

**ENHANCING INTERPROFESSIONAL EDUCATION
WITH TECHNOLOGY**

by

Kathryn M. Shaffer

An executive position paper submitted to the
Faculty of the University of Delaware in partial fulfillment of the requirements
for the degree of Doctor of Education in Educational Leadership

Fall 2014

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Kathryn M. Shaffer

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ACKNOWLEDGMENTS

Henry Ford said, "Coming together is a beginning; keeping together is progress; working together is success." Ford's words perfectly illustrate what this Executive Position Paper is all about: working interprofessionally with others in healthcare for the betterment of the patient.

I would like to first thank Dr. Fred Hofstetter for his constant encouragement through my education at the University of Delaware and my EPP process. I would like to thank Drs. Mouza and Archbald for agreeing to serve on my committee. I would also like to thank Dr. Elizabeth Speakman for mentoring me.

I would not be here without the love and support of my family. My husband Michael, for always believing I could do this and making delicious dinners on Sundays after a long day of writing in my office. To Sophie, David, and Sam, for inspiring me to always be a better person. I love you all "To the moon and back." To my sister Annie and brother Michael, who always knew what to say when I needed encouragement, thank you.

Many people aided and encouraged me on this journey and I could not thank you all, but to my JSN family, thank you. Dr. Jennifer Bellot, you have picked me up many times and for that I am grateful. To the students at Thomas Jefferson University, especially the nursing students, thank you for trusting me with your education, and teaching me in return. Dr. Eisenberg, I am grateful to you for allowing me to tag along during clinical rounding with my iPad.

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ABSTRACT

Most health professional students spend a significant amount of their education in a clinical setting. These settings help students develop patient-centered care that is rooted in evidence and dynamic in design. The settings also socialize students for engaging in collaborative practice. Typically, students involved in interprofessional education (IPE) activities develop team building skills that focus on the function of a team and the role identities of its members. However, little opportunity exists for students to develop collaborative skills in clinical practice. Logistics is the most important factor contributing to the lack of exposure to team-functioning in a clinical setting.

This action research study explored ways technology could be used to enhance IPE in a clinical setting, allowing more students to collaborate and develop the needed competencies for practice in healthcare today. When students from multiple professions learn about, from, and with each other, effective collaboration and communication is enabled and health outcomes are improved (WHO, 2010). This study was designed in four phases that shaped the identifiable tools Google Docs and Google + Hangouts for collaboration during clinical rounding on a patient care unit. A triangulation of data collected was used to identify students' attitudes and beliefs towards technology and clinically focused interprofessional education.

Data analysis showed that for many of the students this was their first experience on a clinical team and, more importantly, their first experience using educational technology for collaboration in the clinical environment. Students stated that the

experience was invaluable, and the faculty noted that the information exchange and collaboration of the students allowed for higher-order thinking and clinical reasoning.

The study showed the potential for interprofessional clinical experiences, no matter how brief, to have an impact on the health profession students' future practice. Based on these findings, collaborative tools are recommended to increase clinical rounding opportunities for students from a variety of professions. It is clear that faculty development for clinical partners to help socialize students to interprofessional practice will not only affect practice, but ultimately patient care.

Chapter 1

INTRODUCTION

More than a decade ago, the Institute of Medicine (IOM) reported that 98,000 people die and close to one million are injured in the United States every year due to preventable medical errors (2000). In response, the IOM urged drastic changes in healthcare delivery. The Joint Commission for Hospital Accreditation reported that 70% of negative patient outcomes resulted from ineffective teamwork, communication, or both (2007). This dramatic percentage of preventable patient outcomes, along with fragmented and episodic care, exacerbates the financial burden on today's already taxed healthcare system.

Since the IOM report, numerous authorities have recommended team-based approaches to healthcare delivery as a means to improving patient outcomes and minimizing medical errors. In 2003, another IOM report, *A Bridge to Quality*, responded to the negative effect that preventable medical errors have on the state of healthcare delivery by urging a change in the way in which healthcare professionals are educated. The IOM report recommended Interprofessional Education (IPE) as a means to decrease errors and meet the ever-changing demands of patient care. The IOM offered basic guidelines to achieve this goal by recommending that “all health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics” (2003, p. 3).

Interprofessional education is an important pedagogical approach for preparing health professional students to provide patient care in a collaborative team environment (Buring et al., 2009). In addition, the IOM (2003) reports that patients receive safer, higher quality care when healthcare professionals work effectively in a team, communicate effectively, and understand each other's roles. This is important because healthcare professionals must be able to effectively collaborate in order to understand the patient's history, create a plan of care, monitor progress, and improve patient outcomes.

Buring et al. also noted that a typical educational environment for healthcare professionals is that of a "silo" in isolation from other healthcare professions members and "traditionally taught within their own schools by members of their own profession" (2009, p. 3).

For many students, exposure to other members of the healthcare team first occurs during their clinical practicum in which interaction may be infrequent and may come with preconceived perceptions that are biased.

In 2010, the World Health Organization (WHO) established a working definition of IPE to ensure all future healthcare practitioners have a foundational knowledge of collaborative care: "IPE is when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (p. 2). Learning together provides opportunities to develop needed skills as a member of a working team. The National Interprofessional Competency Framework was established to ensure all healthcare professions students posed the "needed competencies to function collaboratively on a healthcare team" (Canadian Interprofessional Health Collaborative, 2010).

With the establishment of a focused, IPE-rich curriculum, health professions students are no longer learning in isolation. Rather, at an early stage in their careers, students are beginning to understand the roles, complexities, and contributions that other professions make to improving patient health outcomes. IPE provides opportunities for students to engage in decision-making while focusing on patient centered care.

The IPE pedagogy is dynamic and complex. Finding a common theoretical framework for multiple disciplines to agree upon is challenging. Using an educational foundation for IPE supports the type of transformative learning essential in making substantial changes in attitudes of health professional students, and in so doing will change the way health professionals practice, and will ultimately improve patient outcomes (Oandasan & Reeves, 2005).

"Most health professions students spend more than half of their education in a clinical setting rather than a classroom" (Academic Health Centers, 2003, p. 6). As noted by Burning et al. (2009, p. 2), these clinical settings are often led by individuals who give students little decision making ability. Instead, students receive "scripted responses" when asking anticipated questions, a learning strategy that is not deemed IPE. New approaches to clinical education are needed in order to support students as they develop key IPE competencies and learn to be collaborative practitioners. An effective approach to facilitate interprofessional learning is a "common clinical experience centered on collaboration and decision-making about patient centered care" (Barnsteiner et al, 2007, p. 147).

In 2009 an expert panel of representatives from the Interprofessional Education Collaborative (IPEC) proposed that all healthcare professions students must possess upon

completion of their education four domains of core competencies in order to provide integrated, collaborative, high-quality, and cost-effective care. In 2013, led by the Jefferson Center for Interprofessional Education (JCIFE), the five schools and medical college at Thomas Jefferson University (TJU) adopted the four IPE core competencies for Interprofessional Collaborative Practice into their curricula:

Values/Ethics— Respect the unique cultures, values, roles/responsibilities and expertise of other health professionals.

Roles/Responsibilities— Explain the roles and responsibilities of other health/healthcare providers and how the team works together to provide care.

Interprofessional Communication— Work to ensure common understanding of information, treatment, and health/healthcare decisions by listening actively, communicating effectively, encouraging ideas and opinions of other team members and expressing one's knowledge and opinions with confidence, clarity, and respect.

Team and Teamwork— Reflect on the attributes of highly functioning teams and demonstrate the responsibilities and practices of effective team member(s) (IPEC, 2009).

These core competencies align with JCIFE's mission and goals, which is to develop health care professions students who are able to “incorporate core competencies in interprofessional care across the continuum of health professions education to ensure that everyone provides care that is high quality, safe, patient-centered, collaborative, and evidence-based.”

Framework

IPE focuses on collaborative practice, whereby students who learn together are able to create a knowledge-rich environment that helps establish the foundation of evidence-based practice. These knowledge-rich environments resemble some of the distinct characteristics that social learning theorists term a Community of Practice (CoP). CoPs are groups formed to engage in cooperative learning in a common "domain" (Wenger, 1998). CoPs are distinguished from other learning environments based on three key characteristics: domain, community, and practice. Wenger (1998) defines a domain as the group's shared interest. Members of the group are committed to the domain or interest, but possess a set of shared competencies that distinguish them from others who may share in the domain. The group or community engages in joint activities and social exchanges that help each other gain and share information. Members interact and learn together. The practice is defined by the members, who themselves are practitioners in the shared community's interest. These practitioners develop a shared repository of resources over time.

Wenger's (1998) design framework is crucial for learning in which participants work together in activities that with reflection can overcome differences to address issues. This framework supports the use of IPE in collaborative learning environments such as clinical settings. Students who are engaged in patient centered care develop an understanding that an individual's expertise and knowledge brought to a healthcare team enhances the healthcare team and directly impacts the delivery of quality patient care.

Problem

In 2008, TJU established the Jefferson Center for Interprofessional Education (JCIPE). The mission of the center is to promote excellence in healthcare through interprofessional education and scholarship. TJU has taken a lead in providing its students with interprofessional education experiences. For over six years, health professions students have participated in educational exercises to develop foundational knowledge of collaboration, communication, roles, and patient centered care. A majority of these experiences have centered on team building exercises and team functioning, not necessarily the functioning of the healthcare team. Yet it is widely established that a successful functioning healthcare team collaborates on patient care. Way et al. (2000) noted that “collaborative practice is an interprofessional process for communication and decision making that enables the separate and shared knowledge and skills of care providers to synergistically influence the client/patient care provided” (p. 3). IPE is not a new phenomenon. Forbes and Fitzsimons (1993) noted that an attribute of team collaboration is "interdependence" with members of other professions, whereby combining theories and expertise create a comprehensive patient centered plan of care.

While IPE at TJU has evolved over time, students enter this pedagogy of learning in the beginning stages of their professional career and development. This new working knowledge of interprofessional collaboration has little opportunity to translate into practical application once students begin to practice clinically. In addition to understanding the roles and responsibilities of their own profession, students do not understand how they themselves function on a healthcare team. Movement from interprofessional education to collaborative practice is a current focus of educating

healthcare professions students. When "students from two or more professions learn about, from and with each other, collaborative practice occurs when multiple health workers from different professional backgrounds work together with patients, families, caregivers, and communities to deliver the highest quality of care" (WHO, 2010, p. 10).

In July 2010, JCIPE developed a five-year strategic plan establishing competencies for all healthcare professional students. The goal was to develop a culture of collaborative practice, support innovative learning environments, and become a national leader in developing interprofessional education. JCIPE has created a platform to deliver didactic IPE content, which allows the student to develop basic IPE competencies. More than 3,000 students have participated in IPE activities at TJU, with a majority of these students participating in a two-year Health Mentors program. Students involved in this educational environment receive periodic exposure to activities that promote collaboration, theoretical evidence-based practice, and limited patient centered care. Students spend a majority of their time collecting information and performing team assignments, but little time is spent fostering shared learning and clinical application is hypothetical, not actual.

The final phase of JCIPE's IPE strategic plan is to provide required clinical collaboration experiences or interprofessional practice experience to all students before graduation. Currently, about 10% of all TJU students participate in formal clinical IPE activities (Aston et al., 2012). Thus, a large number of students are missing a vital learning opportunity and sequence that could have a meaningful impact on their own post-graduation clinical practice. In addition, JCIPE has committed to developing competency-driven mandatory clinical IPE placements for all undergraduate students. In

a clinical environment, students would be able to use their new working knowledge in patient-centered, collaborative care to make a transition from the educational environment to the patient bedside. As a result they would enhance outcomes from IPE experience and add to the foundation a structure of clinical practice, ultimately improving patient outcomes. Clinical IPE experiences could support practical application of knowledge acquisition through a CoP.

While there is a willingness to engage students in IPE clinical learning environments, TJU is challenged with competing schedules and course demands. More importantly, it is challenged with the logistics of bringing students together from multiple disciplines. This researcher posits that the utilization of technology could assist with logistics, helping establish and support clinical experiences and an electronic community of practice (eCoP) for students in IPE. “Information technologies provide opportunities for CoPs to facilitate communication among members from different geographic locations and time zones, increasing the diversity of the learning network” (Ho et al., 2010, p. 140). In addition, Ho (2010) and colleagues make the argument that “eCoPs offer theoretical and tangible benefits to health professions who hold disparate expertise” (p. 140).

Key Questions Examined

This Executive Position Paper will examine how to increase the number of students who participate in clinically focused IPE experiences by using technological intervention and Communities of Practice.

1. What are the barriers for implementing interprofessional clinical rounding?
2. What types of information technology (IT) are currently supported at TJU?
3. What role could technology play in increasing the number of students who participate in interprofessional clinical rounding at TJU?
4. Does interprofessional clinical rounding support healthcare professions students' positive attitudes toward healthcare teams?
5. In the context of TJU, what technologies are most appropriate for feasible implementation of interprofessional clinically-focused IPE activities and building Communities of Practice among students?

Chapter 2

METHODOLOGY

Design

The purpose of this EPP is to examine how technology can enhance interprofessional education, particularly clinical rounding. An action research method was used, whereby best practices for communication, collaboration, and interaction were designed and directly observed to answer the key questions of this study. In action research, "participants as well as the researchers participate in the analysis, design, and implementation processes and usually add as much as the researcher to any decision making" (Harrison & Callan, 2013, p. 10). Action research draws its ability for invention and innovation through its cyclical nature so that an issue or problem is progressively addressed through cycles of experimentation and research. This "cyclical process leads to an ever-deeper understanding, not only of the issue/problem, but also of the contextual influences" (Passfield, 2013; Figure 1).



Figure 1. Passfield's Four Phases of Action Research.

There were four phases of data collection for this beginning in the fall semester of 2013 through the first clinical rotation of 2014. Figure 2 illustrates the four phases and timeline for this study. Data were collected through interviews, surveys, observations, and focus groups. The data were analyzed during each phase of the research to identify the feasibility and logistics of technology in a clinical, interprofessional, educational experience.

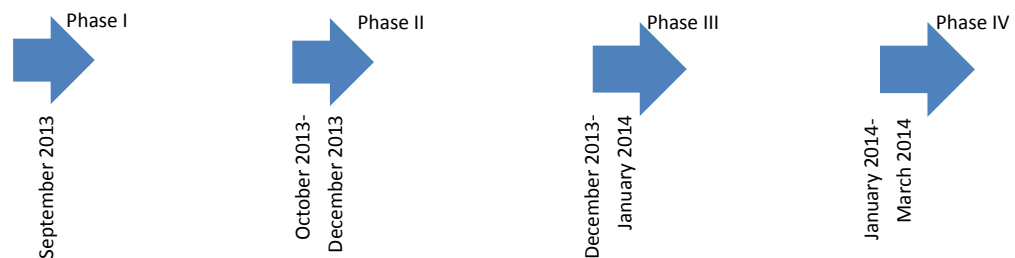


Figure 2. Timeline of Study

Pilot Study

From the fall and spring of 2012-2013, a small pilot of interprofessional clinical rounding was conducted on a colorectal service. Nursing students were grouped with a pharmacy student as well as a medical student on the surgical service. Students huddled mid-morning to collect data on the patient and discuss the plan of care for the day. The nursing students collected data using a paper and pencil method that consisted of several pages (Appendix A). Any data collected during the day was transferred back-and-forth

through face-to-face discussions. The students regrouped mid-afternoon to discuss the patient with the surgeon during clinical rounding. Although students felt the experience was positive for their learning, the physical demands of being at the patient's bedside and the amount of face-to-face communication required hindered the project from developing further with more healthcare professional students participating. Logistics and time limited the potential benefits of collaborative clinical experiences for future students. Why couldn't more students participate in clinical rounding, and did they need to be physically present to meet the learning objectives?

Phase I: Collaborative Action

Participants

The final phase of JCIPE's strategic plan is to provide required clinical collaboration experiences to all students before graduation. Despite the number of interprofessional education opportunities available to students, few experiences are available in clinical practice. In addition, the Center has committed itself to develop, over the next two years, competency-driven mandatory clinical IPE placements for all undergraduate students. With this large undertaking, a plan needs to be developed to provide large numbers of students the opportunity to collaborate in clinical practice. Given the logistical and time issues faced by students, possibilities to use technology and thus bridge the gap were explored as a possible solution.

The participants in the first phase of the study were essential university informants, who were identified in the EPP data framework as representatives from the university Informational Technology (IT) and hospital Information Systems (IS) departments, along with the Co-Directors of the Jefferson Center for Interprofessional

Education (JCIPE). Key informants were identified based on a snowball sampling and by their direct knowledge of desired student learning outcomes, technology and network systems, and system limitations to connect and support students in a collaborative learning environment. Four key informants were identified and semiformal conversations occurred over a one-week period using a convergent interview method to gather data. Written notes were documented and analyzed for feasibility of the solution suggested.

Data Analysis

Key question number 1: What are the barriers for implementing interprofessional clinical rounding?

Jefferson Center for Interprofessional Education

The Co-Directors of JCIPE expressed positive feedback from students and the supervising surgeon regarding the interprofessional colorectal clinical rounding. The Co-Directors reported disappointment in the small number of students who had the opportunity to participate and the withdrawal of pharmacy student participation. One Co-Director remarked:

It's sad that pharmacy can't participate in rounding. They added to the conversation. Students felt they (pharmacy students) helped them identify issues they wouldn't have thought of before. The issues are logistics. For all the schools, it's logistics. For the pharmacy students to join the bedside rounding, a pharmacist has to be with them. And, it is difficult for the pharmacist to leave the satellite pharmacy and come out to the patient's bedside. There is no one to cover the pharmacy.

The Co-Directors also discussed the strategic plan to develop competency-driven, mandatory, clinical IPE placements for all undergraduate trainees over the next two years. One co-director said:

Given the small number of students who can currently participate, since schools find it difficult to fit clinical IPE in their course of study, makes it very hard for all of us. We need to find a way to make it work for everybody. We have to make the schools see the benefits from collaborative clinical interprofessional education. It's time to move past the classroom. Everyone benefits from clinical collaboration, students, and eventually patients. They will take this with them in the real world when they start working, and it will make a difference.

Key question number 2: What types of IT are currently supported at TJU?

University and Hospital Information Technology

Using "expert" referral to identify informants, in-person interviews of local knowledge experts of technology infrastructure took place over a one-week period. Two local experts were identified: the Director of Academic and Instructional Support and Resources (AISR) at TJU IT and the Jeff IT Student Support Manager. The Director of AISR discussed the platforms available to ensure both student and patient security. Wireless networks exist for students and faculty, ensuring student authentication and security within the university. However, Thomas Jefferson University Hospital (TJUH) does not support those networks in its clinical settings. The hospital has its own secure networks that are for hospital clinical personnel and not students. Despite the fact that the university and hospital are geographically proximal, they function under two different

network security systems. TJUH does support an open access network that does not require passwords or user authentication. The AISR Director stated :

This is an issue, the hospital won't let our students on a secure network while in the hospital, they have to use Jeffguest, which often is slow and blocks a lot of network travel. It is really meant for patients and people visiting the hospital. I get HIPAA regulations, but they should just create a wireless network for students. They are always over there. We are supposed to be one department now, but we still act as two separate entities.

The TJU learning management system (LMS) is Blackboard Learn and the university uses Gmail for student email communication. Blackboard Learn supports the use of collaboration tools such as wikis, but requires students to log into the LMS in order to collaborate. TJU does not support all features of Google™ due to the inability of Google to secure off-continent data storage. Only a few features of Google are supported. One of those features is the collaborative tool Google Docs™, as the Director of AISR continued,

The problem is again using Jeffguest. Students can get to the LMS, but the connectivity is so slow for them making the wiki feature frustrating. We can ask the head of IT security to see if the students can use Google Docs as a collaborative tool.

The Jeff IT Manager of Student Support provided the bridge communication between the university and hospital. He also supported the decision to use the

collaborative tool Google Docs as the most secure feature available to the students that the university would support for data transfer and collection.

Analysis of the interview data helped guide selection of the technology to be used to enhance the next iteration of interprofessional colorectal rounding. In addition, this analysis ensured the most appropriate technology available, feasibility of the technology to be used in the hospital setting, and likelihood of adoption by students. Through strategic planning and with the guidance of the IT Security Officer, the decision to use Google Docs was made. Students could create a Google account using their Jefferson Gmail address, not a personal email address, to ensure data safety. All data collected would contain no patient identifiers, ensuring compliance with IRB, TJUH IT, and HIPAA requirements.

With the withdrawal of the pharmacy students due to logistics and unavailability, an invitation was sent to the pharmacy faculty to participate in clinical rounding to determine the feasibility of the technology and the process for future pharmacy students to become involved in clinical rounding. One faculty member offered to join the clinical rounding team virtually.

Phase II: Observation and Data Collection

In action research, observers also act as participants to reflect upon group experiences and to help increase understanding of the information and adjust as needed (Passfield, 2013). This interaction between researcher and participants provided opportunities for change during real-world circumstances and to effect change as needed in real time. Throughout this phase of the study, the researcher was an active participant in the study.

Participants

Students enrolled in Jefferson School of Nursing are randomly assigned to clinical groups by course faculty. A convenience sample of eight first-year nursing students was obtained by those assigned to the patient care unit 7 Center at Thomas Jefferson University Hospital during their first clinical rotation in the fall of 2013, one day a week for eight weeks. Figure 3 shows the demographics of the participants. All eight students consented to participate in this research, via IRB consent letter (Appendix B).

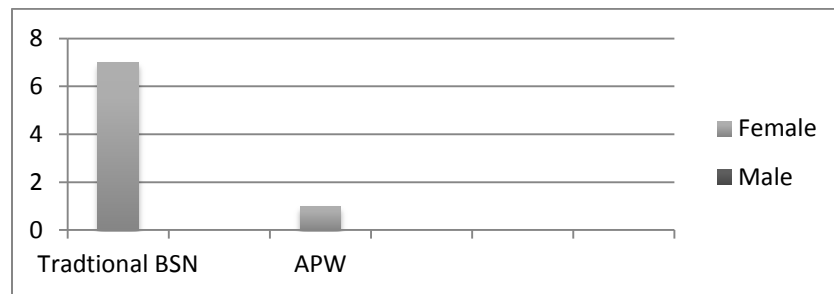


Figure 3. Demographics of Participants in Phase II

An invitation was sent to 15 randomly selected faculty members of Jefferson School of Pharmacy asking for participation in virtual clinical rounding. Three faculty members responded with interest. The researcher then met with the faculty members to explain the research and their potential participation and the hope for eventual student participation. One faculty member agreed to act as a pharmacy consultant to the group. An initial meeting was set up with that pharmacy faculty member to explain the purpose of the study, the faculty role in the study and the logistics of the study. The pharmacy consultant was familiar with Google Docs and did not require orientation to its features as a collaborative tool. In addition, this faculty member practiced off campus and had no access to patient charts.

The researcher also invited two other healthcare professions departments (Physical therapy and Occupational therapy) on campus to participate, and to determine feasibility of future student participation. But neither accepted the invitation to participate.

During the third year of medical school, students are required to complete a 12-week surgical rotation. Students are assigned a different surgical rotation for three to four weeks. The colorectal surgeon conducting the clinical rounding has two different medical students assigned to their team every three weeks during the semester. These students were approached every time a new pair was assigned to the surgeon about participation in this phase of the study. All medical students agreed to use the collaborative tool for patient clinical rounding, but declined to participate in survey data collection or focus groups. Observational and journaling data was collected on the medical students' participation in clinical rounding.

Data Collection

All eight nursing students consented to participate in this research project. Prior to beginning the interprofessional clinical rounding, students were given the Attitudes Toward Health Care Team Survey (ATHCTS) by Heinemann, Schmitt, and Farrell (1994). The survey (Appendix C) was developed to evaluate practice-based team training programs for healthcare students and clinicians in geriatrics. The ATHCTS measures team members' perceptions of the quality of care delivered by healthcare teams and the quality of teamwork. In addition, it measures team members' attitudes toward physician authority within teams and their control over information about patients. The scale is valuable in assessing clinical-team training. The survey consists of 20 Likert-type items

with responses ranging from strongly disagree (1) to strongly agree (6). Heinemann also developed two subscales: Quality of Care and Physician Centrality. The tool was designed to be used to capture results of educational programs intended to improve attitudes toward interprofessionalism and to enhance teamwork. Heinemann et al. conducted psychometric testing in three phases (1999).

Hyer et al. further established the reliability of the survey and modified it to contain 21 questions (2000). Leipzig et al. (2002) tested the 21-item tool with modification of three subscales: attitudes towards team values, attitudes toward team efficiency, and attitudes towards the physician's shared role on the team. Higher total scores reflect more positive attitude towards team work. Previous research in interprofessional education has shown the ATHCTS to be a reliable and valid measure of individual attitudes and perceived behaviors toward teams (Grymonpre, 2010).

Prior to the interprofessional clinical rounding, students were given the Team Skills Scale (TSS) by Hepburn, Tsukuda and Fasser (1996), which is a self-assessment measure of participation as a member of a healthcare team. The TSS (Appendix D) is a 17-item, 5-point Likert-type scale with values ranging from 1 (poor) to 5 (excellent). Higher scores reflect more positive perceptions of team skills. Psychometric testing shows the TSS has good reliability (Grymonpre, 2010).

All undergraduate nursing students at TJU are required to purchase an iPad for their course of study. The iPad is utilized in the clinical setting a number of ways, including continual collection and assessment of data at the patient's bedside. Given this information, the researcher decided the nursing student would initiate the collaborative tool for patient centered care among the team members. Once the nursing students

initiated the collaborative tool, they would invite the other team members to participate in the collaboration and interprofessional approach to the patient's clinical care.

Since this was the first clinical experience for these nursing students, instruction was given on the expectations of meeting with medical students assigned to their patient for clinical rounding, how to collect data, report data to the team, and what would be asked of them by the surgeon during clinical rounding. Students expressed anxiety related to rounding for the first time and the researcher decided that the first week of data collection would be observational only, allowing students to collaborate with each other without using the collaborative tool. It was also decided that the pharmacist would not participate the first week to allow students to be acclimated to the procedure of rounding together.

At mid-morning, the medical and nursing students "huddled" together to discuss the patient assigned for clinical rounding. One patient was assigned to a team. The number of patients assigned for rounding was surgery caseload-dependent and varied from week to week. At least one team consisting of a nursing student and medical student rounded weekly. The researcher provided direction and guidance to nursing students regarding medical terminology, patient diagnosis, and plan of care. The collaborative tool was introduced after the first week of rounding. Students were given a brief tutorial on Google Docs and how it worked for real time collaboration. In order to ensure data security, the researcher set up a Google Drive™ account just for this study. Every student was invited to share the clinical rounding document through Google Docs. By the direction of Jefferson IT, to establish document security students were instructed to create Google Drive accounts using their Jefferson Gmail address and not a personal

email address. The collaborative tool document used by all students was created by the researcher and assigned a number. There were eight clinical rounding documents that were randomly shared individually by the researcher through the Google Drive account with each assigned nursing student.

The researcher met with the third-year medical students and explained the study every time the students rotated onto the service. Although the medical students agreed to use Google Docs for collaboration and patient rounding, no medical student agreed to complete the ATHCT and TSS scale, nor participate in a focus group at end of Phase II. Given the short time allotted and additional requirements on the colorectal surgical rotation, medical students felt they could not participate fully in the study.

During week two of clinical rounding there was a technology device issue; no nursing student had an iPad in the clinical setting. Unbeknownst to the researcher, students were discouraged by staff from bringing iPads to clinical for fear of being lost or stolen. The students did not have a secure area on the clinical patient floor to keep the iPads while were performing patient care. The researcher encouraged students to use the limited desktop computers on the patient care units to initiate the collaboration tool. Students invited the partnered medical student and pharmacist through Google Drive to collaborate on a patient centered plan of care. The pharmacy consultant added comments, questions, and suggestions to the information provided by the nursing and medical students. Using a desktop computer for collaboration made clinical rounding challenging later in the day for the pharmacist to participate through Google Docs. The researcher acted as the conduit for the group present at bedside and the pharmacist off site. Frequently, connectivity was lost during rounding by the nursing student. The

pharmacist suggested that Google+ Hangout™ be used for live communication during patient rounding the next time the group met. With the Google Docs on the desktop computer creating mobility and availability issues, an alternative needed to be considered for the next clinical rounding. Since all students on the clinical patient floor had a smart phone, the researcher suggested they download Google Drive on their personal device to access Google Docs.

With the use of smart phones making mobility and real-time collaboration more manageable, entering data on the document became inefficient due to too much typing and data input. The author suggested students use the voice-to-text feature on the devices to dictate data. Patient data contained no identifiable information, eliminating any HIPAA concerns while the students dictated. The researcher also utilized Google+ Hangouts with the pharmacist during actual rounding. Since the pharmacist was in a location in which she could not use the video feature due to patient privacy rights, the text feature was used for all communication. Again, the researcher acted as the conduit for communication amongst team members. The remaining weeks of clinical rounding occurred using smart phones, voice-to-text features for data entry on the collaborative tool, and Google+ Hangouts to support interprofessional clinical rounding.

Additional data was collected by the researcher through weekly observations, journaling, and intervention, when needed. At the end of the clinical rotation, a semi-structured focus group was conducted with all eight nursing students. Due to end-of-semester time conflicts, the pharmacist was unable to attend on the date and time scheduled. Since the pharmacist provided logistical data, her presence was not essential to moving on to the next phase. Likewise, all the medical students who rotated through

the colorectal service were invited to attend, but declined citing school scheduling interference. The focus group was audio recorded and transcribed in full.

Phase III: Evaluation and Reconceptualisation

Analysis of all data collected during Phase II helped inform and reconceptualize the project for another implementation of technology in interprofessional practice during colorectal clinical rounding, this time conducted in the early spring 2014 semester.

Quantitative Analytical Data

Interprofessional education is woven throughout all curricula at TJU. From the first semester, students are introduced to other professions, collaboration, team work, and patient centered care. Assessing the attitudes, skills, and behaviors related to healthcare teams is a key evaluation of the impact interprofessional education has on a student. A baseline assessment of the eight first-year nursing students' attitudes, perceived skills, and behaviors helped develop and implement effective approaches to clinical rounding and interprofessional practice. Results were analyzed using descriptive statistics for overall survey results. Survey data were analyzed by calculating the means and standard deviations for each item using Microsoft Excel 2010. The means of each item were added together to get a total score for the sample group. This phase of the study was to obtain logistical information regarding use of technology during interprofessional clinical rounding. No post-intervention survey was given.

Findings

Attitudes Toward Health Care Team Scale (ATHCS)

The ATHCS has been used as an evaluation method for team building interventions for healthcare professionals. The 21-item (score range 0 to 105) survey has

three subcategories: Attitudes toward team value, attitudes toward team efficiency, and attitudes about the physician's role on the team (Leipzig, 2002). Per the survey authors, to provide consistency in which high scores reflect incorporation of positive attitudes towards team work, coding was reversed for nine items.

The total mean score for the first group of student participants was 74, with a standard deviation of .49, which indicates that students have a "generally" positive attitude towards teams. Given the clinical inexperience of the nursing students, their total mean score was notable in that they started their clinical educations with a relatively positive attitude toward healthcare teams. Table 1 shows the descriptive analysis of ATHCTS data.

Table 1. Attitudes Toward Health Care Teams Scale

Item	Strongly Disagree		Moderately Disagree		Somewhat Disagree		Somewhat Agree		Moderately Agree		Strongly Agree		Mean	SD
	n	%	n	%	n	%	n	%	n	%	n	%		
Working in teams unnecessarily complicates things most of the time	0	0%	0	0%	1	12.5%	3	37.5%	1	12.5%	3	37.5%	3.75†	1.16
The team approach improves the quality of care to patients	2	25%	0	0%	0	0%	0	0%	3	37.5%	3	37.5%	3.37	2.13
Team meetings foster communication among team members from different disciplines	2	25%	0	0%	0	0%	0	0%	3	37.5%	3	37.5%	3.37	2.13
Physicians have the right to alter patient care plans developed by the team	0	0%	3	37.5%	1	12.5%	4	50%	0	0%	0	0%	2.12†	0.99

Patients receiving team care are more likely than other patients to be treated as whole persons	1 12.5%	2 25%	0 0%	0 0%	2 25%	3 37.5%	3.12	2.10
A team's primary purpose is to assist physicians in achieving treatment goals for patients	3 37.5%	1 12.5%	4 50%	0 0%	0 0%	0 0%	1.12	0.99
Working on a team keeps most health professionals enthusiastic and interested in their jobs	0 0%	0 0%	1 12.5%	1 12.5%	3 37.5%	3 37.5%	4	1.06
Patients are less satisfied with their care when it is provided by a team	0 0%	0 0%	0 0%	0 0%	4 50%	2 25%	4†	0.75
Developing a patient care plan with other team members avoids errors in delivering care	0 0%	0 0%	0 0%	0 0%	4 50%	4 50%	4.5	0.53
When developing interdisciplinary patient care plans, much time is wasted translating jargon from other disciplines	0 0%	0 0%	2 25%	4 50%	2 25%	0 0%	3	0.75
Health professionals working on teams are more responsive than others to emotional and financial needs of patients	0 0%	0 0%	2 25%	3 37.5%	2 25%	1 12.5%	3.25	1.03

Developing an interdisciplinary patient care plan is excessively time consuming	0	0%	0	0%	0	0%	4	50%	3	37.5%	1	12.5%	3.62†	0.74
The physician should not always have the final word in decisions made by the healthcare team	0	0%	0	0%	2	25%	2	25%	3	37.5%	1	12.5%	3.37	1.06
The give and take among team members help them make better patient care decisions	0	0%	0	0%	0	0%	1	12.5%	1	12.5%	6	75%	4.62	0.74
In most instances, the time required for team meetings could be better spent in other ways	0	0%	1	12.5%	2	25%	1	12.5%	2	25%	2	25%	3.25†	1.48
The physician has the ultimate legal responsibility for decisions made by the team	0	0%	2	25%	2	25%	1	12.5%	3	37.5%	0	0%	2.65†	1.30
Hospital patients who receive team care are better prepared for discharge than other patients	0	0%	1	12.5%	0	0%	1	12.5%	3	37.5%	3	37.5%	2.65	1.35
Physicians are natural team leaders	0	0%	0	0%	0	0%	3	37.5%	3	37.5%	2	25%	3.87†	.83
The team approach make the delivery of care more efficient	0	0%	1	12.5%	0	0%	0	0%	2	25%	5	62.5%	4.25	1.38

The team approach permits health professionals to meet the needs of family caregivers as well as patients	0	0%	0	0%	1	12.5%	2	25%	1	12.5%	4	50%	4	1.19
Having to report observations to the team helps team members better understand the work of other health professionals	0	0%	0	0%	0	0%	0	0%	1	12.5%	7	87.5%	4.87	.35

Note: $N = 8$. †per the authors of the survey, reverse coding of question for total higher score

Subscales for the ATHCTS were further tested and defined by Hyer et al. (2000).

The ATHCTS was originally designed to evaluate healthcare professions who were exposed to an IPE activity. Hyer et al. (2000) tested the sub scales with students regarding their attitudes toward healthcare teams and means of communicating about the components of team care. Alpha coefficients for the three subscales are acceptable and ranged from .075 to 0.85, thus adding to the psychometric testing for reliability and validity. Table 2 displays the subscale items of the ATHCTS. Scoring the subscale is determined by the mean of the questions.

Table 2. Attitudes Toward Health Care Teams Scale Subscales

Attitude Toward Team Value Subscale 1	Attitude Toward Team Efficiency Subscale 2	Attitude Toward Physician's Shared Role on Team Subscale 3
The team approach improves the quality of care to patients	Working in teams unnecessarily complicates things most of the time	Physicians have the right to alter patient care plans developed by the team
Team meetings foster communication among team members from different disciplines	Patients are less satisfied with their care when it is provided by a team	A team's primary purpose is to assist physicians in achieving treatment goals for patients

Patients receiving team care are more likely than other patients to be treated as whole persons	When developing interdisciplinary patient care plans, much time is wasted translating jargon from other disciplines	The physician should not always have the final word in decisions made by the healthcare team
Working on a team keeps most health professionals enthusiastic and interested in their jobs	Developing an interdisciplinary patient care plan is excessively time consuming	The physician has the ultimate legal responsibility for decisions made by the team
Developing a patient care plan with other team members avoids errors in delivering care	In most instances, the time required for team meetings could be better spent in other ways	Physicians are natural team leaders
Health professionals working on teams are more responsive than others to emotional and financial needs of patients		
The give and take among team members help them make better patient care decisions		
Hospital patients who receive team care are better prepared for discharge than other patients		
The team approach make the delivery of care more efficient		
The team approach permits health professionals to meet the needs of family caregivers as well as patients		
Having to report observations to the team helps team members better understand the work of other health professionals		

In the subscale, Attitudes Toward Team Value, the 11 items (score range 0 to 55) measure levels of agreement on statements such as, “the team approach improves the quality of care to patients” and “the give and take among team members helps them make better patient care decisions.” For this group, the mean rating was 3.77 (SD = 0.76), which indicates that the students have a positive attitude towards healthcare teams. Students agreed that working in teams provides value to patient care. The five-item Attitudes Toward Team Efficiency subscale (score range 0 to 25) measures levels of agreement on the efficiency of teams with such statements such as “working in teams unnecessarily complicates things most of the time.” The group’s mean rating was 1.55

(SD = 0.45), indicating students have a positive attitude toward how working in teams is an efficient use of their time. The five-item Attitudes Toward Physician's Shared Role on a Team subscale (score range 0 to 25) looks at attitudes toward the physician's shared role on a team and measures the level of agreement on such questions as "physicians have the right to alter patient care plans developed by the team" and "physicians are natural team leaders." The group's mean was 2.35 (SD = 0.20). This sub-category showed that students had some disagreement about the shared roles on a team.

Team Skills Scale (TSS)

The TSS measures current knowledge about team skills that contribute to quality team work. The total mean for the scale was 64.33 out of a possible 85 (SD = 0.42), which indicated students have good perceptions of team skills. One student did not answer question number 29 (Table 3).

Table 3: Team Skills Scale

Item	Poor		Fair		Good		Very Good		Excellent		Mean	SD
	n	%	n	%	n	%	n	%	n	%		
Function effectively in an interdisciplinary team	0	0%	0	0%	3	37.5%	1	12.5%	4	50%	4.12	0.99
Treat team members as colleagues	0	0%	0	0%	1	12.5%	2	25%	5	62.5%	4.5	0.75
Identify contributions to patient care that different disciplines can offer	0	0%	0	0%	1	12.5%	3	37.5%	4	50%	4.25	0.74
Apply our knowledge of geriatric principles for the care of older persons in a team care setting	0	0%	1	12.5%	2	25%	3	37.5%	2	25%	3.75	1.03
Ensure the patient/family preferences/goals are considered when developing the team's care plan	0	0%	0	0%	1	12.5%	2	25%	5	62.5%	4.5	0.75

Handle disagreements effectively	0 0%	1 1.25%	2 25%	3 37.5%	2 25%	3.75	1.03
Strengthen cooperation among disciplines	0 0%	1 1.25%	2 25%	3 37.5%	2 25%	3.75	1.03
Carry out responsibilities specific to your discipline's role on a team	0 0%	0 0%	2 28.5%	1 14.2%	4 57.3%	4.28	0.95†
Address clinical issues succinctly in interdisciplinary meetings	0 0%	1 12.5%	3 37.5%	2 25%	2 25%	3.1	1.06
Participate actively at team meetings	0 0%	1 12.5%	3 37.5%	0 0%	4 50%	3.87	1.24
Develop an interdisciplinary care plan	0 0%	1 12.5%	3 37.5%	2 25%	2 25%	3.1	1.06
Adjust our care to support team goals	0 0%	1 12.5%	4 50%	1 12.5%	2 25%	3.5	1.06
Develop intervention strategies that help patients attain goals	0 0%	2 25%	2 25%	2 25%	2 25%	3.5	1.19
Raise appropriate issues at team meetings	0 0%	1 1.25%	2 25%	4 50%	1 12.5%	3.37	0.91
Recognize when the team is not working well	0 0%	0 0%	5 62.5%	1 12.5%	2 25%	3.62	0.91
Intervene effectively to improve team functioning	0 0%	1 12.5%	1 12.5%	4 50%	2 25%	3.37	0.99
Help draw out team members who are not participating actively in meetings	0 0%	1 12.5%	0 0%	5 62.5%	2 25%	4	0.92

Note: N = 8. †N = 7

Observational Data and Field Notes

Quantitative data does not allow for students to expand on questions asked about team functioning. Additional data were obtained through field notes and a focus group to better understand student perceptions.

During the first two weeks of clinical, students were given the JCIPE colorectal service clinical rounding packet, which was used during the pilot the year before this project was initiated. Students were given a six-page data collection sheet along with an observation guide. The 10-item yes/no observation guide (Appendix A) elevated students' observations of team functioning in identifying the five core interprofessional competencies all students should possess upon graduation. Students responded to questions regarding observations of good functioning teams, such as "do members of the team encourage the ideas and opinions of other members?" as well as communication, such as "do members of the team actively listen to each other?" The observations guide also provided opportunity for students to comment on their observations.

Overall, students felt the team functioned well with the physician leading the group, but there was not a sense of team collaboration. Students remarked, "Everyone had something to say from a different standpoint," and "Everyone had something to contribute." Although students felt everyone had something to say, little connection to collaboration was felt amongst them. In addition to the students' observation data, field notes were kept by the researcher. First-semester nursing students have little ability to conceptualize the roles of a nurse on a clinical unit, let alone the nurse's role as a member of a healthcare team. Students were observed conversing with medical students and exchanging patient data with little collaboration of care noted. Students were overheard to say, "The medical student basically said everything I told him, I feel like I have nothing to add."

Formative evaluation was continuous, and field note observation data showed nursing students' anxiety regarding completing data collection on their assigned clinical

patients and data for rounding. Field notes also observed medical students' frequent visits to the unit to get patient "updates" to present at rounding. Creating a document that could collect data to serve both purposes, address collaborations of healthcare providers, and focus on patient centered care was a priority. After reviewing other data collection tools, a clinical rounding document was introduced to students on the second week of clinical rounding. Field notes from the use of the document describe students' feelings of ease using the document; however, it is important to note that the document was not fully completed due to students' uncertain time management and unfamiliarity of their role as a nurse. Once students were introduced to the Google Docs for collaboration, students were able to quickly share the document with the medical students, thus decreasing the medical student "visits" to the unit for patient updates.

Nursing students were mentored in discussing nursing assessments of patients during clinical rounding, helping define their role as the patient's nurse and member of the healthcare team. Patient data was provided by both the medical and nursing students on the collaborative tool, which in turn fostered team collaboration. With the introduction of the Google Docs came a new team member, namely, the pharmacy faculty member. Questions asked by the pharmacist to the nursing students served to clarify treatments and medications prescribed. Noted entries on the Google Docs show one-way communication from the pharmacist. Internet unavailability and student lack of familiarity of the features of Google Docs required the researcher to act as a conduit between the team at bedside and the pharmacist.

Observational data also showed frustration from both the researcher and students with the lack of computers available to use for collaboration and the inability to secure iPads when students were providing patient care.

Operational Procedure

Key question number 3: What role could technology play in increasing the number of students who participate in interprofessional clinical rounding at TJU?

Time was spent with students to download the Google Drive app and learn how to use the voice-to-text feature on smart phones. All eight students had a smart phone that had a voice-to-text feature. The introduction of Google+ Hangouts took place in week four in order for the pharmacist to be present during rounding. Google+ Hangouts is a messaging app that lets a person send and receive messages and video calls with one or more people. Due to the inexperience of the nursing students related to clinical care, the researcher provided the exchange of questions, clarification, and recommendations between the pharmacists and the team. Due to security issues at the site in which the pharmacist was located, only text exchanges occurred.

The field note observations during later weeks of rounding in which the pharmacist joined the group show responses and exchanges by team members. Valuable educational opportunities were verbally noted by not only the students, but also by the resident, the intern, and physician on the team. Qualities of a learning community were noted during those exchanges. In CoPs, knowledge exchange is achieved through social exchanges, and new knowledge is built through those exchanges. The participants came together in Phase II utilizing a collaborative tool as one of the learning domains to exchange knowledge and collaborate on patient centered care. Examples of collaboration

with Google Docs can be seen in Appendices G and H. Figure 4 is an example of Google Docs collaboration.

Today's Date: 11-20-13			Admission Date: 11-18-13		
Patient's Initials: DY		Age: 61		Sex: F	
Admission Dx: Surgery for Benign neoplasm LG bowel					
Code Status: Full code			Advance Directive: No		
General Health Status: Good					
History of Present Illness: 61 year old female who had a routine colonoscopy on 10/31/13 with Dr. Goldstein and 2 polyps were seen. Pt. reports a smaller polyp was removed but there was a larger polyp, 4cm, that was unable to be removed via colonoscopy and Dr. Goldstein recommended surgical removal. Biopsy revealed tubular adenoma. Scheduled laparoscopic open right hemi colectomy					
Health Condition(s) - Medical Hx: Hepatitis A (age 5), fibroids (leiomyoma) - s/p hysterectomy, wears contact lenses					
Any Medication Allergies?					
2:27 PM Nov 20					
kff004					
2:42 PM Nov 20					
Yes. Pt is allergic to penicillin					

Figure 4. Google Docs Collaboration Example in Phase II

Once the logistics of technology were established and the nursing students became more comfortable in their role as the nurse, the researcher withdrew from rounding immersion and observed team interaction and function for the rest of the clinical rotation, but still provided the link for text exchange between the team and the pharmacist. Field notes reveal more social exchanges occurred between the nursing and medical students as students became more familiar with the unit, their role, and the rounding process.

Focus Group

At the end of the clinical semester, a focus group was conducted using semi-structured iterative questions to elicit opinions about the success and challenges of clinical rounding and the use of technology. The focus group was audio recorded and transcribed in full. During the interview, students were asked about their experiences with clinical rounding, interprofessional education, and the technology used. Students were encouraged to expand upon their answers. Analysis was primarily inductive, with themes emerging from the data and informed by the theoretical framework of interprofessional education, Communities of Practice, and use of technology.

Findings

The following sections emerged as common themes from the data analysis: data collection, role delineation, collaboration, technology, and recommendations.

Data collection: Students noted that at first the thought of clinical rounding was anxiety provoking and the data gathering felt overwhelming.

“...My first [clinical rounding] was a little nerve wracking because I didn’t know what to expect out of it. Especially when there are like different levels of education so you gotta go from your perspective so you have to make yourself look good obviously.” NS#1

“...At the beginning I have the information but I don’t understand the information. You have to look up everything one at a time so I’ll be able to know...just gather the information.” NS# 3

Role delineation: Many of the students felt that clinical rounding helped them identify their role as a nurse.

“...Our way of thinking had to change, I needed to look at it from a nursing perspective and look at it more conception than theory.” NS # 2

“...This is very important in nursing so you all have the same goal in treating the patient but their thinking is so different, ...you’re thinking what intervention do I do first and their like their CBC is this and their other thing is that, it’s definitely different, very medical.” M.D. NS #1

Collaboration: As clinical rounding progressed and the Google Docs was introduced, students felt they were part of a team that they collaborated on to deliver patient centered care.

“...for instance, this med student was like she’s not in pain any more she can go home and I had to, I didn’t want to be a jerk, but I had to correct him and be like no I have been with her all day the oral medication is not working she’s in pain and sure enough when we asked her she was in a great deal of pain.” NS #2

“... It makes you feel part of it. It made me feel, when I was doing the rounding, I was like hey I’m part of something; I’m not just a student...the doctor was actually listening to us validating what we had to say. Walking into patient’s room reaffirming what we say and making a decision on our opinion and what came out of our mouths it wasn’t like ok, NOW RN, It was like I’m valuing what you’re saying.” NS # 1

“.... That time we had the pharmacist I loved it. I was like “oh.” No one thought to ask about that and they were like, “oh” she’s right.” NS #2

Students wished they had more members on clinical rounding other than the pharmacist.

“...I had a patient who was super concerned about getting her laundry done when she went home and was trying to explain to me her house. It would have been nice to put in the Google Docs a PT [physical therapist], “hey this is a main concern,” can you help us, not just me with general you’re going home stuff.” NS # 8

Technology: Students agreed that the Google Docs was a collaborative tool that helped gather data and start interprofessional patient centered focus.

"...how can I tell you in five minutes what has happened all day it's impossible we can't do it, with the Google Docs it's like you want to know look you can see everything you can read it whenever you have free time compared to in five minutes I have to tell you what happened in the whole eight or twelve hour shift.” NS #5

“...the good thing about the Google Docs is that it would save automatically so even if you did get kicked out it wasn't like you had to start all over.” NS# 6

“...the Google Docs was very interprofessional...It's more of a platform to go off of as diving off the same one as doctors were on.” NS # 3

“...the voice-to-text was really easy once I got used to it.” NS# 6

Recommendations: The group as a whole felt that if clinical rounding were to be done again, time should be spent orienting students to the expectations of their participation in clinical rounding and better help them to understand collaboration.

“...next time give them an idea of what they should be looking for, a list of how you should think.” NS # 2

Students felt if data collection could be done via a touch screen app, then obtaining it would be much easier. Also getting phone notifications when the document was updated would help, instead of continuously checking throughout the day.

All data from Phase III was evaluated to inform the next phase of the project.

Phase IV: Further Experimentation

Phase IV takes into consideration evaluation and re-conceptualization, which can be immediately implemented to improve the action. Redesign of student instructions, members of the team, and technology implementation were reconceptualized over the university's winter break and readied for implementation for the first clinical rotation of spring 2014.

Site

The colorectal surgery service is a champion of interprofessional education through its integration of interprofessional, student-led clinical rounding. At Thomas Jefferson University Hospital, patients are assigned to particular units within the hospital by their corresponding physician service. Patients assigned to the colorectal surgeon who led interprofessional, student-led clinical rounding are placed on 7 Center and 13 Pavilion. Those two units were used as the sites for Phase Four of interprofessional, student led clinical rounding.

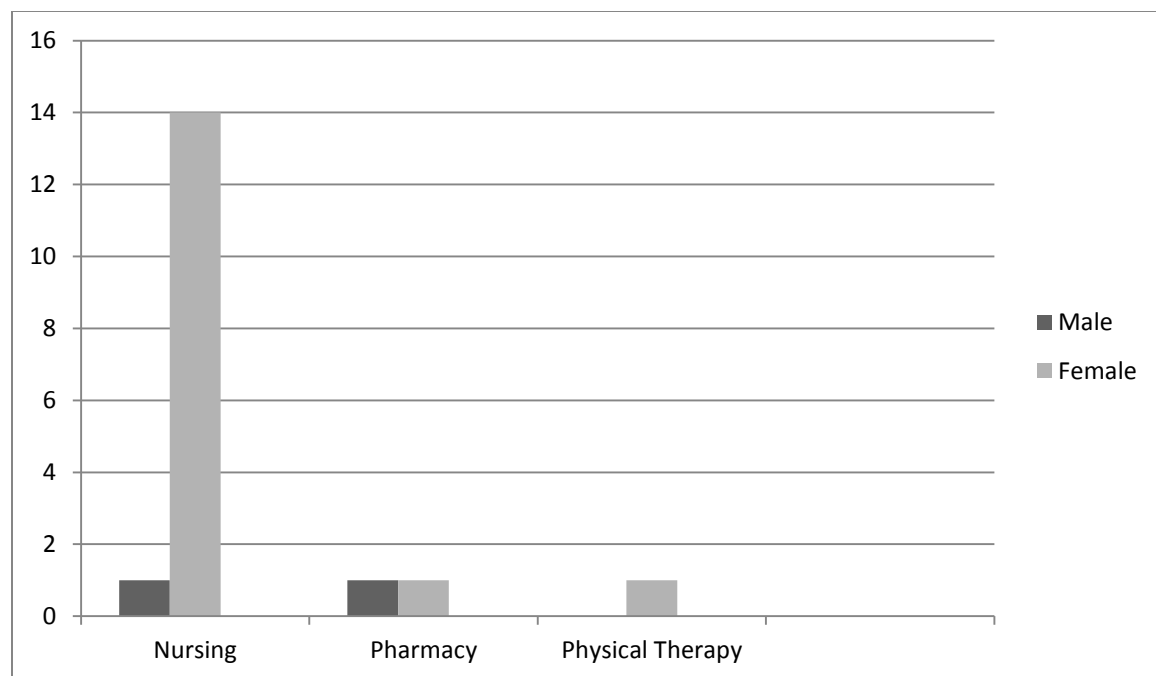


Figure 5. Demographics of Participants in Phase IV

Participants

Nursing Students

Just as with patients assigned to patient care units based on their physicians, clinical rotations in nursing school are based on specialty and course content. Students enrolled in their last semester of nursing school are assigned randomly to clinical groups. A convenience sample of fifteen second-year, last-semester nursing students assigned to 7 Center and 13 Pavilion was obtained. These were different students than those who participated in Phase II.

Pharmacy Students

During Phase II the pharmacist was from an outpatient practice and recommended that students who would be on an inpatient service would be more appropriate for inpatient clinical rounding. An invitation was sent to all inpatient clinical pharmacy faculty soliciting student volunteers to participate in clinical rounding. One clinical

pharmacy faculty member responded with interest for her students to participate. As is the case with nursing students, pharmacy students are randomly assigned to a clinical inpatient pharmacy unit. There are no inpatient pharmacy units on 7 Center, or 13 Pavilion. Instead, two fourth-year pharmacy students assigned to the inpatient pharmacy unit on 3 Northeast volunteered to participate in clinical rounding. Students were given orientation to their role on the team and the purpose of the research study. Given the pharmacy students' main clinical patient population on 3 Northeast, which is a different patient population than on the clinical rounding unit, students would join the team virtually through Google Docs and Google+ Hangouts as a consultant with the inpatient pharmacist as the students' preceptor. The pharmacist preceptor role was to advise students on the scope of practice as a pharmacist for this patient population. Orientation to the collaborative tools was also given to students, but not required, since students were familiar with Google Docs and Google+ Hangouts.

Physical Therapy Students

Based on focus group feedback, an invitation was sent to the occupational and physical therapy faculty to help solicit student volunteers to join interprofessional colorectal clinical rounding. One physical therapy faculty member accepted the invitation to act as a student preceptor and invited second-year students in her anatomy class to participate on a volunteer basis. One second-year physical therapy student volunteered to act as a physical therapy consultant. The faculty member acted as a mentor to the student on the scope of the role of a physical therapist on an inpatient healthcare team. The student had classes scheduled on the days of clinical rounding on campus and would join the group virtually through Google Docs and Google+ Hangouts. Orientation

was given to the student on her role on the team as well as Google Docs and Google+ Hangouts.

Medical Students

Third-year medical students are assigned a 12-week surgical rotation that is broken up into a series of three to four weeks. Students are randomly assigned to the colorectal service and rotate on and off the service at different times than the clinical rotations for other healthcare professions students. Students were directly approached every time a new pair was assigned to the colorectal team about the study. Students agreed to participate in rounding with other members of the team, but chose not to participate in survey data collection or a focus group.

Data Collection

Seventeen students consented to participate via IRB consent form in this final phase of the research project. One nursing student who had previously participated in the pilot of clinical rounding declined to participate. Students were given the ATHCTS and the TSS surveys at the start of their clinical rotation. Both surveys, as explained in Phase II, assessed attitudes towards perceptions of healthcare team values, efficiency, shared role responsibility, and self-assessment of participation as a member of a healthcare team. The TSS was used as a reference point since all students had previously participated in an interprofessional education activity other than clinical rounding. A baseline assessment of their skills was desired by the researcher to inform data collected.

Instructions for the logistics of when clinical rounding would occur and the creation of a Google account were given to students. A majority of students already had

Google accounts and were familiar with the use of Google Docs and Google+ Hangouts. No instructions were given on how the team should function, nor the amount of participation expected. A Google Docs clinical rounding document was created for each nursing student and assigned a number. Only the researcher knew who was assigned to each document, which was kept on a secure network site. A pharmacy student was assigned to each patient care unit using the Google Docs. Since the pharmacy student was at a different physical location in the hospital, they did not know, nor did they meet the nursing student or medical student assigned to their particular patient care team. The physical therapy (PT) student was assigned to each nursing student's Google Docs. Like the pharmacy student, the PT student was located at a different site on campus and did not meet physically with the team. The nursing student acted as lead on initiating the document since the student was the first to see the patient she was rounding on that day and added the medical student to the document. During this phase of the project, the researcher maintained an observation-only role and assisted only with technical questions or problems when encountered with the hospital wireless system or technology used.

A methods triangulation using data from observational field notes, Google Docs documentation and formative assessment during rounding was used to address different dimensions of interprofessional education and technology. Triangulation allows a researcher to capture a more complete and contextual portrayal and reveal varied dimensions of a given phenomenon. Triangulation can decrease bias and enhance validity (Perone and Tucker, 2003).

As stated during the pilot and Phase II, interprofessional clinical rounding took place one day per week on a colorectal service. Due to patient census issues, only four

patients over a six week time frame were available for clinical rounding. In addition, one pharmacy student was away and could not participate. It was then decided that the other pharmacy student would act as the consultant to all patients on both units. The nursing student was instructed to include that student on their Google Docs.

At the end of the six-week clinical rotation, only the six students who participated in clinical rounding were invited to attend a semi-structured focus group. In addition, four medical students who participated in clinical rounding were also invited, but declined due to other clinical obligations. Focus group participants were given the ATCHTS to complete in addition to the Team Performance Scale (TPS) by Thompson et al. (2009).

The TPS (Appendix E) is an 18-item survey with a scale from 0 (none of the time) to 6 (all of the time) and a total possible score of 108. The TPS tool has been shown to allow researchers the ability to quantitatively assess the quality of team and small-group interactions, especially in settings that employ small groups such as in collaborative learning environments. Psychometric testing was conducted to assess and validate the proprieties of the TPS. The TPS was shown to have favorable psychometric properties that included a short administration time, high internal consistency, a proportion of explained item variance (66%) supporting construct validity, and evidence of triangulation with a published peer evaluation scheme (Thompson et al., 2009). The tool measures a student's perception of the quality of team interaction. The higher the score, the more participants think positively about the learning that occurs in team interactions. The tool has been tested for psychometric reliability and showed good construct validity. For this group, a scale rating from 1 (none of the time) to 6 (all of the time) was given.

Qualitative data was collected to gain further understanding regarding the use of technology and the interprofessional clinical rounding experience. "Qualitative methods facilitate study of issues in depth and detail. It produces a wealth of detailed information about a much smaller group of cases" (Patton, 2002, p. 14). "Qualitative research provides complex textual descriptions of how people experience a given research issue," (Mack et al., 2005, p. 1).

A focus group was conducted using semi-structured questions to elicit opinions about group exchanges, team functioning, clinical rounding, and interprofessional practice. In qualitative research, a focus group provides a rich and deep understanding of lived experiences and participants perceptions, which are rooted in the environment of a particular setting, information that cannot be obtained through surveys (Murphy et al., 1998). The interview was audio recorded and transcribed in full.

Participant observational field notes were kept throughout the study. "Through participant observation and recording, factors are uncovered that are important for a thorough understanding of the research problem, but were unknown when the study was designed" (Mack et al., 2005 p. 14).

Findings

Key question number 4: Does interprofessional clinical rounding support healthcare professions students' positive attitudes toward healthcare teams?

Quantitative data in this study was used as a baseline to assess students' attitudes toward healthcare teams, how they function in a team, and how their team functioned together. The data are presented here. Responses for each question from each participant were entered in to Microsoft Excel 2010 and analyzed for the mean and standard deviation.

ATHCTS

Scoring for the scale is described in Phase III (see above, page 23). The total mean pre-clinical rounding for the Phase IV group was 79.84 (SD = 0.19) out of a possible 105, which indicates that students have a generally positive attitude towards teams. The total post-clinical rounding mean for this group was 87.33 (SD = 0.39) out of 105, which shows an increase in positive attitudes towards healthcare teams. Pre-test scores for students in Phase II and Phase IV are relatively the same. There is no significant difference noted in students' attitudes towards healthcare teams based on years of education, but a significant difference in the pre/post-test score of students in Phase IV may suggest that types of exposure, however small, may affect a student's attitudes towards healthcare teams. Due to the mismatched sample sizes, a pre/post-test statistical analysis cannot be done due to the likelihood of errors in inference (Statsoft, 2000). Statistical analysis of this pre/post-test data can create bias in the correlation matrix, producing a significance that may or may not bear any merit to the data.

This EPP focused on an Action Research project to incorporate technology to enhance IPE in clinical settings. Descriptive analysis aims to determine the means, or common tendency, of data presented which can offer a researcher better understanding of the overall data collected. The aim of descriptive analysis is to summarize a sample, rather than use the data to learn about the population that the sample is thought to represent (Dodge, 2003). A descriptive analysis of the ATHCTS post-test is presented in Table 4.

Table 4. Attitudes Toward Health Care Teams Scale: Post-test Results Phase IV ($N = 6$)

Item	Strongly Disagree		Moderately Disagree		Somewhat Disagree		Somewhat Agree		Moderately Agree		Strongly Agree		Mean	SD
	n	%	n	%	n	%	n	%	n	%	n	%		
Working in teams unnecessarily complicates things most of the time	0	0%	0	0%	0	0%	1	17%	2	33%	3	50%	4.3†	0.81
The team approach improves the quality of care to patients	0	0%	0	0%	0	0%	0	0%	0	0%	6	100%	5	0
Team meetings foster communication among team members from different disciplines	0	0%	0	0%	0	0%	0	0%	0	0%	6	100%	5	0
Physicians have the right to alter patient care plans developed by the team	0	0%	0	0%	0	0%	2	33%	2	33%	2	33%	4†	0.89
Patients receiving team care are more likely than other patients to be treated as whole persons	0	0%	0	0%	0	0%	1	17%	3	50%	2	33%	4.16	0.75
A team's primary purpose is to assist physicians in achieving treatment goals	0	0%	0	0%	0	0%	3	50%	2	33%	1	17%	3.6†	0.81

Working on a team keeps most health professionals enthusiastic and interested in their jobs	0	0%	0	0%	0	0%	0	0%	2	33%	4	67%	4.66	0.51
Patients are less satisfied with their care when it is provided by a team	0	0%	0	0%	0	0%	1	17%	2	33%	3	50%	4.3†	0.81
Developing a patient care plan with other team members avoids errors in delivering care	0	0%	0	0%	0	0%	1	17%	2	33%	3	50%	4.3†	0.81
When developing interdisciplinary patient care plans, much time is wasted translating jargon from other disciplines	0	0%	1	17%	0	0%	2	33%	2	33%	1	17%	3.3†	1.36
Health professionals working on teams are more responsive than others to emotional and financial needs of patients	0	0%	0	0%	1	17%	2	33%	2	33%	1	17%	3.5	1.04
Developing an interdisciplinary patient care plan is time consuming	0	0%	1	17%	0	0%	1	17%	3	50%	1	16%	3.5†	1.37

The physician should not always have the final word in decisions made by the healthcare team	0	0%	0	0%	2	33%	0	0%	4	67%	0	0%	3.33	1.03
The give and take among team members help them make better patient care decisions	0	0%	0	0%	0	0%	0	0%	1	17%	5	83%	4.83	0.40
In most instances, the time required for team meetings could be better spent in other ways	0	0%	0	0%	0	0%	1	17%	4	67%	1	16%	4†	0.63
The physician has the ultimate legal responsibility for decisions made by the team	0	0%	0	0%	2	33%	2	33%	1	17%	1	16%	3.16†	1.16
Hospital patients who receive team care are better prepared for discharge than other patients	0	0%	0	0%	0	0%	0	0%	4	67%	2	33%	4.3	0.51
Physicians are natural team leaders	1	17%	3	50%	2	33%	0	0%	0	0%	0	0%	4.16†	0.75
The team approach make the delivery of care more efficient	0	0%	0	0%	0	0%	0	0%	3	50%	3	50%	4.5	0.54

The team approach permits health professionals to meet the needs of family caregivers as well as patients	0	0%	0	0%	0	0%	0	0%	5	83%	1	17%	4.1	0.40
Having to report observations to the team helps team members better understand the work of other health professionals	0	0%	0	0%	0	0%	0	0%	0	0%	6	100%	5	0

Summed scores were obtained for the three subscales, as described in Hyer et al. (2000). The three subscales look at attitudes toward team value, team efficiency, and shared roles. When looking at the subscales for pre and post evaluations, students had an increased change in attitude toward team value on physicians shared roles. Attitudes towards team efficiency did not change much after clinical rounding. Table 5 shows Phase IV pre and post-test subscales mean and standard deviation.

Table 5 Pre and Post-test Scores for Attitude Subscale

ATHCTS	Pre <i>n=19</i>	Post <i>n=6</i>
1. Team Value	42 (SD = 0.51)	49 (SD = 2.83)
2. Team Efficiency	18 (SD = 0.66)	19 (SD = 0.46)
3. Shared Roles	14 (SD = 0.93)	18 (SD = 0.42)

Team Skills Scale (TSS)

The mean total for the Team Skills Scale was 64.82 (SD = 0.12) out of a possible 85. The students had an almost "very good" self-perception of team performance skills which indicates students feel they have skills necessary to participate in and on a team. Students' self-perceptions of team performance skills from students in Phase II and Phase IV are nearly the same. Again, assessing the type of IPE exposure may impact students' perceptions of the skills they bring to a healthcare team in order for it to function collaboratively. Students in Phase IV had been previously exposed to other IPE activities, but not clinical rounding, yet their perceptions of their skill set were about the same as new students who have never been exposed to an IPE activity.

Team Performance Scale (TPS)

The mean total score for the Team Performance Scale in Phase Four was 95.33 (SD = 0.26) out of a possible 108 points. The data show an overall good quality of learning that took place in clinical rounding. Since Phase II was extensively for identifying feasibility, students in Phase II were not given the TPS. There is no data to compare with Phase IV.

Observation and Field Notes

Clinical rounding was conducted as described in Phase II. Colorectal patients were identified on the morning of clinical rounding. The nursing students initiated data collection on the Google Docs and informed the medical student that the Google Docs could be used as a collaboration tool. Medical students and nursing students were observed to be more at ease with each other and were often seen in social exchanges as well as knowledge transfer. Knowledge sharing occurred for then when a patient's

surgical procedures and conditions were explained to nursing students in depth by medical students. Pharmacy and physical therapy students viewed their shared documents to see when data was initiated on the Google Docs and commented as needed. Frequent monitoring of the Google Docs throughout the day showed frequent contributions by the medical and nursing students to update the document.

Clinical rounding took place later in the day. The medical student and nursing student joined the colorectal surgeon and his team on the unit to discuss the patient's plan of care. The team was observed to stand in a large circle. The medical students were often using a smart phone to report medical data. The nursing students were observed to use either a mobile device or a smart phone to report their nursing update for the patient. The nursing students also reported any questions from the pharmacy or physical therapy student to the team. Due to technical issues, the pharmacy student and physical therapy student could only join the group through the text feature of Google+ Hangouts. The researcher monitored Google Hangouts+ to see if either student who joined the group virtually had any other questions or concerns. The team on the unit then met with the patient to discuss the plan and elicit the patient's input. When the team finished, the researcher updated the virtual students on any changes to the patient's plan of care, and the surgeon asked if they had any questions. Due to hospital renovations, some weeks had no patients available for clinical rounding. The researcher informed students that no rounding would be completed on those days.

Google Docs

Key question 5: In the context of TJU, what technologies are most appropriate for feasible implementation of interprofessional clinically focused IPE activities and building Communities of Practice among students?

As in previous phases, students used Google Docs to collaborate inter-professionally on patients for clinical rounding. Entries were made throughout the day by different team members. Figure 6 shows an example of a clinical rounding Google Docs.

Health Condition(s) - Medical Hx. HTN (controlled) Type II Diabetes	Allergies: (Food, drug, other)
Physical Therapy student 12:56 PM Jan 29 From sPT - Ask about regular/daily skin checks on feet. Sensation on feet is important for balance --> decr risk of falls, and mobility. Also from PT - is he actually managing his DM2 through exercise/Diet?	
4:17 PM Jan 29 Pt takes very good care of feet. Wash, inspect, lotion, daily along w daily toenail treatment for broken big toenail. Will ask about DM2 mgmt specifically	

Figure 6. Google Docs Collaboration Example in Phase IV

Analysis of the Google Docs shows members' assessments of data collected, clarification, recommendations, and knowledge transfer among team members. Full examples of team Google Docs can be found in Appendices I and J.

Focus Group

The focus group was audiotaped and transcribed for content analysis. Content analysis "refers to searching text for recurring words or themes" (Patton, 2002, p. 453). In addition, the researcher made notes during the session. No individual identifiers were

noted and all student names were eliminated during transcription. A discussion guide was created based on the key questions of this EPP (Appendix F). A guide provides the moderator with topics to be covered at some point during the focus group (Wong, 2008). Data were coded by hand then further coded into themes by color for a narrative description categorized by knowledge exchange, IPE core competencies, and technology.

Knowledge exchange. Students described knowledge exchange occurred during clinical rounding. When asked about meaningful knowledge exchange, several students were noted to nod their heads and frequently agree with others that clinical rounding was beneficial to learning, collaboration and how they functioned on a healthcare team versus other IPE activities they have been involved in. A subtheme from knowledge exchange was the awareness of patient safety during team exchanges.

Subject 2: "I think our exchanges were meaningful, there were a lot of things brought up I mean all the interactions were meaningful...I don't know if you were the pharmacy student or not."

Subject 1: "I was the only one that did it so yeah."

Subject 2: "You added questions about different meds that I wouldn't have thought of like I think the aspirin dose that my guy was on was real high.... Yeah and I brought it up to the team when they rounded and they didn't know why he was on such a high dose. So that was definitely meaningful and the questions it brought up."

Subject 2: "Like I said, think about things differently and understand things better. There are things that the med students were explaining that made everything make so much more sense...I was able to understand the whole situation."

IPE core competencies. Students' comments reflected the IPE core competencies of value/ethics, role/responsibilities, interprofessional communication, and teamwork.

Subject 2: "I learned, I mean outside of pharmacy and before I started doing all this interprofessional stuff, I had no idea what anyone else—I mean I thought I

did but actually...now I know what everyone does. I've learned way more than I ever could just by myself."

Subject 4: "...here through how what you were doing you learn actually about the professional division of what different fields do... how to react in a professional manner."

Subject 4: "Passing along I mean little slivers of the pie to others to all come together. You guys may know [pointing to nursing student] 75% of everything but that 25% can really impact patient safety like the aspirin dosing. Even physicians don't know it all. No one really knows it all so five minds are better than one."

Subject 3: "I think it makes collaboration easier."

Subject 6: "Because it only behooves the students to be able to see in practice what the other professions....experience more things."

Technology. Students liked the collaborative tool Google Docs as it provided a platform for collaboration among team members in real time despite physical barriers.

Due to technology infrastructure issues, students had some frustration with Google+ Hangouts and its unreliability with the video component.

Subject 5: "I interacted with med students face to face and it kind of helped—I was able to give him an idea of how the patient was doing. But, I think it could've been just via the Google Docs."

Subject 3: "It was kind of everyone coming together and doing everything at the same time...Like with the Google Docs you share it all with multiple people and we were all able to see it and provide input to it." Subject 1 interrupts: "Yeah and the big thing is that we all do that with charts, but not everyone can look at the same as Google Docs, everyone can look at the same time."

Subject 1: "You could be anywhere, calling on the phone to the pharmacy you'd have to be in the pharmacy, but with a Google Docs you could be anywhere and still get the information relayed."

Subject 2: "It allows you to get information in real-time."

Subject 4: "I couldn't get on Google+ Hangout, because of security issues in [building], but video conferencing would have helped me see the patient walk, which is a big, big thing to tell further down the road."

Subject 1: "In the hospital the computers would not let me get to Google+ Hangouts, I used the Google Docs to text type to the team...I would have liked to hear your conversation during rounding, and maybe see the patient, just to say hi."

Summary

This EPP was an action research study to find the best technology available for students to enhance interprofessional education in the clinical setting. Data analyzed throughout each phase of the study informed the next phase. In Phase IV, students utilized the collaborative tool Google Docs to bring together different members of the healthcare team, who previously were unable to participate due to logistics and schedules, which led to an enhanced patient centered care.

Students reported finding benefit in interprofessional education, in particular clinical practice, however short. Students' attitudes towards working as a member of a healthcare team were positive, reinforcing the value of interprofessional practice to create quality patient care. How a group comes together, face-to-face or virtually, does not matter, as long as there is a way for all members to collaborate together. Collaborative tools such as Google Docs and Google+ Hangouts remove some of the common barriers such as logistics and schedules that are impediments to interprofessional practice. Interprofessional clinical patient rounding supports the integration of the IPE competencies that all students from TJU are expected to have upon graduation.

Chapter 3

RECOMMENDATIONS

Shifting paradigms in healthcare delivery require that health professions educators add interprofessional collaborative practice to interprofessional education. Healthcare professions students are traditionally socialized to the practice of their discipline. In addition, they must be socialized to be a participating member of a healthcare team. Overcoming logistical and timing issues is essential for creating collaborative experiential learning. This action research study showed how logistical issues could be addressed through use of a collaborative tool, such as Google Docs, which allows more students to participate in interprofessional clinical practice.

Results from this project indicated students' positive attitudes toward healthcare teams and interprofessional collaboration when students participate in interprofessional education in clinical practice. Based on the findings in this study, recommendations are presented as follows.

Interprofessional Collaborative Practice Pedagogy

Interprofessional education is gaining momentum across the country and is becoming standard for many healthcare professions accrediting bodies. The Essentials of Baccalaureate Education for Professional Nursing Practice (2008) addresses core knowledge expected of graduates of baccalaureate nursing programs. It serves as an "educational framework" (AACN, 2008, p. 4) with Essential VI addressing

interprofessional communication and collaboration for improving patient health outcomes.

A central goal of IPE is to develop the knowledge, skills, and attitudes of healthcare professions students. This will translate into better patient care and functioning members of a healthcare team. Thus, interprofessional education for collaborative patient-centered practice (IECPCP) is needed more than ever. While all students at TJU are exposed to some degree to interprofessional education, a preponderance of that exposure is focused on team building and not team functioning. Task exposure is beneficial to students, but it does not always equal learning; practice needs guidance and requires measurement and feedback (Burke, Salas, Wilson-Donnelly & Priest, 2004).

Appropriately preparing students for collaborative practice necessitates structured learning experiences to include collective problem-solving and group interaction, in which clinical practice settings provide an active learning environment for students in interprofessional education to transfer knowledge to practice (Wellmon, Gilin, Knauss and Linn, 2012; Nisbet, Hendry, Rolls & Field, 2008).

Research data shows students experience a benefit to their learning when they are exposed to interprofessional education in clinical practice, even with small amounts of exposure (Grymonpre et al., 2010). Wellom et al. (2012) found that relatively short educational opportunities prior to graduation can positively change attitudes toward learning and collaboration.

Pre/post-test data subscales of the ATHCTS showed an increase in attitudes towards team value (Team Value subscale). This EPP centered on the feasibility of

increasing the number of students who participated in clinical rounding, but data collected also revealed a positive reflection of student perceptions in clinical rounding.

Table 6. ATHCTS Team Value Results

ATHCTS	Pre <i>N</i> = 19	Post <i>N</i> = 6
1. Team Value	42 (SD = 0.51)	49 (SD = 2.83)

In this EPP, focus group data showed that students had a positive experience during clinical rounding.

Subject 2: "You added questions about different meds that I wouldn't have thought of like I think the aspirin dose that my guy was on was real high... Yeah and I brought it up to the team when they rounded and they didn't know why he was on such a high dose. So that was definitely meaningful and the questions it brought up."

It allowed for further acquisition of role identity, collaboration with real time communication and clarification of patient care.

Subject 4: "Here through how what you were doing you learn actually about the professional division of what different fields do...how to react in a professional manner."

Students' exposure to clinical practice, however abbreviated, provided an opportunity to impact their future practice. Ogbeide et al. (2013) found that prior experience with interdisciplinary teams positively influences non-physicians' attitudes towards collaborative care, which can impact practice and, ultimately, patient care. Interprofessional learning in a clinical setting is reported to have a positive outcome for

practice in that setting, as evidenced by interviews with healthcare professionals (Price et al., 2009).

Socializing Students to Interprofessional Practice and Clinical Rounding

When healthcare professions students enter their educational programs, socialization to their profession begins immediately. This type of socialization helps students identify what makes their profession distinct. The valuable contributions individual students make to health care often occur in isolation from other learners from other professions and results in the development of a "uni-professional identity" (Carpenter & Dickinson, 2008; Gilbert, 2005). The development of a uni-professional identity can beget misunderstandings and prejudice towards other professions and mistrust in others' competencies (Khalili et al., 2013). Evidence of uni-professional identity may be one of the contributing factors of why the medical students did not participate in the focus groups during Phase II and IV.

Khalili et al. (2013) identified the need for interprofessional socialization (IPS) and the development of a dual identity for students. This dual identity is the first step toward creating interprofessional collaborative practice. IPS has three stages: (1) breaking down barriers, (2) interprofessional role learning, and (3) dual identity development. Students can move toward developing an interprofessional identity by participating in collaborative interprofessional activities, such as clinical practice. Khalili et al. (2013) also state that the stages are not linear but rather iterative. With the development of dual identity, students who are further along in their education would benefit from IPS in the

clinical rounding. Nursing students in their first semester of clinical participated in Phase II, while nursing students in their last semester of clinical participated in Phase IV.

“This is very important in nursing so you all have the same goal in treating the patient but their thinking is so different, ...you 're thinking what intervention do I do first and they're like their CBC is this and their other thing is that, it's definitely different, very medical.” (M.D. NS #1, Phase 2, Focus group)

As indicated by results from this EPP, students in Phase II had a positive attitude towards clinical rounding from the education it provided to increase their knowledge base rather than the potential for collaborative learning that it has to offer. Although students in Phase IV also had positive attitudes towards clinical rounding, their stated benefits resulted from collaborative learning from each other and not the surgeon conducting the clinical rounds.

"I think it makes collaboration easier." (Subject 3, Phase IV, Focus group)

In providing interprofessional clinical educational opportunities for students, socialization to their profession should be considered when introducing interprofessional socialization in a clinical area to achieve student learning outcomes (Khalili et al. 2013).

Integration of Technology

As more students representing different healthcare professions enter TJU and with the creation of a new Physician's Assistant program starting in the fall of 2014, providing opportunities for students to participate in interprofessional education becomes more difficult. Challenges in schedules, number of students, and clinical placement are some of the issues faced by all who are committed to interprofessional education across the country (Anderson, 2011).

Computer Supported Collaborative Learning (CSCL) is the educational process that allows groups of learners to collaboratively construct knowledge on a topic in pursuit of a learning goal or objective with the assistance of a computer (Graesser et al., 2008). The integration of collaborative learning tools can help bring together students who would not otherwise be able to join interprofessional collaborative practice. Such learning support can foster communities of practice. A community of practice (CoP) as defined by Wenger (1998) is a group that comes together to work on a common purpose "defined by knowledge rather than task." Interprofessional education creates the understanding and knowledge of CoPs that help students develop the skills needed to be active members. As students move through IPS, the connection to members of a community to support their learning process is greatly needed. With the adoption of technology, virtual communities of practice (Ardichvili, 2008) can help link members together, creating an environment of collaboration.

The use of technology requires that the technology be easy to use in the learning process. Although much has been written about the use of wikis for collaboration, this project could not recommend the use of wikis because the infrastructure at Jefferson does not support such collaborative tools in the clinical area. Google Docs has proven to be an easy-to-integrate tool for collaborative learning. Google Docs allows for synchronous and asynchronous viewing and editing, leading to knowledge construction and allowing for more meaningful collaborative learning experiences (Kieser & Golden, 2009).

"The Google Docs was very interprofessional. ...It's more of a platform to go off of as diving off the same one as doctors were on. " (NS #3)

"You could be anywhere, calling on the phone to the pharmacy you'd have to be in the pharmacy, but with a Google Docs you could be anywhere and still get the information relayed." (Subject 1)

"It allows you to get information in real-time." (Subject 2)

Google Docs can be an invaluable means of maintaining continuity between off-site preceptorship and the classroom (George, 2012). In the case of this project, the off-site classroom is the clinical collaboration experience. Examples of this collaboration are seen in Appendices I and J.

Google Docs provides students the opportunity to develop IPS no matter where they are located and facilitates the inclusion of more students in IPE activities. Data from the focus group in Phase 4 showed that students received added benefit from participating in clinical rounding even though some members were not physically present.

Mobile learning (m-learning) is the educational pedagogy that uses mobile devices to support a learning context (Cochrane & Bateman, 2010). Cochrane and Bateman note that m-learning embodies experiential learning that can be facilitated anywhere, anytime, and is student centered; there are key components that can support IPE. With TJU's rapid adoption of mobile devices such as the iPad to facilitate student learning, Computer Supported Collaborative Learning (CSCL) can be adopted easily for interprofessional education in clinical practice. This can help students overcome barriers such as time, location and schedules. Although the data from the action research did not specify which mobile device was best, it still provided information that smart phones and mobile devices work well with the Google Docs and Google+ Hangouts.

Educational Technology Advisory Group

To support and advise educational technology use at TJU, a committee known as ETAG (Educational Technology Advisory Group) exists. The group consists of

representatives from each of the schools within the university, and various information technology experts on campus.

The mission of the group is to promote closer coordination between Academic and Instructional Support Resources (AISR) and Jeff IT as well as the college and their schools to enhance the use of technology in medical and health sciences education.

More specifically, the IT strategic plan calls for this group to:

- Discuss and identify significant new technology needs of faculty and students.
- Provide "heads-up" of anticipated services that may affect university IT infrastructure.
- Encourage the use and sharing of instructional technology resources across the University.
- As requested, vet proposals for major new initiatives and advocate for funding.
- Advise AISR and Jeff-IT on instructional technology priorities.
- As requested, advise on policy changes that affect technologies related to teaching and learning.

It is to JCIPE's benefit to become an active member of this group for coordination of CSCL, as well as integration of technology in the clinical practice setting.

In the fall of 2013, a new president was hired to oversee both the hospital enterprise of

TJUH and the academic center TJU. With the arrival of Dr. Steven Klasko, the university and hospital boards voted to merge. In April of 2014, Dr. Klasko unveiled his Blueprint for Strategic Action (BSA) highlighting an emphasis on interprofessional education and

innovation. JCIPE is positioned in a most important strategic position to lead Jefferson in strategic interprofessional innovation in education.

Clinical Partner Facilitator Development

For interprofessional education to be successful, and for students to develop competencies needed for interprofessional practice, facilitators of IPE need to be skilled not only in their own practice, but also in interprofessional education, which requires faculty development (Silver & Lesile, 2009). Many facilitators currently were not exposed to interprofessional education themselves and developed their skills through trial and error in practice, with some lacking in interprofessional competencies.

JCIPE has a small administration with limited resources. All faculty involved in interprofessional education are volunteer faculty. Clinical facilitators (preceptors, adjuncts, and mentors) are a vital piece of increasing interprofessional education clinical practice. In addition, many clinicians have little to no educational preparation in teaching, having developed their teaching style from past experience, which can perpetuate the "uni-professional" belief.

While JCIPE has developed a small faculty development program, a more robust program would benefit those involved in facilitating interprofessional learning. The UK Centre for the Advancement of Interprofessional Education (CAIPE) established key knowledge and skills that all IPE teachers/facilitators should possess:

- A commitment to interprofessional education and practice
- Credibility in relation to the particular focus of the IPE to which the educator contributes
- Positive role modeling

- An in-depth understanding of interactive learning methods and confidence in application
- A knowledge of group dynamics
- Valuing diversity and unique contributions
- Balancing the needs of individuals and groups
- Inner conviction and good humor in the face of difficulties

Drawing on key concepts from adult learning theory, a faculty development program grounded in "tailored teaching" (Hewson, 2000) could provide IPE facilitators with the needed skills and competencies for interprofessional clinical practice.

IPE is now becoming standard in health professions curriculums. A voluntary program that offers faculty development in IPE through the Continuing Education Unit (CEU) may encourage more clinical partners to consider becoming more involved in clinical IPE. Thought should also be given to offering a faculty development series that would augment the knowledge, attitudes, and skills of facilitators to become certified IPE facilitators. The National Commission for Certifying Agencies (NCCA) has recently defined certification as "a process, often voluntary, by which individuals who have demonstrated the level of knowledge and skill required in the profession, occupation, role, or skill are identified to the public and other stakeholders" (NCCA, 2004).

Institutional Collaboration

With the launch of Jefferson's BSA and its emphasis on interprofessional education, efforts should be made by Jefferson administration to support JCIPE in expanding IPE in clinical practice. One way to increase opportunities for students to participate in IPE clinically would be to identify clinical facilitator champions to form an

advisory group for JCIPE to transition IPE into practice. In addition, the clinical partners could be the first cohort in the IPE certification group.

Changes in knowledge, skills and attitudes and their impact on practice and patient care take time to implement and to evaluate. A longitudinal study looking at Jefferson graduates in practice is needed to help define the stages of IPE integration at Jefferson. In addition, opportunities for IECPCP using graduates needs to be created to help socialize healthcare professionals and study the impact IPE has on patient care.

Topics for Additional Study

This EPP was designed to establish the best technology available to increase student participation in IPE in clinical practice and note if students' attitudes changed after clinical rounding. Although the participant group size was small, it was established that a mobile device or smart phone could be supported by the hospital IT infrastructure. Additionally, this EPP project found that a collaborative tool, such as Google Docs, was an appropriate platform to support collaborative learning. A repeat of the study with a larger cohort and/or in a different setting would be beneficial to add to the body of knowledge already known in IPE.

Due to infrastructure support issues, the Google+ Hangouts feature of Google Drive was not able to be fully implemented in this EPP. Additional study is recommended in the following areas:

- Does a video feature such as Google+ Hangouts add to the richness of clinical rounding?
- Do the students' levels of education impact student attitudes toward healthcare teams in clinical rounding?

- What are clinical facilitators' perceptions of a collaboration tool in clinical rounding?

IPE is thought to have a direct impact on patient care, but the extent and nature of its impact has not been determined. As more students develop the knowledge, attitudes, and skills for collaborative practice, patient outcomes and quality of care should improve. Additional studies on the effect of IPE on patient care would help quantify the impact of IPE.

Dissemination of Information

Logistical issues prevent IPE from being successfully implemented in health professions curricula across the country. Technology that facilitates collaboration, such as Google Docs, can help remove some of those barriers. An article based on this EPP about the logistics of using Google Docs and Google+ Hangouts has been accepted for publication in the Interprofessional Education and Care Newsletter, a peer reviewed tri-annual publication that aims to disseminate current information and innovative projects advancing interprofessional education, evaluation, research and practice.

This study will be replicated on a designated patient floor unit dedicated solely to the clinical placement of Jefferson students. The researcher will be the key faculty member to implement the study and assume the lead in initiating technology to enhance IPE. The researcher will also be the JCIPE representative on the university ETAG committee.

Further, in September 2014, this content will be presented as a podium presentation at the NLN Education Summit 2014. In addition, the logistics of this study will be a plenary presentation at the first enterprise IPE retreat at Jefferson.

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APPENDIX A

STUDENT MATERIALS

Interprofessional Clinical Rounding: Colorectal Service – Student Agenda

Time	Activity	Location	Form
Prior to clinical rounding	1. Attending physician will give a brief orientation to the medical students 2. JSN Clinical Instructors will give a brief orientation to nursing students 3. JSP faculty will give a brief orientation to pharmacy students		
11am -11:30am (13 Pavilion) 11:30am-12pm (7 Center)	1. The medical and pharmacy students will meet the Clinical Instructor (CI) on 13 Pavilion 2. The CI will introduce the medical and pharmacy students to the nursing student(s) 3. The medical/nursing/pharmacy student team will use the <i>Student Worksheet</i> to gather and discuss assessment data for the clinical rounding: • the patient's current plan of care (i.e. medications, allergies, IV Fluids, treatments, recent/pending studies) • study results, trends in labs and assessments (i.e. comparison with baseline findings), responses to interventions to date • anticipated date of discharge • interprofessional plan of care for discharge (i.e. outstanding treatments, procedures, and consults as applicable) 4. The medical and pharmacy students will then meet the CI on 7 Center and repeat activities 2 and 3.	• 13 Pavilion • 7 Center	• Student Worksheet
3pm <i>Approximately 10 minutes for each patient case</i>	1. The team will meet at the patient's bedside for assessments. The team is the attending physician, pharmacy faculty, CI, medical, pharmacy and nursing students. 2. The team will discuss the patient's case outside the room. The team includes: attending physician, pharmacy faculty, CI, medical, pharmacy and nursing students, interns, residents, fellows, charge nurse or designee and other available care providers. a. <i>Team introduction</i> b. <i>Student presentation of patient case</i> c. <i>Questions and Answers:</i> interactive dialogue to identify and prioritize patient care, modify interventions, goals and provide any constructive feedback related to the interprofessional plan of care d. <i>Medical/student team enters the patient room and assess the patient</i> e. <i>Post-patient meeting/Wrap-Up:</i> summarize the interprofessional plan of care 3. The attending physician, medical students, interns, residents, fellows, pharmacy faculty and student(s) will rotate to 7 Center and repeat activities 1 to 3.	• 13 Pavilion • 7 Center	• Student Worksheet
After rounding	1. Students are requested to complete the observation guide.	• Observation Guide	

Observation Guide

This guide is designed to help you in assessing the extent to which the group you are observing is behaving as an interprofessional team. The characteristics noted are considered to be examples of good team functioning. Please indicate Y if you observed something that described each characteristic, an N if it was missing. Use the additional space to give an example of why you answered the way you did. Please feel free to leave an area blank if you can't decide if a characteristic is present or not. ****Place your completed observation guide in the Colorectal Service Clinical Rounding folder (red binder).***

Date: _____ Your program: _____ Year in Program (circle one) 1 2 3 4

Curricular Activity: Colorectal Service Clinical Rounds

Team Characteristic	Y/N	Please provide any comments here that might explain your answer.
Is there a team leader that coordinates the discussion? (L)		
Is leadership shared among team members during the meeting? (L)		
Is discussion distributed among all team members rather than dominated by one person? (C)		
Do individuals contribute to the discussion using their areas of expertise? (R)		
Do individuals appear to understand the contributions of individuals from other disciplines? (R)		
Do individuals appear to respect the contributions of individuals from other disciplines? (V)		
Does it appear that the opinions of members of the team are valued by other members? (V)		
Do members of the team actively listen to each other? (C)		
Do members of the team encourage the ideas and opinions of other members? (T)		
Does it appear that team members have confidence and trust in one another? (T)		

Describe one aspect of team based care that you observed today:

Describe one aspect of patient centered care that you observed today:

Describe one new thing, either positive or negative, that you observed today about teamwork:

Key: Competencies

V=Values and ethics R=Roles and responsibilities C=Communication T=Teamwork L=Leadership

Interprofessional Clinical Rounding: Colorectal Service – Student Packet
INTERPROFESSIONAL CLINICAL ROUNDING: COLORECTAL SERVICE STUDENT
WORKSHEET (2012-2013)

Student Preparation: As a student team, use this form as a guide to prioritize and organize your thoughts for the Interprofessional Clinical Rounding experience. Feel free to add information that is pertinent to clinical rounding experience.

Patient Initials					IV Site Solution Rate		NGT/GT Type Drain		
Room	Age	Sex							
Admission Date/Diagnosis					Diet Tube Feeding Rate				
Code Status			Dry Wt						
08	T	P	R	Pain /10	Foley				Inserted /
	BP /		Pox	% on	Na	Cl	Bun	Glucose	
12	T	P	R	Pain /10	K	HCO ₃	Cr	Plts	
	BP /		Pox	% on	WBC	Hgb			
Other Pertinent Labs					Hct				
					Intake Oral IV Tube Feeding		Output Urine Drain NGT/GT		
Other Pertinent Studies									
History of Present Illness									
Medical Hx									
Surgical Hx									
Known Allergies (drug, food, other)									
Orders (last 24 hrs)									
Treatments (last 24 hrs)									
Current Med List									

Interprofessional Clinical Rounding: Colorectal Service – Student Packet

Physical Exam	Discharge Planning
General	Psycho/Social Assessment
Skin/Lymph	Level of Mobility & Self Care
HEENT	Current Patient Problem List
Neck	Patient Goals
Chest/Lung	Anticipated Date of Discharge
CV	Patient Teaching
Abd	Safety Issues
M/S	Family/Social Supports
Neuro	Home Environment
Surgical Site(s)	Insurance (Medical/Prescription)
Other	
Team Recommendations	
Nursing	
Medicine/Surgery	
Pharmacy	
Case Manager	
OT	
PT	
Other Health Practitioners /Professionals	
Notes (Instructions follow-up should be documented on the Interprofessional Plan of Care form)	

APPENDIX B

CONSENT FORM FOR PARTICIPATION IN AN ACTION RESEARCH PROJECT

Research Project: Enhancing Interprofessional Education with Technology

Location: Ambulatory Care Practice- Jefferson University Physician Practice, Jefferson
Center for Interprofessional Education Clinical Activity

Dates: September 2013 to December 2013

Principal Investigator: Kathryn Shaffer

Introduction:

My name is Kathryn Shaffer and I am a nursing instructor as well as a doctoral student at the University of Delaware, engaged in research for the purpose of satisfying a requirement for a Doctor in Education degree. Interprofessional education is a requirement for completion of many healthcare programs at Jefferson.

A majority of students' IPE experiences center on group work or "team building" skills, and not the functioning, or problem solving skills of a medical team. Many factors, in particular, logistics and scheduling prevent true collaboration groups and knowledge exchange.

Volunteers are being sought to participate in an educational research study on integrating technology to enhance clinical IPE activities. The purpose of this study is to determine if technology will enhance IPE clinical activities, thus creating Communities of Practice (CoP), eventually having an impact on clinical practice. The study is intended to inform curriculum planning for interprofessional education that encourages students to use working knowledge in patient centered and collaborative care, helping make a transition from the educational environment to the patient bedside adding to the foundational structure of clinical practice and, ultimately, patient outcomes.

If you agree to participate, you will be asked to complete 3 surveys throughout your experience in the Colorectal Surgical Clinical Rounding. The Attitudes Towards Health Care Teams Scale is attached to be completed now and again at the end of the clinic experience. The surveys will assess your attitudes towards healthcare teams and a self-assessment assessment (Team Skills Scale) will be completed before your first team patient encounter gathering information on your attitudes toward participation in a healthcare team. The third survey will be completed at the end of your clinical experience to evaluate your team's performance. Each survey should take approximately 5-10 minutes to complete. If any questions make you feel uncomfortable, you do not have to answer them. During your clinical experience you will be asked to utilize Blackboard and some of its social network features for team interaction and activities as well as be observed in person and on-line. Finally, you will be asked to participate in a focus group at the end of this clinical experience. The focus group should take 30-60 minutes.

Risks/Benefits to the Participant: There are no risks associated in participating in this study. Your responses are completely anonymous, and the questions themselves are not personally probing. There are no direct benefits to you for agreeing to be in this study. Please understand that although you may not directly benefit from participation in this study, you have the opportunity to enhance knowledge of improving clinical IPE experiences which could impact clinical practice.

The most substantial benefits of this research are those gains made by Jefferson Center of Interprofessional Education in better understanding in the use of technology within the IPE curriculum.

Cost and Payment to the Participation:

The only cost to you is the time you take to participate. Participation is completely voluntary and no payment will be provided.

Confidentiality of Records:

I will treat your identity with professional standards of confidentiality. Any information you provide will remain strictly confidential and remain in a locked cabinet. Any information obtain through the internet will be keep on a secured network which only I will have access to the information.

The information I obtain will be analyzed statistically, and qualitative responses will be not be identifiable to you personally. Your name will not appear in any published materials which result from this research.

Withdrawal:

Participation is voluntary. I will answer any questions you may have about the study. You are free to withdraw your consent and discontinue participation at any time. If you decide to withdraw from this study, you will still receive any credit for participating that was promised you.

Contact Information:

Faculty Sponsor:

Fred T Hofstetter

Title(s): Professor, School of Education

Professor, Music

Department: School of Education

Campus Address: 219H Willard Hall Education Building
Newark, DE 19716

E-mail: fth@udel.edu

Results: If your wish to be informed of the results of the study, please request in writing to the investigator and provide an e-mail address.

Consent Statement:

I have read the above statement, understand the nature of my participation in the research, and I freely agree to participate. I recognize my right to withdraw my consent and discontinue participation in the project without fear of any prejudice, and recognize that my activities and data generated by my participation will remain strictly confidential. I also understand that at the conclusion of the study I can choose to destroy any records of my participation, and that if I desire I can request a copy of the final report describing the research's conclusions.

"I _____ (Print name) agree to participate."

_____ (Signature)

Principal investigator
Kathryn M. Shaffer, MSN, RN, CNE

Institutional Review Board(s)

APPENDIX C

ATTITUDES TOWARD HEALTH CARE TEAMS SCALE (ATHCTS)

We would like to know about your attitudes toward interdisciplinary healthcare teams and the team approach to care. By interdisciplinary healthcare team, we mean three or more health professionals (e.g., nurse, physician, social worker) who work together and meet regularly to plan and coordinate treatment for a specific patient population.

In your opinion	Strongly Disagree	Moderately Disagree	Somewhat Disagree	Somewhat Agree	Moderately Agree	Strongly Agree
Working in teams unnecessarily complicates things most of the time	☐	☐	☐	☐	☐	☐
The team approach improves the quality of care to patients	☐	☐	☐	☐	☐	☐
Team meetings foster communication among team members from different disciplines	☐	☐	☐	☐	☐	☐
Physicians have the right to alter patient care plans developed by the team	☐	☐	☐	☐	☐	☐
Patients receiving team care are more likely than other patients to be treated as whole persons	☐	☐	☐	☐	☐	☐
A team's primary purpose is to assist physicians in achieving treatment goals for patients	☐	☐	☐	☐	☐	☐

Working on a team keeps most health professionals enthusiastic and interested in their jobs	☐	☐	☐	☐	☐	☐
Patients are less satisfied with their care when it is provided by a team	☐	☐	☐	☐	☐	☐
Developing a patient care plan with other team members avoids errors in delivering care	☐	☐	☐	☐	☐	☐
When developing interdisciplinary patient care plans, much time is wasted translating jargon from other disciplines	☐	☐	☐	☐	☐	☐
Health professionals working on teams are more responsive than others to emotional and financial needs of patients	☐	☐	☐	☐	☐	☐
Developing an interdisciplinary patient care plan is excessively time consuming	☐	☐	☐	☐	☐	☐
The physician should not always have the final word in decisions made by the healthcare team	☐	☐	☐	☐	☐	☐
The give and take among team members help them	☐	☐	☐	☐	☐	☐

make better patient care decisions						
In most instances, the time required for team meetings could be better spent in other ways	☐	☐	☐	☐	☐	☐
The physician has the ultimate legal responsibility for decisions made by the team	☐	☐	☐	☐	☐	☐
Hospital patients who receive team care are better prepared for discharge than other patients	☐	☐	☐	☐	☐	☐
Physicians are natural team leaders	☐	☐	☐	☐	☐	☐
The team approach make the delivery of care more efficient	☐	☐	☐	☐	☐	☐
The team approach permits health professionals to meet the needs of family caregivers as well as patients	☐	☐	☐	☐	☐	☐
Having to report observations to the team helps team members better understand the work of other health professionals	☐	☐	☐	☐	☐	☐

Heinemann, Schmitt and Farrell (1994). Attitudes Towards Interdisciplinary Teams, all rights reserved.

APPENDIX D

TEAM SKILLS SCALE (A SELF-ASSESSMENT MEASURE)

Please rate your ability to carry out each of the following tasks:

Item	Poor	Fair	Good	Very Good	Excellent
Function effectively in an interdisciplinary team	☐	☐	☐	☐	☐
Treat team members as colleagues	☐	☐	☐	☐	☐
Identify contributions to patient care that different disciplines can offer	☐	☐	☐	☐	☐
Apply our knowledge of geriatric principles for the care of older persons in a team care setting	☐	☐	☐	☐	☐
Ensure the patient/family preferences/goals are considered when developing the team's care plan	☐	☐	☐	☐	☐
Handle disagreements effectively	☐	☐	☐	☐	☐
Strengthen cooperation among disciplines	☐	☐	☐	☐	☐
Carry out responsibilities specific to your discipline's role on a team	☐	☐	☐	☐	☐
Address clinical issues succinctly in interdisciplinary meetings	☐	☐	☐	☐	☐
Participate actively at team meetings	☐	☐	☐	☐	☐
Develop an interdisciplinary care plan	☐	☐	☐	☐	☐
Adjust our care to support team goals	☐	☐	☐	☐	☐
Develop intervention strategies that help patients attain goals	☐	☐	☐	☐	☐

Raise appropriate issues at team meetings	☐	☐	☐	☐	☐
Recognize when the team is not working well	☐	☐	☐	☐	☐
Intervene effectively to improve team functioning	☐	☐	☐	☐	☐
Help draw out team members who are not participating actively in meetings	☐	☐	☐	☐	☐

Hepburn, Tsukuda, and Fasser (1996), Team Skills Scale, all rights reserved.

APPENDIX E

TEAM PERFORMANCE SCALE

	None of the time					All of the time
1. All team members made an effort to participate in discussions	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
2. When team members had different opinions, each member explained his or her point of view	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
3. Team members encouraged one another to express their opinions and thoughts	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
4. Team members shared and received criticism without making it personal	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
5. Different points of view were respected by team members	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
6. Often members helped a fellow team member to be understood by paraphrasing what he or she was saying	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
7. My team used several techniques for problem solving (such as brainstorming) with each team member presenting his or her best ideas	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
8. Team members worked to come up with solutions that satisfied all members	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
9. All team members consistently paid attention during group discussions	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
10. My team actively elicited multiple points of view before deciding on a final answer	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
11. Team members listened to each other when someone expressed a concern about individual or team performance	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
12. Team members willingly participated in all relevant aspects of the team	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
13. Team members resolved differences of opinion by openly speaking their mind	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆

14. Team members used feedback about individual or team performance to help the team be more effective	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
15. Team members seemed attentive to what other team members were saying when they spoke	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
16. My team resolved many conflicts by compromising between team members, with each one giving in a little	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
17. Members who had different opinions explained their point of view to the team	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
18. Team members were recognized when something they said helped the teams reach a good decision.	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆

* The response scale for each item ranged from “none of the time” (score= 1) to “all of the time” (score=6).

APPENDIX F
FOCUS GROUP GUIDE

As you know you were part of a research study to use technology to increase the number of students who participate in clinical rounding?

How do you define a social exchange, a meaningful exchange?

While working in this group, can you give me an example of both?

Would you consider your experience here social or meaningful exchanges?

Have you ever been part of a CoP?

How do you think this group compares to a CoP?

Have you participated in other IEP? How is this same/different?

What part of technology supported this group?

Was the technology helpful? Useful? Easy to use?

Anything you would like to share or I add that I didn't?

Thank you for participating in this research study.

APPENDIX G

NURSING STUDENT, MEDICAL STUDENT, RESEARCHER AND PHARMACIST GOOGLE DOC PHASE II INTERPROFESSIONAL CLINICAL ROUNDING STUDENT WORKSHEET

Today's Date: 11-20-13 **Admission Date:** 11-18-13

Patient's Initials: DY **Age:** 61 **Sex:** F

Admission Dx: Surgery for Benign neoplasm LG bowel

Code Status: Full code **Advance Directive:** No

General Health Status: Good

History of Present Illness: 61 year old female who had a routine colonoscopy on 10/31/13 with Dr. Goldstein and 2 polyps were seen. Pt. reports a smaller polyp was removed but there was a larger polyp, 4cm, that was unable to be removed via colonoscopy and Dr. Goldstein recommended surgical removal. Biopsy revealed tubular adenoma. Scheduled laparoscopic open right hemi colectomy

Health Condition(s) - Medical Hx: Hepatitis A (age 5), fibroids (leiomyoma) - s/p hysterectomy, wears contact lenses

Any Medication Allergies?

2:27 PM Nov 20

kff004

2:42 PM Nov 20

Yes. Pt is allergic to penicillin

Hospitalizations/Surgical Procedures:

Date(s):

(10/31/13) - colonoscopy

(1993) - hysterectomy, Salpingo-Oophorectomy, bilateral

Smoking hx. No

Alcohol consumption: denies alcohol intake

Recreational Drug Hx. denies history of drug abuse

V/S 0800

T: 97.6 R: 16 BP: 159/73

Pulse on 99% on. RA Pain 2/10

Labs (date): 11/19

Na+. 138 K+ 3.5 Cl. 101 HCO3. 21 BUN. 4 Cr. 0.7 glucose 128

WBC. 7.7 Hgb. 12.7 Hct. 34.7 Plt. 260

Other Pertinent Labs:

Pertinent Diagnostic Studies:

Diet: Normal house

Tube Feeding:

Type/Rate:

IV site: peripheral R hand

Solution: dextrose 5%-0.45% NSS

Rate: 40 ml/hr

Foley NO.

date inserted:

Intake:

Oral.

Output: 775

Urine

Current Medications:

Medication: magnesium sulfate **Dose:** 2 g **Route:** IVPB **Frequency:** q2hr

Medication: potassium chloride **Dose:** 20 meq **Route:** IV **Frequency:** q2hr

Medication: acetaminophen **Dose:** 650 mg **Route:** PO **Frequency:** q6hr PRN

Medication: Percocet **Dose:** 1 to 2 tabs **Route:** PO **Frequency:** q4hr PRN

How often is the patient receiving these meds? Total daily dose of acetaminophen?



kff004

2:42 PM Nov 20

Has not received any today. Pt denies pain

Medication: morphine **Dose:** 2 mg

Route: IV **Frequency:** q4hr PRN

Medication: promethazine **Dose:** 6.25 mg

Route: IVPB **Frequency:** once PRN

Medication: ondansetron **Dose:** 4 mg

Route: PO **Frequency:** q8hr PRN

Current Orders: (last 24hrs.)

Regular house diet

Current Treatments:(last 24hrs.)

Physical Findings:

General: AAOx3

Skin/Lymph:

HEENT/NECK:

Respiratory: diminished lung sounds

Cardiac:

Abd:

Nutrition:

GI/GU:

M/S:

Neuro:

Cognitive:

Surgical Site:

Discharge Planning:

Insurance: (medical/prescription) - Aetna USHC

Social Hx.:

Marital Status: Married

Lives with:

Support System: husband and mother

Career/Occupation:

Functional Status/Activity Level:

Current Living situation:

Does your home have:

☐ stairs ☐ bathroom on first floor ☐ ramp

Ambulatory Status:

Do you use:

☐ Cane ☐ Walker/rolling walker ☐ Wheelchair ☐ Glasses ☐ Hearing Aid(s)

Patient Goals:

Strengths:

Opportunities:

Weaknesses:

Threats:

Anticipated Date of Discharge:

Patient teaching needed:

Safety Issues:

TEAM RECOMMENDATIONS:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

APPENDIX H

STUDENT NURSE AND MEDICAL STUDENT GOOGLE DOC PHASE II INTERPROFESSIONAL CLINICAL ROUNDING STUDENT WORKSHEET

Today's Date: 12/4/13 Admission Date: 12/3/13
Patient's Initials: SP Age: 53 Sex: F
Admission Dx: Diverticulitis and Sigmoid Resection Code Status: Full Code

Advance Directive: ☐ Yes **No**
General Health Status: ☐ Excellent ☐ **Good** ☐ Fair ☐ Poor
History of Present Illness: Pt. reports abdominal pain increasing over time, nausea, vomiting, cramping, back pain, and blood in stool.

Health Condition(s) - Medical Hx: Depression and Anxiety, Anemia, and occasional LBP
Allergies: (Food, drug, other): Penicillin-Rash

Hospitalizations/Surgical Procedures:
Date(s): 12/3/13 Laparoscopic or Robotic Sigmoid Resection
Smoking hx. ☐ yes 1 pack per week Alcohol consumption: 1 6 ppd 3x a week
Recreational Drug Hx. ☐ yes ☒ **no**
V/S Pulse on 99 % on. Pain 8/10
V/S Pulse on % on. Pain /10
Labs (date): 12/4/13

Na+. 138 K+. 3.7 Cl. 106 HCO3. 22 BUN. 6 Cr. 0.6 glucose 76
WBC. 11.8 Hgb. 9.7 Hct. 28.7 Plt. 316
Other Pertinent Labs: Pertinent Diagnostic Studies:
Diet: CCC Tube Feeding: Yes Type/Rate: ☐ No
IV site: peripheral hand left and right on 12/3/13
Solution: Rate:
Foley Yes date inserted: ☐ No NGT ☐ GT ☐ Type: Drain ☐
Intake: Output:
Oral. Urine

IV. Foley D/C 12/4/13
Tube feeling. Drains
Current Medications:
Medication: Acetaminophen Dose: 1000mg Route: IVPB Frequency: q6hr
Medication: Morphine Dose: 50mg Route PCA Frequency:
Medication: Ringers Solution Lactated Dose: 1000mL @80mL/hr Frequency: q13hr

Current Orders: (last 24hrs.)

Current Treatments: (last 24hrs.) incentive spirometer

Physical Findings:
General: some pain but awake and alert
Skin/Lymph: normal skin turgor, dry intact

HEENT/NECK:

Respiratory: bilateral diminished breath sounds

Cardiac: regular heart rhythm

Abd:

Nutrition: CCC

GI/GU: abdominal pain

M/S: LBP:

Neuro: AAOx3, some anxiety

Cognitive:

Surgical Site: clean some drainage from umbilical site

Discharge Planning:

Insurance: (medical/prescription) hopefully home by weekend and Medicare aid

Social Hx.:

Marital Status: ☐ Married ☐ Widowed ☐ Divorced

Lives with:

☐ Alone ☒ **Partner/Spouse only** ☐ Partner/Spouse and other ☐ Children ☐ Other

Support System: fiancé and some family in area.

Career/Occupation: server and cook

Functional Status/Activity Level: high activity

Current Living environment: apartment 2nd floor

Does your home have:

☒ **stairs** ☐ bathroom on first floor ☐ ramp

Ambulatory Status:

Do you use:

☐ Cane ☐ Walker/rolling walker ☐ Wheelchair ☐ Glasses ☐ Hearing Aid(s)

Patient Goals: pain management and discharge

Strengths: confidence and faith

Weaknesses: anxiety

Opportunities:

Threats:

Anticipated Date of Discharge: 12/8/13

Patient teaching needed: incentive spirometer

Safety Issues:

TEAM RECOMMENDATIONS:

Focus Area/(plan of care) pain

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area

APPENDIX I

CLINICAL ROUNDING TEAM GOOGLE DOC PHASE IV INTERPROFESSIONAL CLINICAL ROUNDING STUDENT WORKSHEET

Today's Date: 1/29/2014 Admission Date: 1/27/2014

Patient's Initials: L.M Age: 86 Sex: M

Admission Dx: Malignant Neoplasm Cecum Code Status: Full

Advance Directive: ☐ Yes ☐ No

General Health Status: ☐ Excellent ☒ Good ☐ Fair ☐ Poor

History of Present Illness:

Blood in stool on Christmas. Colonoscopy showed mass in colon. Dx with colon CA

Health Condition(s) - Medical Hx. Allergies: (Food, drug, other)

HTN (controlled)

Type II Diabetes

PT student

12:56 PM Jan 29

From SPT - Ask about regular/daily skin checks on feet. Sensation on feet is important for balance --> decr risk of falls, and mobility.

Also from PT - is he actually managing his DM2 through exercise/Diet?

4:17 PM Jan 29

Pt takes very good care of feet. Wash, inspect, lotion, daily along w daily toenail treatment for broken big toenail. Will ask about DM2 mgmt specifically

Hospitalizations/Surgical Procedures:

Date(s): Comments:

1997 TURP for BPH

1/27 laparoscopic r hemicolectomy

Smoking hx. ☐ yes ____ ppd **no**
____ type ☐ **no**

Alcohol consumption ☐ yes ____ drinks per week,

Recreational Drug Hx. ☐ yes ☒ **no**

V/S 106/58 HR 58 RR 20 T 99.1

V/S 102/49. HR 63. RR20 T 97.0

Pulse on 93 % on. RA Pain 2 /10

Pulse on 93 % on. RA Pain 1 /10

Labs (date):

Na+. 137 K+. 4.1 Cl. 104 HCO3. BUN. 21 Cr. 1.0 glucose 99 & 132
WBC. 12.2 Hgb. 10.7 Hct. 32.4 Plt. 274

Other Pertinent Labs:

Pertinent Diagnostic Studies:

Diet: mechanical soft. Tube Feeding: Yes Type/Rate: ☐ No

IV site: L hand 20G. R hand 18G

Solution: Lactated ringers Rate: 70ml/hr in R IV

Foley Yes date inserted: ☐ No

NGT ☐ GT ☐ Type: Drain ☐

Intake:

Output:

Oral. 750.

Urine 1050

IV. 700

Foley

Tube feeling.

Drains

Current Medications:

Medication: aspirin. Dose: 325mg Route: po Frequency: qday

jxp053

3:22 PM Jan 29

Is there an indication for the higher dose aspirin daily? Usually prophylactic doses are 81 or 162 mg daily to prevent bleeding

jxp053

4:29 PM Jan 29

Does the patient have anticoagulation on board for DVT prophylaxis? Also...what is his current pain regimen?

4:50 PM Jan 29

Yes, it was not under my shift so I forgot to add it. I have added it to the doc. His pain is low, 1-2 at most and doesn't want pain meds at this time

4:55 PM Jan 29

Thanks for bringing that to my attention

Medication: metoprolol Dose: 25mg Route: po Frequency: q12hr

Medication: amlodipine Dose: 5mg Route: po Frequency: qday

Medication: HCTZ Dose: 12.5mg Route: po Frequency: qday

Medication: valsartan Dose: 320mg Route: po Frequency: qday

Medication: benazepril Dose: 20mg Route: po Frequency: qday

Medication: docusate Dose: 100mg Route: po Frequency: qday

Medication: Senna Dose: 1 tab. Route: Po. Frequency: qday

Medication: Enoxaparin. Dose: 40mg. Route: SC. Frequency: qday

Medication: Clonidine. Dose: 0.1mg. Route: PO. Frequency: qhs

Current Orders: (last 24hrs.)

Current Treatments:(last 24hrs.)

Physical Findings:

General:

Skin/Lymph: incision dressed w steri strips and band aids

HEENT/NECK:

Respiratory: lung sounds diminished. No adventitious sounds **Caroline Morrow**

3:53 PM Jan 29

I would examine lateral expansion of thorax during inspiration and evaluate accessory muscle use. Possibly would provide education for aerating lungs - top of the chest, mid chest, abdomen to ensure full breath (1-2-3 pattern, and exhale). Use lateral expansion to teach pt to bring deep each breath.

4:01 PM Jan 29

Pt went to PT for the first time today

Cardiac:

Abd: tender

Nutrition: probably inadequate

PT student

3:57 PM Jan 29

What is BMI to indicate this?

4:04 PM Jan 29

No BMI, pt on clears but moved to mechanical soft today so nutrition will likely improve

PT student

4:11 PM Jan 29

Ok

GI/GU urine yellow & clear. BM 1/29

M/S:

Neuro:

Cognitive:

Surgical Site:

Abdomen

Discharge Planning:

Insurance: (medical/prescription)

Social Hx.:

Marital Status: ☐ **Married** ☐ Widowed

☐ Divorced

Lives with:

☐ Alone ☐ **Partner/Spouse only** ☐ Partner/Spouse and other ☐ Children ☐ Other

PT student

3:54 PM Jan 29

If the pt has any functional deficits and if home health will not be available, it will be important to know if wife is able to provide for pt's needs (assist in toiletry, ambulation if needed)

Support System: family

Career/Occupation: retired

Functional Status/Activity Level:

Current Living environment:

Does your home have:

☐ stairs ☐ bathroom on first floor ☐ ramp

Ambulatory Status: ambulates w supervision

Do you use:

☐ Cane ☐ Walker/rolling walker ☐ Wheelchair ☐ **Glasses** ☐ Hearing Aid(s)

Patient Goals:

Strengths:

Opportunities:

Anticipated Date of Discharge: 1/30

Patient teaching needed:

Safety Issues:

TEAM RECOMMENDATIONS:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

Weaknesses:

Threats:

APPENDIX J

CLINICAL ROUNDING TEAM GOOGLE DOC PHASE IV INTERPROFESSIONAL CLINICAL ROUNDING STUDENT WORKSHEET

Today's Date: 1/29/14 Admission Date: 1/24/14

Patient's Initials: M, B Age: 59 Sex: Male

Admission Dx: malignant neoplasm colorectal cancer Code Status: Full

General Health Status: **Good** Advance Directive: No

History of Present Illness:
Health Condition(s) - Medical Hx. Allergies: NKDA, NKA

Hospitalizations/Surgical Procedures:
Date(s): Comments:
1/24/14 ex lap loa. Cysto with b/l stent placement.
Smoking hx. no Alcohol consumption ☐ no

Recreational Drug Hx. ☐ no
V/S Temp: 99.6F HR: 75 Resp: 16 BP: 153/75 Pulse on 93 % on. RA Pain 8 /10
V/S Pulse on % on. Pain /10
Labs (date): 1/29/14
Na+. 138 K+. 3.8 Cl. 99 HCO3. BUN 10 Cr. 0.9 glucose 122
WBC. 4.8 Hgb. 10.6 Hct. 30.9% Plt. 235

Other Pertinent Labs: Pertinent Diagnostic Studies:
Diet: RHD IV site: right FA 20G
Solution: N/a Rate: n/a

Foley Yes date inserted: 1/24/14 --D /C'ed (1/29/14) ☐ No NGT ☐ GT ☐
Type: Drain ☐

Intake: Output:
Oral. 440ml Urine: 675ml
IV. 650 ml Foley-- d/c'ed
Tube feeling. Drains

Current Medications:
Medication: Loperamide Dose: 2mg Route: PO Frequency: Q6hr
Medication: Vicodin Dose: 5mg/325 mg Route: PO Frequency: q4h
PRN **JP053**

3:18 PM Jan 29

Selected text:

pm

How often is the patient taking this?

[Reply](#)

.

[Resolve](#)

Current Orders: (last 24hrs.)
Foley D/C
Percocet 1 tab PO PRN
Acetaminophen 625 mg PO PRN D/C
Magnesium Sulfate 2g/25ml
Potassium chloride 20meq/50ml
OT/PT evaluation/treatment

Current Treatments:(last 24hrs.)

Physical Findings:

General:

Skin/Lymph: Midline abdominal incision is c/d/I with 4*4 gauze

PT student

3:58 PM Jan 29

Selected text:

*MAE*4 with generalized weakness (4/5) all extremities.*

Would wonder if this is his normal strength level.

[Reply](#)

.

[Resolve](#)

HEENT/NECK: WNL

Respiratory: breath sounds are clear

Cardiac: hypertensive

Abd:

Nutrition: pt is tolerating PO intake. -N/V

GI/GU

Ileostomy is pink and moist and producing stool. Stool is liquid green and output for 1/28/14 was 1500 mL.

Ileostomy output for today (1/29/14 10:52) is 675ml

Urinary output via catheter is 625ml (1/29/14 10:52)

Urinary output via stent (R) 55 (1/29/14 10:52)

JP/HH output : 0 ml(1/29/14 10:52)

M/S: MAE*4 with generalized weakness (4/5) all extremities.

PT student

3:58 PM Jan 29

Would wonder if this is his normal strength level

Neuro: AAO*3

Cognitive: pt. seems withdrawn and once wife come visits pt. is more compliant with OOB activities

Surgical Site:

Midline abdominal incision c/d/I

Stent site is

Discharge Planning:

Insurance: (medical/prescription)

Social Hx.:

Marital Status: ☐ Married - 28 years

Lives with:

☐ ☐ Partner/Spouse only ☐ Partner/Spouse and other ☐ C ☐

Support System: wife and family

Career/Occupation: probation board in bucks county

Functional Status/Activity Level:

Current Living environment:

Does your home have:

☐ stairs ☐ bathroom on first floor ☐

Ambulatory Status:

Do you use

Patient Goals:

-Control abdominal pain

PT student

3:04 PM Jan 29

PT: Cough Splinting Technique will assist in this goal

-ileostomy resources and teaching.

Strengths:

Familial support system

Opportunities:

Anticipated Date of Discharge:

Patient teaching needed:

Ileostomy

Safety Issues:

TEAM RECOMMENDATIONS:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

Focus Area/(plan of care)

Who will be involved in focus area:

Weaknesses:

Threats:

APPENDIX K

INSTITUTIONAL REVIEW BOARD (IRB) APPROVALS



RESEARCH OFFICE

210 Hüllihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: May 14, 2013

TO: Kathryn Shaffer
FROM: University of Delaware IRB

STUDY TITLE: [467375-1] Enhancing Interprofessional Education with Technology

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: May 14, 2013

REVIEW CATEGORY: Exemption category # 1

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.

October 3, 2013

Kathryn Shaffer, RN, MSN
Jefferson School of Nursing

Dear Ms. Shaffer:

The **Institutional Review Board (IRB)** has evaluated revisions to your exempt human subjects research study entitled:

"Enhancing IPE with Technology" (Departmental) Control #13E.231

Amendment: Student data collection changed to the clinical setting of TJUH 13 P and 7C.

In accordance with Federal-Wide Assurance #00002109 to the U.S. Department of Health and Human Services, I am pleased to inform you that this amendment was administratively approved on 10/3/13. Board #153 will be notified at the 10/10/13 meeting.

As this study has been determined to be Exempt, no further review and approval by the Board will be required if the study is to be conducted as proposed. Any proposed revision in this protocol will necessitate submission of an OHR-12 to the IRB for further consideration prior to final implementation.

Please notify the IRB by letter when the study has been completed.

This approval verifies that the IRB operates in accordance with applicable federal, local and institutional regulations that govern IRB operations.

Thank you for your cooperation in the institutional review process.

Sincerely yours,



Kyle Conner, MA, CIP
Associate Director
Division of Human Subjects Protection

KC/pmo



APPENDIX L

PERMISSIONS

Kathryn Shaffer

From: Ron Passfield <rpassfield@optusnet.com.au>
Sent: Wednesday, March 12, 2014 9:26 PM
To: Kathryn Shaffer
Subject: Permission to use diagram
Attachments: AR_DiagramV2.jpg

Hi Kathy

I am responding to your email request to use my action research diagram (copy of email below).

I am happy for you to use the diagram in my blog article::

<http://www.meritsolutions.com.au/structures-and-culture/organisation-structures/action-research-for-organisational-innovation/>

You will notice that the diagram has been amended slightly from the original that you viewed (the top step of the cycle is now "collaborative planning and action") - amended diagram attached.

Could you please acknowledge the source with a link to the above blog post.

Best wishes for your doctoral research and write-up.

Ron

Dr. Ron Passfield, Director, Merit Solutions, Brisbane, Australia

<http://www.meritsolutions.com.au>

Adjunct Professor, Australian Institute of Business

<http://www.aib.edu.au/>

Email: rpassfield@optusnet.com.au

Skype: ronpass4575

Phone: 61-7-33995750

Mobile: 0409 266 582

From: Kathryn Shaffer [<mailto:Kathryn.Shaffer@jefferson.edu>]
Sent: Tuesday, 11 March 2014 7:52 AM
To: enquiry@meritsolutions.com.au
Subject: Permission to use diagram

Dear Dr. Passfield,

My name is Kathy Shaffer and I am a doctoral student at the University of Delaware, USA. I am currently doing an action research study on using technology to create virtual clinical rounding teams in a hospital setting. My research took 3 phases for feasibility and logistics to find the best collaborative tool for students to use in inter-professional education. I am writing to ask permission to use an action research module you designed in my dissertation. I have attached the image.

Thank you for your time and consideration,

Kathy Shaffer

"The function of education is to teach one to think intensively and to think critically." Martin Luther King, Jr.

Kathryn M. Shaffer, RN, MSN, CNE

Director of Clinical Education and Faculty Development

Instructor

Thomas Jefferson University

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