekly case study, available via the University's learning management system, one week before their assigned meeting time. Once the case is released, the students would then have the opportunity to meet with their group members outside of the assigned class time to begin working the patient case. Students would need to utilize the virtual electronic medical record to gain access to their patients' longitudinal medical history, as it will be critical to the development of the patients care plan. The case information students would receive will only have information pertaining to the patient's current encounter; all other pertinent historical information will have to be properly retrieved from the patient's electronic medical record. Each patient case and eventual treatment care plan would require the input from each member of the interprofessional care team fostering collaboration and communication between group members. Students would need to identify the chief complaints, identify labs, tests and other consults they wish to order, as well as develop a pharmacological treatment plan.

As the treatment care plan is developed and completed, each member of the care team would be responsible for entering his or her appropriate clinical information into the patient's electronic medical record. For example, the nursing student would be responsible for entering the health and physical information about the patient retrieved from the weekly encounter notes as well as developing the appropriate electronic nursing documentation. Once the nursing student has completed his or her documentation, the physician's assistant student would then be responsible for entering the identified labs, tests, and specialist consultations for the patient as well as ordering the best-case medications identified by the group. The physician's assistant

student would also be responsible for preparing SOAP (subjective, objective, assessment, and plan) notes and other clinical documentation necessary to document the patient's encounter and diagnosis in their electronic medical record. Following the physician's assistant, the pharmacy student would then be responsible to check for any drug contraindications with past medical history, past medication history, or current drug allergies the patient may have. The pharmacy student would have the final sign off on the pharmacotherapeutic plan for the patient. The group often selects the ideal medications for the most effective patient care, often times the patient may not be able to afford these or selected maintenance medications. The pharmacy student would be responsible for reviewing the patient's current socioeconomic status and past history from their electronic medical record and developing an alternate pharmacotherapeutic care plan for the patient in addition to the primary pharmacotherapeutic care plan developed by the team.

Following the submission of the teams' interprofessional treatment plan, each week one group would be randomly selected to present their findings and care plan to their rest of the seminar groups during class. Students would have the ability to utilize the electronic medical record system during their presentation to enhance the delivery and quality of their presentation. Members of the interprofessional care team would be responsible for presenting the information that their future job function would be responsible for during a clinical presentation. Following the delivery of the selected teams' treatment care plan, time should be taken to compare and contrast the different groups' care plans for the patient. We know that each individual doctor may treat a certain disease state different from the next; the seminar facilitator would be present to engage the groups in a meaningful dialogue on the differences in their treatment care plans. Each of the groups would be allowed to defend their care plan and would then collaboratively develop a master care plan for the patient's case at hand.

Following the facilitated group discussions, the seminar facilitator would then "release" information within the electronic medical record system to the students regarding their patient's case. The release of information can be any combination of laboratory work, a specialist's findings/consultation, radiologic studies, information on adverse drug events developed by the patient, etc… This release of information would simulate a real life clinical environment, as new information becomes available practitioners and their team would need to reevaluate care plans they've developed for their patients. After the new information is released, students would need to login to the electronic medical record system to see the new information and work in their interprofessional care team to modify their treatment plan to account for the new information. The new information would provide a significant introduction of new information to force the interprofessional care team to rework their treatment care plan.

Access to the adequate technology is crucial to the success of the interprofessional healthcare seminar. A necessity of the course would be the ability to access the virtual electronic medical record from the seminar classroom. This would require the institution to either have a dedicated computer classroom or have a sufficient number of laptops available with the ability to connect to the virtual electronic medical record. As further discussed below, utilizing a virtual technology, such as VMware View, would allow the students to utilize their own laptops and tablets to access the electronic medical record system thus reducing the overhead necessary on the institution.

The Virtual Electronic Medical Record System

At this point, the electronic medical record system the institution selects it purely preferential and in some cases, as in large academic medical centers where there is already a system in place, the option isn't there to change. The key at this step isn't selecting the perfect

electronic medical record system; nine out of ten times the institution does not have a working medical center to support, choosing the system that has the functionality useful for educational purposes is far more important. Once faculty and seminar facilitators have designed the cases that are to be used during the seminar, identifying the functionality in the electronic medical record system the institution requires to run the seminar becomes far easier. Lastly, the other consideration that needs to be accounted for is how the students will access the electronic medical record system. Granted the institution should still abide by as many HIPAA standards and regulations as possible to simulate as true of a clinical experience as possible, they certainly have some leeway as none of the information contained in the system is real.

Utilizing current technology that many higher education institutions already have, much of the groundwork for implementing an electronic medical record system may already be complete. Today, many higher education institutions are leveraging virtual technology to reduce costs and increase efficiency. Virtualization allows servers and applications to be consolidated in a much smaller footprint rather than having the traditional one physical server per application. The technology that would ideally fit the needs of this proposed interprofessional healthcare seminar would be VMware View. VMware View allows any authorized user to access a virtual desktop anywhere they have an internet connection. The institutions IT staff would need to build and maintain a desktop pool that would allow users to interface with the electronic medical record system. In many cases, institutions utilizing VMware View are using it in technology labs and other open student spaces, utilizing this technology would remove a layer of training necessary to access the electronic medical record system.

Discussion

Interprofessional education is the engagement of two or more professions learning from and with one another (Ateah et al., 2011). The interprofessional education model is rapidly becoming the standard at which all higher education healthcare institutions are training their students. Interprofessional education has the potential to create better-prepared healthcare professionals who continue using the interprofessional practices they learn during their education through their career (Bennett et al., 2011). The integration of electronic medical records systems during a student's education also gives them a competitive advantage over their peers from other institutions. Having the exposure to any electronic medical record system, clinical preceptors may look favorably on the students in comparison to students from other institutions. At this time, it is understood that smaller medical education institutions may not be positioned to take on the task of implementing an electronic medical record for educational purposes if they still feel as if they are still cultivating quality clinicians. Sooner rather than later, institutions that have interprofessional healthcare education seminars utilizing electronic medical record systems as a backbone learning tool will quickly become the school of choice for many medical and health profession students alike. With time, students may begin selecting schools with interprofessional healthcare education components over schools that do not.

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