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Effect of a case-based online discussion forum on resident professionalism skills and knowledge

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EFFECT OF A CASE-BASED, ONLINE DISCUSSION FORUM ON
RESIDENT PROFESSIONALISM SKILLS AND KNOWLEDGE

by

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Abstract

Teaching professionalism in graduate medical education is required by the Accreditation Council for Graduate Medical Education. Program directors face several challenges in developing and implementing methods to effectively teach professionalism. However, the benefits of implementing an effective method can lead to improved resident performance and knowledge, patient care outcomes, and teamwork interactions. A research study was developed to investigate the effects of a professionalism traditional lecture versus a professionalism traditional lecture and a case-based, online discussion forum on residents' professionalism skills as measured by the Professionalism Mini-Evaluation Exercise (P-MEX) and professionalism knowledge as measured by a posttest while controlling for postgraduate year level and program. Residents from ACGME accredited Diagnostic Radiology and Family Medicine residency programs at the University of Tennessee Health Science Center served as participants in a posttest only control group experiment. Participants were randomly assigned to a control (e.g. traditional lecture) and experimental group (e.g. traditional lecture and a case-based, online discussion forum). After the lecture, the experimental group participated in a four-week case-based, online discussion forum. Weekly discussions were centered around case-based scenarios that highlight unprofessional behavior and encourage reflective discourse amongst the participants. Afterwards, professionalism skills were assessed via the P-MEX and knowledge base was assessed via a posttest. Results of the two ANOVAs showed no statistically significant differences between groups' professionalism knowledge and skill levels.

Keywords: professionalism, graduate medical education, case-based, discussion forum

Table of Contents

List of Tables

List of Abbreviations

Accreditation Council of Graduate Medical Education (ACGME)

Analysis of Variance (ANOVA)

Association of American Medical Colleges (AAMC)

Graduate Medical Education (GME)

Health Insurance Portability and Accountability Act of 1996 (HIPAA)

Learning Management Systems (LMS)

Medical College Admission Test (MCAT)

Musculoskeletal Systems (MSS)

National Board of Medical Examiners (NBME)

Performance Improvement Plan (PIP)

Post Graduate Year (PGY)

Professionalism Mini-CEX (P-MEX)

Social Constructivist Theory (SCT)

Self-determination Theory (SDT)

United States Licensing Medical Examinations (USMLE)

University of Tennessee Health Science Center (UTHSC)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Introduction and Background

Professionalism has been described as the "basis of medicine's relationship with society" (Cruess & Cruess, 2009, p. 18) where physicians are expected to exhibit honesty, commitment, competence, morality, confidentiality, and trustworthiness (Accreditation Council for Graduate Medical Education [ACGME], 2016a; Cruess & Cruess, 2009). The lack of professionalism by physicians can negatively affect the quality of patient care received, patient outcomes, and collaboration efforts amongst the healthcare team (Bahaziq & Crosby, 2011; Hultman et al., 2013; Patel et al., 2011; Rosenstein & O'Daniel, 2008). In a survey of 4,530 physicians, nurses, and other healthcare team members, "67% felt that there was a linkage between disruptive behaviors and adverse events, 71% felt that there was a linkage to medical errors and 27% felt that there was a linkage to patient mortality" (Rosenstein & O'Daniel, 2008, p. 466). The lack of professionalism skills is detrimental to the promotion of high quality patient care. Effective instruction in professionalism can be implemented in medical education to decrease lapses in professional behavior, and the Accreditation Council for Graduate Medical Education (ACGME), recognizing this, has made professionalism an accreditation and curriculum requirement. Residency programs are required to provide education regarding professionalism, assess resident professionalism skills, and report resident competence in professionalism skills and knowledge level. Thus, effective instructional strategies for teaching professionalism in graduate medical education that lead to documented improved outcomes need to be developed and investigated.

Problem of Practice

According to the ACGME (2016a) Common Program Requirement IV.A.5.e, all "residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles" (p. 11). ACGME also mandates that residents must demonstrate competence in professional behavior prior to completion of clinical training to be deemed "competent to enter practice without direct supervision" (ACGME, 2016a, p. 14). Although professionalism skills are required to be taught and obtained within graduate medical education programs, ACGME allows residency programs the flexibility to choose instructional strategies that are feasible for their specific program as opposed to mandating standardized activities. However, effective instructional strategies to teach these skills have not been well researched. Many residency programs find it challenging to identify effective strategies because there is no consensus on the definition of professionalism or best practices to teach it (Cummings, Geis, Kesselheim, & Sayeed, 2015; Deptula & Chun, 2013; Hultman et al., 2012; Joiner, Husain, Duddu, & Chaudhry, 2015; Kesselheim, Sectish, & Joffe, 2012; Kesselheim et al., 2015; Nadeau, Tysinger, & Wiemers, 2016). Furthermore, residency programs have struggled with this resulting in a wide range of instructional strategies being implemented that may or may not be effective or consistent (Cummings et al., 2015; Joiner et al., 2015; Kesselheim et al., 2012). Forty-six percent of pediatric program directors who participated in a survey describing their professionalism curriculum reported having only an informal curriculum while 26% reported having no curriculum (Kesselheim et al., 2012). Twenty-five percent of psychiatry residents surveyed about receiving professionalism training stated they had received professionalism training, yet 78% of those residents reported this training to be inadequate (Joiner et al., 2015). Thirty percent of neonatology residents who were surveyed about their education in

professionalism reported receiving no education about professionalism (Cummings et al., 2015). Identification of instructional strategies that are effective, adequate, and consistent can assist program directors teach professionalism in residency programs as required by ACGME.

Identifying effective instructional strategies to teach professionalism skills is a challenge for many medical educators. The lack of a unified definition of professionalism makes identification of strategies challenging (Birden, Glass, Wilson, Harrison, & Usherwood, 2014). Professionalism has been characterized as "intangible and difficult" (O'Sullivan, van Mook, Fewtrell, & Wass, 2012, p. e64) and "poorly understood" (Riley & Kumar, 2012, p. 9). The lack of a solid definition for professionalism directly impacts the ability to teach it (Birden et al., 2014). In addition to the challenge of defining professionalism, to date there is no consensus in the literature on a best strategy to teach professionalism (Birden et al., 2013; Byyny, 2015; Kesselheim et al., 2012; & Papadakis, 2015). Scant research has investigated instructional strategies to effectively teach professionalism. Most studies have been primarily exploratory, qualitative, and descriptive.

Currently, program directors in the University of Tennessee Health Science Center (UTHSC) residency programs find teaching professionalism the most challenging ACGME competency to integrate into the curriculum. Within the 72 accredited residency programs at UTHSC, instructional strategies to teach professionalism vary from traditional lectures to on-the-job training. In addition to teaching professionalism, each program director must submit semi-annual assessment reports regarding resident performance in professionalism to ACGME. Program directors struggle to teach professionalism as evidenced by their performance improvement plans (PIP). Residency programs use PIPs to document underperformance of residents, learning activities to improve performance, and assessment strategies to evaluate

improvement.   On average, 15 PIPs are developed per year, which equates to approximately one for every 53.3 residents. Since January 2015, programs have written 45 performance improvement plans in which 19 included professionalism as a competency needing improvement. In the development of PIPs, program directors have expressed frustration with identifying learning activities to improve professionalism.

Two instructional strategies that demonstrate potential effectiveness in teaching professionalism present within the literature include case-based activities (Cummings et al., 2015; Domen et al., 2017; Edwards, Sterbis, & Olson, 2014; Kesselheim et al., 2015; Kung, Eisenberg, & Slanetz, 2012; Kung, Slanetz, Huang, & Eisenberg, 2015) and group discussions via online discussion boards either through learning management systems (LMS) or social media platforms (Bernard et al., 2014; Kornegay, Leone, Wallner, Hansen, & Yarris, 2016; Nadaeu et al., 2016). Residents from several specialties including radiology, family medicine, pediatric hematology-oncology, and neonatology expressed high satisfaction rates with learning professionalism when case-based activities were utilized (Cummings et al., 2015; Kesselheim et al., 2015; Kung et al., 2012; Kung et al., 2015; Nadaeu et al., 2016). Both studies by Kung et al. (2012) and Kung et al. (2015) utilized a pre- and post- survey design study to investigate radiology residents' perceptions of the effectiveness of case-based discussions to learn professionalism. Results from the surveys identified case-based discussions as effective in improving their professionalism. In another study, Kesselheim et al. (2015) implemented a survey design study to investigate pediatric hematology-oncology fellows' satisfaction with using case-based modules and small group discussion to learn professionalism. On the survey, 90% of the fellows agreed that case-based modules and small group discussions were "valuable" and "touched on issues important for fellowship training" (p. 339). Literature reviews and a

meta-analysis identified case-based activities as a potential instructional strategy to improve professionalism skills in medical education (Antes et al., 2009; Birden et al., 2013; Deptula & Chun, 2013). Nadeau et al. (2016) investigated the impact of a case-based, online discussion forum in Blackboard on teaching family medicine residents' professionalism by tracking resident participation and engagement in the discussions and administering a post-survey. Although this study did not produce data to support improved learning outcomes, the residents who participated were actively engaged in the discussions and reported positive feedback to using the case-based, online discussions (Nadeau et al., 2016). Current research is beginning to establish these strategies as effective; however, given the lack of rigorous, experimental studies more research is needed. Moreover, social constructivism supports the use of case-based, online discussions to construct knowledge through social interactions (Cunningham & Duffy, 1996; Vygotsky, 1978). Online discussion forums that use authentic scenarios as prompts promote student-centered learning environments, which enhance the construction of knowledge and collaboration between learners (Clark & Mayer, 2011; Huang, 2002; Kay & Kibble, 2016; Richey, Klein, & Tracey, 2011; Sthapornnanon, Sakulbumrungsil, Theeraroungchaisri, & Watcharadamrongkun, 2009).

Problem Statement

In sum, developing professionalism skills is an ACGME accreditation requirement and a necessary skill for effective patient care. UTHSC residency program directors want to, and need to, identify instructional strategies to improve residents' skills in professionalism, and in turn, improve patient care and program outcomes. Unfortunately, the literature on best practices for teaching professionalism is lacking (Birden et al., 2013; Byyny, 2015; Kesselheim et al., 2012; Papadakis, 2015). The term professionalism has been ambiguous and inconsistent. Studies

examining instructional strategy effectiveness to teach professionalism have been exploratory and descriptive in nature. Experimental research to identify best practices to teach professionalism in residency education is needed.

By investigating instructional strategies to teach professionalism, the need expressed by program directors to identify effective strategies to improve resident professionalism skills was addressed. Identifying effective strategies to teach professionalism enables program directors to improve residents' knowledge and skills, comply with ACGME accreditation requirements, and enhance patient care. Drawing from social constructivist principles and evidence from scant research, case-based, online discussion forums can be effective in improving professionalism skills and knowledge through collaborative dialogue with others that critically analyzes practice (Clark & Mayer, 2011; Vygotsky, 1978).

Purpose Statement

The purpose of this posttest only control group experimental study was to investigate the effect of a traditional lecture and a case-based, online discussion forum on residents' professionalism skills while controlling for postgraduate year (PGY) level and program. The study took place in two Graduate Medical Education residency programs at the University of Tennessee Health Science Center (e.g. Family Medicine Jackson and Diagnostic Radiology). For the purpose of this study, professionalism was defined as the demonstration of integrity and respect for patients, families, and members of the healthcare team; response to patient needs regardless of personal commitments; protection of patient confidentiality; and "accountability to patients, society and the profession" (ACGME, 2016a, p. 11). Professionalism skills were measured using the Professionalism Mini-Evaluation Exercise (P-MEX), which has been validated through several research studies. Professionalism knowledge was measured using a

researcher developed posttest validated by experts. A professionalism traditional lecture, independent variable level 1, was generally defined as a 45-minute PowerPoint presentation that covered the ACGME requirements and milestones for professionalism, importance and impact of professionalism, and case-based scenarios. The case-based, online discussion forum with lecture, independent variable level 2, was generally defined as the professionalism traditional lecture and a four-week asynchronous online discussion group within a Google Plus community with case-based scenario prompts. Case-based was generally defined as problems that "reflect real-world practice" (Stavredes, 2011, p. 119). Performance of professionalism skills, the dependent variable in research question one, was generally defined as the results received on the P-MEX, which is a validated assessment tool that evaluates resident performance in 21 attributes of professionalism on a four-point, Likert-type rating scale (Cruess, McIlroy, Cruess, Ginsburg, & Steinert, 2006b). Professionalism knowledge, the dependent variable in research question two, was generally defined as the results received on a posttest. Postgraduate year (PGY) in training (e.g. PGY 1-5) and residency program (e.g. Radiology and Family Medicine) was controlled for by using stratified random assignment prior to the beginning of the treatment period.

<center>**Research Questions**</center>

The research questions for this study were:

Research Question 1

What is the effect of a traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on residents' overall performance of professionalism skills as measured on the Professionalism Mini-Evaluation Exercise while controlling for PGY-level and program?

Research Question 2

What is the effect of the traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on residents' knowledge of professionalism as measured by an instructor-created, expert-validated posttest while controlling for PGY-level and program?

Null Hypotheses

The null hypotheses for this study were:

Null Hypothesis 1

The combination of a traditional lecture and case-based, online discussion forum when compared to a traditional lecture will have no statistically significant effect on residents' overall performance of professionalism skills as measured by the Professionalism Mini-Evaluation Exercise while controlling for PGY-level and program.

Null Hypothesis 2

The combination of a traditional lecture and case-based, online discussion forum when compared to a traditional lecture will have no statistically significant effect on residents' knowledge of professionalism as measured by a posttest while controlling for PGY-level and program.

Definitions

Professionalism. For the purposes of this study, professionalism is defined as the demonstration of integrity and respect for patients, families, and members of the healthcare team; response to patient needs regardless of personal commitments; protection of patient confidentiality; and "accountability to patients, society and the profession" (ACGME, 2016a, p.11).

Traditional lecture. For the purposes of this study, the traditional lecture is a 45-minute Powerpoint presentation that covers the ACGME requirements and milestones for professionalism, importance and impact of professionalism, and case-based scenarios.

Case-based. For the purposes of this study, case-based scenarios were used as prompts for discussions of professionalism. According to Stavredes (2011), case-based learning is part of problem-based learning where the scenarios "reflect real-world practice;... based on problems that practitioners face in their field" (p. 119) to promote learning and understanding.

Online discussion forum. According to Stavredes (2011), an online discussion forum is an electronic communication tool (e.g. Google Plus Community) that "allows learners to interact asynchronously one-to-one or one-to-many to discuss topics and freely exchange thoughts and ideas" (p. 175).

CHAPTER TWO: REVIEW OF THE LITERATURE

Introduction

Professionalism is the demonstration of integrity and respect for patients, families, and members of the healthcare team; response to patient needs regardless of personal commitments; protection of patient confidentiality; and "accountability to patients, society and the profession" (ACGME, 2016a, p. 11). It is an integral characteristic that residents and fellows in Graduate Medical Education (GME) must exhibit when interacting with patients, families, and other interprofessional healthcare providers (ACGME, 2016a). Failure to demonstrate professional behaviors may result in poor patient outcomes and healthcare team interactions (Bahaziq & Crosby, 2011; Hultman et al., 2013; Patel et al., 2011; Rosenstein & O'Daniel, 2008). The inclusion of effective instructional strategies to teach professionalism in GME is necessary to develop competent physicians and positively impact patient care outcomes. However, identifying effective instructional strategies to teach professional behavior has been a challenge for medical educators. In the following sections, I discuss the theoretical context that provides a foundation for instruction, illustrate how professionalism has been taught in GME, and discuss the benefits and challenges for including professionalism in GME curriculum. Following these sections, I examine how online discussion forums via social media have been used within GME and other healthcare professionals' education and present a solution to identifying effective instructional strategies to teach professionalism.

Teaching Professionalism in Medical Education: Current Problems and Benefits

Challenges to Teaching Professionalism

Program directors face several challenges when trying to develop and implement instructional strategies that aim to teach professionalism skills to residents. Two of these

challenges rest in the fact that there is no consensus within the medical profession of a definition

of professionalism or best method to teach professionalism (Birden et al., 2013; Birden et al.,

2014; O'Sullivan et al., 2012). The lack of a solid definition for professionalism directly impacts

the ability to teach it (Birden et al., 2014). The third challenge stems from the presence of a

"hidden curriculum" which can influence the effectiveness of the instructional strategy (Rogers,

Boehler, Roberts, & Johnson, 2012).

Professionalism has been characterized as "intangible and difficult" (O'Sullivan et al.,

2012, p. e64) and "poorly understood" (Riley et al., 2012, p.9). Birden et al. (2014) identified

195 studies that explored the definition of professionalism and found that no "comprehensive,

universally accepted definition of medical professionalism" (p. 11) existed but rather a "closely

argued view, widely accepted, concerning what such a definition should consist of" (p. 11).

This absence of a unified definition impacts the development of effective instructional strategies

because a unified definition provides the foundation for instruction (Birden et al., 2014).

The second challenge to implementing an effective instructional strategy is the fact that

there is no consensus within the literature on the best method. Current literature stated that there

is a shortage of quantitative evidence supporting what method is most effective to teach

professionalism (Byyny, 2015; Kesselheim et al., 2012; Papadakis, 2015). Papadakis (2015)

described the current state of best practices for teaching professionalism by stating "best

practices at this time means best consensus opinions" (p. 3). The lack of a best practice makes it

challenging for program directors to identify effective instructional strategies for professionalism

(Cummings et al., 2015; Deptula & Chun, 2013; Hultman et al., 2012; Joiner et al., 2015;

Kesselheim et al., 2012; Kesselheim et al., 2015; Nadeau et al., 2016). In a survey of 96

pediatric program directors, 46% reported having an informal curriculum and 26% reported

having no curriculum (Kesselheim et al., 2012). Fifty-five psychiatry residents were surveyed

about the adequacy of the educational experiences focused on professionalism and only 11 of the

55 residents reported being satisfied with their education (Joiner et al., 2015). Cummings et al.

(2015) surveyed 82 neonatology fellows about their training in professionalism during

fellowship training. Only 70% of the fellows reported participation in professionalism training

during fellowship. Effective strategies to teach professionalism, although required by GME

program accreditation, remains elusive (Birden et al., 2013). Yet, effective strategies can be

attainable through the application of theory to guide development and evidence-based research to

determine efficacy. While several strategies have been researched and demonstrated satisfaction

rates among learners, there remains limited research surrounding case-based, online discussions

and its impact on residents' ability to attain professionalism skills and knowledge.

The third challenge program directors face when developing and implementing methods

to teach professionalism is the "hidden curriculum." Gofton and Regehr (2006) defined the

hidden curriculum phenomena as the "unrealized transmission of implicit beliefs, attitudes, and

behaviors" (p. 20). During experiential learning in clinical settings, residents are subject to the

influential power of the faculty and the unspoken rules of the environment. The hidden

curriculum profoundly affects a student's professionalism development both positively and

negatively (Rogers et al., 2012). When behaviors displayed in the hidden curriculum are in

opposition to formal training in professionalism, effective methods become eroded (Rogers et al.,

2012).

Benefits to Teaching Professionalism

The benefits of implementing effective instructional strategies to teach professionalism include improved patient care outcomes and improved interactions within the healthcare team members. Turner et al. (2015) stressed the importance of professional behaviors during high stress situations in a pediatric critical care unit stating that "a receptive and calm demeanor is critical for team performance...and [unprofessional behavior] may negatively impact important provider relationships and adversely affect patient care" (p. 380). Likewise, correlations identified between lapses in professionalism and higher rates of adverse events and diminished team attitudes emphasize the need for effective strategies to teach professionalism (Patel et al., 2011).

More recent literature has drawn additional connections between professionalism, patient outcomes and teamwork. Bahaziq and Crosby (2011) found a correlation between lapses in professionalism and poor patient outcomes and concluded that "the quality of care is enhanced when physician leaders set expectations for professional behaviors in the care environment, when they encourage these behaviors, and when they intervene consistently when these expectations are not met" (p. 1048). In another study, as surgery residents' professionalism skills improved, the amount of poor patient outcomes decreased and patient satisfaction rates increased (Hultman et al., 2013). Implementing effective strategies to teach professionalism is not only beneficial to the residents by expanding their knowledge and skill level, it also has a direct correlation to providing high quality care and improving patient outcomes.

While it is necessary to implement effective instructional strategies to teach professionalism, graduate medical education program directors and faculty may find it difficult to choose which strategy is best. Applying appropriate learning theory to the choice of

instructional strategies can assist program directors in selecting the most effective strategy based on how residents learn. Theory-based selection of instructional strategies can maximize learning, improve residents' professionalism skills and knowledge, and directly affect patient care.

Theoretical Context

According to Steinert (2009), "theory can influence practice, provide a structure for interactions that move toward identifiable outcomes, and create the shared understanding and terminology that is a necessary prerequisite for discussion and debate" (p. 32). Program directors and faculty can use learning theories to understand how students learn and to guide the selection of instructional strategies to effectively teach professionalism. Social constructivism influenced by Vygotsky's (1978) social-cultural theory offers a framework that identifies effective instructional strategies to maximize knowledge and skill acquisition that can be used with teaching professionalism in GME.

Social Constructivist Theory

Social constructivism provides program directors and faculty a foundation to develop effective instructional strategies that capitalize on the way learning occurs.   Lev Vygotsky (1978), in his social-cultural theory of learning, emphasized the role of society and culture on the construction and acquisition of knowledge. In his writings, Vygotsky (1978) stated, "learning awakens a variety of internal developmental processes that are able to operate only when a child is interacting with people in his environment and in cooperation with his peers" (pp. 89-90). A major tenet of Vygotsky's (1978) theory is the zone of proximal development, described as the area of knowledge creation just beyond a learner's actual level that is obtainable through assistance from a more knowledgeable instructor or peer. In other words, the interactions

between a learner and others within the learning environment help to create further knowledge. Social-cultural theory and Vygotsky's emphasis on social collaboration to develop knowledge influenced other tenets found within social constructivism.

Along with Vygotsky, Dewey, Piaget, Bruner, and other cognitivists influenced social constructivism. Cunningham and Duffy (1996) described social constructivism as an "umbrella term for a wide variety of views" (p. 2) rather than a distinct theory. The principle tenet held by social constructivists is that knowledge is actively constructed through interactions with others, a major theme in Vygotsky's social-cultural theory (Cunningham & Duffy, 1996). Collaboration through active communication is inherent in social constructivism, which provides justification for creating cooperative activities among learners. Other tenets of social constructivism that influence instructional design include an emphasis on student-centered learning environments, transforming the role of instructor to facilitator and the promotion of "students' deep understanding and creativity" (Sthapornnanon et al., 2009, p. 1).

Social constructivists use "computer-mediated collaboration" (Richey et al., 2011, p. 137) (e.g. discussion forums) to promote collaboration amongst learners and to create a student-centered learning environment. Clark and Mayer (2011) suggested using an online learning environment over traditional environments because "virtual collaboration can lead to more reflection and sharing of ideas than a face-to-face environment" (p. 289). Within an online discussion forum, differing perspectives from participants are highlighted, potentially challenging current understanding of peers and influencing the construction of new knowledge (Cunningham & Duffy, 1996), as suggested by the zone of proximal development. An online discussion forum also allows learners to spend adequate time to critically think before posting, which can deepen learning as opposed to providing spontaneous responses during face-to-face

15

discussions (Sthapornnanon et al., 2009). Cunningham and Duffy (1996) emphasized the importance of discussions within the learning process stating, "knowledge is a construction, … by participants in a community that simultaneously transforms and is transformed by such participation" (p. 9).

In addition to using online technology to stimulate knowledge construction, social constructivists have stressed the importance of using authentic, real-world scenarios to promote learning (Huang, 2002). Through the use of case-based scenarios, learners are "encouraged to answer real-life questions that they have identified based on their own experiences" (Kay & Kibble, 2016, p. 22). Authentic, real-world experiences are influential in knowledge construction and educators should capitalize on this resource (Huang, 2002). Vygotsky (1978) believed that "a child's greatest achievements are possible in play, achievements that tomorrow will become her basic level of real action and morality" (p. 100). This belief can be compared to an adult learner through the analysis and discussion of case-based scenarios. Case-based scenarios for adults are similar to imaginary play for children. Discussions that occur during case-based scenarios regarding authentic situations may influence future action in real settings similar to that of children's action during play that impacts their behavior in reality. To maximize learning and influence future behaviors, case-based approaches can be effective in promoting group discussions and collaboration amongst learners.

An example of how the tenets of social constructivism can be instituted through a case-based, online discussion forum to teach professionalism includes presenting scenarios that incorporate unprofessional behaviors. Upon reviewing the case scenarios, learners are afforded the opportunity to construct knowledge through student-led, interactive, group discussions. The learners participated in group discussion on the case-based scenario, which, based on social

constructivism, led to the integration of new perspectives into previously held viewpoints constructing new knowledge (Sthapornnanon et al., 2009). Because the discussions were student-led, faculty acted as facilitators when discussions stray from topic or become too shallow for redirection. Using social constructivist theory (e.g. knowledge creation through interactions) grounded in Vygotsky's social-cultural theory provided an impetus for implementing a case-based, online discussion forum to improve professionalism skills and knowledge in GME residents.

Review of the Literature

Social constructivist theory provides a foundation for medical educators to use when developing instructional strategies to teach residents. Drawing from social constructivist theory, educators should focus on evidence-based instructional strategies that promote the construction of knowledge characteristics through collaboration with peers, student-centered learning environments, authentic, case-based activities, and support from instructional facilitators. Online discussion forums via social media used as an instructional strategy possess these characteristics and can be an effective strategy to promote learning outcomes. The following sections describe instructional strategies for teaching professionalism and the challenges and benefits to teaching professionalism in graduate medical education as presented within the literature. Additionally, I discuss the use of online discussion forums via social media and challenges for implementing discussion forums considering current literature.

Instructional Strategies to Teach Professionalism

Implementing effective instructional strategies grounded in social constructivist theory to educate residents and fellows regarding appropriate professionalism skills is paramount to producing competent physicians. Within the review of the literature, multiple instructional

strategies emerged that demonstrate effectively improving professionalism within graduate medical education. Instructional strategies identified in the literature include role modeling (Birden et al., 2013; Deptula & Chen, 2013; Riley & Kumar, 2012; Salam et al., 2012; Turner et al., 2015), standardized patient encounters (Bearman et al., 2012; Downar, Knickle, Granton, & Hawryluck, 2012; Hochberg et al., 2012; McEvoy, Butler, & MacCarrick, 2012), formal curriculums (Hultman et al., 2013; Schulz et al., 2013), reflection activities (Birden et al., 2013; Kung et al., 2012; Kung et al., 2015), and case-based discussions (Cummings et al., 2015; Domen et al., 2017; Edwards et al., 2014; Kesselheim et al., 2015; Kung et al., 2012; Kung et al., 2015; Nadeau et al., 2016).

Role modeling, defined as behaviors exhibited by faculty within and outside the clinical settings that act as an influential force in shaping the behaviors of residents, has the potential to be an effective instructional strategy to teach residents professionalism knowledge and skills (Birden et al., 2013; Deptula & Chen, 2013; Riley & Kumar, 2012; Salam et al., 2012; Turner et al., 2015). Two literature reviews identified role modeling as a best practice to teach professionalism (Birden et al., 2013; Deptula & Chen, 2013). Three survey-designed research studies found that residents and faculty perceive role modeling as one of the best instructional strategies to teach professionalism (Riley & Kumar, 2012; Salam et al., 2012; Turner et al., 2015).

Additionally, standardized patient encounters, both live and virtual, can positively impact professionalism knowledge and skill acquisition on pre-and posttest, performance-based evaluations (Downar et al., 2012; Hochberg et al., 2012). Surgical residents who participated in standardized patient encounters described the strategy as "feasible" for teaching professionalism (Bearman et al., 2012, p. 201). In a second survey-designed study, medical students reported

standardized patient encounters as "authentic" (McEvoy et al., 2012, p. 35) and effective for teaching professionalism.

Implementing formal curriculums that include multiple activities can also lead to improved outcomes in residents' professionalism knowledge and skill levels (Hultman et al., 2013; Schulz et al., 2013). A leadership curriculum integrated in an otolaryngology residency program increased posttest scores by 44%, from 56% to 100% (Schulz et al., 2013). Plastic surgery residents also saw an increase in posttest scores after participating in a six-week professionalism curriculum (Hultman et al., 2013).

Activities that promote reflection are also identified by residents and faculty as an effective strategy to teach professionalism (Birden et al., 2013; Kung et al., 2012; Kung et al., 2015). In a systematic literature review, Birden et al. (2013) reviewed 43 articles and identified critical reflection as one of the best methods to teach professionalism. Kung et al. (2012) and Kung et al. (2015) examined the effectiveness of case-based small group reflection sessions to teach professionalism to radiology residents. Both studies used surveys to rate the residents' perceptions of the sessions' effectiveness, which verified reflective activities as effective.

Although these four strategies were identified as effective within the literature, case-based, online discussions is the focus of the following sections. While case-based activities and online discussions are prevalent separately within the literature, the combination of the two strategies is limited especially with regards to teaching professionalism in graduate medical education.

Case-based Discussions. The use of case-based activities, scenarios that "reflect real-world practice" (Stavredes, 2011, p. 119), to teach professionalism receives high satisfaction rates from residents, which can lead to increased effectiveness. Radiology residents ($n = 25$),

who participated in four small group, case-based discussions regarding online professionalism, expressed satisfaction with the strategy on a post-session survey (Kung et al., 2012). In a similar survey design study, transitional year residents (*n* = 30) who completed annual review surveys reported high approval ratings of case-based strategies to teach appropriate professional behaviors (Edwards et al., 2014). When case-based strategies were augmented to include asynchronous online discussion boards, family medicine residents (*n* = 13) reported increased satisfaction rates within written feedback of the professionalism activity (Nadeau et al., 2016). On post-activity surveys, pediatric hematology-oncology residents (*n* = 187) also expressed high satisfaction with case-based instructional strategies and anticipated future sessions (Kesselheim et al., 2015). Neonatal-perinatal fellows and faculty (*n* = 128) who completed surveys ranked discussions with physicians and peers about actual cases to be the most effective instructional strategy to teach and learn professionalism (Cummings et al., 2015). The abundance of survey design studies examining satisfaction rates within the literature propagates the need to investigate other outcome measures such as performance and learning.

When implemented to teach professionalism, case-based instructional strategies are most effective when they emphasize collaborative learning and engage learners. In a meta-analysis of the literature, Antes et al. (2009) found that the most successful instructional strategies used case-based scenarios to provide residents the opportunity to practice applying problem-solving skills to real-life situations. When compared to traditional classroom settings, case-based strategies had a larger effect on learners' ability to learn (*d* = .53, *SD* = .14) when compared to traditional lectures (*d* = .36, *SD* = .25) (Antes et al., 2009, p. 12-13). During case-based activities, collaborating with residents and faculty reinforces clinical decision-making skills necessary to work within the healthcare team and promotes critical thinking skills (Steinert,

2009; Kung et al., 2015). Family medicine residents ($n = 13$) reported that case-based scenarios

paired with online discussions were more engaging and enhanced collaborative learning (Nadeau

et al., 2016). Similar results from a survey-designed study were reported by pediatric

hematology-oncology residents ($n = 187$) in which they felt that case-based strategies were

useful and engaging (Kesselheim et al., 2015). Strategies that engage residents and promote

collaboration can lead to increased knowledge and skill levels.

In addition to improving residents' professionalism knowledge base and skill acquisition,

case-based strategies can lead to the reduction of unprofessional behaviors within patient care

settings. Pathology residents ($n = 350$) and faculty ($n = 150$) demonstrated the development of

skills to identify unprofessional behaviors and define professionalism through analyzing case-

based scenarios and choosing appropriate actions (Domen et al., 2017). On post-session surveys,

radiology residents ($n = 25$, $n = 30$) agreed that case-based discussions improved their knowledge

and made them more aware of professionalism issues (Kung et al., 2012; Kung et al., 2015).

However, neither Kung et al. study explored residents' attainment of professionalism knowledge

or skills following the instructional intervention. Case-based activities can also reduce the

amount of unprofessional behaviors exhibited during actual clinical setting activities. When

transitional year residents ($n = 30$) participated in case-based discussions, analysis of the number

of unprofessional behaviors that occurred before and after the case-based activity decreased from

four occurrences to one (Edwards et al., 2014).

Utilizing case-based discussions can increase resident satisfaction levels leading to

heightened levels of engagement, collaboration, and acquisition of knowledge and skills.

Although many of the sources researched the effectiveness of case-based strategies to teach

professionalism through the perceptions of program directors, faculty, and residents, the

evidence for implementing case-based activities is compelling (see Table 1). Overall, the participants who were surveyed believed the method to be effective, in turn increasing their engagement, collaboration, and knowledge base.

While case-based instructional strategies have been identified as a potentially effective strategy to teach professionalism, a majority of the research utilized exploratory and descriptive design studies and examine satisfaction rates or perceptions. Additional research should utilize experimental designs to investigate learning outcomes to demonstrate the effectiveness of instructional strategies. Combining case-based discussions with online technology may increase the strategy's effectiveness to teach professionalism (Nadeau et al., 2016).

Table 1

Summary of Articles Reviewed for Professionalism Instructional Strategies

Author, Publication Date	Study Design	Focus	Setting
Antes et al., 2009	Meta-analysis	Case-based approach	Science Education
Bahaziq and Crosby, 2011	Literature Review	Relationship between professionalism and patient care	GME-Anesthesiology
Bearman et al., 2012	Survey	Standardized patients	Surgical Education
Birden et al., 2013	Literature Review	No consensus on best method	Medical Education
Birden et al., 2014	Literature Review	Defining Professionalism	Medical Education

Author, Publication Date	Study Design	Focus	Setting
Cummings et al., 2015	Survey	Various methods	GME-Neonatology
Deptula and Chun, 2013	Literature Review	Various methods	Surgical Education
Domen et al., 2017	Survey	Case-based approach	GME-Pathology
Downar et al., 2012	Survey, Pre/Posttest	Standardized patients	GME-Critical Care
Edwards et al., 2014	Survey	Case-based approach	GME-Transitional
Hochberg et al., 2012	Quasi-experimental	Standardized patients	GME-Surgery
Hultman et al., 2012	Survey	Case-based approach	Undergraduate Medical Education
Hultman et al., 2013	Survey, Posttest	Formal course	Plastic Surgery Practice
Joiner et al., 2015	Survey	No specific method	GME-Psychiatry
Kesselheim et al., 2012	Survey	No specific method	GME-Pediatrics
Kesselheim et al., 2015	Survey	Case-based approach	GME-Pediatric Hematology Oncology
Kung et al., 2012	Survey	Case-based approach	GME-Radiology
Kung et al., 2015	Survey	Case-based approach	GME-Radiology

Author, Publication Date	Study Design	Focus	Setting
McEvoy et al., 2012	Survey	Standardized patients	Undergraduate Medical Education
Nadeau et al., 2016	Survey	Case-based approach	GME-Family Medicine
O'Sullivan et al., 2012	Literature Review	No specific method	Medical Education
Riley and Kumar, 2012	Survey	Role modeling	Medical Education
Salam et al., 2012	Survey	Role modeling	Undergraduate Medical Education
Schulz et al., 2013	Posttest	Formal course	GME-Otolaryngology
Turner et al., 2015	Survey	Role modeling	GME-Pediatric Critical Care

Online discussion forums via social media. Online discussion forums, an electronic communication tool (e.g. Google Plus Community) that "allows learners to interact asynchronously one-to-one or one-to-many to discuss topics and freely exchange thoughts and ideas" (Stavredes, 2011, p. 175), are often implemented within online technology via learning management systems (e.g. Blackboard, eCourseware, etc.) or social media platforms (e.g. blogs, Facebook, Google+, etc.). While discussion forums within learning management systems exist, this literature review focused on discussion forums used within social media. O'Hagan, Roy, Anton, and Chisolm (2016) defined social media as "learner generated, collaborative, and

engaging software applications in which users are encouraged to communicate, share, and update information in a way that promotes easy flow of knowledge" (p. 131). The collaborative nature of discussion forums provides learners the opportunity to share knowledge with peers and instructors, solve problems cooperatively, reflect on previous experiences, and hone critical thinking skills (Cheston, Flickinger, & Chisolm, 2013; Hamm et al., 2013; Hollinderbaumer, Hartz, & Uckert, 2013; Macznik, Ribeiro, & Baxter, 2015). Online discussion forums also promote learner-centered environments conducive to constructing knowledge, which are major tenets of social constructivist theory (Cheston et al., 2013; Hollinderbaumer et al., 2013). Through collaboration during discussions, learners can "improve knowledge acquisition" (Macznik et al., 2015, p. 10), "enhance development of practical skills" (Macznik et al., 2015, p. 10), and "stimulate reflection and actively integrate [into] the construction of their own knowledge" (Hollinderbaumer et al., 2013, p. 7).

Within healthcare professionals' education, including medical, nursing, dental, etc., online discussion forums based in social media are perceived as being an instructional strategy to promote learning and engagement (Bernard et al., 2014; Hudson, 2014; Linjawi, Walmsley, & Hill, 2012; McGowan et al., 2012; Merzel & Goodman, 2016; Poirier, Cooley, Wessely, Guebert, & Petrocco-Napuli, 2014; Salem et al., 2017). Descriptors of online discussion forums as instructional strategies include "efficient and effective" (McGowan et al., 2012, p. e117), "successful" (Linjawi et al., 2012, p. e3), "useful" (Merzel & Goodman, 2016, p. 154; Salem et al., 2017, p. 497), and "feasible" (Bernard et al., 2014, p. 326) for improving knowledge acquisition. Chiropractic residents ($n = 20$) who participated in an asynchronous discussion forum rated it as an effective method to teach diagnostic imaging on a post-activity survey (Poirier et al., 2014). Messages ($n = 330$) posted by dental students and faculty in an online

25

discussion forum were analyzed via a mixed methods designed study and highlighted the potential success of the forum to benefit learning (Linjawi et al., 2012). From coding the discussion posts ($n = 259$) of Master of Public Health students ($n = 24$), Merzel and Goodman (2016) concluded that discussion forums were useful for engaging the students and providing a safe arena to discuss issues. Eighty-two percent of nursing students ($n = 54$) reported satisfaction with participating in an online discussion forum (Hudson, 2014).

The utilization of online discussion forums has also been examined within graduate medical education and from the perspective of practicing physicians. On a survey, physicians ($n = 485$) reported that social media, including those functioning as a discussion forum, can act as an effective and efficient method to share knowledge and improve patient care (McGowan et al., 2012). Forty-three percent of urology residents ($n = 58$) surveyed about the usefulness of technology, i.e. social media, internet, applications, perceived social media to be "useful for education" (Salem et al., 2017, p. 498). Emergency medicine residents ($n = 37$) who participated in a discussion forum via a secure online social media platform reported that it was a feasible tool for promoting learning (Bernard et al., 2014).   Kornegay et al. (2016), who examined the effect of a web-based curriculum within an emergency medicine residency program, described the online discussion forum used within the asynchronous web-based modules as "particularly advantageous" (p. 1119), especially when addressing topics that are abstract and difficult to teach (e.g. professionalism). Family medicine residents ($n = 13$) who participated in case-based, online discussions provided positive feedback about the strategy for teaching professionalism stating that online discussions were an interesting way to learn (Nadeau et al., 2016). Utilization of an online discussion forum embedded in social media is perceived by learners and faculty as an effective instructional strategy to stimulate knowledge acquisition.

In addition to positive perceptions, online discussion forums promote learner engagement, motivation, and collaboration (Bernard et al., 2014; Cheston et al., 2013; Jordan, Hoffman, Arora, & Coates, 2016). Emergency Medicine residents ($n = 37$) and faculty reported that participating in a secure online discussion forum was "engaging" and "valuable" (Bernard et al., 2014, p. 328). Thirty-three percent of fourth year medical students ($n = 14$) participating in an online discussion forum to share knowledge and experiences reported that the forum created a sense of community and promoted engagement (Jordan et al., 2016). Incorporating social media with online discussion forums creates a learning environment that is highly engaging and collaborative within medical education and encourages learning (Cheston et al., 2013).

Although many studies identified online discussion forums to be an advantageous instructional strategy to promote learning in general and for medical education, few studies have researched the potential effects of online discussion forums on improved knowledge and no studies have investigated the effect on professionalism skills and knowledge attainment. Only one article examined resident satisfaction rates of using case-based, online discussions to teach professionalism in graduate medical education (Nadeau et al., 2016). Research has examined participation levels linked to grades received for coursework within online discussion forums. Nursing students ($n = 54$) who failed a semester long course had little to no participation in the online discussion forum as compared to their peers who passed the course and participated frequently in the discussions (Hudson, 2014). Similarly, first- ($n = 460$) and second- ($n = 137$) year medical students' participation in an online discussion forum directly correlated with end of course grades; the higher the participation rate, the higher the grade (Green & Hughes, 2013). Obstetrics and gynecological residents ($n = 15$) witnessed a 22 to 30 percent increase in posttest scores when frequent participation in an online discussion forum was included as part of

a blended curriculum (Taylor, Nelson, Delfino, & Han, 2015). Participation in online discussion

forums can positively impact knowledge acquisition and improve skills.

While discussion forums as instructional strategies are among the most frequently studied

online technology, many of the studies are exploratory and descriptive in nature (Cheston et al.,

2013; Hamm et al., 2013; Sterling, Leung, Wright, & Bishop, 2017). Three of the articles

reviewed utilized quantitative survey and correlational designs, but none of the articles

reviewed implemented randomized, controlled experimental designs to study the effectiveness of

online discussion forums on knowledge and skill acquisition (see Table 2). In addition, only six

studies were conducted in GME with only one of these investigating the effect on

professionalism skills and knowledge. The lack of true experimental studies situated in graduate

medical education provides an impetus for rigorous, experimental designs to investigate

instructional strategies within graduate medical education. In addition to the lack of true

experimental studies focused in graduate medical education, only one study investigated the

utilization of case-based, online discussions to teach residents professionalism which propagates

the need for additional research to examine this strategy and its effect on professionalism

knowledge and skills.

Table 2

Summary of Articles Reviewed for Online Discussion Forum via Social Media

Author, Publication Date	Study Design	Focus	Setting
Bernard et al., 2014	Survey	Discussion Forum-Edmodo	GME-Emergency Medicine

Author, Publication Date	Study Design	Focus	Setting
Cheston et al., 2013	Literature Review	Blogs, Wikis, Twitter, Facebook	Medical Education
Gholami-Kordkheili et al., 2013	Literature Review	Blogs, Facebook, Twitter, YouTube	Medical Education
Green and Hughes, 2013	Correlational	Discussion Forum	Undergraduate Medical Education
Hamm et al., 2013	Literature Review	Discussion Forum, Facebook, YouTube, Twitter, Wikipedia, Second Life	Health Care Professionals
Hollinderbaumer et al., 2013	Literature Review	Podcasts, Blogs, Wikis, YouTube, Twitter, Skype	Medical Education
Hudson, 2014	Correlational	Discussion Forum	Nursing School
Jordan et al., 2016	Mixed Methods	Discussion Forum	Undergraduate Medical Education
Kornegay et al., 2016	Survey	Discussion Forum	GME-Emergency Medicine
Linjawi et al., 2012	Mixed Methods	Discussion Forum	Dental School
Macznik et al., 2015	Literature Review	Websites, Discussion Forum	Physiotherapy School

Author, Publication Date	Study Design	Focus	Setting
McGowan et al., 2012	Survey	Social Network, Online Community, Wikis, Blogs	Physicians
Merzel and Goodman, 2016	Qualitative	Discussion Forum	Master Public Health
Nadeau et al., 2016	Survey	Case-based, online discussions	GME-Family Medicine
Poirier et al., 2014	Survey	Discussion Forum	Chiropractic School
Salem et al., 2017	Survey	Internet, Apps, Social Media	GME-Urology
Sterling et al., 2017	Literature Review	Twitter, Blogs, Wikis, Podcasts, YouTube	GME
Taylor et al., 2015	Survey, Experimental	Discussion Forum	GME-OBGYN

Challenges of developing online discussion forums. Developing online discussion forums via social media can present several challenges for instructors including maintenance of patient confidentiality and privacy, unprofessional discussion posts, and low participation rates (Bergl & Muntz, 2016; Cheston et al., 2013; Gholami-Kordkheili, Wild, & Strech, 2013; von Muhlen & Ohno-Machado, 2012). Program directors can overcome these challenges through utilizing appropriate instructional design. The most concerning of these are patient confidentiality and privacy and unprofessionalism. Failure to maintain patient anonymity within

discussions can have serious repercussions for violating the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which protects patients' personal health information (Gholami-Kordkheili et al., 2013; von Muhlen & Ohno-Machado, 2012). Faculty and residents must be vigilant in monitoring their posts to comply with HIPAA regulations. The other challenge that raises concern is unprofessional behavior that can occur through discussion posts (Gholami-Kordkheili et al., 2013; von Muhlen & Ohno-Machado, 2012). Both faculty and residents must maintain appropriate behavior during debates, use appropriate language, and respect all members of the group. To counteract unprofessional posts that pose a threat to patients and residents, program directors must develop policies that include definitions for appropriate and inappropriate posting and procedures for disciplinary action (Gholami-Kordkheili et al., 2013).

Another challenge in developing online discussion boards via social media is creating content to engage faculty and residents to avoid potentially low participation rates (Cheston et al., 2013). Participation rates can be impacted by a number of factors including technical difficulties, time constraints, and difficulty following discussion threads (Bergl & Muntz, 2016; Cheston et al., 2013). Technical difficulties can lead to frustration causing participants to abandon the discussion (Cheston et al., 2013). Time demands of reading all the discussion posts and responses and then writing an individual post may hinder high participation, especially in an already time-challenged medical curriculum (Cheston et al., 2013). Depending on the online technology used for the discussion forum, threads can be difficult to follow especially when they become lengthy. Learners may lose interest and fail to participate if the threads become too long or difficult to follow (Bergl & Muntz, 2016). Program directors can overcome this challenge by

providing structure and discipline to the discussions, using relevant cases to prompt and guide discussions, using open-ended questions, and stimulating critical thinking skills.

Solution

Implementing an effective instructional strategy to teach professionalism in GME is crucial in meeting accreditation standards and to improve physician performance, patient care outcomes, and healthcare team interactions. However, identifying an effective instructional strategy is challenging for program directors and faculty. The identification of effective strategies is hindered by the lack of a universally-accepted definition of professionalism and instructional strategy to teach it within the literature. Due to abundant sources of exploratory, descriptive, and qualitative research, a study using a randomized, controlled experimental design to investigate the effectiveness of specific instructional strategies used to improve residents' professional knowledge and skills is warranted. While resident and faculty perception and satisfaction rates of case-based discussions via social media and learning management systems are high, this does not guarantee significant learning will occur when implemented. A study that employs rigorous experimental design to examine the effects of case-based, online discussions via social media on residents' professionalism knowledge and skill acquisition fills a dual gap within the literature, i.e. lack of effective instructional strategies and rigorous experimental designs. Investigating the effect of case-based, online discussions via social media provides program directors an effective instructional strategy that can be implemented to teach professionalism, improve physician performance, and enhance patient care.

CHAPTER THREE: METHODOLOGY

Introduction

The demonstration of professional behaviors by Graduate Medical Education residents is a skill mandatory for graduation and essential for providing high quality patient care that results in positive patient outcomes. However, program directors of GME residency programs find it challenging to identify and implement effective instructional strategies to teach residents professionalism skills. Case-based, online discussion forums grounded in social constructivist theory can provide residents with an environment that maximizes knowledge construction through interactions with instructors and peers. Investigating the effect of a case-based, online discussion forum on residents' professionalism knowledge and skills can provide medical educators with an evidence-based instructional strategy to effectively teach professionalism.

Method and Design

A quantitative, posttest only control group experimental study was conducted to investigate the difference between the control (e.g. professionalism traditional lecture) and experimental groups' (e.g. professionalism traditional lecture and case-based, online discussion forum) professionalism skills as measured by the Professionalism Mini-Evaluation Exercise (P-MEX) and knowledge as measured by a posttest. The control group participated in a traditional lecture, and the experimental group participated in a traditional lecture and a four-week, case-based, online discussion forum. The research design was chosen as the aim of the study was to test for differences between two groups in which participants were randomly assigned. This study included a researcher-developed treatment, random assignment of participants to each group, and treatment and control groups. The design was rigorous and controlled for most threats to internal validity (Creswell, 2015). The absence of experimental studies investigating

instructional strategies for professionalism found within the literature was also used as a deciding factor in choosing this method. The results of this study can be used by program directors to make curricular decisions and implement effective instructional strategies within their program to improve residents' professionalism skills and knowledge base in turn improving patient care and outcomes.

<div align="center">**Participants**</div>

The sample population for this study was medical residents currently training in ACGME accredited Graduate Medical Education residency programs at UTHSC. As the researcher, I have access to residents within 72 ACGME accredited residency programs. The sample was selected using a single-stage, non-random, convenience technique. From the 72 ACGME accredited residency programs, I non-randomly selected two programs based on availability to participate in the research study. The Diagnostic Radiology and Family Medicine Jackson residency programs confirmed availability and contained a total of 48 residents ranging from postgraduate year (PGY) one to five. Prior to assigning the residents to groups, I sent an email to all residents that contained the informed consent and a link to a demographic survey housed within Qualtrics. Before the lecture, the residents were allowed to ask questions or discuss any concerns about the study with me. After all questions and concerns were addressed, the consent forms were signed and collected. The professionalism traditional lecture and case-based, online discussion forum was integrated into the programs' curriculum. The residents assigned to the control group were required to participate in the lecture, while the residents assigned to the experimental group were required to participate in both the lecture and online discussion. However, the informed consent provided the residents with an opt out option. If a resident chose the opt out option, he/she participated in the traditional lecture and his/her data

was not included in the study. Stratified, random assignment of residents to the control and experimental groups was used to equate the groups and provided a high level of control within the study (Creswell, 2015). The residents were stratified based on PGY level and program and then randomly assigned to either the control or experimental groups. The PGY level and program may affect the results of the study due to differing maturity levels and experiences of the residents (Creswell, 2015).

All residents within this sample have completed four years of medical school in either an allopathic or osteopathic program and have successfully passed the United States Licensing Medical Examinations (USMLE) Steps 1 and 2 or COMLEX-USA Levels 1 and 2. Years in training ranged from PGY-1 to PGY-5. Ages of residents ranged from 26-46 with 33 males and 14 females. In addition, the sample contained racial diversity including Caucasian, African American, Asian, and American Indian/Alaskan. The racial diversity may also influence the results due to differences in cultural definitions of professionalism and acceptable behavioral norms. Participant demographics including PGY- level, program, age, gender, race, and ethnicity were collected via a demographic survey in Qualtrics. A link to the survey was distributed to each participant via email along with the informed consent.

Based on research conventions discussed by Creswell (2015), the minimum sample size for an experimental control group study must include at least 15 participants per group. Although this is the minimum standard, Lipsey (1990) recommended the use of the power analysis formula to determine sufficient sample size to ensure the highest level of power necessary to reject the null hypothesis. With the sample including 48 residents, both groups had 24 residents, assuming the mortality rate was zero. Using Lipsey's sample size table, the sample

size of approximately 24 per group produced an effect size of 0.80 for a power of .80 (Creswell, 2015).

Setting

The research study occurred at the University of Tennessee Health Science Center in Memphis, TN, an ACGME accredited Graduate Medical Education Institution that trains residents in a variety of medical specialties. UTHSC was chosen due to its direct accessibility to the researcher. Each residency program within the Institution is based at a different hospital location throughout the region. Separate program directors certified in the corresponding specialty, i.e. Diagnostic Radiology and Family Medicine, are charged with overseeing the program's curriculum based on ACGME Common Program and specialty specific requirements. The program director and faculty within each program are physicians who are board certified within the specialty, hold an active Tennessee medical license, and have University faculty appointments and hospital privileges. Educational activities for each program occur in multiple environments including inpatient and outpatient facilities and classroom settings.

The UTHSC Radiology residency program is a four-year program that trains PGY-2 through PGY-5 residents who have completed a one-year preliminary program in either internal medicine, surgery, or transitional year program. Currently, there are 24 residents in training with six PGY-2, five PGY-3, seven PGY-4, and six PGY-5. Training in radiology includes "diagnostic and image guided therapeutic techniques, including all aspects of image-based diagnosis, radiography, nuclear radiology, diagnostic ultrasound, magnetic resonance, computed tomography, interventional procedures, and molecular imaging" (ACGME, 2016c, p.

1). Educational activities and clinical rotations occur at four large urban hospitals that include both inpatient and outpatient facilities.

The UTHSC Family Medicine Jackson residency program is a three-year primary care training program that trains PGY-1 through PGY-3 residents. Family medicine does not require a preliminary year, so trainees typically enter the program directly after finishing medical school. Currently, there are 24 residents in training with nine PGY-1, nine PGY-2, and six PGY-3. Training in family medicine includes

> demonstrating high quality care within the context of a personal doctor-patient relationship and with an appreciation for the individual, family, and community connections. Continuity of comprehensive care for the diverse patient population family physicians serve is foundational to the specialty. Access, accountability, effectiveness, and efficiency are essential elements of the discipline. The coordination of patient care and leadership of advanced primary care practices and evolving health care systems are additional vital roles for family physicians. (ACGME, 2016b, p. 1)

Educational activities and clinical rotations occur at an urban hospital that consists of inpatient and outpatient facilities and multiple rural outpatient settings.

The control and experimental groups participated in a professionalism traditional lecture, which occurred in a classroom setting located at each separate residency program. The program director from each program and I gave a pre-developed lecture based on ACGME professionalism requirements and milestones and P-MEX assessment criteria to both the control and experimental groups. This training in professionalism did not occur at a specific time within the training program. The experimental group also participated in an asynchronous, case-based, online discussion forum via a Google Plus Community. Since an asynchronous system was

used, the experimental group posted reflections and discussions at any time and from any location that had a computer with Internet access, e.g. home, hospital, computer lab, etc. At the end of the online discussion forum, both the control and experimental groups participated in a professionalism posttest. The posttest was developed in Qualtrics, an online survey system, and a link to the posttest was sent to each participant via email. The posttest was taken at any time and from any computer or mobile device that had internet access. In addition to the posttest, the residents in both groups were assessed via observation by the program director or faculty using the P-MEX. The observations occurred in a clinical setting, e.g. radiology suite or family medicine ambulatory clinic.

Instructional Design Intervention

At the beginning of the instructional strategy period, both groups participated in a 45-minute professionalism traditional lecture given by their program director and the researcher that encompassed the ACGME requirements and milestones for professionalism, program expectations for behavior, implications for patient care, application to practice, and analysis of case-based scenarios. The professionalism traditional lecture was developed via a collaborative effort by the researcher and program directors using elements of Dick, Carey, and Carey's (2015) systems approach model for designing instruction including writing performance objectives and aligning assessment instruments with objectives. Attendance at the lecture was collected via a sign-in sheet.

Approximately a week after the lecture, the experimental group joined an asynchronous, case-based, online discussion forum via a Google Plus Community that provided opportunities to reflect upon case scenarios and personal experiences, identify unprofessional behaviors, discuss appropriate responses, and respond to fellow participants in the community. The experimental

group participated in the case-based discussion forum for four weeks. At the beginning of each week the group received a case-based scenario with several open-ended questions that focused on the professional or unprofessional behavior occurring in the case, the potential impact on patient care, their own response to the scenario, and reflection upon previous experiences with similar situations. The case-based scenarios aligned with ACGME requirements and milestones and the four domains of professionalism included on the P-MEX, i.e. doctor-patient relationships, reflective skills, time management, and interprofessional skills. Each resident was required to post answers to the questions and respond to at least two of his/her peers within the community. Daily, the researcher and program director monitored the discussion board to ensure resident participation, appropriate interaction, and critical thinking (Stavredes, 2011). When the discussion became too shallow or strayed off topic, the program directors participated within the discussion to provide direction and facilitate deeper dialogue. Weekly participation of each resident in the discussion forum was logged into an excel spreadsheet and used to monitor and ensure involvement.

Compliance with the study's procedures (e.g. attendance at the lecture, participation in the discussion forum, and completion of posttest) was included as part of each resident's end-of-rotation evaluation, which assesses the resident's performance in patient care, medical knowledge, practice-based improvement, interpersonal and communication skills, professionalism, and systems-based practice during the rotation. Participants in both the control and experimental groups were assessed using the end-of-rotation evaluation. Failure to comply with procedures resulted in lower scores on this evaluation form, which could ultimately affect progression within the program. The results of the end-of-rotation evaluations were not used as a variable or instrument within the present study.

The present study utilized two assessment tools. The Professionalism Mini-Evaluation Exercise assessed the participant's ability to perform professionalism skills using a four-point, Likert-type scale. The posttest assessed the participant's knowledge base in professionalism elements. After the traditional lecture and conclusion of the four-week, case-based, online discussion forum, both assessments were administered.

Professionalism Mini-Evaluation Exercise (P-MEX)

The P-MEX, designed by Cruess et al. (2006b), is an evaluation form used by an observer (e.g. program director) to rate residents' skills in professionalism within and outside of the clinical setting. It was developed by a group of 92 physician faculty and residents at McGill University in Montreal, Quebec, Canada. Initially, the group identified 142 attributes of professionalism, similar to lists developed by the National Board of Medical Examiners (NBME) and the Association of American Medical Colleges (AAMC). Consolidation of the list resulted in 24 attributes of professionalism distributed amongst four domains including doctor-patient relationship skills, reflective skills, time management, and interprofessional relationship skills. Each attribute and overall performance is scored using a four-point Likert-type scale including 1=unacceptable, 2=below expectations, 3=met expectations, and 4=exceeded expectations. Cruess et al. (2006b) defined each rating to ensure standardized grading. Unacceptable means "lapses of professional behavior that are intentional, are likely to harm, and for which there are no mitigating circumstances" (Cruess et al., 2006a, p. 3). Below expectations stands for "lapses of professional behavior that are unintentional, result in minimal to no harm, or for which there may be mitigating circumstances" (Cruess et al., 2006a, p. 3). Met expectations means "demonstrated the performance expected for the level of the resident"

(Cruess et al., 2006a, p. 3). Exceeded expectations stands for "exceptional performance,

demonstrating the behaviors expected of an outstanding physician-to-be" (P-MEX form and

rating scale section). Residents that score a rating of three or four on the overall performance

have demonstrated appropriate professionalism skills and receive a passing score on the P-MEX.

On the other hand, residents that score a rating of one or two on the overall performance fail the

P-MEX. The form also included a not applicable option for selection when skills were not

observed, a resident demographic section, an area to indicate the setting of the evaluation, a

question to score the resident's overall performance, a comment section, and an area to indicate

the occurrence of a critical event.

Cruess et al. (2006b) conducted a study to investigate the the validity and reliability of

the original P-MEX through simulation and clinical setting activities. Based on factor analysis,

reproducibility coefficients, and standard error of measurements, the researchers concluded that

the P-MEX was feasible to assess professionalism skills, held content and construct validity, and

was reliable. Content validity was determined based on the rigorous process to develop the form

and its similarity with lists developed by NBME and the AAMC. Construct validity was found

using a factor analysis which resulted in "the 24 original items cluster into identifiable factors of

the construct" (Cruess et al., 2006b, p. S77). Reproducibility was confirmed using the

dependability coefficient of .80 when 10-12 forms were completed. Based on the results, the

original P-MEX form was revised to its current state, which includes 21 professionalism

attributes scored on a four-point Likert-type scale with scores ranging from zero to 84 with

higher scores indicating higher levels of professionalism (e.g. zero-27 = low scores, 28-55 =

medium scores, 56-84 = high scores). The resident's overall professionalism performance is also

assessed based on a four-point Likert-type scale with scores ranging from one (below expectations) to four (exceeded expectations).

Tsugawa et al. (2011) conducted a study that investigated the validity and reliability of the P-MEX form to assess professionalism within Japanese residency education programs. The researchers conducted a multi-center cross sectional study that investigated the validity and reliability of the P-MEX in assessing residents' professionalism skills. The researchers found that the P-MEX was both valid (criterion and construct) and reliable for assessing residents' professionalism skills. Validity was determined through a Pearson correlation coefficient ($r =$ 0.78) and a comparative fit index (CFI = 0.079). The reliability was determined through the calculation of dependability coefficients of 0.80. In conclusion, the P-MEX is a "useful tool" (Tsugawa et al., 2011, p. 1030) in assessing professionalism skills. The results found in Tsugawa et al.'s (2011) research confirmed the results from Cruess et al.'s (2006b) study.

The P-MEX form was chosen for the present study based on its validity, reliability, and its appropriateness for use in graduate medical education. It was created by physician faculty and residents in graduate medical education for the specific purpose of assessing professionalism skills in medical education settings (Cruess et al., 2006b). In addition, the 21 attributes included on the P-MEX directly correspond with ACGME requirements and milestones that guide graduate medical education curriculum and assessment. Since the P-MEX is currently under the creative commons license, which allows for sharing and remixing of the form, its accessibility made it a viable assessment form to use in this research study. The reliability of the P-MEX in this study was determined using Cronbach's alpha where a higher alpha level correlates to higher reliability (Thorndike & Thorndike-Christ, 2010).

At the end of the treatment, the program directors from each program, researcher, or one faculty was asked to observe the participants of both groups in a clinical setting (e.g. radiology suite or family medicine ambulatory clinic) and assess their performance of professionalism skills using the P-MEX. The P-MEX was completed by hand and sent to the researcher for tabulation and preparation for analysis. Prior to the study, the program directors received a training manual with instructions for using the P-MEX.

Professionalism Posttest

Participants in both the control and experimental groups completed a posttest that assessed their knowledge of professionalism. The posttest was developed by the researcher and the group of UTHSC residency program directors who developed the professionalism lecture. Using elements of the Dick et al. (2015) instructional design method, the posttest included 10 questions, one for each of the lecture objectives. Test questions aligned with the behavior specified in each objective (Dick et al., 2015) and consisted of defining professionalism based on ACGME requirements and milestones, identifying unprofessional behaviors, choosing professional responses to situations, and identifying attributes of professionalism. Potential scores on the posttest ranged from zero to 100 with higher scores correlating with higher levels of professionalism knowledge. After development of the posttest, it was reviewed by a second group of UTHSC program directors for face and content validity. The posttest was administered via a Qualtrics link emailed to the participants. Internal consistency reliability of the posttest was determined through the use of the Kuder-Richardson 20 reliability test where a higher alpha value correlates with a higher reliability (Thorndike & Thorndike-Christ, 2010).

Table 3

Description of Measurement Instruments

	Professionalism Mini-Evaluation Exercise	Posttest
Research Question	1	2
Construct Measured	Professionalism Skills	Professionalism Knowledge
Format of Assessment	Likert-type scale	Multiple Choice (n=10)
Reliability	Cronbach's alpha 10-12 forms to reach Reproducibility Coefficient of .80	Cronbach's alpha was used to determine internal consistency
Validity	Reported as having both content and construct validity through rigorous development process and factor analysis	Face and construct validity was confirmed via rigorous development process
Score Range	1-4 (unacceptable, below expectations, met expectations, exceeded expectations)	0-100 (each question was given a score of 10=correct and 0=incorrect)
Subscale	None	None

Procedures

Institutional Review Board Approval

Prior to the beginning of the research study, Institutional Review Board approval was requested and received through the University of Tennessee and University of Memphis IRB offices (see Appendix E for IRB approval letters).

Recruitment of Participants and Development of Instruction and Instrumentation

The program directors of the programs selected through non-random convenience sampling were contacted via email to determine availability to participate in the research study. The email provided the program directors with a summary of the study including research questions, variables, time commitment from them and the residents, instructional interventions, and assessment strategies. Once availability was confirmed, a group of UTHSC program directors and I developed the professionalism traditional lecture in PowerPoint; presenter notes; the posttest; and the case-based scenarios based on research by Cruess et al. (2009) and using ACGME requirements and milestones for professionalism, the P-MEX, and expectations for behavior. The development process based on Dick et al.'s (2015) instructional design method included writing objectives, assessment questions, and instruction. The lecture, presenter notes, posttest, and case-based scenarios were reviewed by a second group of UTHSC program directors to ensure face and content validity. Revisions and additional reviews of each document occurred if necessary. Once these were finalized, I developed a training manual that instructed the radiology and family medicine residency program directors on giving the lecture and their involvement in the discussion board and assessment. The training manual included the lecture, presenter notes, instructions on giving the lecture, descriptions of the case-based, online discussion board and the Google Plus Community, expectations for resident involvement in the discussion board, program director responsibilities for monitoring and interacting in the discussion board, and use of the P-MEX to assess resident performance. I met with both program directors to review the manual and answer questions to ensure treatment and instrument fidelity.

Next, I set up a Google Plus Community, a social networking site supported by Google that was used for the discussion forum (Create or edit a community, n.d.). The Community was setup as a private community, which allowed me to invite members, approve posts prior to release, and control public access. As moderator, I employed settings that blocked the Community from being available for public searches and the public from requesting membership. Community members were invited to join and had access to read and create posts and respond to other members' posts.

After the Google Plus Community was created, I sent an email to all residents within each program that contained the informed consent and a link to a demographic survey housed within Qualtrics. The professionalism traditional lecture and the case-based, online discussion forum were integrated into the programs' curriculum. The traditional lecture was required for both the control and experimental groups while both the lecture and case-based, online discussion forum was required for residents in the experimental group. However, the informed consent provided the residents with an opt-out option. If a resident chose the opt-out option, he/she participated in the traditional lecture but his/her data was not included in the study. Receipt of signed consent forms and completion of the demographic survey began the process of stratified random assignment of participants based on residency program and PGY level to the control or experimental group. Twenty-four residents were randomly assigned to each group.

Intervention

All residents participated in a traditional lecture regarding professionalism given by their respective program director. Along with the program director, I presented the lecture to ensure treatment fidelity, address any concerns or questions regarding the study, and to collect the

informed consent forms. After the lecture was given to both groups, I emailed residents in the

experimental group to provide instructions and procedures for using the discussion

forum. Instructions included registering for a Google account, sending their Gmail account to

me, joining the Google Plus Community, and participating in the discussion forum (e.g.

expectations for discussions, HIPAA regulations). The participants also received a copy of the

Paul-Elder Model of Critical Thinking, which included elements of critical thinking to guide

their discussions (Elder & Paul, 2010). The researcher monitored the participant's compliance

with joining the discussion forum and garnered program director assistance if necessary to

ensure completion.

Once all residents joined the Google Plus Community, the case-based, online discussion

forum began and lasted four weeks. Participants reflected and discussed four case-based

scenarios accompanied by five questions. Each Tuesday, a case-based scenario along with open-

ended questions was posted (Stavredes, 2011). The residents were required to post one original

post answering the questions by Friday and respond to at least two other posts and any questions

posed to them by Monday. The program directors and I monitored for compliance and posted

comments when necessary to facilitate discussions. After each week, I recorded the number of

posts and responses made by each resident into an Excel spreadsheet.

Data Collection

At the end of the four-week period, the program directors from each program, researcher,

or a faculty were asked to observe the participants of both groups in a clinical setting (e.g.

radiology suite or family medicine ambulatory clinic) and assess their performance of

professionalism skills using the P-MEX. The program directors or faculty completed the P-MEX

and sent the form to the researcher for tabulation and preparation for data analysis.

In addition to the assessment of professionalism skills via the P-MEX, the participants of both groups completed a professionalism posttest after the completion of the online discussion forum activity. The posttest was administered to the participants through Qualtrics, an electronic survey system. Each participant received a link to the posttest via email, which included instructions for completion and submission of the test. Results for both the P-MEX and posttest were collected and used by the program director and faculty to assess resident performance in professionalism on the end of rotation evaluation forms. Once all P-MEX forms and posttests were completed, I collected the scores from the P-MEX forms and the posttest from Qualtrics for analysis purposes.

<div align="center">

Data Analysis

</div>

Research Questions One and Two

The research study's purpose was to study the effect of the independent variable (e.g. traditional lecture versus traditional lecture and a case-based, online discussion forum) on the dependent variable (e.g. professionalism skills and knowledge base). Both research questions implied the use of a difference test and included a categorical independent variable measured with a nominal scale, a continuous dependent variable measured on an interval (research question one) and ratio scale (research question two), and no covariate. Based on the research study's characteristics, descriptive statistics (e.g. mean and standard deviation) were used to describe the data's relationship to mean scores and a one-way analysis of variance (ANOVA) was used to test the hypotheses. An ANOVA was the most appropriate because the researcher was looking for differences between groups when there were one or more independent variable levels and one dependent variable with no covariate (Creswell, 2015). In other words, in testing the null hypothesis the analysis of variance analyzed "the variance of the scores on the dependent

variable" (Hinkle, Wiersma, & Jurs, 2003, p. 334). The characteristics needed to run an ANOVA were present within this research study.

ANOVA statistics rely on assumptions that can impact the validity of the results if not met (Hinkle et al., 2003). Prior to conducting the ANOVA, assumption tests were run to test for the distribution of normality and the homogeneity of variance. The distribution of normality was tested for using the Shapiro-Wilk test, one of the more powerful tests to identify deviations from normality (Stevens, 2009). Normality is assumed when the significance level is greater than .05 (Stevens, 2009). Homogeneity of variance within the population was tested for using Levene's Test for Equality. The assumption of homogeneity of variance is accepted with a significance level greater than .05. Other assumptions that impact an ANOVA include random sampling, independent observations, no extreme outliers, and interval or ratio scales to measure dependent variables.

Based on research conventions, the alpha level, the maximum level of risk that differences are based on chance, was set at .05 (Creswell, 2015). Effect size indicating the strength of the difference made by the treatment was reported using partial eta squared using Cohen's 1988 guidelines (Stevens, 2009). The sample size, alpha level, and effect size was used to determine the power of the study. A power of .80 or higher was desired to ensure that the null hypothesis was correctly rejected or not (Stevens, 2009). Due to the sample size of 48, Type II errors were a potential threat to the present study and were considered when interpreting results. All data was analyzed using IBM SPSS Statistics version 24 software.

Table 4

Research Questions, Data Sources, and Data Analysis Alignment

Research Question	Data Source	Data Analysis
RQ1. What is the effect of a traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on resident's overall performance of professionalism skills as measured on the Professionalism Mini-Evaluation Exercise?	Results from the Professionalism Mini-Evaluation Exercise	Mean Standard Deviation ANOVA Cronbach's alpha
RQ2. What is the effect of the traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on resident's knowledge of professionalism as measured by a posttest?	Results from the professionalism posttest	Mean Standard Deviation ANOVA Cronbach's alpha

Limitations

Although the use of a true experiment controls many threats to internal validity, some limitations still existed that might impede the significance of the results. At the current sample size of 48, each group included 24 participants, which created a threat of low power and increased the chance of Type II errors. The potential of Type II errors were carefully considered when interpreting the analysis (Creswell, 2015; Stevens, 2009). History posed another threat to internal validity. As the study progressed, the participants' professionalism skills and knowledge could have been affected by the hidden curriculum, role modeling by faculty, or other curricular activities that included elements of professionalism. Controlling influences on the dependent variable outside the study's purview were difficult to control. The interaction of selection and history could have also affected the dependent variable (Creswell, 2015). Since the two

programs participating in the study were located in two different hospital settings, each hospital may have emphasized professionalism differently affecting the participants' skill and knowledge. Controlling for program and PGY-level and program through stratified random assignment may have limited the impact of selection and history threat. Diffusion of treatments may have posed a threat to the results since participants in both groups continued to work together on rotations and share didactic sessions where professionalism may have been discussed (Creswell, 2015). Finally, demoralization of the control group may have affected the results (Creswell, 2015). To overcome this threat, the control group was offered the opportunity to participate in a case-based, online discussion forum after the study concluded.

In addition to the threats to internal validity, threats to external validity and other weaknesses threatened the study's results. External validity was threatened by the interaction of the setting and treatment (Creswell, 2015). Due to the small sample, low generalizability to other large university graduate medical education settings existed. Low generalizability can be addressed through repeating the study in a variety of other settings including other residency programs, specialties, and geographical locations. Other weaknesses found within the present study included a lack of selection randomization and the use of a posttest that had not been tested for validity and reliability.

Ethical standards were maintained to the highest extent possible throughout the study including participant confidentiality, informed consent, and privacy protections while sustaining minimal risk.

Biases/Subjectivities

The motivations for conducting this research study were twofold. First, as a GME leader, I am charged with the responsibility of overseeing the residency's compliance with ACGME

requirements. If programs are having difficulty meeting requirements, it is my duty to develop methods to help programs comply with the regulations and maintain accreditation. Second, as a future patient, I want my physicians to perform the best in all competency areas including professionalism. Not only do I want my physicians to be the best, I believe that all patients deserve well-trained physicians. The results of this study may help program directors implement effective instructional strategies to improve resident professionalism skills in turn improving the patient care provided.

When conducting research, epistemological and philosophical assumptions provide a rationale for the choices made and actions taken prior to and during the study. Hathaway (1995) stated, "when one chooses a particular research approach, one makes certain assumptions concerning knowledge, reality, and the researcher's role" (p. 536). Epistemological assumptions (e.g. objectivism) that underpin quantitative research include the idea that there is one reality based on observations that form a "universal knowledge" (Hathaway, 1995, p. 547). This knowledge is then generalized to the larger population. Quantitative researchers also assume a role that is separate from the event or thing being observed, eliminating his/her bias from influencing the results of the study (Hathaway, 1995). These assumptions provide a foundation for and guide the proposed study.

CHAPTER FOUR: RESULTS

Introduction

The purpose of this posttest only control group experimental study was to investigate the effect of a traditional lecture and a traditional lecture plus a case-based, online discussion forum on residents' professionalism skills and knowledge. Resident professional performance was measured using the Professionalism Mini-Evaluation Exercise (P-MEX) observation form, and knowledge was measured by a researcher-developed, 10-question, multiple-choice posttest. Both control and experimental groups participated in the traditional lecture, completed a posttest, and were observed by faculty using the P-MEX form. In addition, the experimental group participated in a four-week, case-based, online discussion forum within a Google Plus Community. Both instructional interventions and the posttest were delivered and completed as intended in the research design.

For the purpose of this study, resident professionalism was defined in alignment with the Accreditation Council for Graduate Medical Education's requirements for professionalism. According to ACGME Common Program Requirements IV.A.5.e).(1-5) (2016a), professionalism is the demonstration of integrity and respect for patients, families, and members of the healthcare team; response to patient needs regardless of personal commitments; protection of patient confidentiality; and "accountability to patients, society and the profession" (p. 11).

The contents of this chapter include a description of the resident demographics, a summary of the statistical data collected for each research question, and the results of the statistical analysis tests implemented. Results are organized by research question.

Demographics

The Diagnostic Radiology and Family Medicine Jackson programs and residents were chosen through a convenience sample based on availability. At total of 48 residents, 24 per group with comparable mean ages ($M_c = 31.1$, $M_e = 31$), participated in the study. However, only 46 (95.8%) cases were used in the data analysis due to a mortality rate of two (4.17%). Table 5 provides a summary of demographic variables disaggregated by groups. The demographics appeared homogenous across groups with the exceptions of sex and ethnicity. Thus, a few analyses were run to determine if the demographic variables were of concern and needed to be controlled. The chi-square test of independence indicated that there was no difference in the proportion of ethnicities across groups, $\chi2$ (3, $n = 46$) $= 0.81$, $p = .85$, phi. $= .13$. It was deemed that resident ethnicity did not need to be controlled. Another chi-square test for independence with the Yates Continuity Correction was run and indicated a significant difference in the proportion of males and females across the control and experimental groups, $\chi2$ (1, $n = 46$) $= 4.49$, $p = .03$, phi. $= .31$. Given that each cell did not have five cases, results might not be valid. As such, Fisher's exact test was also examined. Results were significant, $p = .035$. Therefore, an independent samples t test was used to investigate if males and females differed in their P-MEX score and knowledge scores. Results of the t test indicated that males and females did not significantly differ in their P-MEX scores, $t(44) = -0.90$, p $= .37$ or knowledge scores, $t(44) = -0.67$, p $= .51$. Despite the fact that males and females differed in proportion across the control and experimental groups, the t test results indicated that males and females did not differ on the two dependent variables. Considering the test results, coupled with the fact that there was no significant association between sex and the two dependent variables as analyzed with bivariate correlation analyses, the decision was made to not consider sex as a covariate in the study.

Table 5

Summary of Control and Experimental Group Demographics (N = 44)

Variable	Control (*n* = 24) *n* (%)	Experimental (*n* = 22) *n* (%)
Radiology	12 (50%)	11 (50%)
Family Medicine	12 (50%)	11 (50%)
Sex (Male)	20 (83.33%)	12 (54.55%)
Sex (Female)	4 (16.67%)	10 (45.45%)
PGY 1	5 (20.83%)	3 (13.64%)
PGY 2	7 (29.17%)	8 (36.37%)
PGY 3	6 (25%)	5 (22.72%)
PGY 4	3 (12.5%)	3 (13.64%)
PGY 5	3 (12.5%)	3 (13.64%)
Race (non-Hispanic)	24 (100%)	22 (100%)
Ethnicity (White)	17 (70.83%)	18 (81.82%)

Results

Research Question One

An ANOVA was used to investigate the effect of a traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on residents' overall performance of professionalism skills as measured on the P-MEX observation form. Through rigorous experimental studies, the P-MEX observation form was validated and found reliable for use in Graduate Medical Education by Cruess et al. (2006b) and Tsuwaga et al.

(2011). Within this study, the P-MEX form was also found to have good internal consistency as assessed by Cronbach's alpha, $p = 0.90$ (Thorndike & Thorndike-Christ, 2010).

The experimental group residents ($n = 22$, $M = 3.23$, $SD = 0.43$) scored slightly higher than the residents in the control group ($n = 24$, $M = 3.13$, $SD = 0.34$) on the P-MEX. Prior to running the ANOVA, assumption testing was conducted to determine if the assumptions of normality and homogeneity of variance were met. The P-MEX scores were not normally distributed in either group as analyzed by the Shapiro-Wilks test ($p_c < 0.0001$, $p_e < 0.0001$). However, the variance of the P-MEX scores was equal across groups, meeting the homogeneity of variance assumption as assessed by Levene's test for equality, $p = .07$.

Although the P-MEX data did not meet all of the assumptions required to run a one-way ANOVA, Warner (2007) stated that parametric analyses such as the ANOVA can be robust when there are minor assumption violations. Accordingly, the one-way ANOVA was conducted demonstrating that there was no statistically significant difference between the groups' P-MEX scores, $F(1,44) = 0.81$, $p = .37$, $\eta^2 = 0.02$. However, the Kruskal-Wallis H test was also run given the assumption violation. The results of the Kruskal-Wallis H test corroborated one-way ANOVA results, demonstrating that there was no statistically significant difference between the groups' professionalism skill level, $\chi2 (1) = 0.82$, $p = .37$.

Research Question Two

Another one-way ANOVA was conducted to investigate the effect of a traditional lecture compared to the combination of a traditional lecture and a case-based, online discussion forum on residents' professionalism knowledge as measured on a researcher designed, 10-question, multiple-choice posttest. Due to the dichotomous nature of the items on the posttest, its internal consistency was assessed using the Kuder-Richardson Formula 20 reliability test. The initial

Kuder-Richardson Formula 20 test value was 0.433, indicating that a deletion of several questions could increase the internal consistency of the instrument. After the deletion of questions four, seven, and eight, the internal consistency of the seven-item posttest increased to 0.604, which was deemed as adequate reliability (Thorndike & Thorndike-Christ, 2010). However, the results should be interpreted with caution when making decisions about individual resident professionalism knowledge levels.

On the seven items, the control group ($n = 24$, $M = 73.25$, $SD = 22.37$) scored slightly lower than the experimental group ($n = 22$, $M = 77.36$, $SD = 22.74$). Prior to running the ANOVA, assumption testing was conducted to determine if the assumptions of normality and homogeneity of variance were met. The assumption of normality, as assessed by the Shapiro Wilk test for both groups, was not tenable ($p_c = 0.003$, $p_e = 0.005$). However, the variance of the posttest scores was equal across groups as analyzed by Levene's test, $p = .75$.

Similar to the analysis of the P-MEX scores, a one-way ANOVA was run based on Warner's (2013) conclusion that an ANOVA can maintain its robustness when there are minor assumption violations or if only one assumption is violated. The difference in posttest scores between the control and experimental groups was not statistically significantly different as assessed by the one-way ANOVA, $F(1,44) = 0.38$, $p = .54$, $\eta^2 = 0.01$. A Kruskal-Wallis H test, the nonparametric alternative to a one-way ANOVA, was also conducted and supported the ANOVA results. The difference in posttest scores as analyzed by the Kruskal-Wallis H test did not display a statistically significant difference between groups, $x^2(1) = 0.65$, $p = .42$.

Summary

A posttest only control group experimental study was implemented to investigate the effect of a traditional lecture and a case-based, online discussion forum on resident

professionalism skills and knowledge. Resident skill and knowledge levels were measured using

the P-MEX observation form and a posttest, respectively. Reliability of the P-MEX was found

to be high as assessed by Cronbach's alpha, while the reliability of the posttest was found to be

weak to adequate as assessed by the Kuder-Richardson Formula 20. No statistically significant

difference in the P-MEX and posttest scores between the control and the experimental group was

found, indicating that the online discussion forum had little to no effect on residents'

professionalism skill or knowledge levels. Table 6 provides a summary of the statistical data for

both research questions.

Table 6

Summary of Statistical Analysis Results for Research Questions One and Two

Statistical Test	Question 1 (P-MEX)	Question 2 (Posttest)
Cronbach's Alpha (reliability)	$\alpha = 0.904$	not applicable
Kuder-Richardson Formula 20 (reliability)	not applicable	$\alpha = 0.604$
Shapiro Wilks Test for Normality	$p_c < 0.0001$ $p_e < 0.0001$	$p_c = .003$ $p_e = .005$
Levene's Test for Equality	$p = .07$	$p = 0.75$
One-way ANOVA	$F(1,44) = 0.81, p = .37$	$F(1,44) = 0.38, p = .54$
Effect Size (partial eta squared)	$\eta^2 = 0.02$	$\eta^2 = 0.01$
Kruskal-Wallis H Test	$x^2(1) = 0.82, p = .37$	$x^2(1) = 0.65, p = .42$

CHAPTER FIVE: DISCUSSION

Introduction and Summary

Identifying effective instructional strategies to teach professionalism to residents has been a challenge for medical educators because there is no consensus on a single definition of professionalism or a best practice to teach it (Cummings et al., 2015; Deptula & Chun, 2013; Hultman et al., 2012; Joiner et al., 2015; Kesselheim et al., 2012; Kesselheim et al., 2015; Nadeau et al., 2016). The purpose of this quantitative research study was to investigate the effect of a traditional lecture with a case-based, online discussion forum on residents' professionalism knowledge and skill levels. Diagnostic Radiology and Family Medicine Jackson residency programs were selected to participate in this study based on convenience sampling. A total of 48 residents consented to participate in the study and were randomly assigned to a control or experimental group stratified by PGY-level and program. Both groups participated in a traditional lecture about professionalism while the experimental group also participated in a four-week, case-based, online discussion forum via a Google Plus Community. After the instructional strategies were implemented, both groups completed a professionalism posttest that assessed knowledge and were evaluated on professionalism skills through faculty observations using the P-MEX form. Inferential statistics were used to analyze the data and indicated no statistically significant differences between the control and experimental groups' skills and knowledge as measured by the P-MEX and a researcher created posttest, respectively. The contents of this chapter include a discussion of the study's findings, implications for medical educators, recommendations for future research, and conclusions.

Discussion

Based on the study results, the case-based, online discussion forum as designed had little to no effect on the residents' professionalism skill and knowledge levels. The discussion forum was designed according to the principles set forth within the social constructivist theory (SCT) of learning, which emphasizes the importance of interactions with others, e.g. peers and instructors, in the acquisition and construction of new knowledge. Social collaboration, active communication, student-centered learning environments, the zone of proximal development (ZPD), and authentic scenarios are key components of SCT (Cunningham & Duffy, 1996; Huang, 2002; Sthapornnanon et al., 2009). Each of these constructs were considered and implemented into the design of the case-based, online discussion forum. The discussion forum included 22 residents and was built to stimulate growth and learning through social collaboration and interactive communication of case-based scenarios. Participation in the case-based, online discussion forum occurred on a weekly basis for a total of four weeks. At the beginning of each week, a case involving unprofessional behavior was posted along with five questions including (1) identify the unprofessional behavior, (2) what would you do in this situation and why, (3) what potential impact does this have on patient care, (4) were any barriers present to prevent the resident from behaving professionally, and (5) reflect on your own experience. The residents were required to post one original discussion post that answered the questions and respond to at least two peers. During the discussions, more knowledgeable peers were relied upon to assist other learners advance through the zone of proximal development to construct professionalism knowledge. Using a Google Plus online community for the discussion forum allowed all residents to engage in the dialogue offering multiple perspectives, challenging current understanding, and deepening learning (Clark & Mayer, 2011; Cunningham & Duffy, 1996).

Faculty participation, however, in the discussion forum was limited to monitoring participation and facilitating discussion if it strayed from topic in an effort to preserve a student-centered learning environment. Implementing instructional strategies that reflect the tenets of social constructivist theory created a discussion environment conducive to learning and the construction of new knowledge.

Drawing from SCT, it was hypothesized that the case-based, online discussion forum would improve residents' professionalism knowledge and skill levels more than the lecture alone. However, no statistically significant difference between the residents' in the experimental and control groups' knowledge or skill level was noted. A number of factors may explain the non-significant results.

Social Constructivist Theory

In this study, which was based on previous research findings, peers served one another as more experienced others to teach professionalism concepts to those less experienced or less knowledgeable residents in order to construct knowledge and traverse the zone of proximal development. Vygotsky (1978), in his social cultural theory which provides a foundation for SCT, defined the ZPD as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). In support of Vygotsky's ZPD, students participating in online learning environments who "reported high levels of interaction with their classmates…also reported high levels of learning" (Shea, Fredericksen, Pickett, Pelz, & Swan, 2001, p. 12) indicating that peers as instructors can positively affect learning. Although this study utilized peers as instructors based on SCT and

61

previous research, alternative studies have emphasized the importance of training the facilitators, whether peer or faculty, to serve as more knowledgeable others prior to instruction.

In previous research, senior medical students after participating in a two-week training session on peer assisted learning facilitated the learning of second year medical students about screening techniques for the musculoskeletal systems (MSS) examination. The trained senior medical students provided instruction comparable to that of an expert and guided the second-year students through the ZPD. Regardless of who provided training, peers or experts, the second-year medical students were "1.3 to 1.4 times more likely to pass the MSS examination, when compared with students undertaking standard training" (Graham, Burke, & Field, 2008, p. 652). Another study compared the performance of peer instructors who participated in a two-day study module on medical education to expert instructors in effectively teaching advanced cardiac resuscitation to medical students. The amount of passing scores received on the training session demonstrated no difference between student groups (Hughes et al., 2010). The results confirmed that peer instruction could be as effective as expert instruction in student acquisition of passing grades but not high passing grades. However, both studies also highlight an important element that may have been missing from this study, and if implemented, could have resulted in significant findings. Training peers to facilitate learning in the Google Plus Community discussion forums could have led to enhanced learning and construction of knowledge.

Residents do not begin residency training with skills to effectively teach others, hence the need for training. Morrison and Hafler (2000) found no correlation between clinical competence and the ability to teach; these abilities only become evident with formal training. Potential benefits to teaching residents/peers to teach include the learners' "ability to better understand clinical reasoning, improvement in clinical and patient care skills, and cognitive congruence"

(Ramani, Mann, Taylor, & Thampy, 2016, p. 645). Although peers can provide adequate

instruction (Shea et al., 2001), training them to do so can enhance learning (Graham et al., 2008;

Hughes et al., 2010). Training the more knowledgeable peers within this study may have

improved the online discussion forum and, lack thereof may have contributed to the non-

significant results.

An alternative to using trained or untrained peers, as found within this study, is to use

trained expert faculty to facilitate learning. Faculty within Graduate Medical Education "have

not usually received a significant amount of education in how to teach" (Dunphy & Dunphy,

2003, p. 56), yet are responsible for instructing residents. Providing faculty training in

pedagogical strategies prior to instruction can improve resident performance. Medical students

trained in internal jugular vein cannulation by faculty who underwent a four-step cognitive

training session prior to teaching scored significantly higher on global evaluations ($p = .02$) and

completed the task significantly faster ($p < 0.0001$) than medical students trained by faculty who

did not participate in a cognitive training session (Murphy, Neequaye, Kreckler, & Hands, 2008).

In another study, when medical students were taught aspects of gastroenterology by faculty who

participated in multiple two-hour faculty development sessions over a three-year period, they

scored significantly higher on the gastrointestinal section of USMLE Step 1 in 2005 than in 2001

and 2002 ($p = .05$; $p = .02$) (Shields et al., 2007). Although no standard form of faculty

development was used within these studies, it is evident that faculty must be experts in both

clinical knowledge and skills as well as teaching strategies to be effective teachers resulting in

higher-performing residents (Dunphy & Dunphy, 2003; Murphy et al., 2008). The absence of

trained faculty within this study's discussion forum may have led to the non-significant results.

However, if present, this may have improved those results.

Population Characteristics

Another factor to consider in explaining the results may be population characteristics. The population for this study included residents within Graduate Medical Education (GME) training programs. Residents in GME training at UTHSC have demonstrated high levels of intelligence and performance as evidenced through previous educational achievements. High grade point averages in undergraduate education (*M*=3.71, *SD*=0.25) and Medical College Admission Test (MCAT) scores (*M*=510.4, *SD*=6.6), which highlight intelligence levels, are required for matriculation into medical school (Association of American Medical Colleges [ACGME], 2017). Requirements for acceptance into GME programs, including graduation from medical school and passage of medical licensing examinations also illustrate their high-performance levels (ACGME, 2015). Residency training programs are rigorous including a variety of intense clinical rotations and didactic sessions requiring the resident to analyze, synthesize, evaluate, and problem solve on a regular basis (ACGME, 2016a).

In addition to being high performers, residents are trained and adept at analyzing a situation, synthesizing the individual parts, developing a diagnosis, and creating a plan to solve or improve the situation resulting in proficient problem solvers and test takers. These highly intelligent and skilled individuals are likely to overcome instructional impediments when constructing new knowledge and developing new skills. Individuals participating in only the lecture may have compensated for instructional impediments and achieved the same or better results than individuals participating in the case-based, online discussion forum simply. For, all the residents participating in the study were high achievers and had the skills to problem solve. In this study, the high scores on the P-MEX and skewed distribution of the posttest scores indicating a tendency to score high illustrated resident achievement.

Resident Motivation

Resident's motivation is another factor that was not examined in this study; however, it is a factor that could have influenced the results, and could even be a factor necessary to explore given the concern of professionalism in the discipline. While medical residents are high achievers and do what is necessary to perform well on assessments, research as well as behaviors in this study provide evidence that this population lacks motivation to develop professionalism. During this study, residents exhibited a lack of motivation by voicing negative attitudes towards the study after volunteering and through low participation within the discussion forum (e.g. 51% participation rate from the Family Medicine residents), potentially affecting the results. Most social psychological theories focused on behavior change assume a degree of motivation for change (Schunk, 2004; Slavin, 2012). Theories identify low motivation as a state and often do not provide explanations of amotivation. Accordingly, this study assumed at least a low level of motivation in residents, and an intervention was developed to promote professionalism in those who were assumed to have some level of motivation to change. However, this may have been a faulty assumption. Failure to consider the absence of motivation of residents to engage in professionalism coupled with the residents' drive to have high achievement may have contributed to the non-significant results.

Many residents do not engage in professionalism behaviors despite the research that has shown that engaging in professionalism results in quality patient care, a reduction of poor patient outcomes, and effective collaboration amongst healthcare teams (Bahaziq & Crosby, 2011; Hultman et al., 2013; Patel et al., 2011; Rosenstein & O'Daniel, 2008). Motivating students uninclined to engage in and learn professionalism is a significant challenge for medical educators. Individual motivation can be improved by integrating tenets of the self-determination

theory (SDT) into the online discussion forum. The main tenet of SDT focuses on the intrinsic

and extrinsic factors that motivate learners to accomplish tasks and to learn new material.

Extrinsic motivation can occur via "compliance with external regulations" (Ryan & Deci, 2000,

p. 71) such as those set forth by societal demands and healthcare regulatory agencies. Ryan and

Deci (2000) also identified three needs of the learner that if met in the learning environment

would motivate them to learn. These needs include competence, relatedness, and autonomy,

which "appear to be essential for facilitating optimal functioning of the natural propensities for

growth" (p. 68).   Emphasizing the importance of certain topics is essential when teaching

residents, especially professionalism, which is considered a "soft skill" by physicians (Deptula &

Chun, 2013, p. 408). Residents can internalize behaviors that promote professionalism "if he (or

she) is helped to see the value of the behavior in a long-term context" (ten Cate, Kusurkar, &

Williams, 2012, p. 967). Providing professionalism's relevance to patient care prior to

implementing the online discussion or other instructional strategy used to teach professionalism

is essential for motivating residents to learn professionalism and become active members within

the learning process. Effective strategies to promote behavior change in individuals with little or

no motivation to change are relatively scarce and need to be considered in future research about

teaching medical residents professionalism.

Resident perceptions of professionalism can also impact motivation to learn and engage

in instructional activities. Thirty-two percent of fourth year medical students surveyed

responded that professionalism cannot be taught, therefore making it difficult to teach these skills

and necessary to stress the relevance of learning professionalism (Hultman et al., 2012).

Excessive attention to professionalism within curriculums may also negatively skew students'

perceptions of its importance, leading to low motivation. Medical students surveyed were "sick

and tired of professionalism being shoved down our throats" (Wear & Zarconi, 2008, p. 950) affecting their motivation to learn. These studies illustrate the effect of resident perceptions of professionalism on learning and motivation, an element absent in this study but if implemented may have led to significant results.

Role Modeling

Behaviors exhibited by faculty during clinical and didactic settings is another factor not considered in this study, yet if addressed may have had positive implications for resident professionalism performance. Residents may not exhibit professionalism skills or understand its relevance due to a disconnect between professionalism values taught within the formal curriculum and "the reality evidenced in clinical training" (Salinas-Miranda, Shaffer-Hudkins, Bradley-Klug, & Monroe, 2014, p. 93). This reality, also known as the hidden curriculum, includes knowledge, skills, and behaviors, which "are lessons learned that are embedded in culture and are not explicitly intended" (Lehmann, Sulmasy, & Desai, 2018, p. 1). Negative behaviors exhibited within the hidden curriculum erode what is taught in the formal curriculum. Failure to see appropriately modeled behaviors can influence residents' perceptions of professional behavior in turn effecting their performance.

Previous studies have emphasized faculty role modeling as an effective strategy to teach professionalism. Medical students, residents, and faculty identified role modeling as one of the best instructional strategies to teach professionalism via survey designed research studies (Riley & Kumar, 2012; Salam et al., 2012; Turner et al., 2015). Birden et al. (2013) and Deptula and Chun (2013) identified role modeling as a beneficial strategy through systematic literature reviews. However, true experimental studies about the effectiveness of role modeling to teach professionalism are scarce and warrant future research.

Posttest Internal Consistency

Additionally, in interpreting the results of this study for question two, it would be remiss to not mention the poor to adequate internal consistency of the researcher-created test to measure professionalism knowledge. The posttest, as originally designed for the study, included 10 multiple-choice questions, which were aligned with the learning objectives and content included in the professionalism lecture. Using the Kuder-Richardson Formula 20 reliability test, the internal consistency of the original posttest was weak at 0.443. Further data analysis indicated that the alpha level would increase if certain questions were deleted from the posttest. In other words, the internal consistency would improve making the test more reliable for measuring professionalism; the higher the alpha level, the more reliable the test. After deleting three questions, numbers four, seven, and eight, Kuder-Richardson Formula 20 was 0.604, indicating only adequate reliability (Thorndike & Thorndike-Christ, 2010). Since the reliability of the posttest is adequate at best, the professionalism knowledge levels of the residents as indicated from the posttest scores should be interpreted with caution.

Implications

The traditional lecture given about professionalism and the combination of the traditional lecture and the online discussion forum based on case scenarios that included unprofessional behaviors produced similar results in residents' professionalism skill and knowledge levels. Limitations in this study and reasons for the lack of a significant difference between the control and experimental groups' professionalism skill and knowledge levels provide implications for those designing instruction for graduate medical education residency programs. Expanding the application of SCT, training experts and peers in pedagogical strategies, adding components of

SDT, and ensuring the internal consistency of the assessment tool should be considered in the design of instructional strategies to effectively teach professionalism.

Social constructivist theory describes the ZPD as the area of learning that is just beyond the learner's capabilities, and learning can be achieved with the assistance of a more knowledgeable peer, instructor, or expert (Vygotsky, 1978). The discussion forum for this study relied solely upon student-led discussions and interactions to assist residents construct knowledge and navigate through the ZPD. Faculty were asked to monitor participation and join in the discussion only when it deviated from the topic; therefore, their expertise was not utilized to construct knowledge. In future studies, faculty may play a more active role in facilitating discussion and improve knowledge and skill construction. Moreover, as four previous studies highlighted, training the instructor whether peer or faculty in effective pedagogical strategies is essential in the transference and construction of knowledge (Graham et al., 2008; Hughes et al., 2010; Murphy et al., 2008; Shields et al., 2007). Thus, in future implementation and study, ensuring the presence of more knowledgeable and trained peers and/or faculty acting as instructors within the discussion should be considered when teaching professionalism through an online discussion forum.

In addition to the social constructivist theory, medical educators should consider the tenets of the self-determination theory (SDT) created by Deci and Ryan (2000) when teaching residents about professionalism. Some residents within this study lacked motivation to learn professionalism and engage in the online discussion, e.g. 51% participation rate in the discussion forum by Family Medicine residents. According to SDT, motivation can be heightened by emphasizing the relevance of the topic. Professionalism, considered a "soft skill" (Deptula & Chun, 2013, p.408), is not viewed as the most important of ACGME's six core competencies

69

even though a relationship has been identified between unprofessional behavior and poor patient outcomes. When designing instructional strategies to teach professionalism, medical educators must infuse motivation strategies and relevance into its design.

Limitations and Recommendations

While an experimental design was used controlling for most threats to internal validity, limitations still existed, which provide impetus for future research. The study was limited in its number of residents, type and number of residency programs, and setting. Only two medical specialty programs, Diagnostic Radiology and Family Medicine, with a total of 48 residents participated within this study limiting the applicability of the results to other medical specialties. The study's setting was centered in a large, urban university medical school again limiting the generalizability of the study's results. Repeating this research study within other programs or other institutions may prove beneficial in the identification of effective instructional strategies to teach professionalism. Other limitations within this study included a lack of diversity in terms of sex and ethnicity. Within the combined groups, 14 (30.43%) residents were female and 32 (68.57%) were male, whereas 35 (76.09%) of the residents identified themselves as White/Caucasian and 11 (23.91%) identified themselves as African American, Asian, or other. The sex and ethnicity percentages present within this study are not reflective of the larger Graduate Medical Education population ($N = 129,720$), which consists of 57,130 (44%) female, 68,613 (52.9%) male, 55,921 (43.11%) White/Caucasian, 23,305 (17.97%) Asian, 5,811 (4.48%) African American, and 44,683 (34.45%) other ethnicities (ACGME, 2017). Due to the lack of diversity within this study's population, the results are not applicable to more diverse populations or populations that do not reflect a White/Caucasian male majority. As more diverse populations are examined, medical educators should construct learning activities that "respond to culturally-

diverse backgrounds" (Rovai & Ponton, 2005, p. 89) to meet the needs of all learners and close the achievement gap between diverse groups.

Limitations discussed previously provide ideas for expanding the current study. Implementing a redesigned discussion forum that utilizes faculty to facilitate the discussion may prove effective in increasing residents' knowledge of professionalism. Faculty participation may improve the quality of discussion that occurs and impart expertise to the residents. Research studies using a revised posttest that has at least 35 questions to increase its internal consistency or administering the posttest multiple times may provide accurate measurements of knowledge increasing the chances of statistically significant results (Thorndike & Thorndike-Christ, 2010).

Future studies could extend the current study. Learning analytics, e.g. level of participation in the discussion forum, could be examined in association with professionalism. A predictive model could be built and tested to determine if participation rates in the discussion forum predicted posttest or P-MEX scores. A mixed methods study could be useful to collect data regarding resident perceptions of the effectiveness of the online discussion forum. A second mixed methods study might be useful to analyze the discussion posts identifying themes in order to support results of quantitative data analysis. Additional research studies could include a diverse population, which requires the consideration of instructional techniques for cultural differences.

Conclusions

Teaching professionalism to residents in graduate medical education programs is essential to ensure competent physicians who are prepared to provide the highest quality of patient care, which can prevent poor patient outcomes (Bahaziq & Crosby, 2011; Hultman et al., 2013; Patel et al., 2011; Rosenstein & O'Daniel, 2008). Identifying effective instructional

strategies to teach professionalism is still challenging; however, research provides insights on development methods and implementation strategies chipping away at the challenge one step at a time. Although the case-based, online discussion forum within this study had little to no effect on resident professionalism knowledge and skill levels, the results did provide insight for future study and design of professionalism interventions. The non-significant results of the study demonstrate that more research and improved interventions need to continue being developed. Research in this area is its infancy and still has a long way to go. Future research is warranted to investigate a revised discussion forum and to broaden the participation to include more institutions, programs, and residents.

References

Accreditation Council for Graduate Medical Education. (2015). Institutional Requirements. Retrieved from http://www.acgme.org/Portals/0/PDFs/FAQ/InstitutionalRequirements_07012015.pdf

Accreditation Council for Graduate Medical Education. (2016a). Common Program Requirements. Retrieved from http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_07012016.pdf

Accreditation Council for Graduate Medical Education. (2016b). *Program requirements for graduate medical education in family medicine*. Retrieved from http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/120_family_medicine_2016.pdf

Accreditation Council for Graduate Medical Education. (2016c). *Program requirements for graduate medical education in diagnostic radiology*. Retrieved from http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/420_diagnostic_radiology_2016.pdf

Accreditation Council for Graduate Medical Education. (2017). *Data Resource Book Academic Year 2016-2017.* Retrieved from file:///C:/Users/ahall32/Downloads/2016-2017_ACGME_DATABOOK_DOCUMENT.pdf

Antes, A.L., Murphy, S.T., Waples, E.P., Mumford, M.D., Brown, R.P., Connelly, S., & Devenport, L.D. (2009). A meta-analysis of ethics instruction effectiveness in the sciences. *Ethics Behavior, 19*(5), 379-402. doi: 10.1080/10508420903035380

Association of American Medical Colleges. (2017). MCAT scores and GPAs for applicants and matriculants to U.S. medical schools, 2016-2017 through 2017-2018. Retrieved from https://www.aamc.org/download/321494/data/factstablea16.pdf.

Bahaziq, W., & Crosby, E. (2011). Physician professional behaviour affects outcomes: A framework for teaching professionalism during anesthesia residency. *Canadian Journal of Anesthesia, 58*, 1039-1050. doi: 10.1007/s12630-011-9579-2

Bearman, M., O'Brien, R., Anthony, A., Civil, I., Flanagan, B., Jolly, B., … Nestel, D. (2012). Learning surgical communication, leadership and teamwork through simulation. *Journal of Surgical Education, 69*(2), 201-207. doi: 10.1016/j.jurg.2011.07.014

Bergl, P., & Muntz, M. (2016). Using social media to enhance health professional education. *Clinical Teacher, 13*, 399-404.

Bernard, A.W., Kman, N.E., Bernard, R.H., Way, D.P., Khandelwal, S., & Gorgas, D.L. (2014). Use of a secure social media platform to facilitate reflection in a residency program. *Journal of Graduate Medical Education, 6*(2), 326-329.

Birden, H., Glass, N., Wilson, I., Harrison, M., Usherwood, T., & Nass, D. (2013). Teaching professionalism in medical education: A best evidence medical education (BEME) systematic review. *Medical Teacher, 35*, e1252-e1266. doi: 10.3109/0142159X.2013.789132

Birden, H., Glass, N., Wilson, I., Harrison, M., & Usherwood, T. (2014). Defining professionalism in medical education: A systematic review. *Medical Teacher, 36*(1), 47-61. doi: 10.3109/.142159X.2014.850154

Byyny, R.L. (2015). Preface. In R. Bynny, M. Papadakis, & D. Paauw (Eds.), *Medical professionalism best practices* (pp. xi-xix). California: Alpha Omega Alpha Honor Medical Society.

Cheston, C.C., Flickinger, T.E., & Chisolm, M.S. (2013). Social media use in medical education: A systematic review. *Academic Medicine, 88*(6), 893-901.

Clark, R.C., & Mayer, R.E. (2011). *e-Learning and the science of instruction*. San Francisco, CA: Pfeiffer.

Create or edit a community. (n.d.). In *Google+ Help*. Retrieved from https://support.google.com/plus/answer/6320395

Creswell, J.W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* (5th ed.). Boston, MA: Pearson.

Cruess, R.L., Cruess, S.R., & Steinert, Y. (2009). *Teaching medical professionalism*. New York, NY: Cambridge University Press.

Cruess, R.L., McIlroy, J., Cruess, S.R., Ginsburg, S., & Steinert, Y. (2006a). *Professionalism Mini-Evaluation Exercise* [Measurement instrument]. Retrieved from https://www.mededportal.org/publication/9929/

Cruess, R.L., McIlroy, J., Cruess, S.R., Ginsburg, S., & Steinert, Y. (2006b). The professionalism mini-evaluation exercise: A preliminary investigation. *Academic Medicine, 81*(10), S74-S78.

Cruess, S.R., & Cruess, R.L. (2009). The cognitive base of professionalism. In R. Cruess, S. Cruess, & Y. Steinert (Eds.), *Teaching medical professionalism* (pp.7-27). New York, NY: Cambridge University Press.

Cummings, C.L., Geis, G.M., Kesselheim, J.C., & Sayeed, S. (2015). Ethics and professionalism education during neonatal-perinatal fellowship training in the United States. *Journal of Perinatology, 35*, 875-879. doi: 10.1038/jp.2015.70

Cunningham, D., & Duffy, T. (1996). Constructivism: Implications for the design and delivery of instruction. In D.H. Jonassen (Ed.) *Handbook of research for educational*

communications and technology (pp. 170-198). New York: Macmillian Library Reference.

Deptula, P., & Chun, M.B.J. (2013). A literature review of professionalism in surgical education: Suggested components for development of a curriculum. *Journal of Surgical Education, 70*(3), 408-422. doi: 10.1016/j.jsurg.2012.11.007

Dick, W., Carey, L., & Carey, J.O. (2015). *The systematic design of instruction.* (8th ed.). Boston, MA: Pearson.

Domen, R.E., Johnson, K., Conran, R.M., Hoffman, R.D., Post, M.D., Steinberg, J.J., … & Powell, S.Z. (2017). Professionalism in pathology: A case-based approach as a potential educational tool. *Archive Pathology Laboratory Medicine, 141*, 215-219.

Downar, J., Knickle, K., Granton, J.T., & Hawryluck, L. (2012). Using standardized family members to teach communication skills and ethical principles to critical care trainees. *Critical Care Medicine, 40*(6), 1814-1819. doi: 10.1097/CCM.0b013e31824e0fb7

Dunphy, B.C., & Dunphy, S.L. (2003). Assisted performance and the zone of proximal development (ZPD); a potential framework for providing surgical education. *Australian Journal of Educational and Developmental Psychology, 3*, 48-58.

Edwards, M., Sterbis, J.R., & Olson, H.L. (2014). A military transitional year professionalism curriculum. *Journal of Graduate Medical Education*, 571-573. doi: http://dx.doi.org/10.4300/JGME-D-13-00399.1

Elder, L., & Paul, R. (2010). *The thinker's guide to analytic thinking*. Dillon Beach, CA: Foundation for Critical Thinking Press.

Gathright, M. (2014). Critical synthesis package: professionalism mini-evaluation exercise (P-MEX). *MedEdPORTAL Publications, 10*, 1-12. http://doi.org/10.15766/mep_2374-8265.9929

Gholami-Kordkheili, F., Wild, V., & Strech, D. (2013). The impact of social media on medical professionalism: A systematic qualitative review of challenges and opportunities. *Journal of Medical Internet Research*, *15*(8).

Gofton, W., & Regehr, G. (2006). What we don't know we are teaching: Unveiling the hidden curriculum. *Clinical Orthopaedics and Related Research, 449*, 20-27.

Graham, K., Burke, J.M., & Field, M. (2008). Undergraduate rheumatology: Can peer-assisted learning by medical students deliver equivalent training to that provided by specialist staff? *Rheumatology, 47*, 652-655.

Green, R.A., & Hughes, D.L. (2013). Student outcomes associated with use of asynchronous online discussion forums in gross anatomy teaching. *Anatomical Sciences Education, 6*, 101-106.

Hamm, M.P., Chisholm, A., Shulhan, J., Milne, A., Scott, S.D., Klassen, T.P., & Hartling, L. (2013). Social media use by health care professionals and trainees: A scoping review. *Academic Medicine, 88*(9), 1376-1383.

Hathaway, R.S. (1995). Assumptions underlying quantitative and qualitative research: Implications for institutional research. *Research in Higher Education, 36*(5), 535-562.

Hinkle, D.E., Wiersma, W., & Jurs, S.G. (2003). *Applied statistics for the behavioral sciences.* (5th ed.). Boston, MA: Houghton Mifflin Company.

Hochberg, M.S., Berman, R.S., Kalet, A.L., Zabar, S.R., Gillespie, C., & Pachter, H.L. (2012). The professionalism curriculum as a cultural change agent in surgical residency education. *The American Journal of Surgery, 203*, 14-20. doi: 10.1016/j.amjsurg.2011.05.007

Hollinderbaumer, A., Hartz, T., & Uckert, F. (2013). Education 2.0 - How has social media and Web 2.0 been integrated into medical education? A systematical literature review. *GMS Zeitschrift fur Medizinische Ausbildung, 30*(1), 7-12.

Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology, 33*(1), 27-37.

Hudson, K.A. (2014). Teaching nursing concepts through an online discussion board. *Journal of Nursing Education, 53*(9), 531-536.

Hughes, T.C., Jiwaji, Z., Lally, K., Lloyd-Lavery, A., Lota, A., Dale, A.,…& Bulstrode, C.J.K. (2010). Advanced cardiac resuscitation evaluation (ACRE): A randomised single-blind controlled trial of peer-led vs. expert-led advanced resuscitation training. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 18*(3), 1-6.

Hultman, C.S., Connolly, A., Halvorson, E.G., Rowland, P., Meyers, M.O., Mayer, D.C., …Meyer, A.A. (2012). Get on your boots: Preparing fourth-year medical students for a career in surgery, using a focused curriculum to teach the competency of professionalism. *Journal of Surgical Research, 177*, 217-223. doi: http://dx.doi.org/10.1016/j.jss.2012.06.019

Hultman, C.S., Halvorson, E.G., Kaye, D., Helgans, R., Meyers, M.O., Rowland, P.A., & Meyer, A.A. (2013). Sometimes you can't make it on your own: The impact of a professionalism curriculum on the attitudes, knowledge, and behaviors of an academic plastic surgery practice. *Journal of Surgical Research, 180*, 8-14. doi: http://dx.doi.org/10.1016/j.jss.2012.11.029

Joiner, A.B., Husain, N., Duddu, V., & Chaudhry, I.B. (2015). Medical professionalism education for psychiatry trainees: Does it meet standards? *Australasian Psychiatry, 23*(1), 72-75. doi: 10.1177/1039856214563847

Jordan, J., Hoffman, R., Arora, G., & Coates, W. (2016). Activated learning; providing structure in global health education at the David Geffen School of Medicine at the University of California, Los Angeles (UCLA) - a pilot study. *BMC Medical Education, 16*(63), 1-8. doi: 10.1186/s12909-016-0581-9

Kay, D., & Kibble, J. (2016). Learning theories 101: Application to everyday teaching and scholarship. *Advanced Physiology Education, 40*, 17-25. doi: 10.1152/advan.00132.2015

Kesselheim, J.C., Sectish, T.C., & Joffe, S. (2012). Education in professionalism: Results from a survey of pediatric residency program directors. *Journal of Graduate Medical Education*, 101-105. doi: http://dx.doi.org/10.4300/JGME-D-11-00110.1

Kesselheim, J.C., Atlas, M., Adams, D., Aygun, B., Barfield, R., Eisenman, K., … Leavey, P. (2015). Humanism and professionalism education for pediatric hematology-oncology fellows: A model for pediatric subspecialty training. *Pediatric Blood Cancer, 62*, 335-340. doi: 10.1002/pbc.25253

Kornegay, J.G., Leone, K.A., Wallner, C., Hansen, M., & Yarris, L.M. (2016). Development and implementation of an asynchronous emergency medicine residency curriculum using a web-based platform. *Internal and Emergency Medicine, 11*, 1115-1120. doi: 10.1007/s11739-016-1418-6

Kung, J.W., Eisenberg, R.L., & Slanetz, P.J. (2012). Reflective practice as a tool to teach digital professionalism. *Academic Radiology, 19*, 1408-1414. doi: http://dx.doi.org/10.1016/j.acra.2012.08.008

Kung, J.W., Slanetz, P.J., Huang, G.C., & Eisenberg, R.L. (2015). Reflective practice: Assessing its effectiveness to teach professionalism in a radiology residency. *Academic Radiology, 22*, 1280-1286. doi: 10.1016/j.acra.2014.12.025

Lehmann, L.S., Sulmasy, L.S., & Desai, S. (2018). Hidden curricula, ethics, and professionalism: Optimizing clinical learning environments in becoming and being a physician: A position paper of the American College of Physicians. *Annals of Internal Medicine*. Advance online publication. doi: 10.7326/M17-2058

Linjawi, A.I., Walmsley, A.D., & Hill, K.B. (2012). Online discussion boards in dental education: Potential and challenges. *European Journal of Dental Education, 16*, e3-e9. doi: 10.1111/j.1600-0579.2010.00662.x

Lipsey, M.W. (1990). *Design sensitivity: Statistical power for experimental research*. Newbury Park, CA: Sage.

Macznik, A.K., Ribeiro, D.C., & Baxter, G.D. (2015). Online technology use in physiotherapy teaching and learning: A systematic review of effectiveness and users' perceptions. *BMC Medical Education, 15*(160), 1-12. doi: 10.1186/s12909-015-0429-8

McEvoy, M., Butler, B., & MacCarrick, G. (2012). Teaching professionalism through virtual means. *The Clinical Teacher, 9*, 32-36. doi: 10.1111/j.1743-498X.2011.00487.x

McGowan, B.S., Wasko, M., Vartabedian, B.S., Miller, R.S., Freiherr, D.D., & Abdolrasulnia, M. (2012). Understanding the factors that influence the adoption and meaningful use of social media by physicians to share medical information. *Journal of Medical Internet Research, 14*(5), e117. http://doi.org/10.2196/jmir.2138

Merzel, C., & Goodman, A., (2016). Becoming a professional: Online discussion boards as a tool for developing professionalism among MPH students. *Pedagogy in Health Promotion, 2*(3), 154-160. doi: 10.1177/2373379916656639

Morrison, E.H., & Hafler, J.P. (2000). Yesterday a learner, today a teacher too: Residents as teachers in 2000. *Pediatrics, 105*, 238-241.

Murphy, M.A., Neequaye, S., Kreckler, S., & Hands, L.J. (2008). Should we train the trainers? Results of a random trial. *Journal of American College of Surgeons, 207*(2), 185-190. doi: 10.1016/j.jamcollsurg.2008.02.032

Nadeau, M.T., Tysinger, J., & Wiemers, M. (2016). A case-based approach for teaching professionalism to residents with online discussions. *Journal of Advances in Medical Education & Professionalism, 4*(1), 1-7.

O'Hagan, T.S., Roy, D., Anton, B., & Chisolm, M.S. (2016). Social media use in psychiatric graduate medical education: Where we are and the places we could go. *Academic Psychiatry, 40*, 131-135. doi: 10.1007/s40596-015-0372-3

O'Sullivan, H., van Mook, W., Fewtrell, R., & Wass, V. (2012). Integrating professionalism into the curriculum AMEE Guide No. 61. *Medical Teacher, 34*(2), e64-e77. doi: 10.3109/0142159X.2012.655610

Papadakis, M.A. (2015). Introduction. In R. Bynny, M. Papadakis, & D. Paauw (Eds.), *Medical professionalism best practices* (pp. 3-8). California: Alpha Omega Alpha Honor Medical Society.

Patel, P., Robinson, B.S., Novicoff, W.M., Dunnington, G.L., Brenner, M.J., & Saleh, K.J. (2011). The disruptive orthopaedic surgeon: Implications for patient safety and malpractice liability. *The Journal of Bone and Joint Surgery, 93*(21), e1261-e1266. doi: 10.2106/JBJS.J.01933

Poirier, J.N., Cooley, J.R., Wessely, M., Guebert, G.M., & Petrocco-Napuli, K. (2014). Evaluation of three different methods of distance learning for postgraduate diagnostic imaging education: A pilot study. *Journal of Chiropratic Education, 28*(2), 157-163. doi: 10.7899/JCE-13-34

Ramani, S., Mann, K., Taylor, D., & Thampy, H. (2016). Residents as teachers: Near peer learning in clinical work settings: AMEE Guide No. 106. *Medical Teacher, 38*(7), 642-655. doi: 10.3109/0142159X.2016.1147540

Richey, R.C., Klein, J.D., & Tracey, M.W. (2011) *The instructional design knowledge base*. New York, NY: Routledge.

Riley, S., & Kumar, N. (2012). Teaching medical professionalism. *Clinical Medicine, 12*(1), 9-11.

Rogers, D.A., Boehler, M.L., Roberts, N.K., & Johnson, V. (2012). Using the hidden curriculum to teach professionalism during the surgery clerkship. *Journal of Surgical Education, 69*(3), 423-427. doi: 10.1016/j.jsurg.2011.09.008

Rosenstein, A.H., & O'Daniel, M. (2008). A survey of the impact of disruptive behaviors and communication defects on patient safety. *The Joint Commission Journal on Quality and Patient Safety, 34*(8), 464-471.

Rovai, A.P., & Ponton, M.K. (2005). An examination of sense of classroom community and learning among African American and Caucasian graduate students. *Journal of Asynchronous Learning Networks, 9*, 77-92.

Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist, 55*(1), 68-78. doi: 10.1037//0003-066X.55.1.68

Salam, A., Song, C.O., Mazlan, N.F., Hassin, H., Lee, L.S., & Abdullah, M.H. (2012). A pilot study on professionalism of future medical professionals in Universiti Kebangsaan Malaysia (UKM) Medical Centre. *Social and Behavioral Sciences, 60*, 534-540. doi: 10.1016/j.sbspro.2012.09.419

Salem, J., Borgmann, H., MacNeily, A., Boehm, K., Schmid, M., Groeben, C., Baunacke, M., & Huber, J. (2017). New media for educating urology residents: An interview study in Canada and Germany. *Journal of Surgical Education, 74*(3), 495-502. doi: 10.1016/j.jsurg.2016.11.009

Salinas-Miranda, A.A., Shaffer-Hudkins, E.J., Bradley-Klug, K.L., & Monroe, A.D.H. (2014). Student and resident perspectives on professionalism: Beliefs, challenges, and suggested teaching strategies. *International Journal of Medical Education, 5*, 87-94. doi: 10.5116/ijme.5334.7c8d

Schulz, K., Puscas, L., Tucci, D., Woodard, C., Witsell, D., Esclamado, R.M., & Lee, W.T. (2013). Surgical training and education in promoting professionalism: A comparative assessment of virtue-based leadership development in otolaryngology-head and neck surgery residents. *Medical Education Online, 18*. http://dx.doi.org/10.3402/meo.v18i0.22440

Schunk, D.H. (2004). Motivation. In *Learning theories: An educational perspective, 4th ed*. (pp. 329-388). Columbus, OH: Pearson.

Shea, P., Fredericksen, E., Pickett, A., Pelz, W., & Swan, K. (2001) Measures of learning effectiveness in the SUNY learning network. *Online Education: Learning Effectiveness, Faculty Satisfaction, and Cost Effectiveness.* Needham, MA: SCOLE.

Shields, H.M., Guss, D., Somers, S.C., Kerfoot, B.P., Mandell, B.S., Travassos, W.J., … Hafler, J.P. (2007). A faculty development program to train tutors to be discussion leaders rather than facilitators. *Academic Medicine, 82*(5), 486-492.

Slavin, R.E. (2012). Motivating students to learn. In *Educational psychology: Theory and practice, 10th ed.* (pp. 284-313). Boston, MA: Pearson.

Stavredes, T. (2011). *Effective online teaching: Foundations and strategies for student success*. San Francisco, CA: Jossey-Bass.

Sterling, M., Leung, P., Wright, D., & Bishop, T.F. (2017). The use of social media in graduate medical education: A systematic review. *Academic Medicine*, *92*(1), 1-14. doi: 10.1097/ACM.0000000000001617

Sthapornnanon, N., Sakulbumrungsil, R., Theeraroungchaisri, A., & Watcharadamrongkun, S. (2009). Social constructivist learning environment in an online professional practice course. *American Journal of Pharmaceutical Education, 73*(1), 1-8.

Steinert, Y. (2009). Educational theory and strategies for teaching and learning professionalism. In R. Cruess, S. Cruess, & Y. Steinert (Eds.), *Teaching Medical Professionalism* (pp. 31-52). Cambridge: Cambridge University Press.

Stevens, J.P. (2009). *Applied multivariate statistics for the social sciences.* (5th ed.). New York, NY: Routledge.

Taylor, F.A., Nelson, E., Delfino, K., & Han, H. (2015). A blended approach to learning in an obstetrics and gynecology residency program: Proof of concept. *Journal of Medical Education and Curricular Development, 2*, 53-62. doi: 10.4137/JMECD.S32063

ten Cate, O.T.J., Kusurkar, R.A., & Williams, G.C. (2012). How self-determination theory can assist our understanding of the teaching and learning processes in medical education. AMEE Guide No. 59. *Medical Teacher, 33*(12), 961-973. doi: 10.3109/0142159X.2011.595435

Thorndike, R.M., & Thorndike-Christ, T. (2010). *Measurement and evaluation in psychology and education* (8th ed.). Boston, MA: Pearson.

Tsugawa, Y., Ohbu, S., Cruess, R., Cruess, S., Okubo, T., Takahashi, O., . . . Fukui, T. (2011). Introducing the Professionalism Mini-Evaluation Exercise (P-MEX) in Japan: Results

from a multicenter, cross-sectional study. *Academic Medicine, 86*(8), 1026-1031. doi:
10.1097/ACM.0b013e3182222ba0

Turner, D.A., Fleming, G.M., Winkler, M., Lee, K.J., Hamilton, M.F., Hornik, C.P., … Mink, R.
(2015). Professionalism and communication education in pediatric critical care medicine:
The learner perspective. *Academic Pediatrics, 15*(4), 380-385.

von Muhlen, M., & Ohno-Machado, L. (2012). Reviewing social media use by clinicians.
Journal of American Medical Information Association, 19, 777-781. doi:
10.1136/amiajnl-2012-000990

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes.*
Cambridge, MA: Harvard University Press.

Warner, R.M. (2007). *Applied statistics from bivariate through multivariate techniques*. Boston,
MA: Pearson.

Wear, D., & Zarconi, J. (2008). Can compassion be taught? Let's ask our students. *Journal of
General Internal Medicine, 23*, 948-953.

Traditional Lecture on Professionalism
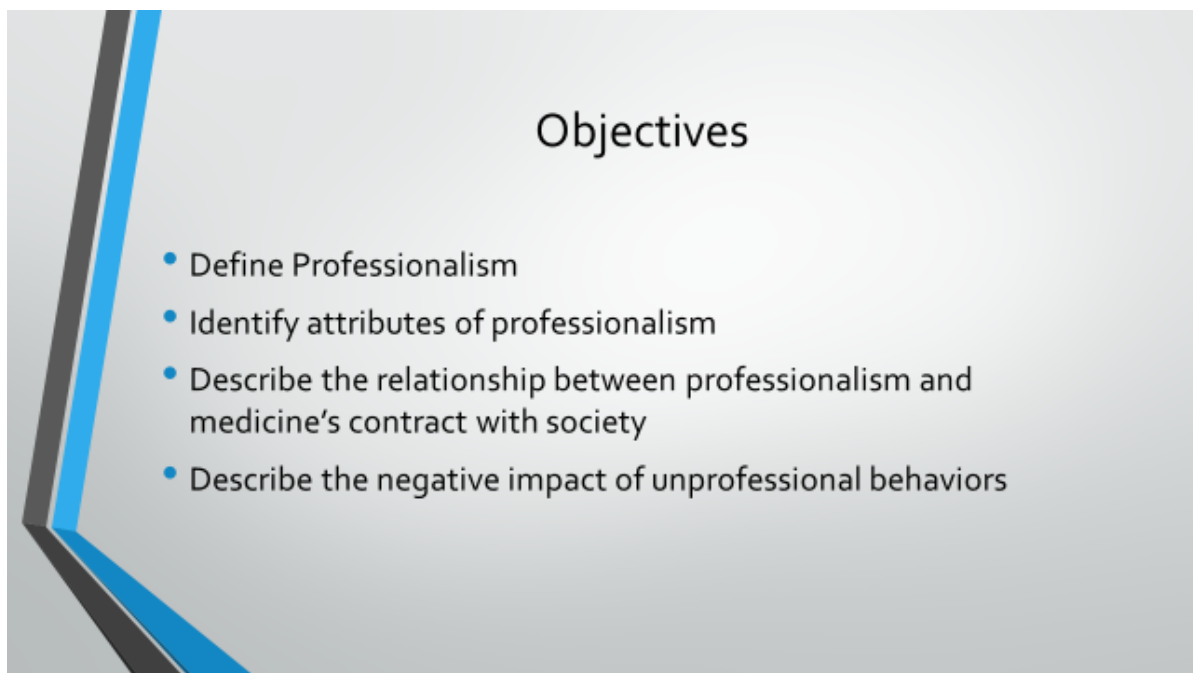
Why Professionalism?

Associated with Disciplinary Actions by Licensing Boards

Linked to poor patient outcomes and healthcare team interactions

Social Contract

Medicine is given:
- Monopoly
- Autonomy
- Prestige/Status
- Self-Regulation
- Financial Rewards

Medicine is expected to exhibit:

Professionalism

What is Professionalism?

- According to ACGME:

  "a commitment to carrying out professional responsibilities and an adherence to ethical principles"

Accreditation Council for Graduate Medical Education. (2016a). Common Program Requirements. Retrieved from http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_07012016.pdf

Attributes of Professionalism

- honesty, integrity, and respect
- response to patient needs regardless of personal commitments
- protection of patient confidentiality
- accountability to patients, society and the profession

Accreditation Council for Graduate Medical Education. (2016a). Common Program Requirements. Retrieved from http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_07012016.pdf

Honesty, Integrity, and Respect

- Listen actively to patient
- Maintain appropriate boundaries
- Maintain composure in difficult situation
- Appropriate appearance
- On time
- Admitted errors/omissions

Case #1

- You are seeing one of your partner's patients, as she is on a 2-week vacation. The patient is a 63 year old male complaining of several weeks of cough with wheezing, and occasional blood-tinged sputum. He had a similar episode about a year ago for which he saw his doctor, had a chest x-ray, and was given a course of antibiotics. Since he is a former smoker, and admits to a 10-pound weight loss, you decide to send him for a chest x-ray. You are called later by the radiologist regarding a RUL mass that is now larger than when seen on chest film one year ago. Puzzled, you look in the patient's chart and discover that the chest x-ray report from the previous year was filed in the chart without being reviewed, and your partner's note makes no mention of the findings. What should you do?

Conigliaro, R.L. (2006). Professionalism: self-study module. *MedEdPORTAL Publications*, 2(250). http://doi.org/10.15766/mep_2374-8265.250

Response to patient needs regardless of personal commitments

- Show interest in patient as a person
- Recognize and meet patient needs
- Extended oneself to meet patient needs

Case #2

- You are a PGY-2 on a busy medical service. Your son is performing in a school play this afternoon and you planned on leaving early to attend the play. As you are finishing up your work and preparing to sign out, you get a call that one of your patients is becoming unstable. At the bedside, it is clear that he needs to go to the intensive care unit, and there are many issues that need to be taken care of for that to happen. Your attending is in clinic. The night float intern is not due for several hours. What do you do?

Conigliaro, R.L. (2006). Professionalism: self-study module. *MedEdPORTAL Publications*, 2(250). http://doi.org/10.15766/mep_2374-8265.250

Protection of patient confidentiality

- HIPAA regulations
- Verbal and written confidentiality

Case #3

- Two visiting nurses from Australia, a GME representative, and a patient with his family are riding in the elevator when two residents, one dressed in short shorts and no lab coat, enter the elevator having a spirited conversation. They are overheard discussing a procedure that they had completed earlier in the day. The conversation specifically included the name of the procedure, what disease the patient suffered from, the prognosis, and gender of the patient.

Accountability to patients, society and the profession

- Ensured continuity of care
- Admitted errors/omissions
- Solicited and accepted feedback
- Complete tasks in a reliable fashion
- Address gaps in knowledge
- Availability to colleagues

Case #4

- You are seeing a patient who is complaining of low back pain, with pain and numbness down his leg. His exam is consistent with a herniated disc at L5-S1, and you are considering obtaining an MRI. However, he has no neurologic findings, and you have not yet tried conservative therapy. The patient lives near a diagnostic facility at which your wife works as a radiologist, and you have holdings in that company. You order the MRI, telling the patient that it will better help you manage his LBP.

Conigliaro, R.L. (2006). Professionalism: self-study module. *MedEdPORTAL Publications*, 2(250). http://doi.org/10.15766/mep_2374-8265.250

Appendix B

Case-based Scenarios for Online Discussion Forum

Four case-based scenarios were developed based on the ACGME requirements and milestones

and the P-MEX domains.

Case #1
"You are on rounds with your attending, and one of the PGY-1 residents is presenting. The PGY-1 resident has been working very hard and doing a good job. The attending asks the resident about the results of a laboratory test that the student was to have checked on. You know that the resident did not have an opportunity to get the test results but the resident responds by saying that the test was normal" (Spector & Trimm, n.d.).

Case #2
"As a first year resident, you care for a 15 year old boy with a malignancy. You develop a close relationship with him during your residency. By the time you are a PGY-3 he is terminal, and he has begun to talk openly with you about dying. You have assured him that you will be there as a support for him whenever needed. He is admitted to the hospital conscious but close to death, and he asks one of the other residents to call you at home and ask you to come in. You are not on call, and you are on your way out the door to your 10-year old's championship basketball game" (Spector & Trimm, n.d.).

Case #3
"A patient who recently underwent esophageal surgery is scheduled for a percutaneous gastrostomy tube placement. During the procedure, the tube is inadvertently passed through both the anterior and posterior gastric walls. In discussing the adverse outcome with the patient, the radiologist explains, Unfortunately a known complication of this procedure has occurred, and the next step is to refer you to surgery to complete the procedure" (Gunderman & Brown, 2013, p. 1184).

Case #4
"A senior radiologist makes it a point not to answer the phone after 3:30 pm. Moreover, he makes it clear to everyone else in the reading room that they are to follow the same policy. The rationale, he states, is that by this point the group is generally behind on the work list and it is important to avoid taking on any additional commitments so that everyone can leave the reading room by quitting time" (Gunderman & Brown, 2013, p. 1185).

Questions asked for each scenario

1. Identify the unprofessional behavior(s) within the scenario.

2. What would you do in this situation? Why?

3. What potential impact does this behavior have on patient care?

4. Were any barriers present to prevent the resident from behaving professionally?

5. Reflecting on your own experiences, have you witnessed or been in a situation similar to this scenario? What happened? How did you respond? If you were involved in the situation, what if any action was taken to ensure this behavior was not repeated?

References

Gunderman, R.B. & Brown, B.P. (2013). Teaching professionalism through case studies. *Academic Radiology, 20*, 1183-1185.

Spector, N.D. & Trimm, R.F. (n.d.). Teaching, promoting and assessing professionalism across the continuum: A medical educators' guide. Retrieved from https://www.abp.org/sites/abp/files/pdf/professionalism.pdf

Appendix C

The Professionalism Mini-Evaluation Exercise

Guidelines for Using the P-Mex

The Professionalism Mini-Evaluation Exercise (P-MEX) focuses on the healing and professional behaviors that students/residents demonstrate in various settings during their daily professional activities. It is designed to be easily implemented and to encourage early feedback. This assessment became part of the resident's permanent record and is meant to encourage feedback.

Form and Rating Scale

For each encounter, each behavior should be categorized utilizing the following rating scale. Utilize the **N/A (not applicable)** category if the behavior was **not observed** or if the category is **not applicable** to the setting.

Rating	Description of Behavior
Unacceptable	Lapses of professional behavior that are intentional, are likely to harm, and for which there are no mitigating circumstances.
BELow expectations	Lapses of professional behavior that are unintentional, result in minimal to no harm, or for which there may be mitigating circumstances.
MET expectations	Demonstrated the performance expected for the level of the student/resident.
EXCeeded expectations	Exceptional performance, demonstrating the behaviors expected of an outstanding physician-to-be.
Critical Event	A clear breach of professional boundaries. Documentation of a critical event is sent directly to the appropriate authority for immediate action

Guidance for Evaluators

Most students/residents will on most occasions "meet expectations". Some will demonstrate behaviors, which exceed expectations on selected occasions. A few individuals will consistently demonstrate behaviors, which exceed expectations. Individuals may, at times, demonstrate behaviors, which are "below expectations". It is extremely important to identify these occasions, because if they occur frequently, remedial action may be necessary. Behaviors classified as "unacceptable" will always require remedial action.

Evaluating Behaviors

It is believed that the behaviors on the evaluation form are self-evident and that descriptors are not necessary. However, each behavior observed must be placed in the context of the person, the situation, and the potential for harm caused by behaviors that deviate from the norm. For example, being late on a single occasion could either be acceptable, below expectations, or unacceptable depending upon the context. If the student/resident is late because they were giving patient care in an emergency situation it may be acceptable, while if they are late for frivolous reasons, it is not.

PROFESSIONALISM MINI-EVALUATION EXERCISE

Evaluator:_____

Student/Resident:_____

PGY Level: (please circle) **1   2   3   4   5**

Setting: <u>Patient Related</u>: **Patient Present   Patient Not Present   Ward   Clinic   OR   ER**

       <u>Non Patient Related</u>: **ie – general teaching, small group teaching, etc.**

Please rate the student's/resident's performance: **UN**acceptable, **BEL**ow expectations, **MET** expectations, **EXC**eeded expectations, **N**ot **A**pplicable.

	N/A	UN	BEL	MET	EXC
Listened actively to patient					
Showed interest in patient as a person					
Recognized and met patient needs					
Extended his/herself to meet patient needs					
Ensured continuity of patient care					
Advocated on behalf of a patient					
Demonstrated awareness of limitations					
Admitted errors/omissions					
Solicited feedback					
Accepted feedback					

Maintained appropriate boundaries					
Maintained composure in a difficult situation					
Maintained appropriate appearance					
Was on time					
Completed tasks in a reliable fashion					
Addressed own gaps in knowledge and skills					
Was available to colleagues					
Demonstrated respect for colleagues					
Avoided derogatory language					
Maintained patient confidentiality					
Used health resources appropriately					

► Please rate (circle) this resident's overall professional performance:

UNacceptable   BELow expectations   MET expectations   EXCeeded expectations

► Did you observe a critical event?   no   yes (comment required)

Comments:_____

_____
_____
_____

     Evaluator's signature:_____

     Student's/Resident's signature: _____

     Date & Time:_____

Appendix D

Posttest

Q1 According to ACGME, Professionalism is generally defined as which of the following? Choose the best answer.

a. A set of values, behaviors and relationships that underpins the trust the public has in doctors.
b. A foundation of clinical competence, communication skills, and ethical and legal understanding.
c. The commitment to professional competence, improving quality of care and access to care, scientific knowledge, professional responsibilities, and patient confidentiality.
d. A commitment to carrying out professional responsibilities and an adherence to ethical principles by demonstrating honest, integrity, respect, responsiveness, patient privacy, and accountability to patients, society and the profession.

Q2 Which of the following is not an attribute of professionalism?

a. HIPAA regulations
b. responsiveness to patient's needs
c. accountability to patients
d. respect, integrity, and honesty

Q3 Identify the attribute of professionalism that is demonstrated in the following case:

You are on the wards taking care of a particularly demanding patient, whose family is always asking questions about the plan of care. The patient develops sharp chest pain, and his CT scan is positive for a new pulmonary embolism. When you and the team review the patient's medication, it is clear that, although the use of sub-cutaneous heparin was discussed at the time of admission, the order was never written. The family is asking about the causes of the blood clot, and if the patient had been on blood thinning medication. You report the incident to risk management and move on to the next case. Chose the best answer

a. patient confidentiality
b. accountability to patient
c. maintaining appropriate boundaries
d. meeting the patient's needs

Q4 Why is professionalism consider the basis for medicine's contract with society?

a. Professionalism is not considered the basis for medicine's contract with society
b. Unprofessional behaviors have been linked to poor patient outcomes
c. Attributes of professionalism can be linked to the exchange of services provided by physicians
d. In exchange for autonomy, financial rewards, and status, physicians must demonstrate honesty, respect, competence, and devotion

Q5 Identify the attribute of professionalism highlighted by the following case:

You are seeing a patient for routine follow-up, whose son is also your patient. At the end of the visit, your patient asks if you would refill a prescription for her son, but put it in her name, since her son's insurance will not cover the medication but her insurance will. You comply with the request, since you believe that the insurance companies unfairly decide what medications get covered for patients. Choose the best answer.

a. honesty
b. response to patient needs regardless of personal commitments
c. accountability to patients
d. respect

Q6 Admitting errors and omissions can be considered a characteristic of which main attribute of professionalism?

a. response to patient needs regardless of personal commitments
b. honesty, integrity, and respect
c. accountability to patient, society and profession
d. protection of patient confidentiality

Q7 Identify the attribute of professionalism highlighted in the following case:

You are a passenger on a domestic flight, when a patient develops chest pain. You see the commotion in the back, and then a flight attendant asks for assistance from anyone with any medical background. You look back and see a middle-aged man, somewhat diaphoretic and pale,

but otherwise okay. You decide that you will wait and see if anyone else comes forward first, and consider helping out if no one else does. Choose the best answer.

a. accountability to patient, society and profession
b. integrity
c. response to patient needs regardless of personal commitments
d. protection of patient confidentiality

Q8 Why is it so important for physicians to maintain professionalism skills during practice? Choose all that apply.

a. Unprofessionalism has been linked to disciplinary actions taken by licensing boards
b. Studies have found correlations between unprofessional behaviors and poor patient outcomes
c. Unprofessionalism has been associated with disciplinary actions taken by certifying boards
d. Professionalism is the basis of medicine's contract with society which demands that physicians maintain standards of excellence

Q9 Identify the attribute of professionalism that is highlighted in the following case:

A fellow resident is presenting a case to the clinic preceptor, and you listen in. The resident presents "a 32 year old here for ER follow up. He's a drug seeker, a real looser, who complains of back pain. They gave him three percs to go and now he's in my room demanding more pain meds. His exam is normal and I don't want to give this guy anything, I think he's faking it to get meds." Choose the best answer

a. accountability to patient, society and profession
b. honesty, integrity, and respect
c. response to patient needs regardless of personal commitments
d. protection of patient confidentiality

Q10 Within medicine's social contract, medicine is afforded autonomy, prestige, financial rewards and self-regulation in exchange for which of the following.

a. demonstrate honesty and integrity
b. ensure the competence of their colleagues
c. devotion to the public good
d. None of the above
e. All of the above

Appendix E

IRB Approval and Informed Consent

THE UNIVERSITY OF TENNESSEE
HEALTH SCIENCE CENTER.

<div align="right">

Institutional Review Board
910 Madison Avenue, Suite 600
Memphis, TN 38163
Tel: (901) 448-4824

</div>

October 04, 2017

Amy Elizabeth Hall, MS
UTHSC - COM - Graduate Medical Educ Admin STE 447
920 Madison Building

Re: 17-05454-XP
Study Title: The effect of a case-based, online discussion forum on resident professionalism skills and knowledge

Dear Ms. Hall:

The IRB has received your written acceptance of and/or response dated October 02, 2017 to the provisos outlined in our correspondence of September 28, 2017 concerning **revisions** to your previously approved project, referenced above.

The Administrative Section of the IRB determined that your application is eligible for **expedited** review under 45 CFR 46.110(b)(2). The IRB has reviewed these materials and determined that they do comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects. Therefore, this letter constitutes approval of the attached revisions. Approval does not alter the expiration date of this project, which is August 18, 2018.

The revisions to this study may not be instituted until you receive approval from the institution(s) where the research is being conducted.

In the event that subjects are to be recruited using solicitation materials, such as brochures, posters, webbased advertisements, etc., these materials must receive prior approval of the IRB. Any revisions in the approved application must also be submitted to and approved by the IRB prior to implementation. In addition, you are responsible for reporting any unanticipated serious adverse events or other problems involving risks to subject or others in the manner required by the local IRB policy.
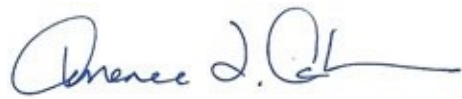
Finally, **re-approval** of your project is required by the IRB in accord with the conditions specified above. You may not continue the research study beyond the time or other limits specified unless you obtain prior written approval of the IRB.

Sincerely,

Donna Stallings

Signature applied by Donna L Stallings on 10/04/2017 01:38:21 PM CDT

Donna Stallings, CIM
IRB Administrator
UTHSC IRB

Terrence Ackerman

Terrence F. Ackerman, Ph.D. Chairman

UTHSC IRB

Attachment: Revisions

1. The study application was updated to version 1.4 to incorporate:

    a. Adding Claudette Jones Shephard as co-principal investigator.

2. The consent form was revised in all applicable sections to incorporate:

    a. Adding Claudette Jones Shephard as co-principal investigator.

    The revised consent form is dated September 29, 2017 and was stamped IRB approved October 04, 2017. You must use the date-stamped version of the consent form. The stamped IRB-approved consent form is available in the *Informed Consent* folder of iMedRIS.

Institutional Review Board
Office of Sponsored Programs
University of Memphis
315 Admin Bldg
Memphis, TN 38152-3370

Sep 28, 2017

PI Name: Amy Hall
Co-Investigators:
Advisor and/or Co-PI: Amanda Rockinson-Szapkiw
Submission Type: Initial
Title: The effect of a case-based, online discussion forum on resident professionalism skills and knowledge
IRB ID **: #**PRO-FY2018-148

Expedited Approval: Sep 1, 2017 UTHSC Facilitated
Expiration: Aug 18, 2018

Approval of this project is given with the following obligations:

1. This IRB approval has an expiration date, an approved renewal must be in effect to continue the project prior to that date. If approval is not obtained, the human consent form(s) and recruiting material(s) are no longer valid and any research activities involving human subjects must stop.

2. When the project is finished or terminated, a completion form must be submitted.

3. No change may be made in the approved protocol without prior board approval.

Thank you,
James P. Whelan, Ph.D.
Institutional Review Board Chair
The University of Memphis.

Main Consent Form (approved by UT IRB September 29, 2017)

TITLE: The Effect of a Case-based, online discussion Forum on Resident Professionalism Knowledge and Skills

PRINCIPAL INVESTIGATOR:
Amy E. Hall
920 Madison Ave., Suite 447
Memphis, TN 38163

CO-PRINCIPAL INVESTIGATOR:
Claudette J. Shephard, MD
853 Jefferson Ave., Rm E102
Memphis, TN 38163

1. INTRODUCTION:

You are being given the opportunity to participate in this research study. The purpose of this consent form is to help you decide if you want to be in the research study. This consent form may contain words that you do not understand. Please ask the researcher to explain any words or information that you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. Please tell the researcher if you are taking part in another research study.

The purpose of this study is to investigate the effect of a case-based, online discussion forum on residents' professionalism knowledge base and skill level. The participants will either participate in a traditional lecture on professionalism or participate in a lecture and a discussion forum. After the instructional strategies have finished, all participants will complete a professionalism posttest and be assessed by the Professionalism Mini-Evaluation Exercise. The results of the assessment methods will be analyzed to determine the instructional strategies' effect on knowledge base and skill level.

49 subjects will be participating in this study.

The study will take place at four sites:

1. University of Tennessee Health Science Center, Graduate Medical Education Office
    920 Madison Ave., Suite 447, Memphis, TN 38163
2. Methodist University Hospital, Radiology/Nuclear Medicine
    1265 Union Ave., Memphis, TN 38104
3. Regional One Health, Radiology
    877 Jefferson Ave., Memphis, TN 38103
4. UT Family Medicine Clinic
    294 Summar Ave., Jackson, TN 38301

Your participation in this study will last between 4-8 weeks.

2. PROCEDURES TO BE FOLLOWED:

Week 1:
- Informed Consent
- Complete a demographic questionnaire
- You will be randomly assigned (like the flip of a coin) to the group that receives the traditional professionalism lecture only (control group) or the group that receives the case-based, online discussion forum (experimental group). You have a 50% chance of being assigned to the online discussion forum group, the experimental instructional strategy. The investigator will not be the person who decides which you receive. A computer program that gives random numbers will be used to decide which you receive. It is not known whether the experimental instructional stratgey is as good as, better than, or worse than the traditional instructional strategy.
- Both groups will receive the traditional professionalism lecture

Week 2-5:
- The experimental group will participate in a case-based, online discussion forum.

Week 6-8:
- Both groups will complete a professionalism posttest.
- Participants in both groups will be observed and assessed by either the program director or researcher via the Professionalism Mini-Evaluation Exercise. This observation will occur in the Radiology departments at either Methodist University Hospital or Regional One Health or in the UT Family Medicine Clinic in Jackson, TN.

The traditional professionalism lecture is part of the regular educational process while the fourweek case-based, online discussion forum is experimental. The demographic survey, professionalism posttest, and observation assessment via the Professionalism Mini-Evaluation Exercise are for research purposes only.

3. **RISKS ASSOCIATED WITH PARTICIPATION**:

While the cased-based online discussion forum via a Google Plus Community will be a private community, the discussion posts will not be anonymous. Residents participating in the discussion forum will be able to identify each other.

There is a risk that your private identifiable information may be seen by people not involved in the research (such as if a researcher's computer is stolen or an electronic database is hacked). However, we will use very careful security measures (such as locks on file cabinets, computer passwords, etc.) to minimize the chance that any unauthorized persons might see your confidential information.

The research may involve risks to you, which are currently unforeseeable. You will be told about any new information that might change your decision to be in this study. You may be asked to sign a new consent form if this occurs.

4. **BENEFITS ASSOCIATED WITH PARTICIPATION:**

Your professionalism knowledge and skill level may improve while you are in this study; however, this cannot be promised.

The results of this study may help residency and fellowship program directors in the future by providing evidence for effective instructional strategies to teach professionalism.

5. ALTERNATIVES TO PARTICIPATION:

Professionalism must be taught in residency and fellowship programs. Completion of the traditional lecture and case-based, online discussion forum will be a required learning activity for all residents. You do have the option to "opt out" of the research study but will be required to participate in the lecture and discussion forum. By opting out of the research study, your survey data, posttest scores, and the score received on the Professionalism Mini-Evaluation Exercise will not be included in the data analysis.

6. CONFIDENTIALITY:

Research records
All your paper research records will be stored in locked file cabinets and will be accessible only to research personnel and those entities named below in this section, except as required by law (such as reports of child abuse, plans to commit suicide, etc.).

All your electronic research records will be computer password protected and accessible only to research personnel and those entities named below in this section, except as required by law (such as reports of child abuse, plans to commit suicide, etc.).

Presentations/Publications
While individual details about your case might be provided in publications or presentations about this research, they will not be discussed in a way that would allow you to be individually identified as a participant.

7. COMPENSATION AND TREATMENT FOR INJURY:

You are not waiving any legal rights or releasing the University of Tennessee or its agents from liability for negligence. In the event of physical injury resulting from research procedures, the University of Tennessee does not have funds budgeted for compensation for medical treatment. Therefore, the University of Tennessee does not provide for treatment or reimbursement for such injuries.

If you are injured or get sick as a result of being in this study, contact your PCP or dial 911 if it is an emergency.

If you are injured or get sick as a result of being in this study, you and/or your insurance will be billed for the costs associated with this medical treatment.

No compensation will be available to you for any extra expenses that you may have as the result of research related physical injuries, such as additional hospital bills, lost wages, travel expenses, etc.

No compensation will be available to you for any non-physical injuries that you may have as a result of research participation, such as legal problems, problems with your finances or job, or damage to your reputation.

8. QUESTIONS:

Contact Amy E. Hall at 901-448-5208 if you have questions about your participation in this study, or if you have questions, concerns, or complaints about the research.

If you feel you have had a research-related injury contact Amy E. Hall at the following 24hour/7-day cell phone number 901-603-8971.

You may contact Terrence F. Ackerman, Ph.D., UTHSC IRB Chairman, at 901-448-4824, or visit the IRB website at http://www.uthsc.edu/research/compliance/irb/ if you have any questions about your rights as a research subject, or if you have questions, concerns, or complaints about the research.

9. PAYMENT FOR PARTICIPATION:

You will not be paid for participation in this research study.

10. COSTS OF PARTICIPATION:

There are no costs to you for participating in this study.

11. VOLUNTARY PARTICIPATION AND WITHDRAWAL:

Your participation in this research study is voluntary. You may decide not to participate or you may leave the study at any time. Your decision will not result in any penalty or loss of benefits to which you are entitled.

Participating or not participating in this study will in no way influence your grade or standing in any course or your employment status.

If you decide to stop being part of the study, you should tell your researcher, and any information that you have already provided will be kept in a confidential manner.

Your participation in this research study may be stopped by the researcher without your consent for any of the following reasons:
- If you do not participate in the case-based, online discussion forum
- If you violate HIPAA regulations during the discussion forum

12. CONSENT OF SUBJECT:

You have read or have had read to you a description of the research study as outlined above. The investigator or his/her representative has explained the study to you and has answered all the questions you have at this time. You knowingly and freely choose to participate in the study. A copy of this consent form will be given to you for your records.

_____ _____ _____

Signature of Research Subject (18 years +)   **Date**   **Time**

_____

Printed Name of Adult Research Subject

_____ _____ _____

Signature of Person Obtaining Consent   **Date**   **Time**

_____

Printed Name of Person Obtaining Consent

In my judgment, the subject has voluntarily and knowingly given informed consent and possesses the legal capacity to give informed consent to participate in this research study.

_____ _____ _____

Signature of Investigator   **Date**   **Time**