

FACTORS INFLUENCING CLINICAL FACULTY PARTICIPATION IN A TEACHER  
PROFESSIONAL DEVELOPMENT PROGRAM DURING A PANDEMIC: A ROOT CAUSE  
ANALYSIS

by

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## Abstract

Findings from a needs assessment supported the design and creation of an online, asynchronous teacher professional development program for medical clinical faculty but low participation—due, in part, to the COVID-19 pandemic—prompted an investigation into the factors that reduced clinical faculty interest in the pilot program. A secondary purpose of this study was to identify changes that may help improve future participation while taking the short- and long-term realities of the pandemic into consideration. This study took place at a college of medicine affiliated with a large state university in the northeastern United States during the 2020–2021 school year. Participants were 16 key stakeholders at the institution: four departmental and clinical leaders, six curriculum administrators, and four clinical faculty. A qualitative phenomenological approach was used to conduct a root cause analysis by investigating how the equipment, measurement, process, people, materials, and environment domains of cause contributed to the problem of low faculty interest. Data were gathered through semi-structured individual interviews using video conferencing software. Interviews were analyzed using descriptive and pattern coding to identify themes specific to the domains of cause. The main finding was that the COVID-19 pandemic directly and indirectly influenced how faculty perceived and participated in the online program. Indirect effects include the volume of the content included in the program, the asynchronous nature of the program, the perceived value of the program, and the perceived institutional commitment to faculty development. Recommendations for practice include adding synchronous components, using root cause analyses to understand unexpected educational programmatic outcomes, aligning programming with existing intuitional faculty development, and supporting faculty development as a valued institutional activity. Recommendations for future research include evaluation of an updated pilot program, focusing on variations in participation based on faculty experience level.

*Keywords:* online teacher professional development, undergraduate medical education, clinical faculty, COVID-19 pandemic, faculty development, root cause analysis

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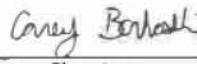
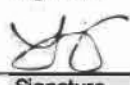
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*The student has made all necessary revisions, and we have read, and approve this dissertation for submission to the Johns Hopkins Sheridan Libraries as partial fulfillment of the requirements for the Doctor of Education degree.*

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## Dedication

My dedication begins with the people in my life who are gone but still with me. My mother, Bridget E. Rooney Folk, was the first critic of my academic work and my most steadfast supporter through school, the automobile accident I had as a high school senior, then college, medical school, and beyond. She didn't say it often or loudly, but she was Mom. My grandfather, John C. Folk, a man who survived the battlefields of World War II and the Korean War, never went to college, but would buy me any book I wanted. He told me: "You can't know everything, but books know everything". To this day, "my house" is defined as the place where I keep my books. My uncle, Dennis C. Folk, was like a father who, even when he thought I was nuts for working so hard, would look over my shoulder when I would bring my EdD homework when I visited my Long Island family. Lastly, my mother-in-law, Virginia M. Whaley, who also never went to college, yet had more common sense than many of the physicians I would speak with while on call in my high-risk obstetrical practice.

I dedicate this dissertation to my wife, Diane M. Folk, CNM, NP, BSN, MS, DNP, FACNM, who earned all those degrees before I started at JHU and supported me in my EdD. I also dedicate this to my daughter, Isabella M. Folk, who was about to start second grade when I began at JHU and is now a highly intelligent, culturally aware, socially engaged, artistic, yet frighteningly fierce young lady in eighth grade. Papa is done!

Lastly, I dedicate this dissertation to medical professional educators who are preparing our future healthcare providers to take care of all of us.

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I met Dr. Germain at one of the meetings of a committee composed of clerkship directors at my medical school. I was a relatively new clerkship director, but with my experience teaching medical students for about 20 years at that time, I was an “expert” clinical educator (in my own “humble” opinion). I objected to something Dr. Germain said in the meeting in a manner that was loud and not well-informed. Dr. Germain then, politely, and professionally, explained the error in my thinking. I have been her student since and I am deeply grateful for her contributions as the institutional representative on this committee, as my friend and colleague, and I look forward to future collaboration.

Dr. Borkoski was involved in both of my research methods courses. As I moved from needs assessment survey through the development of my original dissertation project program employing mixed methods strategies, and then when my online program met head-on with the pandemic and I needed to switch to an entirely qualitative approach to a new project, Dr. Borkoski generously shared her expertise in methods in a way that greatly enhanced the value of my work. I hope to emulate her acuity of knowledge and expertise and share them with my colleagues in her kind and professional manner.

I met Dr. Prosser in my first semester at JHU in the Multiple Perspectives on Learning and Teaching course. One of my first, and best, decisions was to ask her to be my advisor and dissertation chair. We share an interest in medical education. Since then, she has patiently

worked with me through my thinking, writing, and research processes. Dr. Prosser has infinite patience yet insists on rigorous standards for academic excellence that include appointment as the chief of the APA police, the sworn enemy of circumlocution, Jedi Master of qualitative research, a highly valued friend, and a fellow explorer of how physicians think and teach.

Though not a formal member of my dissertation committee, I wish to thank Stephen J. Pape, PhD, who was the EdD program director at the time of my comprehensive examination “adventure” and stepped in at the last minute to sit on my committee for my successful examination. His leadership and generosity in the face of an “unexpected educational outcome” will always be appreciated.

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## Executive Summary

The first major revision of medical professional education in the United States and Canada occurred in 1910 with the publication of the 1910 Flexner Report undertaken by the Carnegie Foundation for the Advancement of Teaching (Cooke et al., 2006). Medical schools were required to model their curriculum on the European model adapted by the curricula of Harvard University, University of Michigan, University of Pennsylvania, and Johns Hopkins University (Cooke et al., 2006). Starting with the reforms proposed in the Flexner Report, medical education in the United States became a world-class standard for excellence in patient care, education, and research (Cooke et al., 2006). In the decades following the second world war, multiple factors, including the Medicare and Medicaid programs, exponential advances in medical science research, contributed to an environment and culture in medical education that emphasized medical practice productivity, medical practice income, and research productivity at the expense of medical education (Cooke et al., 2006).

The Carnegie Foundation conducted a survey of selected medical schools and teaching hospitals in the United States from 2005 through 2006 and a review of medical educational literature (Irby et al., 2010). Themes that emerged from the Carnegie Foundation analysis included standardization and individualization of the learning process, integration of foundational and clinical sciences, formation of habits of inquiry over the entire course of a medical career, focus on progressive professional identity formation (Cooke et al., 2010). Throughout the history of medical education, content knowledge expertise was sufficient preparation for teaching with few medical school faculty members prepared to function as educators (Finn et al., 2011). Clinical faculty manage increased responsibilities related to economic and administrative demands that result in reduced engagement in teaching (Abruzzo et

al., 2019). Faculty physicians struggle to balance responsibilities as expert clinicians, researchers, and teachers with research or patient care productivity often overshadowing teaching as a priority (Irby et al., 2010).

### **Problem of Practice**

Medical school curriculum is no longer optimal for transmitting an ever-expanding body of scientific information to medical students (Cooke et al., 2006). After a decade of effort on improving undergraduate medical education curriculum, concern persists (Brauer & Ferguson, 2015). Medical education is described as inflexible, centered on productivity rather than learners, and emphasizing mastery of information while providing limited clinical experience (Irby et al., 2010). Clinical faculty are often not trained as teachers, relying on content knowledge expertise and modeling teaching based on prior experience as learners (Finn et al., 2011). With the commercial emphasis of healthcare, including the need to provide care to more patients in less time, medical students do not develop a holistic view of patient care (Irby et al., 2010). As a result, students do not have the opportunity to develop the fundamental values of practicing physicians (Irby et al., 2010). Faculty balance responsibilities, placed by economic and administrative forces, with teaching that often results in less time and engagement in teaching (Abruzzo et al., 2019). The teacher–student bond that is based in mutual trust between the teacher and the student resulting in lower quality teaching and learning (Abruzzo et al., 2019). The model of faculty physicians as expert clinicians, researchers, and teachers is no longer sustainable as faculty are spending more time optimizing either research or clinical productivity with little time remaining for teaching (Irby et al., 2010). Following national trends, clinical faculty in a medical school in the northeast United States teach in a manner that does not reflect the current expectations and norms of medical education.

## **Theoretical Framework**

Systems thinking in medical practice creates a bridge between the reductionist approach to knowledge in biomedical practice and the complexities encountered in caring for patients (Woodruff, 2019). Medical education employed a reductionist, mechanistic approach to medical education limited to defining problems and seeking solutions (Woodruff, 2019). Complex adaptive systems recognize patterns and interrelationships rather than cause and effect relationships in understanding how systems function (The Health Foundation, 2011). The complex adaptive systems approach in medical education emphasizes the patient as the central figure in an interacting system where the patient as a person, with medical, personal, and social identity that interacts with a larger healthcare system that includes teams of professionals and institutions (Cristancho et al., 2017). Clinical faculty are often not prepared as teachers but rely on content expertise as the basis for teaching (Finn et al., 2011) while balancing economic and administrative demands that often overshadow medical student teaching (Abruzzo et al., 2019). An intervention in teacher professional development for clinical faculty, based on a shared values regarding medical student education, may provide clinical faculty an approach to medical student teaching that encourages adaptation to complex clinical teaching environments (Goldman & Mintz, 2017).

## **Synthesis of Literature**

The focus of undergraduate medical education (i.e., medical school curricula) should change from the institution and the faculty to the learner (Cooke et al., 2010). The medical education literature was reviewed and synthesized to determine if challenges identified in the literature exist at this institution.

## **Medical Education Institutions**

Content presented early during an undergraduate medical education curriculum often must be applied later in the clinical application portion of the program (Hortsch & Mangrulkar, 2015). Integration of medical school curriculum is complex and perceived differently by faculty versus medical students (Muller et al., 2008). Medical students often find the volume of content knowledge presented overwhelming while medical school curricula often do not emphasize current strategies for effective learning and informational recall (Augustin, 2014).

## **Medical Students**

Standardized testing strategies often employed in medical education settings for medical students do not have the ability to measure and reflect learning that comes from clinical experiences (Brown et al., 2014).

## **Clinical Faculty**

Medical education institutional administrators identified time management, institutional needs, teamwork, clinical practice, research, and teaching as faculty priorities while faculty identified maintaining content expertise and work/life balance as their own priorities (Pololi et al., 2005). Medical students and clinical faculty agree that effective faculty teaching includes content expertise, interest in teaching, clinical competency, and interaction between students and faculty (Jahan et al., 2008). Faculty gain teaching experience and expertise through informal learning opportunities in authentic environments, emphasizing the importance of learning by doing in faculty development (Steinert et al., 2016)

## **Needs Assessment for Clinical Faculty**

Clinical faculty provide an essential interface between an institution's curriculum and medical students.

## **Context**

This study was undertaken in a college of medicine within a large state university in the northeastern United States. The medical school enrolls almost 700 students. The curriculum is a variation on two years of foundational sciences followed by two years of clinical sciences as defined by the Flexner Report in 1910 (Cooke et al., 2010). Clinical faculty consist of full-time, part-time, and voluntary members who engage in clinical practice while teaching medical students and other healthcare professional learners.

## **Purpose**

This needs assessment was undertaken to determine if factors identified in the literature were present for the clinical faculty of this institution. Research questions that guided the needs assessment were:

1. What are clinical faculty beliefs regarding medical student teaching?
2. What are clinical faculty beliefs regarding the institutional value of medical student teaching?
3. What are clinical faculty beliefs regarding their preparation for medical student teaching?
4. What topics and formats do clinical faculty prefer for future faculty development?

## **Findings of the Needs Assessment Survey**

Clinical faculty respondents ( $N = 66$ ) reported teaching was hampered by demands for clinical practice productivity that limited time for teaching as described by Thomas et al. (2018). Respondents agreed that they are not prepared well to teach as suggested by Jahan et al. (2008) and Steinhert et al. (2006). Respondents favored an approach to teacher professional development in an online, independent format, including educational approaches for faculty with medical students in clinical settings as described by Brown et al. (2014) and Larsen et al. (2009).

## **Faculty Development Intervention**

An online, asynchronous teacher professional development program was developed guided by the problem of practice supported by the findings of the needs assessment questionnaire.

### **Theoretical Framework for Intervention**

Social cognitive theory provided a framework to understand the interaction between clinical faculty and medical students where learners develop skills regulating their motivational, affective, and social behaviors as part of their intellectual and cognitive functioning (Bandura, 1995). The social interaction between medical students and faculty facilitates the development of medical students from novice to expert level within the “signature pedagogy” of the medical profession as described by Shulman (2005).

### **Synthesis of Literature for Intervention**

The medical education literature was reviewed specific to teacher professional development for clinical faculty, teaching in clinical educational sessions, and online strategies.

#### ***Teacher Professional Learning***

Standards for teacher professional development and learning as defined by Learning Forward (2011) emphasizes teacher pedagogical knowledge and application of that knowledge in teaching practice.

#### ***Online Professional Development***

Online professional development should address faculty goals and needs, define a framework for effective teaching, opportunities to build pedagogical knowledge with reflection, and advocates for research-based approaches to teaching practice (Schneider et al., 2016).

## ***Effective Professional Development in Medical Education***

Self-efficacy beliefs among clinical faculty who participated in a teacher professional development program improved with acquisition and application of pedagogical knowledge as demonstrated by Finn et al. (2011) and Singh et al. (2013)

### **Outcome of Intervention**

An online, asynchronous, module-based, teacher professional development pilot program for clinical faculty teaching medical students based on the factors identified as part of my problem of practice, clarified by the results of a needs assessment survey of clinical faculty, constructed based on a review of teacher professional development and medical education literature was constructed in this institution's learning management system and presented to the clinical faculty at the opening of a new academic year for medical student clinical education. The opening of the program also occurred during the height of the COVID-19 pandemic. Participation in the program was disappointing, as 11 clinical faculty signed up for the program, but none made progress after ten weeks.

### **Method**

I assumed the COVID-19 pandemic was a major factor contributing to lack of program participation, but I recognized that a systematic approach to identify as many of the factors involved was necessary to improve future program participation.

### **Context of the Study**

Prior to the pandemic, clinical faculty at my institution were engaged in a wide range of medical practice specialties in a variety of inpatient and outpatient settings. All the participants in this study were faculty at this institution as described in the overall context of this dissertation.

I have been a member of this institution's clinical faculty for over twenty years and work as a colleague but not a supervisor for those who became participants in this part of the study.

### **Purpose of the Study**

The purpose of this study was to conduct a root cause analysis for an unexpected outcome in a medical educational program as described by Santen et al. (2019) to determine the factors that contributed to lack of participation in the online teacher faculty development program. The research questions were:

1. What do key stakeholders perceive as factors that reduced clinical faculty participation in a pilot program?
2. How do key stakeholders describe modifications that may increase clinical faculty participation in an online teacher professional development program?

### **Research Design**

The theoretical framework for the study continued to be complex adaptive systems theory as described by Woodruff (2019). Within the framework of complexity, contribution analysis as defined by Van Melle et al., (2017) addresses how to explore undefined factors that may be influencing programmatic implementation. Santen et al. (2019) applied complex adaptive systems and contribution analysis using a root cause analysis, a method for examining factors contributing to unexpected or adverse outcomes in medical practice, for unexpected or adverse outcomes in a medical education program.

For this root cause analysis, key stakeholders were identified that included clinical faculty who signed up but did not complete the program, administrative directors of the medical school program, and leaders who run educational programs within the clinical curriculum of this medical school. Santen et al. (2019) defined six domains including equipment, measurement,

process, people, materials, and environment. A structured questionnaire was developed for each participant group (e.g., faculty, administrators, leaders) based on how issues from within the domains might have contributed to the lack of program outcome. The questionnaire explored potential factors including the pandemic, clinical practice and education challenges, the online program itself such as content, design, function, activities, and assessments. I interviewed each of 16 participants individually, conducted the discussion using the questionnaires created, recorded each session, and had each interview transcribed.

### **Data Analysis**

Qualitative analysis was done using first cycle and second cycle coding as described by Saldaña (2021). Descriptive coding was used in the first cycle and pattern coding was used in the second coding cycle. I also applied saliency to evaluate the frequency and importance of emergent themes as described by Buetow (2010) and Tickle and Braham (2012). Pattern coding pulls together a volume of material identified in first cycle coding and defines a series of themes that suggests an explanation for what has occurred in the data set (Saldaña, 2021). Data was reviewed iteratively to assure the constructs, categories, explanations, and interpretations were consistent and logical to support reliability and credibility as defined by Creswell & Miller, 2000).

### **Findings**

The COVID-19 pandemic had an important influence on the environment into which the online teacher professional development program for clinical faculty was introduced. The pandemic had both direct and indirect influences on participation. Direct effects included an overwhelming increase in patient care responsibilities, regulations that limited medical student contact with patients that reduced opportunities for clinical faculty participants to complete the

application to teaching activities in the program. An indirect effect of the pandemic was to amplify the long-present disconnect between the institution's stated support for teacher professional development for clinical faculty and the lack of commitment to ensure clinical faculty participate in faculty development. It is unclear if the pandemic influenced this finding, but participants commented, contrary to the findings of the root cause analysis, that social or group activities during the modules would enhance and add value to participation. Suggestions for programmatic participation included incentives (e.g., certificates, continuing medical education credits, badging, promotion points) and scheduled, interactive components including protected time away from other responsibilities that could enhance commitment to program participation.

## Chapter 1

### Origins of Undergraduate Medical Education

In 1910, Flexner and his collaborators published the results of a detailed survey of the 155 medical schools then in operation in the United States and Canada in response to public outcry regarding the state of medical education in the nineteenth century. A multitude of non-university affiliated medical schools were criticized for poor quality medical education, profit motivation, inadequate curriculum and facilities, and non-scientific preparation for the medical profession (Cooke et al., 2006). Flexner envisioned a four-year medical education with a two-year scientific foundation followed by two years of clinical application (Cooke et al., 2006). Medical education should be centered in academically affiliated teaching hospitals, like those in Germany and adopted by Harvard University, the University of Michigan, the University of Pennsylvania, and Johns Hopkins University (Cooke et al., 2006). The investigation and report that was undertaken by Flexner and his collaborators were a major impetus for moving medical education in North America to become world-renowned (Cooke et al., 2006).

Cooke et al. (2006) described the history of medical education from the beginning to the end of the twentieth century. For the first half of the 20th century, academic physicians conducted medical research and education in university-affiliated hospitals while carrying out patient care (Cooke et al., 2006). The academic environment of medical education has undergone major changes from the end of World War II to the present. Research evolved as an endeavor undertaken at the bedside to one centered in the laboratory remote from medical education and patient care settings (Cooke et al., 2006). Research also became a major measure of academic output, rendering patient care, public health considerations, and teaching less important (Cooke et al., 2006). Clinical faculty focused on patient care became less involved in cutting-edge

research while faculty that focused on research became less involved in clinical practice (Cooke et al., 2006). With the passage of Medicare and Medicaid in the United States Congress in 1965, clinically practicing physicians were pressured to increase clinical practice income, or the dollars collected for providing medical care, and productivity, or the number of patient encounters undertaken within a given time frame (Cooke et al., 2006). These expanded responsibilities further eroded the importance of medical student teaching (Cooke et al., 2006).

In response to these concerns, the Carnegie Foundation conducted a survey of selected United States medical schools and teaching hospitals in 2005 and 2006. The Carnegie Foundation also reviewed the theoretical and empirical literature on medical education and the learning sciences for the purpose of updating the original 1910 Carnegie Foundation report (Irby et al., 2010). This report included data collected during Carnegie Foundation research team visits to 11 medical schools and three non-university affiliated teaching hospitals. The purpose of this survey was not to evaluate the programs based on a standard as had been done by Flexner and colleagues prior to their 1910 report, but to explore each institutions' challenges with resulting innovations. These institutions were selected based on demonstrated specific criteria for educational innovation and diversity related to institutional type and geographical areas. In addition to site visits to selected institutions, the investigators reviewed the medical education literature and general education literature to formulate meaningful recommendations. The vision proposed by the Carnegie Foundation included a medical education process that would maximize flexibility in achieving defined medical educational outcomes, create opportunities for integrated and collaborative learning, engender processes for inquiry and improvement, and establish supportive learning environments while advancing the health of patients as individuals and members of specific populations. The conclusions of the updated survey indicated that medical

training at the undergraduate and graduate education levels were inflexible, excessive in duration, and centered on clinical or research productivity rather than learners (Irby et al., 2010). Medical training emphasizes mastery of information while providing a limited hospital-based clinical experience necessary for the full development of the professional attributes necessary for the practice of medicine as physicians (Irby et al., 2010). The findings of the survey and literature review provided four themes including: (1) standardization of learning outcomes with individualization of the learning process, (2) integration of foundational science learning with clinical experience, (3) fostering habits of inquiry and improvement in all levels of medical education, and (4) focusing on progressive development of professional identity (Cooke et al., 2010).

Throughout the decades that followed the original 1910 Flexner Report, emphasis shifted in undergraduate medical education curriculum regarding what was explicitly taught in the clinical learning environment to what medical students actually learn, implying the existence of a disconnect between what is taught and what is learned (Hafferty, 1998). Medical school graduates are increasingly required to demonstrate expertise in population health, healthcare policy, healthcare delivery systems, and interdisciplinary care in addition to standard curricular topics such as anatomy and physiology (Brauer & Ferguson, 2015). A common approach to introduce new topics into medical student educational programs employs an integrated curriculum, where new material is presented in tandem with or parallel to traditional medical school topics (Brauer & Ferguson, 2015). This approach has not consistently improved learning outcomes in medical schools (Brauer & Ferguson, 2015). Medical schools employ multiple instructional techniques including formal classroom lectures, laboratory exercises, and simulation sessions using mannequins or standardized patient actors (Brown et al., 2014).

Medical education still relies heavily on standardized multiple-choice written examinations for content knowledge assessment among students; medical students who have read about clinical conditions perform as well as students who have participated in authentic simulation exercises on these written examination formats (Brown et al., 2014). The importance of repeated practice in realistic situations becomes a secondary consideration when compared to the efficiency of standardized written examination assessment (Brown et al., 2014). Strategies to improve clinical learning skills among medical students include group learning approaches where students engage in interactive and practice-based learning in an inverted classroom design as opposed to individual learning experiences (Bösner et al., 2015). Authentic learning experiences have also been described for medical students working in clinical practice settings where learning experiences are deliberately structured and sequenced to fit the learning needs of individual students while maintaining patient safety during practice (Chen et al., 2015).

Throughout the history of medical education, it was presumed that content knowledge alone was sufficient preparation to teach medical students in clinical practice contexts with few physicians formally prepared to function as educators (Finn et al., 2011). Medical school faculty physicians were asked to take on new academic duties that would include evolving educational strategies based on medical education and general education literature but without formal training in education (Cooke et al., 2006). The lack of formal training in education is compounded by clinical faculty that have less time to teach and institutions that are not in a financial position to fully support teaching missions (Cooke et al., 2006). Observations included sub-optimal formation of connections between foundational scientific knowledge, or the basic science knowledge that underpins medical practice, and experiential clinical learning (Cooke et al., 2006). Inadequate focus on different patient populations and issues related to healthcare

delivery, patient safety, and quality care improvement are additional challenges (Cooke et al., 2006). With the commercial emphasis of healthcare, including the need to provide care to more patients in less time, medical students do not develop a holistic view of patient care (Irby et al., 2010). Students, therefore, do not have the opportunity to develop a sense of civic or advocacy responsibilities, which engender the fundamental values of what it means to become a physician, that society expects physicians to hold regarding patients and their care (Irby et al., 2010). Clinical faculty balance added responsibilities placed by economic and administrative forces with teaching that often results in less engagement in teaching (Abruzzo et al., 2019). The teacher-student bond that is based in mutual trust between the teacher, the learner, the patient care team, and the clinical practice environment is weakened, resulting in lower quality teaching and learning (Abruzzo et al., 2019). Flexner's ideal of faculty physicians as expert clinicians, researchers, and teachers is no longer tenable as faculty are spending time optimizing either research or clinical productivity with little time remaining for teaching (Irby et al., 2010).

### **Problem of Practice**

Medical school curriculum is no longer optimal for transmitting an ever-expanding body of scientific information to medical students (Cooke et al., 2006). After a decade of effort on improving undergraduate medical education curriculum, concern persists (Brauer & Ferguson, 2015). Medical education is described as inflexible, centered on productivity rather than learners, and emphasizing mastery of information while providing limited clinical experience (Irby et al., 2010). Clinical faculty are often not trained as teachers, relying on content knowledge expertise and modeling teaching based on prior experience as learners (Finn et al., 2011). With the commercial emphasis of healthcare, including the need to provide care to more patients in less time, medical students do not develop a holistic view of patient care (Irby et al., 2010). As a

result, students do not have the opportunity to develop the fundamental values of practicing physicians (Irby et al., 2010). Faculty balance responsibilities, placed by economic and administrative forces, with teaching that often results in less time and engagement in teaching (Abruzzo et al., 2019). The teacher–student bond that is based in mutual trust between the teacher and the student resulting in lower quality teaching and learning (Abruzzo et al., 2019). The model of faculty physicians as expert clinicians, researchers, and teachers is no longer sustainable as faculty are spending more time optimizing either research or clinical productivity with little time remaining for teaching (Irby et al., 2010). Following national trends, clinical faculty in a medical school in the northeast United States teach in a manner that does not reflect the current expectations and norms of medical education.

### **Theoretical Framework**

Systems thinking in medical practice provides a bridge between the reductionist knowledge of biomedical systems and the complexities of patient care (Woodruff, 2019). The health care industry is joining many professional endeavors employing complexity science to understand the nature of medical practice, changing the way health care organizations and clinical practice is conducted (Woodruff, 2019). Medical education has been slower to engage complexity science while continuing to rely on a reductionist approach (Woodruff, 2019).

### **Complex Adaptive Systems Theory**

The 1910 Flexner Report inspired the American Medical Association and Council on Medical Education to institute expectations for American medical schools that defined an ideal curriculum restricted to the scientific understanding of health and disease (Beck, 2004). An empirical, reductionist, and scientific approach defined the backbone of medical knowledge, practice, and education (Beck, 2004). This approach to medical knowledge and practice

influenced medical education, where medical students are introduced to medical knowledge and practice through an empiric basic science curriculum taught by scientific specialists (Beck, 2004). Basic and clinical science education reinforce a reductionist approach that breaks health care down to constituent components. Medical education has been focused on a mechanistic approach to defining problems and seeking solutions for so long that medical education has been described as a reductionist endeavor (Woodruff, 2019).

### ***Definition of Complex Adaptive Systems***

Complex adaptive systems are defined as “a way of thinking about and analyzing things by recognizing complexity, patterns, and interrelationships rather than focusing on cause and effect” (The Health Foundation, 2011, p. 6). Complex adaptive systems as a way of thinking has been around since the nineteenth century when applied in economics to describe how order in a market system is not necessarily planned but emerges from the interaction of incompletely understood components of a market system. Beginning in the 1980’s complex adaptive systems continue to be applied in economics, psychology, biology, cybernetics, and anthropology (The Health Foundation, 2011). More recently, complex adaptive systems have been applied and studied in the social sciences, education, and healthcare. Proponents of complex adaptive systems advocate abandoning linear approaches to problem solving that rely on explicit understanding of cause and effect (The Health Foundation, 2011). A detailed definition for complex adaptive systems includes:

- a dynamic network of components and agents acting in parallel, constantly reacting to and changing responses to what the other components and agents are doing, influencing the behavior of the network as a whole,

- control of the network is not centralized, but is dispersed over many agents and components where decisions are made independently, and
- order emerges rather than being planned or predetermined (The Health Foundation, 2011).

### ***Application of Complex Adaptive Systems in Medical Education***

Medical education tends to present problems as singular, stable, and solvable (Cristancho et al., 2017). This approach has limited medical student preparation as clinicians who must deal with a multi-faceted health care system that includes team-based care and patients with complex medical issues (Cristancho et al., 2017). In the context of complex adaptive systems theory, the conversation must shift from problem-solving to problem definition. Defining the problem is not limited to the individual patient but includes the situation where the problem is manifested (Cristancho et al., 2017). This broadened approach to problem-solving enables advocacy for novel educational approaches that encourages medical student learners to effectively manage patient problems in a team-based, complex health care setting (Cristancho et al., 2017). When applying complexity science to change approaches to medical education, planners in institutions start by shifting away from an emphasis on patient problems that are singular, stable, solvable and focused on a correct solution toward an approach that emphasizes diagnosis and treatment planning (Cristancho et al., 2017). The planning process includes emphasis on meaning-making and problem-solving for long-term patient care within a complex system (Cristancho et al., 2017).

Goldman and Mintz (2017) outline four concepts when designing interventions applying complexity science. “Emergence” describes how changes planned for programmatic structure or function are not given in detail, but instead in outline form where outcomes are encouraged to

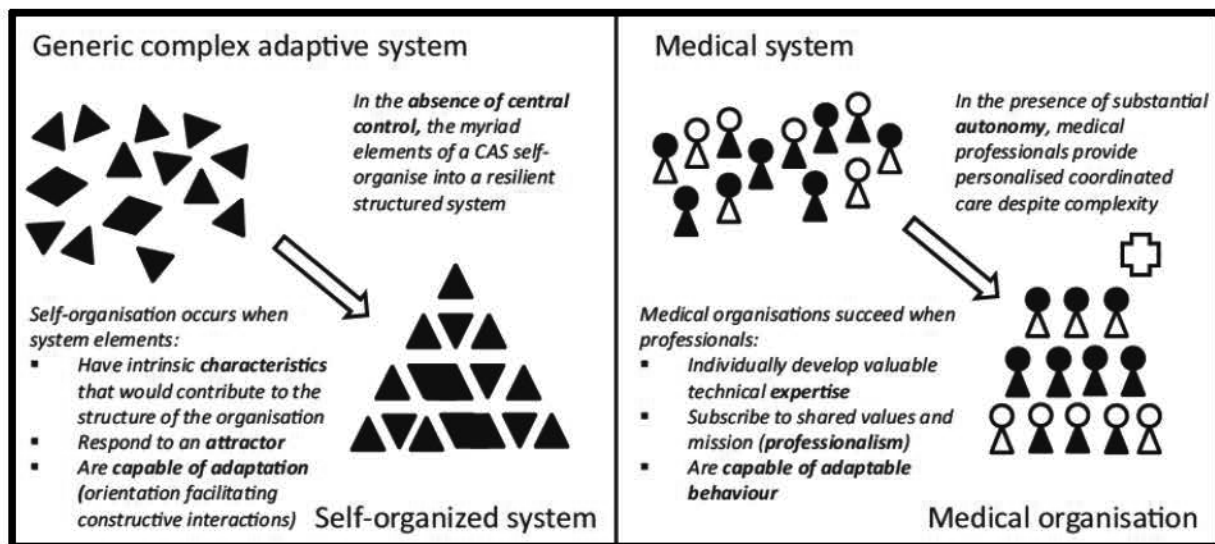
emerge from the interactions between individuals and systems. The emerging changes are tracked by experimentation, feedback, and discussion (Goldman & Mintz, 2017). Encouraging outcomes to emerge require the establishment of “simple rules”, or minimum specifications that encourage changes in system-wide patterns in alignment with outcome goals (Goldman & Mintz, 2017). “Fractals” are defined as the “values, beliefs, philosophies, and/or ideologies that are consistently applied to the change process” (Goldman & Mintz, 2017, p. 443). Fractals help to generate a coherent image of organizational activity intended to provide consistency over time. As change occurs within the programmatic structure or function of an institution, monitoring the feedback provided by individual stakeholders provide evidence of adaptation within the institution as change occurs (Goldman & Mintz, 2017).

In the absence of a focus of control, individuals within in a system will self-organize based on a complex adaptive system framework (Woodruff, 2019). The process of self-organization occurs when the elements within the system have intrinsic characteristics that contribute to the emerging structure of the organization, respond to an attractor, and are capable of adaptation (Woodruff, 2019). An attractor can be a set of beliefs or professional characteristics that provide a unifying mission for individuals in a system and guide group behavior. Complex systems produce adaptation rather than organization as a way that will facilitate complex problem-solving and promotes resilience (Woodruff, 2019). When applied to a medical system, a complex adaptive system maintains the autonomy of medical professionals (e.g., physicians, medical students) provide personalized, coordinated care based on prior education and training in a medical system that is highly complex. Woodruff (2019) describes an emergent complex adaptive system in a medical system has intrinsic characteristics (e.g., individual medical professional technical expertise), has an organizing principle such as shared values and mission

(i.e., professionalism), and can promote adaptive behavior (e.g., shift behavior and function to meet the needs of a patient with severe disease). The interactions between intrinsic characteristics, attractor, and adaptive behavior are explained for complex adaptive systems in general and for a medical system (see Figure 1.1).

**Figure 1.1**

*Components of a Complex Adaptive System*



*Note.* In the panel on the left, many elements operating at a distance from each other will interact and lead to the emergence of a resilient organization in a complex adaptive system. The panel on the left demonstrates how the components of a medical organization function within a complex adaptive system, resulting the emergence of structure and resilience in the organization. From “Accounting for Complexity in Medical Education: A Model of Adaptive Behavior in Medicine,” by J. N. Woodruff, 2019, *Medical Education*, 53, p. 865

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Within the complex adaptive system in medical organizations the role of the individual is defined within the framework of intrinsic characteristics, shared mission, and adaptation. An

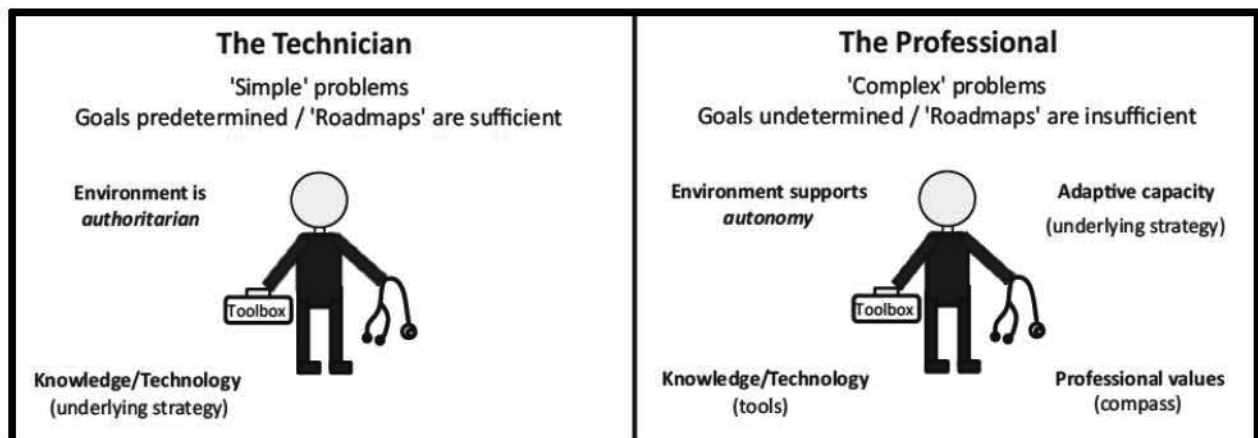
adaptive understanding of the role of the medical professional within a medical complex adaptive system will have important implications for medical practice and education (Woodruff, 2019). The roles of knowledge, technology, and environment differentiate the function of a technician who can address simple problems that are defined by predetermined goals and can be understood with a roadmap approach from a professional who is able to address complex problems not amenable to defined goals or a roadmap approach (Woodruff, 2019). A technician sees the environment as unchanging and therefore directs the activities that occur within the environment; the environment is in charge. Knowledge and technology define and fix the strategies technicians can apply within the environment that will define what can and cannot be done within the environment (Woodruff, 2019). The professional, in contrast to the technician, functions as a change agent within the environment, allowing the professional to function autonomously within the environment. Shared professional values provide an overall mission; knowledge and technology provide tools to enable change within the environment (Woodruff, 2019). The professional combines his or her sense of autonomy within an environment with a sense of mission, knowledge and technology tools contribute to the adaptive capacity of a functioning medical complex adaptive system (see Figure 1.2).

Beginning 50 years ago, complexity science emerged as a method to examine dynamic, interrelated, and interacting systems such as health care (Cristancho et al., 2018). For medical education, complexity theory has been employed to shift the focus from demonstrating competence in rigidly defined domains of knowledge to a focus on capacity to adapt to changing domains of knowledge over the course of a career. Changing the focus of medical education to emphasizing capability and adaptation to everchanging domains of knowledge has changed the definition of the professional identity of physicians and how they interact within medical practice

environments (Cristancho et al., 2018). The application of complexity science in medical education has driven a shift from emphasis on biomedical science knowledge to competency-based education that includes an emphasis on the humanities, interprofessional interaction, lifelong learning, social responsibility, simulation-based learning, and teamwork. With new expectations grounded in complexity theory, a change in teaching focus on a national, institutional, and individual clinical faculty member level is being addressed in medical education research (Cristancho et al., 2018). Learners in medical education institutions benefit in professional identity formation when a health systems science approach, grounded in complexity theory, is applied to medical education for institutions, clinical faculty, and individual learner education (Mills et al., 2017).

**Figure 1.2**

*The Technician Versus the Professional*



*Note.* A technician addresses problems that have defined goals and a clear technological roadmap that lead to expected solutions. If the roadmap is strictly followed, then a successful outcome to the problem is found. A professional addresses problems that do not have defined goals or a clear roadmap that leads to expected outcomes. Autonomy allows professionals to explore innovative uses of knowledge and technology guided by professional values as a strategy that encourage

adaptive strategies for addressing complex problems. From “Accounting for Complexity in Medical Education: A Model of Adaptive Behavior in Medicine,” by J. N. Woodruff, 2019, *Medical Education*, 53, p. 866 (<https://doi.org/10.1111/medu.13905>) Copyright 2019 by John Wiley & Sons and The Association for the Study of Medical Education. Reprinted with permission. Reprinted with permission from “Accounting for complexity in medical education: A model of adaptive behavior in medicine” by J. N. Woodruff. (2019). *Medical Education*, 53, p. 866.

### ***Complex Adaptive Systems in This Problem of Practice***

A decade of effort has focused on improving medical education performance (Brauer & Ferguson, 2015), yet medical school curriculum remains less than optimal for transmitting the ever-expanding body of knowledge required for medical students to become practicing physicians (Cooke et al., 2006). Clinical faculty are not often trained as teachers but rely on content knowledge as a basis for teaching expertise (Finn et al., 2011). Clinical faculty balance economic and administrative responsibilities with medical student teaching in a way that often reduces in less time and engagement in teaching (Abruzzo et al., 2019) resulting in a reduced bond between a teacher and his or her learner and a reduction in the quality of teaching (Abruzzo et al., 2019). Considering the complexity of this important issue in defining the interaction between clinical faculty members and medical student learners, the emphasis must shift from problem-solving to problem definition (Cristancho et al., 2017). An intervention designed to address these issues in clinical faculty teaching with medical students can be based in complexity science. If an intervention is designed to encourage emergence, follow simple rules based on fractals (i.e., shared values in medical student education), and encourages adaptation to a complex teaching clinical environment embraces an approach grounded in complexity science

(Goldman & Mintz, 2017). For a large group like the clinical faculty of a college of medicine, composed of members representing a wide variety of clinical practice specialties, adapting a teacher professional development program in a complex adaptive systems approach is more likely to be effective than an intervention that is proscriptive (Woodruff, 2019).

### **Factors Related to Clinical Undergraduate Medical Education**

The Carnegie Foundation called for reform of medical education that provides learner-centered curriculum that changes the focus of undergraduate and graduate medical education from the institution and the teacher to the learner (Cooke et al., 2010). The process of bringing learning and cognitive science into undergraduate medical education curriculum is complex; the process is dynamic and operates under varying conditions with mixed end-results designed to bring about transformational change (Mennin, 2010). Cognitive science provides an understanding of knowledge not as an objective construct, but as a process that emerges between teachers and learners (Mennin, 2010). The goal is to produce an undergraduate medical education curriculum that produces physicians who are more integrated in their understanding and mastery of scientific knowledge with social aspects of medical practice (Mennin, 2010). The interaction between the challenges clinical faculty face teaching medical students while carrying on patient care and the demands made on faculty by the role of teacher is an example of the complex nature of medical education. To determine if clinical faculty at this institution face the same challenges described in the medical education literature, an understanding of individual factors involved in clinical education is necessary. Factors explored include medical education institutions, medical students, and clinical faculty.

## **Medical Education Institutions**

The structure of undergraduate medical education in United States medical schools continues to be largely grounded in the 1910 Flexner Report model where the four-year program is divided with the first two years centered on foundational or basic science knowledge and the subsequent two years centered on clinical science knowledge (Cooke, et al., 2006). Gross anatomy and histology are often taught as part of the foundational science portion of the medical school curriculum in the first year. Even though these courses are taught early, it may not be evident to medical students that mastery of the knowledge presented early in their medical school careers will return as part of their functional knowledge when these students move toward their clinical years (Hortsch & Mangrulkar, 2015). A curriculum in gross anatomy and histology that integrates clinical application and a system to monitor student progress was developed (Hortsch & Mangrulkar, 2015). The curriculum provided counseling and remediation as necessary for these subjects within an integrated undergraduate medical education curriculum to improve knowledge and application of anatomy and histology in an integrated manner in clinical practice (Hortsch & Mangrulkar, 2015). This program includes members of a basic science academic review board of select faculty and students and course directors and does not include the faculty or students outside of those on the academic review board or identified as struggling in anatomy or histology (Hortsch & Mangrulkar, 2015). It is not clear how this program connects to the rest of the curriculum or the other faculty in basic sciences or clinical sciences of the institution.

The challenge of undergraduate medical education curriculum is to produce common core learning outcomes for medical students as they become physicians. A curriculum that is designed on the level of the physician faculty contributes to medical student disenfranchisement (Rees, 2004). A curricular control model that allows collaboration between faculty physicians

and medical students is more likely to facilitate learner empowerment if the value of precisely defined learning outcomes is assessed and reevaluated in an ongoing manner (Rees, 2004). One of the challenges identified in an authentic application of common core learning outcomes as described by Rees (2004) will involve convincing faculty to apply learning outcomes defined by the students and faculty together rather than seeking outcomes faculty expect. The School of Medicine, University of California San Francisco reviewed their integrated foundational and clinical sciences curriculum from the point of view of the key stakeholder participants including medical students, faculty members and curricular leaders through interviews and analysis of interview transcripts for emerging themes (Muller et al., 2008). This study confirmed that curricular integration is complex and was understood and experienced in different ways by medical students and faculty members. Integration was experienced in different ways, at different rates, and with different degrees of understanding by the stakeholder groups including the institution, faculty, and medical students; these insights can guide ongoing effort to improve integration efforts (Muller et al., 2008). Important insights from curriculum leaders, course directors and students recognized the value of an integrated approach to curricular design rather than isolated independent discipline-based courses (Muller et al., 2008). These stakeholders recognized the necessity of collaboration and cooperation to promote interdisciplinary teaching included the process required to integrate faculty and promote interdisciplinary collaboration to promote interdisciplinary teaching (Muller et al., 2008). Students were interested in promoting understanding about defined curricular links between content presented and how content is presented in frameworks and how content is sequenced within the curricular design (Muller et al., 2008).

The Johns Hopkins University School of Medicine focused on curricular integration on the level of medical student understanding of the interaction between health versus illness (Wiener et al., 2010). The intention of the program was to encourage medical students to explore the scientific information that informs medical practice in the context of how a patient's experience of health and illness manifests for the patient and within a wider integrated system that includes the patient's psychological, social, cultural, and environment (Wiener et al., 2010). This curricular reorganization and integration defined the patient's individual 'genotype' as the sum of the patient's biological functions on a molecular, genetic, cellular, and organ-system level and then 'phenotype' as external familial, social, and environmental settings as part of a single functioning system (Wiener et al., 2010). Participating medical students were encouraged not see a patient as either in a state of health or illness, but to view a patient as part of a dynamic system where the patient exists at a point along a continuum of health and illness (Wiener et al., 2010). Such a process would require considerable resources; a five-year planning process was described including development of the curriculum, a new education building, and student and faculty preparation to enact the curriculum (Wiener et al., 2010).

Augustin (2014) stated medical students are often overwhelmed by the extensive amount of medical knowledge that is required to demonstrate mastery in an undergraduate medical education program. Though effective learning strategies have been described, these strategies have not been extensively incorporated into medical school curricular development as students are largely unaware of current strategies for successful learning and memory improvement (Augustin, 2014). Effective learning by medical students incorporates the testing effect, active recall, and spaced retention strategies; recall of factual knowledge is best undertaken with repeated testing rather than frequent episodes of studying as a single strategy for learning

(Augustin, 2014). Active recall involves pairing information with an action to improve the process of recalling information for later use; spaced recall involves studying and then later returning to the same information for review (Augustin, 2014). This study suggested medical education institutions consider incorporating active learning methods into the curriculum given the vast amount of information imparted (Augustin, 2014). This study focused on medical students and individual learning and did not offer insight or suggestions in how to promote these learning strategies for institutions designing curriculum or preparing faculty to teach students.

Applying cognitive principles in undergraduate medical education has produced insight into teaching and learning strategies most effective in improving long-term retention of information. Recurrent testing with feedback results in significantly greater long-term retention of information presented in a clinical didactic conference than repeated and spaced study (Larsen et al., 2009). Recurrent testing should be considered for impact on learning and not only as a method of assessment (Larsen et al., 2009). Recurrent testing can also be helpful in foundational or pre-clinical learning for students at risk to fail the summative final examination in a gross anatomy program (Azzi et al., 2015). This program identified and provided support for students that were underperforming in the anatomy program (Azzi et al., 2015). Combining written testing with clinical testing using standardized patient clinical scenarios provided a robust method to present, reinforce, and then later assess long-term retention of clinical learning when compared to written testing alone or studying review material without either written testing (Larsen et al., 2012). Another strategy that resulted in improved long-term learning combined recurrent testing with student reflection after a simulated or actual patient clinical experience where the students are asked to formulate based on factual and experiential knowledge obtained in the encounter an explanation for how the material learned fits together in the context it is

presented, a process referred to as self-explanation (Larsen et al., 2013). Recurrent testing in combination with self-explanation reflection is an effective method for fostering long-term retention. When done independently, recurrent testing was superior to self-explanation reflection alone, though recurrent testing alone was inferior to the combination of both strategies (Larsen et al., 2013). Two of these studies (Larsen et al., 2009; Larsen et al., 2013) did not offer insight into how institutions should implement recommendations or how faculty might be prepared to teach using recurrent testing. Larsen et al. (2012) did offer recommendations for preparing standardized patients for the simulated exercises while Azzi et al. (2015) did state faculty utilized team-based learning in small groups for their medical students in anatomy laboratories but did not describe the process utilized. The decade after the publication of the second Carnegie Foundation Report on medical student education (Irby et al., 2010) has included efforts to improve medical student curricular and pedagogical strategies, yet concern persists these changes to date have not been entirely effective on the institutional level (Brauer & Ferguson, 2015).

### **Medical Students**

Medical students demonstrate clinical skills in situations that simulate clinical practice compared to rote learning as they prepare to function as clinicians during their medical school education (Brown et al., 2014). For a clinician seeing a patient, explicit memory is the conscious consideration of a clinician's knowledge base in formulating how the patient's situation lines up with the factual knowledge base; implicit memory involves an automatic subconscious polling of past experiences to help interpret what the patient presents (Brown et al., 2014). The clinician then makes a judgement call regarding what diagnosis is likely and/or important, and what next steps are appropriate; this process of building a factual knowledge base and providing the variety of experiences necessary to develop this skill set is the goal of a clinical medical education

curriculum (Brown et al., 2014). Simply reading about a patient's concerns is not sufficient (Brown et al., 2014). Standardized written or computer-based testing of factual knowledge does not have the ability to measure learning that has occurred from clinical experience; testing application of the combination of factual and experiential learning requires testing that involves patient care situations involving either actual patients in a clinical setting or simulated patients in an authentic clinical situation (Brown et al., 2014).

Medical students constitute an important factor in considering the issues of this problem of practice. Considering medical students simply as recipients of the knowledge the institution and the faculty wish to impart is simplistic and does not recognize or value the role students have as active participants in their own learning. Another aspect of medical students as a factor in this problem of practice lies with the recognition that even though most medical students have been highly successful learners within the educational system up to the point of medical school, it does not necessarily follow that continuing the same learning strategies that were successful in high school or college will be effective in professional education.

### **Clinical Faculty**

The clinical practice of medicine involves complex organizations of different types of medical professionals that are trained and certified to perform multiple tasks; some general in nature while other tasks are highly specific. Faculty can consist of full time, part-time and voluntary types. The first and second years of medical school are generally foundational, with a major emphasis on basic science topics with an introduction to some clinical applications. The third year of medical school offers clinical sciences courses such as emergency medicine, obstetrics and gynecology, psychiatry, and surgery. Full-time and part-time faculty includes individuals who teach in the foundational and clinical sciences and voluntary faculty teach

exclusively in the clinical sciences portion of the program. Voluntary clinical faculty members are often appointed through one or more clinical departments based on type of training and area specialty, but do not receive compensation from the university or affiliated departments for service. Most faculty members participate in the clinical portion of the program and typically consist of clinically practicing physicians, clinical specialists, advanced practice nurses, and certified technologists in clinical practice.

Historically, it was assumed that competent preparation as a basic scientist or a clinical practitioner with a base of content knowledge was sufficient preparation as an effective medical education teacher (Steinert et al., 2006). A needs assessment survey using a validated instrument was undertaken to compare the priorities identified by medical school faculty verses the priorities senior institutional administrators set for faculty (Pololi et al., 2005). Administrators identified time management, institutional needs, teamwork, and improved performance in clinical practice, research, and teaching as priorities while faculty identified maintenance of content expertise and life/career balance (Pololi et al., 2005). A survey of medical student and clinical faculty was undertaken to determine what members of each group considered important attributes of an effective clinical teacher (Jahan et al., 2008). Results indicated that clinical faculty and students agreed the attributes of an effective teacher included content knowledge, interest in teaching, clinical competency, and being interactive with students (Jahan et al., 2008). Other than gaining at least five years of experience, Jahan et al. (2008) did not suggest how clinical faculty should obtain the attributes identified. A common method that medical education faculty gain teaching expertise is through informal learning opportunities in authentic environments (Steinert et al., 2016) suggesting the ongoing importance of learning by doing as a common informal faculty development strategy.

A literature review was undertaken to provide information regarding how medical schools are structuring appointment, tenure, and compensation for faculty (Jones & Gold, 2001). An increase in differentiation of faculty into two groups, researchers and clinicians, an increase in contract-term versus tenured appointments, and an increase in productivity-based compensation agreements were described (Jones & Gold, 2001). This review emphasized the importance of financial sources such as research grant support or clinical practice income while teaching is considered a secondary activity that is much less emphasized in comparison to research or clinical practice activities (Jones & Gold, 2001). Due to concern clinical practice income potentially compromised medical student learning, the University of Illinois College of Medicine developed estimates of primary care physicians' clinical practice productivity while also engaged in medical student education at three ambulatory patient care centers at an undergraduate medical education institution (Garg et al., 1991). The measured outcomes were then compared to the clinical practice productivity of primary care physicians who were not engaged in medical student education to determine if a difference in clinical practice productivity could be attributed to teaching medical students (Garg et al., 1991). The University of Washington School of Medicine determined the extent changes in the American healthcare system effected the willingness of community primary care physicians to volunteer as faculty for medical student education (Vath et al., 2001). Demands for clinical productivity has reduced primary care physicians in serving as voluntary faculty for the medical school program (Vath et al., 2001). Both studies illustrate the concern that primary care physicians are a limited resource available to function as voluntary clinical faculty for medical students and that ability to maintain a viable voluntary clinical education faculty may become increasingly challenging into the future.

Several studies were undertaken to assess the impact of important challenges on undergraduate medical education faced by primary care physician voluntary faculty members teaching medical students in ambulatory healthcare settings. Garg et al. (1991) approached the issue in a quantitative manner with an economic perspective that utilized direct measures of physician productivity as full-time equivalent units and difference measured in productivity dollars over the course of a unit of time. Vath et al. (2001) built on the work done by Garg et al. (1991) utilizing a survey instrument that characterized respondent perceptions with the intention of gathering insight beyond consideration of productivity measures alone. Practicing physicians are aware of the impact of teaching medical students on productivity and time utilization while seeing patients and are less likely to teach (Vath et al., 2001). Another study at the University of Missouri-Columbia involved a survey of clinical faculty working with third- and fourth-year medical students in their family medicine rotations (Vinson & Paden, 1994). Clinical faculty reported an increased average work time of 46 minutes per day (Vinson & Paden, 1994), which again highlights the increased burden imposed by medical student teaching on voluntary clinical faculty time, resulting in increased difficulty recruiting clinically practicing physicians to participate in undergraduate medical education (Irby, 2001).

A literature synthesis described how teaching medical students effects general practitioners taking care of patients in rural health care settings (Walters et al., 2005). Recurrent themes among the reviewed articles included personal, patient care, professional relationships and development, and practice business infrastructure (Walters et al., 2005). General practitioners report that acting as preceptors for medical students is personally fulfilling, increases professional relationships, and increases opportunities for professional development due to working closely with a medical university (Walters et al., 2005). However, practitioners

find patient care and practice business infrastructure challenges increased by working with students such as decreased time per patient in an office visit, and difficulty finding physical space for students in offices (Walters et al., 2005). A survey questionnaire was distributed to over 2,000 community-based primary care preceptors in North Carolina to assess satisfaction and likelihood to continue as a preceptor (Latessa et al., 2007). The results indicated a high level of satisfaction based on intrinsic reasons (e.g., enjoyment of teaching), issues related to limited time for teaching and impact on practice income were identified as issues (Latessa et al., 2007). A more recent 53-item survey questionnaire was distributed to 260 directors of medical student education in psychiatry (Thomas et al., 2018). This study reported diminished faculty resources, insufficient compensation for time spent providing education, and lack of teacher professional development as important issues related to medical student teaching (Thomas et al., 2018). These studies provide insight regarding the challenges that face clinical faculty engaged in patient care and teaching medical students; it is not simply a perception that practicing clinical faculty have less time for teaching. These are measured outcomes that demonstrate loss of clinical practice income, increased time expenditure while practicing and teaching, and less interest in teaching medical students that collectively contribute to a reduction in clinical faculty interest in medical student education.

### **Pedagogical Knowledge**

To understand faculty self-efficacy beliefs as part of a social cognitive framework, content knowledge regarding areas of specialty practice and knowledge regarding teaching, or pedagogical knowledge, may contribute to faculty self-efficacy (Shulman, 1970). Social cognitive theory has contributed to advancing the understanding of human cognitive function and how programs can be designed to enhance educational processes (Shulman, 1970). Behavioral

and cognitive science has impacted the education of children, but had not impacted university-based education, including professional educational programs such as medicine (Shulman, 1970). Teacher self-efficacy beliefs are influenced by teacher development that recognizes both domain expertise, the individual's command of the content being taught, and pedagogical knowledge as the individual's understanding of how to transmit content efficiently to learners (Shulman, 2000). Medicine as a profession defines a specific signature pedagogy that defines the characteristic methods of teaching and learning that guide future practitioners preparing to enter the medical profession (Shulman, 2005). How this process is functioning among clinical faculty at an institution can help describe how the challenges to teaching are functioning in a setting and how individual faculty self-efficacy beliefs may be influenced in their preparation for and application in teaching activities.

### **Summary**

The Carnegie Foundation for the Advancement of Teaching undertook a literature review and assessment of undergraduate medical education and concluded that medical education was inflexible, was not managed efficiently for time utilization, emphasized mastery of information over clinical practice experience, and emphasized practice productivity rather than teaching (Irby et al., 2010). Recommended goals for undergraduate medical education include standardization of learning outcomes, individualization of learning processes, integration of basic and clinical sciences, fostering habits of inquiry and improvement, and focus on development of professional identity (Cooke et al., 2010). Medical school faculty took on new academic duties with new educational strategies without formal training in education, compounded by decreasing time for teaching with increasing responsibilities to maintain practice or research income and manage administrative responsibilities (Cooke et al., 2010). As institutions are making curricular changes

in response to the Carnegie Foundation recommendations to improve educational processes for medical students (Irby et al., 2010) faculty are more challenged to have time and preparation for teaching (Cooke et al., 2010). The factors involved in understanding the challenges faced by clinical faculty teaching under these circumstances include the medical education institution, medical students, and clinical faculty. While institutions endeavor to create curricula that embrace learner-centered core learning outcomes, faculty need teacher professional development to understand how a learning-centered program differs in philosophy and application compared to a faculty-based or institution-based program (Rees, 2004). Medical students are often overwhelmed by the task of understanding and applying the large volume of medical science information; most students find that changing learning strategies are essential to remain successful as medical students (Augustin, 2014). Clinical faculty are challenged by the historical notion that preparation as a content expert also provides preparation for teaching (Steinert et al., 2006). Faculty are further challenged by the need to maintain practice income (Jones & Gold, 2001), while having less time for teaching (Thomas et al., 2018). To understand how the clinical faculty at this institution relate to the factors suggested by the above literature review, a needs assessment survey for this problem of practice was carried out to investigate how faculty perceive teaching, the perceived importance teaching has within this institution, how teaching is recognized in the institution, and what topics and formats might be of interest in a faculty professional and teacher development program.

## Chapter 2

### Assessing the Needs of Clinical Faculty

Clinical faculty provide an important interface between an institution's curriculum and medical student learning. Clinical faculty, however, have little preparation for teaching beyond content expertise and clinical experience (Jahan et al., 2008; Steinert et al., 2006). Institutions tend to value clinical or research productivity over teaching when considering appointment, tenure, or compensation (Irby et al., 2010; Jones & Gold, 2001). Teaching medical students reduces practice income (Garg et al., 1991; Walters et al., 2005) and limits time for teaching (Latessa et al., 2007; Vath et al., 2001), which combine to reduce clinical faculty interest in medical student teaching (Irby, 2001; Thomas et al., 2018). A needs assessment survey, therefore, was undertaken with clinical faculty to determine if the factors found in the literature review apply at this medical institution.

### Context of the Study

The context of this study was a college of medicine affiliated with a large state university in the northeastern United States. This medical school enrolls nearly 700 students. The minimal requirement for admission is a bachelor's degree including required courses in science and statistics. Many students have also completed advanced certifications, master's degrees, or doctoral degrees in other disciplines. This medical school has a four-year program that includes two years of pre-clinical, or foundational, medical science followed by two years of clinical medical science. The foundational sciences include four semesters of courses structured around human organ system topics (e.g., cardiovascular system, lymphoreticular system) that includes didactic sessions, laboratory exercises, small group learning, and basic clinical skills education. The third and fourth years provide students opportunities to have contact with patients and

faculty members in clinical practice situations. During the third year, students rotate through block units based on medical specialty departments (e.g., internal medicine, pediatrics). During the fourth year, students continue to work and learn in clinical practice settings, focused on students' individual areas of interest.

This medical school has over 2,000 faculty members, most of whom are clinical. Of these faculty members, approximately 500 are full-time, 200 are part-time, and 1,500 are voluntary. Full-time faculty members are employed by the medical university to either engage in research or clinical practice, with some additional responsibilities for teaching medical students. Part-time faculty members are health care professionals that are employees of the university for a specific purpose, usually related to clinical practice. For part-time faculty, teaching medical students is usually voluntary. Voluntary faculty members are health care professionals that are appointed to teach medical students for no monetary compensation. Residents and fellows have graduated medical school as physicians and are in the advanced training defined by their medical specialty (e.g., medical resident physicians) or subspecialty (e.g., cardiology fellowship physicians). As part of the responsibilities as residents or fellows, these physicians are appointed to the faculty as clinical instructors with medical student teaching responsibilities.

The focus of this study is clinical faculty teaching and mentoring students working toward the Doctor of Medicine degree. Clinical faculty predominantly teach third- and fourth-year students. Clinical faculty include certified and licensed medical professionals that are appointed members of the clinical faculty of the medical school. Each of these faculty are also members of a clinical department within the medical university. Each clinical department is associated with a clerkship or course within the clinical science curriculum of the medical school.

## **Statement of Purpose**

As medical education institutions are responding to calls for a more authentic, clinically based curriculum (Muller et al., 2008; Rees, 2004; Wiener et al., 2010) and the complex learning needs of medical students are recognized (Augustin, 2014; Brown et al., 2014), faculty are expected to teach the curriculum in clinical practice settings with little preparation in how to teach (Cooke et al., 2010). The purpose of this needs assessment was to determine if the factors identified in the literature review are present for the clinical faculty of this institution. More specifically, clinical faculty were surveyed to determine their beliefs about teaching medical students, how the institution values teaching, how they were prepared to teach, and potential faculty professional development programs. Research questions that guided the needs assessment were:

5. What are clinical faculty beliefs regarding medical student teaching?
6. What are clinical faculty beliefs regarding the institutional value of medical student teaching?
7. What are clinical faculty beliefs regarding their preparation for medical student teaching?
8. What topics and formats do clinical faculty prefer for future faculty development?

## **Method**

The needs assessment focused on clinical medical faculty. Survey research is considered an efficient method for gathering descriptive data regarding circumstances identified in healthcare educational programs through literature review and synthesis (Evsenbach & Wyatt, 2002). Questionnaires have been used at other medical institutions as instruments to assess clinical faculty experience in medical student teaching. The work of Copeland and Hewson

(2000); Farley et al. (2008); and Sierles and Magrane (2008) guided the structure and content of the questionnaire items.

## **Respondents**

All respondents ( $N = 66$ ) were faculty and actively practicing clinical medicine. Among these respondents, 38% were voluntary faculty, 24% were part-time faculty, 29% were full-time faculty, while 9% were residents or fellows. Approximately 87% of participants held a clinical doctoral degree (e.g., MD or DO) while others hold other doctoral degrees (e.g., PhD), master's degrees, advanced practice degrees, or specialty practice certification. Approximately 88% of participants were certified in one or more area of clinical practice. Multiple responses were permitted among the 66 respondents regarding teaching responsibilities: 28% taught medical students in the foundational or pre-clinical first and second years of the medical student curriculum, while 91% taught medical students in the clinically focused third year and 64% in the fourth year. Respondents had 5 to 30 years of experience in clinical practice and medical student teaching (see Appendix C for details).

## **Measures and Instrumentation**

Three questionnaires from the medical education literature were used to create the questionnaire used in this study: (1) a validated instrument by the Cleveland Clinic Foundation to assess faculty teaching medical students in clinical settings (Copeland & Hewson, 2000), (2) a national survey of emergency medicine faculty to determine career and faculty development needs and the resources available to meet these needs (Farley et al., 2008), and (3) a survey of clerkship directors teaching skills self-assessment (Sierles & Magrane, 1996).

The questionnaire was prepared online using Survey Monkey and included descriptive information, involvement in patient care, education and certification for clinical practice,

academic rank, the variety of learners taught, years of experience in clinical practice, and years of experience teaching. I assessed clinical faculty member perceptions of investment in medical student teaching, adequate time for medical student teaching, practice income challenges, recognition for teaching effort, as well as other responsibilities and preparation for their role as teachers. Finally, I assessed respondents' interest in enhancing teaching background and faculty development.

The 29-item questionnaire had four types of responses: one yes-or-no item; eight multiple choice items; 11 Likert-type items, two of which had an option for open-ended comments; and two open-ended items (see Appendix B). The first seven items were administrative or descriptive and confirmed faculty classification, medical practice certification, medical student academic years taught, experience as a practicing clinician and as a medical student educator. Eleven items used a five-point Likert scale, ranging from "strongly agree" to "strongly disagree," and sought to assess issues identified in the literature synthesis: time for clinical practice and medical student teaching; time for administrative responsibilities and medical student teaching; level of interest in medical student teaching; value of medical student teaching compared to other activities such as practice productivity, research productivity, teaching more advanced learners; and value given teaching medical students within the academic departments. Two multiple-choice questions sought to determine the form and content for a potential faculty development intervention and two open-ended questions provided respondents an opportunity to share any other potential issues that were not already addressed in the questionnaire.

## **Procedure**

This section describes the procedure, including respondent selection, data collection, and data analysis.

**Respondent selection.** The target population was the 414 clinical faculty in the following clerkships: emergency medicine, family medicine, internal medicine, neurosciences, obstetrics and gynecology, pediatrics, psychiatry, surgery, and surgical subspecialties. In addition to the clerkships, targeted courses included clinical bioethics, population health for physicians, and rural medicine experience. The administrative coordinators for each targeted clinical science clerkship or course forwarded an email explaining the study and a link to the online survey. I sent an email message that briefly described the study and survey instrument, provided a copy of the informed consent document, and a link to the survey instrument to 16 administrators, each of whom provides administrative support to one of the clerkships or courses third year medical students are required to complete.

**Data collection.** Respondents acknowledged the informed consent document (Appendix A) and then completed the questionnaire (Appendix B). Data were collected in the Survey Monkey online platform. The survey link was open for 6 weeks. Sixty-six clinical faculty members responded to the survey, with a 16% response rate. Data from the survey were stored anonymously and electronically in a secure file on a home computer.

**Data analysis.** Questionnaire responses were downloaded into a spreadsheet. For each Likert-type question, a median and mode was determined (Jamieson, 2004). Open-ended written responses were evaluated using directed content analysis (Hsieh & Shannon, 2005). Written comments regarding respondent beliefs related to their medical student teaching activities, for example, were triangulated with quantitative findings to provide additional understanding. With this approach, codes were derived from the items to connect responses to identified themes within the medical education literature (Hsieh & Shannon, 2005), such as time for teaching, department support, challenges to teaching time, and faculty development preferences.

## **Findings**

The findings indicated that, although faculty were interested in teaching medical students and believed teaching was a valued activity within their departments, faculty were interested in having more time for teaching. Faculty identified demands to produce practice income and meet administrative responsibilities as limiting time for medical student teaching and that the fundamentals of education science and theory had not been a part of faculty preparation for teaching. Faculty expressed interest in a variety of topics to be covered in a potential teacher professional intervention program and what formats would be preferred to present the program. Unless otherwise noted, 66 faculty responded to this needs assessment survey.

### **Beliefs About Teaching Medical Students**

This section includes measures that address the first research question regarding clinical faculty member beliefs related to medical student teaching. Questionnaire items allow respondents to express their opinion regarding their teaching process as individuals engaged in teaching. Nine questionnaire items are included. All the items in this section were presented using a five-point Likert scale.

The first research question sought to determine clinical faculty beliefs regarding medical student teaching. Members of this faculty indicated that medical student teaching was a highly valued activity within the spectrum of all the responsibilities these faculty bear. The majority of clinical faculty “agree” or “strongly agree” (90.1%) teaching medical students is personally fulfilling and that teaching medical students enhances the reputation of their clinical departments (98.5%). Additionally, although it was challenging for faculty to balance their careers to include teaching, they believed that teaching should be considered as important as their other professional activities. Respondents “agree” or “strongly agree” (81.2%) teaching medical

students is equal in value when compared to research or publication. Respondents “disagree” or “strongly disagree” (54%) that it was easy to balance teaching, research, and generating practice income. Faculty “agree” or “strongly agree” (84.4%) that the recognition they receive for teaching should be equal to the recognition given for clinical productivity, research, and publication. Please see Table 2.1 for additional details.

**Table 2.1**

*Beliefs Regarding Medical Student Teaching*

Questionnaire item	<i>n</i>	%	Median	Mode
Teaching medical students is personally fulfilling			5	5
Strongly agree/Agree	60	90.6		
Neutral	5	7.6		
Disagree/Strongly disagree	1	1.5		
Quality medical student teaching enhances reputation of department (N = 65)			5	5
Strongly agree/Agree	64	98.5		
Neutral	1	1.5		
Disagree/Strongly disagree	0	0		
Teaching medical students is a valuable scholarly activity comparable to research/publication			5	5
Strongly agree/Agree	54	81.2		
Neutral	6	9.1		
Disagree/Strongly disagree	6	9.1		
It is easy to excel in teaching, research, and clinical practice at the same time (N = 65)			2	2
Strongly agree/Agree	13	20.6		
Neutral	16	25.4		
Disagree/Strongly disagree	36	54.0		
Recognition for excellence in teaching should be equal to recognition given for clinical productivity, research, and publication			5	5
Strongly agree/Agree	56	84.4		
Neutral	7	10.6		
Disagree/Strongly disagree	3	4.6		

*Note.* 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

Written comments from questionnaire items that provided opportunity for open-ended responses that addressed faculty beliefs regarding teaching were triangulated with quantitative results. Respondents commented on how departmental demands to maintain clinical practice

productivity (e.g., seeing as many patients as possible to optimize practice income) and how departments may value productivity over teaching. For these faculty members, maintaining productivity has a direct effect on time available for teaching; representative comments include “one problem is heavy schedules and the resulting time pressures” (Respondent 20) and “productivity is rewarded, and teaching slows productivity” (Respondent 33). One faculty member described the conflict he or she experienced balancing the desire to teach with clinical practice demands:

Most of us on the part-time and voluntary faculty have full-time practice needs. Taking time to teach a medical student correctly takes time. For the most part we enjoy this activity but the more time-consuming it is the harder it becomes. (Respondent 45)

Faculty seemed to be aware of the tension between responsibilities for practice productivity and medical student teaching where practice productivity limited medical student teaching time.

### **Institutional Value of Teaching Medical Students**

The second research question sought to determine clinical faculty beliefs regarding how their institution valued their medical student teaching. Faculty “agree” or “strongly agree” (81.8%) their departments consider medical student teaching an important activity. Faculty “agree” or “strongly agree” (49.2%) that they would like to have more time for teaching while about half were “neutral” (30.2%) or “disagree” to “strongly disagree” (20.6%), suggesting that this item regarding more time for teaching was insufficient to understand how faculty time was structured to support their priorities. Most “agree” or “strongly agree” that requirements to maintain or increase practice income (51.6%) and attend to administrative responsibilities (76.6%) reduces teaching time with medical students. Please see Table 2.2 for additional details.

**Table 2.2***Beliefs Regarding the Institutional Value of Medical Student Teaching*

Questionnaire item	n	%	Median	Mode
Teaching medical students is an important activity in department			4	4
Strongly agree/Agree	54	81.8		
Neutral	10	10		
Disagree/Strongly disagree	2	3		
Would like more time to teach medical students (N = 65)			4	4
Strongly agree/Agree	33	49.2		
Neutral	19	30.2		
Disagree/Strongly disagree	13	20.6		
Practice income demand reduces time for medical student teaching			4	4
Strongly disagree/Agree	34	51.6		
Neutral	18	28.1		
Disagree/Strongly disagree	14	20.3		
Time requirements for administrative and regulatory matters reduces time for teaching			4	4
Strongly agree/Agree	51	76.6		
Neutral	6	9.1		
Disagree/Strongly disagree	9	13.6		

*Note.* 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

Faculty believed their departments considered teaching an important activity yet found their teaching activity to be hampered by other departmentally defined responsibilities such as maintaining practice productivity, administrative, and regulatory responsibilities. Written comments from questionnaire items that addressed faculty beliefs regarding institutional value placed on teaching were triangulated with quantitative results. One faculty member placed the responsibility for the tension between time to teach and other responsibilities on the institution by noting that “this medical institution likes to say it equally values excellence in teaching, clinical care, and publication, but the reality is that clinical care has always come first, research/publication if grant funded has always come second, and teaching comes last”

(Respondent 21). Another faculty member was less sure where the source of the tension between teaching and other responsibilities originated but agreed on the consequences: “Whether it is departmental, chair-driven, or frankly the physician’s personal choice, productivity benchmarks rule as far as priority [and] it is pretty clear that med student hands-on training and teaching is third place” (Respondent 33). When asked about suggestions to improve the medical teaching experience, one respondent wrote that “some type of recognition would be welcome, since I have no mandate to teach students. It really slows me down when I have students” (Respondent 20). Although faculty believed their departments valued teaching as an important activity, they indicated that practice productivity, funded research, and publication were more likely valued by their departments.

### **Preparation for Teaching Medical Students**

The third research question sought to determine clinical faculty beliefs regarding their preparation for medical student teaching. Faculty “disagree” (46.9%) or were “neutral” (23.4%) that the fundamentals of education science and theory were part of their preparation for educating medical students. Respondents “agree” or “strongly agree” (45.3%) they would benefit from an increased background in the fundamentals of education science and theory, while 28.1% were “neutral” on this item. Please see Table 2.3 for a summary of these results.

Written comments from questionnaire items that addressed faculty beliefs regarding preparation for teaching were triangulated with the quantitative results. Less than 50% of faculty “disagree” or “strongly disagree” they were prepared with educational science and theory for medical student teaching. Less than 50% “agree” or “strongly agree” that increased background in education science and theory would benefit their teaching. These findings indicate faculty recognize a lack of preparation for medical student teaching, while also suggesting such

preparation in the view of the faculty may be of limited value. As such, faculty may not understand pedagogical practices that can support medical student teaching nor recognize the need for such understanding. One respondent expressed doubt that preparation for medical student education was a valuable activity in stating:

Disagree only because much of it is NOT evidence-based. There is [*sic*] virtually no studies with meaningful outcomes in medical education and no one has ever shown [that understanding how to teach medical students] produces better doctors. At this point, it is entirely a religion. (Respondent 29)

Another respondent suggested a solution where faculty are hired with defined roles: “recruit academic clinicians who will be key teachers per each department [to] allow others to be/stay productivity-minded” (Respondent 33). While about half of the faculty believed they were prepared to teach medical students, half of the respondents were either neutral or did not agree that more preparation would benefit their instructional practices.

**Table 2.3**

*Beliefs Regarding Their Preparation for Medical Student Teaching*

Questionnaire item	<i>n</i>	%	Median	Mode
Fundamentals of education science and theory was part of preparation for teaching medical students			2	2
Strongly agree/Agree	19	29.7		
Neutral	15	23.4		
Disagree/Strongly disagree	32	46.9		
More background in educational science and theory would benefit medical student teaching			4	3
Strongly agree/Agree	31	45.3		
Neutral	18	28.1		
Disagree/Strongly disagree	17	26.6		

*Note.* 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree

## Future Faculty Development

The fourth research question sought to determine what topics and formats clinical faculty prefer for future faculty development. Given 15 choices, faculty favored topics such as preceptorship (i.e., teaching medical students while with a patient) (54.4%), providing more effective evaluation and feedback (50.9%), mentoring medical students (42.1%), small group teaching (35.1%), case-based learning (33.3%), and teaching medical students in specific settings such as the operating room (33.3%; see Appendix B). Regarding the format of the PD Respondents preferred an online platform with independent learning sessions to work at their own pace (48.3%), with some interest in half-day seminar series (27.6%), one-hour sessions (22.4%), and day-long retreats (20.7%). Please see Table 2.4 for a summary of these results.

**Table 2.4**

### *Topics and Formats Preferred for Future Faculty Development*

Component of faculty development	<i>n</i>	%
Interest in topics for faculty development <sup>a</sup> ( <i>N</i> = 57 with 238 responses)		
Teaching medical students while with a patient	31	54.4
Providing more effective evaluation and feedback for medical students	29	50.9
How to be a mentor for medical students	24	42.1
Small group teaching sessions	20	35.1
Case-based learning approach	19	33.3
Teaching medical students in specific settings	19	33.3
Preferred faculty development education format <sup>a</sup> ( <i>N</i> = 58 with 75 responses)		
Online with independent learning sessions	28	48.3
Half-day seminar series	16	27.6
One-hour sessions	13	22.4
Day-long retreat	12	20.7
Online synchronous sessions	6	10.3

*Note.* <sup>a</sup> respondents selected from multiple responses

Written comments from questionnaire items that addressed preferred topics and preferred formats for future faculty development were triangulated with quantitative results. Six of the 15 topic choices were supported by at least 33% of the respondents and almost half of the faculty

avored an online independent learning session format. Efficiency in how future faculty development would be presented was an important consideration. For example, respondents noted that there is “no time to attend the faculty development opportunities that already exist!” (Respondent 51) and “The trouble is finding the time. Saturday is all that is left” (Respondent 44). One faculty member connected his or her need for training with a specific format: “This lack of support and training is the main reason for me cutting down my teaching activities. The easiest platform for me is online sessions” (Respondent 22).

### **Discussion**

The findings of the needs assessment of faculty at this medical education institution were largely consistent with issues and challenges found in the medical education literature that defined and supported the problem of practice. For example, the faculty reported teaching was hampered by the need to maintain clinical practice productivity, as in Garg et al. (1991) and that limited time was available for teaching medical students, as in Vath et al. (2001). Later researchers have reported the need to maintain clinical practice productivity (Walters et al., 2007) and reduced time to spend with medical students (Latessa et al., 2007). Responsibilities to maintain practice productivity and spend more time seeing increased numbers of patients have persisted as challenges to medical student teaching (Thomas et al., 2018).

Contrary to the findings of Irby (2001), in which clinical faculty reported decreased interest in medical student teaching given the demands of maintaining practice income, respondents at this institution maintain interest in teaching. The faculty felt supported by the institution within their individual clinical departments but suggested that more support on an institutional level would increase a sense of institutional recognition of value of teaching, which is consistent with the literature describing medical education institution challenges in providing a

more learner-centered curriculum such as Hortsch and Mangrulkar (2015) or Mennin (2010). Respondents agreed with literature that clinical faculty are not specifically prepared for teaching beyond context expertise (Jahan et al., 2008; Steinert et al., 2006). Faculty at this institution favor a professional development program that could be done independently, in an online format that covers topics such as teaching medical students with a patient, case-based learning, mentoring, and teaching in specific clinical settings. These topics of interest are consistent with educational approaches proposed by Wiener et al. (2010) on the level of institutional curricular design and consistent with Brown et al. (2014) and Larsen et al. (2009) on the level of faculty teaching medical students in clinical practice settings.

Findings from the needs assessment provide some insight into clinical faculty beliefs regarding medical student teaching, beliefs regarding the institutional value placed on teaching, and beliefs regarding preparation for teaching. These findings indicate a complex relationship between the faculty and their departments, suggesting a generally supportive relationship but one where medical student teaching is not as strongly supported as other priorities such as clinical practice productivity or funded research. Lack of time for teaching emerged as a major theme within the complex interaction between faculty and their departments. When asked about the value of educational science and theory, respondents provided mixed responses regarding applicability to their teaching practice. Regarding future faculty development, an online independent format was favored. As such, a literature review was undertaken to identify successful online independent faculty professional development programs used in medical education settings that address the value of medical education science in teaching practice with evidence-based clinical educational strategies.

## Chapter 3

### Literature Synthesis for Clinical Faculty Development Intervention

This problem of practice, supported by the results of a needs assessment questionnaire at a medical school in the northeastern United States, indicated that clinical faculty have difficulty balancing medical practice, research activities and medical student teaching activities. Medical student teaching was hampered by practice income demand and time requirements for administrative and regulatory matters. Almost half of faculty members disagreed or strongly disagreed the fundamentals of education science and theory was part of their preparation for teaching. The results from this institution are consistent with issues identified in the education literature as challenges to the medical profession on a national level and have persisted over the past decade (Abruzzo et al., 2019; Bösner et al., 2015; Brauer & Ferguson, 2015; Brown et al., 2014; Chen et al., 2015; Cooke et al., 2006; Finn et al., 2011; Irby et al., 2010). Though items that directly assessed self-efficacy beliefs of faculty respondents were not included in the needs assessment, factors that limit medical student teaching and lack of preparation for teaching act as indirect evidence for attributional judgements that influence perception of individual agency and self-efficacy (Bandura, 1997).

The needs assessment questionnaire for this problem of practice included items that assessed what topics and in what format clinical faculty respondents prefer in a faculty development program. Faculty expressed interest in teaching medical students while with a patient, providing effective evaluation and feedback for medical students, how to be a mentor for medical students, small-group teaching, case-based learning, and teaching medical students in specific settings. The preferred format was online with independent learning sessions.

Professional development is defined as a process of continuous learning designed to increase a professional's knowledge and performance over the course of his or her practice while assuring compliance applying evidence-based strategies (Reutzel & Clark, 2014). Effective professional development includes adequate duration, analysis of curricular content and learning, active learning strategies appropriate for teachers, and follow-up support while implementing learned interventions and strategies (Dagen & Bean, 2014). Professional development that encourages participants to apply, transform, share, and incorporate into daily teaching practice content learned in professional development activities position participants as agents of change; purposeful learning occurs when participants address issues present within their own practice contexts in a manner that is systematic, sustained, and remain applicable over time (Raphael et al., 2014).

Professional development can be designed with key features that include content focus, active learning, coherence, and sustained duration (Desimone & Garet, 2015). Having a content focus means activities that are centered on subject matter content and how students engage with the content (Desimone & Garet, 2015). Active learning provides opportunities for teachers to observe other teachers, receive feedback on their own teaching, understand their teaching by reviewing student work, and actively presenting during a professional development program rather than passively attending lectures (Desimone & Garet, 2015). Coherence occurs when teaching consistently represents the institution's curriculum, learning outcome goals, teacher beliefs and knowledge, student needs, governmental policies, and reform mandates (Desimone & Garet, 2015). Sustained duration consists of at least 20 hours of contact time in a professional development program that is ongoing throughout a school's academic year (Desimone & Garet, 2015). Randomized controlled trials suggest changing procedural approaches to professional

practice is more effective than improving content knowledge (Desimone & Garet, 2015). Participants respond to professional development with unique outcomes, however, and implementation must account for varieties of applied contexts experienced by individuals (Desimone & Garet, 2015).

Professional development should address the increasingly complex skills required by participants, including preparation for additional professional development. Professional development curricula need to emphasize competencies such as deep mastery of complex content, critical thinking, problem-solving, communication, and self-directed learning strategies (Darling-Hammond et al., 2017). Characteristics of effective faculty professional development as described by Desimone and Garet (2015) and Darling-Hammond et al. (2017) are present in faculty development programs in medical education. Finn et al. (2011) presented a faculty development program that involved peer observation for clinical faculty teaching medical students in clinical practice settings. Singh et al. (2013) described a faculty development program intended to improve measured teacher self-efficacy beliefs in a longitudinal program for clinical teachers. The needs assessment questionnaire for this problem of practice indicated faculty are interested in faculty development that includes teaching, mentoring, evaluating, providing feedback, small-group teaching, case-based learning, and teaching in specific settings. Based on professional development characteristics described by Desimone and Garet (2015) and Darling-Hammond et al. (2017) and applied by Finn et al. (2011) and Singh et al. (2013) in medical education professional development, a professional development program addressing the expressed needs of the clinical faculty could be designed.

The results of the needs assessment questionnaire for this problem of practice suggested the clinical faculty may have reduced teacher self-efficacy beliefs. The questionnaire identified

difficulty balancing professional responsibilities while teaching that may be related to maintaining medical practice income, administrative responsibilities, and lack of preparation as teachers. Social cognitive theory provides the framework for understanding how Bandura (1997) self-efficacy assessment and Shulman (2005) understanding of the medical profession as a signature pedagogy define collective interactive social relationship between clinical faculty physicians and their medical student learners. Faculty expressed interest in professional development that can be designed with characteristics of effective professional development from both the general and medical education literature (Darling-Hammond et al., 2017; Desimone & Garet, 2015; Finn et al., 2011; Singh et al., 2013). An online format has been used in both general and medical education learning (Day et al., 2015; McAleer & Bangert, 2011). From these perspectives, an intervention for faculty development to increase teacher self-efficacy assessment challenged by limited time for medical student teaching is proposed.

### **Theoretical Framework**

Social cognitive theory provides a framework to understand the interactions occurring between a clinical faculty member and a medical student. Based on social cognitive theory, individuals develop skill in regulating their motivational, affective, and social aspects of their intellectual and cognitive functioning (Bandura, 1995). “Agency” describes actions done by individuals with intention, as individuals can exercise influence over what they do (Bandura, 1997). When an individual holds a belief of personal efficacy or believes he or she has the power to produce desired outcomes, individuals then exhibit motivation in manifesting their agency in the setting of their environments (Bandura, 1997). Triadic reciprocal causation describes the interaction between an individual’s internal personal motivations and concerns, the observable

behavior of the individual, and how the individual interacts within the individual's environment (Bandura, 1997).

Individuals interact within their environments directly as an individual, or indirectly through a proxy, or as part of a group collectively (Bandura, 1982). Central to social cognitive theory are efficacy beliefs, defined as beliefs held by individuals regarding their capability as individuals or as a group in learning to perform specific actions with a defined level of proficiency (Bandura, 1982). Self-efficacy is central to an individual's ability to complete tasks or accomplish goals. Self-efficacy perception influences individual thought patterns, actions, and emotional states (Bandura, 1982). With higher levels of perceived self-efficacy, individuals can complete new tasks with a greater measure of success and less emotional distress than those with lower perceived self-efficacy (Bandura, 1982). Individual perceived self-efficacy assessment influences collective or group efficacy in social contexts and leads to development of collective efficacy (Bandura, 1982).

Self-efficacy is understood within the model of triadic reciprocal causation where the influences of personal, environmental, and behavioral factors combine to define an individual's perceived self-efficacy in addressing issues within a social context (Bandura, 1989). Social cognitive theorists state that individuals produce experiences and shape events as active agents interacting within an environment; an assessment of how well an individual feels he or she succeeds in these interactions is the major contributor to perceived self-efficacy (Bandura, 2000). Self-efficacy is expressed within an individual's network of sociocultural interactions, interrelationships, and influences (Bandura, 2000). When considering teaching and perceived self-efficacy, an individual's perceived efficacy influences every aspect of how an individual can address challenges, face adversity, and maintain persistence. Individuals with a high sense of

efficacy are generally successful, endure adversity, and maintain persistence (Tschannen-Moran & Chen, 2014). Individuals with a low sense of efficacy are not successful, do not overcome adversity, and lack persistence relative to a given task or challenge; teachers who lack confidence in their own ability to prepare and deliver instructional content to learners are more likely to reduce effort when encountering difficulties, even if these teachers actually possess the content expertise and requisite skills to instruct their learners (Tschannen-Moran & Chen, 2014).

Part of how individuals develop self-efficacy beliefs include understanding who teachers are as people, understanding the contexts in which teaching occurs, questioning assumptions and updating knowledge and understanding through a cultural awareness (Gay & Kirkland, 2003). Medicine as a profession defines a culture that influences the interactions between faculty, medical students, and patients in clinical care settings (Boutin-Foster et al., 2008). In addition to the culture of the medical profession, each faculty member, student, and patient in the clinical practice setting brings his or her own unique cultural and social characteristics to the encounter; faculty self-efficacy beliefs and motivation may be influenced by the complex interaction of culture that occurs with teaching activities (Boutin-Foster et al., 2008).

Shulman (2005) defined “signature pedagogies” as the recognizable and characteristic teaching and learning constructs that exist within a discipline. Signature pedagogies are most recognizable among professional education programs that are organized both at the level of an individual institution and on a larger professional level (Shulman, 2005). Examples include medicine, law, and education. For the medical profession, novices endure years of education and training to understand how to think and perform in a manner expected of a physician; this signature pedagogy provides insight into the personalities, disposition, and cultures within the medical profession (Shulman, 2005). The social cognitive dimensions of the medical profession

and the education of future physicians can be defined and understood as cognitive and social functions among the learners (Shulman, 2005). Social cognitive theory, self-efficacy beliefs, and the signature pedagogy for the medical profession help to define a theoretical framework for understanding how clinical faculty teach their students in patient care settings.

### **Synthesis of Intervention Literature**

Within the framework of social cognitive theory, perspectives on cultural awareness, adult learning perspective, and social constructivism can be applied to understand specific components of the clinical faculty and medical student relationship to better define how social cognitive theory is functioning within the context of this project.

### **Teacher Professional Learning**

Learning Forward (2011) revised standards for professional learning to act as the principal strategy for schools and educational systems to improve education practice and learning outcomes. Improvement should be continuous and include the efforts of individuals, schools, and school systems that is evidence-based and grounded in effective practice (Learning Forward, 2011). Professional development has been described as providing individual teachers with a passive activity that imparts information but does little to change teaching practice or learning outcomes (Learning Forward, 2011). Opportunities for professional development are often described as episodic and unconnected to a shared systemwide vision; professional development has consumed considerable resources while failing to produce intended results for both teacher and student outcomes (Learning Forward, 2011). The difference between professional development and professional learning includes an emphasis on educators sharing an active role with education leadership in a process of continuous improvement of student learning (Learning Forward, 2011). Robustly implemented professional learning enlists teachers, staff, school, and

system leaders as active partners defining the focus and intent of their learning, including how the learning is presented and how learning effectiveness is evaluated in a team effort (Learning Forward, 2011).

Learning communities are defined as organizations within an educational institution that establish a culture of continuous teaching and learning improvement, take on responsibility for teaching and learning improvement, and align the teaching with educational goals defined by the institution (Learning Forward, 2011). “Communities of practice” are defined in medical practice and medical education as social collaboration that guides and encourages learners in specific medical practice contexts (Taylor & Hamdy, 2013). Johns Hopkins School of Medicine created and developed faculty learning communities to enhance the quality and consistency of teaching practice in a clinical skills course for medical students (Kern & Thomas, 2016).

Leadership is defined to include individuals who develop, support, and promote systems for professional learning (Learning Forward, 2011). In a medical education context, curricular innovation is supported by a leader in curricular development is encouraged to be a change agent and champion for curricular innovation (Hughes, 2016). The role of resources in professional learning is defined as the process of setting priorities, monitoring, and coordinating resources in support of professional learning (Learning Forward, 2011). Leaders managing limited resources in medical education settings are encouraged to allocate resources in a manner that enhances the institution’s educational mission goals (Lindeman & Lipsett, 2016). Data is defined in professional learning as information that originates from a variety of sources including students, educators, and educational systems that are used for planning, assessment, and evaluation of professional learning (Learning Forward, 2011). Data can be used in medical education applications for development of dashboards for data analysis, dissemination of outcomes and

trends, evaluation of program effectiveness, and learning program implementation fidelity (Lindeman & Lipsett, 2016).

Professional learning implementation supports long-term change by sustaining support for professional learning (Learning Forward, 2011). When developing effective curricular change in a medical education setting, attention to implementation fidelity, or the accurate translation of a curricular change from conception to application in teaching practice, should include measures involving leaders, preceptors, students, and stakeholders to assure accurate implementation of the curricular change model (Lindeman & Lipsett, 2016). Learning Forward (2011) defines professional learning outcomes as measures of the alignment of educator performance with student curriculum standards. In a medical education curriculum, alignment of educational learning objectives and goals with actual medical student learning is an essential component of a teaching strategy in a clinical practice setting (Thomas, 2016).

A professional development program for clinical faculty can incorporate selected standards for professional learning from Learning Forward (2011). A program can collect data regarding clinical faculty participant pedagogical knowledge perception and application in teaching practice but may not collect data regarding student learning outcomes or system data. A professional development program can present a learning design based on models, theories, and research in adult learning to achieve intended outcomes while collecting measures of outcomes that can align with the program itself but may not be aligned with institutional standards for professional development as these standards for professional development. A professional development program may choose to not develop learning communities, may not address how to change the relationship of educational leadership and professional development, may not address how resources are allocated for teacher professional development, and may not be implemented

to provide sustained support for professional learning activities as recommended in Learning Forward, (2011), but can serve as an introductory professional development program that may lead to a more fully realized professional learning program that encompasses all of the Learning Forward (2011) professional standards.

### **Online Professional Development**

To be effective, online professional development should not be focused on the technology used, but on the context of the professional development, the pedagogical design used, the participants enrolled, and the duration of the program (Fishman, 2016). Online professional development activities can be asynchronous where participants work with content at their own pace (Fishman, 2016). High quality professional development contributes to curricular reform and improved learning outcomes; online professional development provides advantages including flexibility to accommodate schedules, bringing together participants over distances, and sharing resources efficiently (Fishman, 2016). Online professional development should engender the tenets of effective professional development including: (1) a design that addresses participant learning goals and needs, (2) driven by a defined image of effective teaching, (3) provides opportunities for participants to build pedagogical knowledge with reflection, (4) provides research-based approaches to use in teaching practice, and (5) is evaluated for improvement (Schneider et al., 2016). Online programs should be designed to include the same level of depth, curriculum implementation, and support models as face-to-face programs (Schneider et al., 2016). A professional development program for mathematics teachers was given in an online format that included ten modules requiring approximately 90 to 120 hours for completion (Schneider et al., 2016). The purpose of this program was to help teachers implement Common Core mathematical practices in their teaching practices; teachers engaged the program

asynchronously, working through the modules independently (Schneider et al., 2016). The evaluation of the program was not able to determine if an asynchronous model was clearly inferior to a model that promotes participant engagement (Schneider, 2016). The investigators did note an interest in developing programs for other teaching in other curricular areas, suggesting this model may be generalized to other teaching settings (Schneider et al., 2016).

Wilkinson et al. (2015) presented a study comparing two approaches to teaching hand-held cardiac ultrasonography skills over four weeks to 24 resident physicians in an internal medicine program. This was a single center randomized nonblinded trial that developed two different learning strategies, randomized resident physician participants, and compared the learning outcomes (Wilkinson et al., 2015). Thirteen of the participants completed the conventional arm, consisting of four 1-hour sessions given once a week with an expert in hand-held cardiac ultrasonography, while 11 of the participants completed the technology arm, consisting of two online module-based exercises over four weeks (Wilkinson et al., 2015). Participants from both learning strategies were evaluated at the end of their training period using a combination of assessment of technical skills and diagnostic interpretation identifying both normal and abnormal cardiac findings obtained by hand-held ultrasonography (Wilkinson et al., 2015). Both the conventional and technology approaches to learning a skill set in a medical education setting were found to be effective and applicable in medical education program development (Wilkinson et al., 2015).

An online module-based education program was developed for 49 resident physician learners by a development team within a department of family medicine consisting of 28 faculty and staff members (Skye et al., 2011). Sixteen modules were developed based on important medical practice content; example module topics included the elbow, joint injection, and obesity

(Skye et al., 2011) Each module contained between 12 and 25 web pages of content each taking 12 to 60 minutes to complete; each module had defined learning objectives, pretest and posttest questions designed with the assistance of an education specialist (Skye et al., 2011). As a mixed method study, the frequency distributions and mean comparison of test performance were compared quantitatively while participant comments were evaluated using thematic analysis (Skye et al., 2011). Results demonstrated improvement in content knowledge while participants believed the online module-based approach met their educational goals (Skye et al., 2011).

Online strategies can be used to deliver effective professional development (Fishman, 2016; Schneider et al., 2016) and can be used to deliver content in medical education settings (Skye et al., 2011; Wilkinson et al., 2015). By recognizing the strategies used to provide effective professional development for teachers in preK-12 education are also used successfully in medical education and training applications, one can postulate that a program to delivery pedagogical knowledge to faculty at a medical school should be possible using an online, asynchronous, module-based format.

### **Effective Professional Development in Medical Education**

Teacher professional learning is important in student learning outcomes as the volume of content knowledge, content knowledge complexity, and skill set complexity increases (Darling-Hammond et al., 2017). Professional learning must provide effective and sophisticated forms of teaching and learning that support student “deep mastery of challenging content, critical thinking, complex problem-solving, effective communication and collaboration, and self-direction” (Darling-Hammond et al., 2017, p. v). This level of commitment is also recognized in medical education and calls for medical education curriculum reform (Cooke et al., 2010). Effective professional development is defined as “content focused, incorporates active learning,

supports collaboration, uses models of effective practice, provides coaching and expert support, offers feedback and reflection, and is of sustained duration” (Darling-Hammond et al., 2017, p. v-vi). Two professional development programs in medical education will be reviewed considering the Darling-Hammond et al. (2017) definition of effective professional development. The first clinical faculty development program focused on a formal peer observation of teaching project for preceptors teaching medical students in clinical practice settings (Finn et al., 2011). The second clinical faculty development program involved an intervention designed to improve measured teacher self-efficacy beliefs among participants versus controls in a longitudinal activity (Singh et al., 2013).

Teaching in a clinical practice environment is a complex activity that requires preceptors to balance many factors including a medical student learner, a patient, family members, staff and other factors such as the clinical environment and time available for the encounter (Finn et al., 2011). Many new clinical faculty begin their teaching careers with little formal preparation in clinically based medical student education; an observational and mentoring relationship with a more experienced colleague was provided as an intervention to ameliorate the new faculty members’ challenges as a beginning teacher (Finn et al., 2011). A group of 11 clinician educators were assigned to new clinical faculty members on a one-to-one basis as the clinical faculty members led teams consisting of resident physicians and medical students caring for patients admitted to an internal medicine hospital service (Finn et al., 2011). The clinician educators provided detailed and specific teaching feedback for the clinical faculty members while encouraging the faculty members to reflect on teaching style and to explore a variety of teaching strategies (Finn et al., 2011). The results of this study indicated collaborative peer observation encouraged reflection by both the observed and observing physicians, emphasized the

importance of detailed and specific observations, and focused on specific strategies including how to ask learners questions to test content knowledge, physical examination instruction, and how to engage learners at different levels of competence in a single teaching environment (Finn et al., 2011).

Finn et al. (2011) incorporated several the characteristics of effective professional development (Darling-Hammond et al., 2017). The clinical educators joined the observed faculty member and his or her team for morning rounds where patients were discussed and education provided to the learners over an average of two hours with a private session for feedback and reflection afterwards (Finn et al., 2011). This program was content focused as the discussion involved teaching relevant to the clinical issues the patients presented to the team on rounds. Active learning was a major component as the clinical educator and the observed faculty member worked together over the course of several days. Collaboration was inherently necessary to the process of this program. The clinical educator was portraying models of effective practice in medical education while providing coaching, offering feedback, and encouraging reflection. The duration of the program was not explicitly described and may be a weakness of this program if not ongoing.

Teacher self-efficacy beliefs have important influences on how teachers engaged in a faculty development program will assimilate new knowledge and how teachers will implement the new knowledge in their teaching practices (Singh et al., 2013). The aim of this study was to evaluate the changes in measured teacher self-efficacy beliefs of health care professionals enrolled in a longitudinal faculty development program using a quasi-experimental methodology (Singh et al., 2013). Seventy health professional educators participated in the intervention program at four sites in India and South Africa while an equal number of comparable

professionals were enrolled as members of a control group (Singh et al., 2013). The study conducted assessments of self-efficacy at six months and 12 months for all participants (Singh et al., 2013). The intervention was a two-year fellowship program that provided enrolled participants pedagogical content knowledge regarding medical education, educational leadership and management training, and support to build a functional community of practice among other enrolled participants (Singh et al., 2013). After six months, participants enrolled in the fellowship had an increased measure of teacher self-efficacy beliefs with an effect size of 0.56 (Singh et al., 2013). Conclusions of this study include improved teacher self-efficacy beliefs mediates between acquisition and application of pedagogical content knowledge, participation in faculty development improves teacher self-efficacy beliefs (Singh et al., 2013). In addition, longitudinal faculty development programs help increased teacher self-efficacy beliefs persist over time, and teacher self-efficacy beliefs can be used as a measure of the impact of faculty development programs (Singh et al., 2013).

Faculty professional development in medical education share structural and functional characteristics with effective professional development in the K-12 education literature. Singh et al. (2013) demonstrated all the characteristics of effective professional development as described by Darling-Hammond et al. (2017). The Finn et al. (2011) and the Singh et al. (2013) faculty development studies both serve as examples where a detailed approach to effective faculty development that incorporates attention to content focus, active learning, encouraging collaboration, applying effective practice models, providing coaching and expert support, encouraging feedback and reflection, and sustained in duration as described by Darling-Hammond et al. (2017). Approaches to developing and implementing effective professional development from the general education literature (Darling-Hammond et al., 2017; Learning

Forward, 2011) have been applied successfully in medical educator professional development (Finn et al., 2011; Singh et al., 2013) and should be incorporated in future clinical faculty professional development.

Learning theories and cultural awareness are part of medical education were used to structure the pedagogical content of the modules presented in this professional development program. Levy et al. (2016) compared an operant learning program to a teaching by demonstration approach for two specific behaviors used in orthopedic surgery by first-year orthopedic surgical residents and medical students. For the operant learning group, reinforcement for correct performance of the steps that make up the target behaviors was given non-verbally with a mechanical clicker (Levy et al., 2016). For the demonstration group, learning and reinforcement for correct performance of the target behaviors was given in discussion between the learner and preceptor (Levy et al., 2016). The results of the study support operant learning as an effective approach to mastering new behavioral skills resulting in more accurate replication of complex skills compared to demonstration (Levy et al., 2016). The results of this study demonstrate how an understanding of behaviorist learning theory is applicable in skill development in medical education settings and how a non-verbal operant reinforcement of behavior can help avoid the difficulties that can complicate the cultural interrelationship between a learner and a preceptor.

**Learning theories in medical education.** Learning theories are part of medical education and can be used to structure the pedagogical content of a professional development program. Understanding learning theories can assist a clinical educator to appreciate how his or her learning and teaching approach developed and how his or her approach can be enhanced (Ozuah, 2005). Within a medical education setting, behaviorism is employed to change

observable behavior (Ozuah, 2005). Behaviorism guides formation of learning objectives, define stimulus, assess response, provide reinforcement of learning while the clinical faculty directs, manages and reinforces the learning experience particularly for practical and specific skill development training (Ozuah, 2005). Cognitivism can be applied to imparting applicable medical knowledge and problem-solving skills (Ozuah, 2005). Faculty employing cognitive theory in their clinical teaching assess learner skill levels and provide guidance and examples of applicable clinical practice while connecting new concepts to prior knowledge and assessing the learner's thought processes while solving clinical problems (Ozuah, 2005). Constructivism is applicable in clinical practice learning where faculty and learners build a shared understanding through a process of knowledge acquisition (Ozuah, 2005). Both faculty and learners develop learning objectives grounded in the practice experience of the learners where the faculty assists the learner to develop a functioning hypothesis that is developed and refined throughout the learning process (Ozuah, 2005).

An understanding and application of learning theories from the behaviorism, cognitivism, and constructivism perspectives have guided improvements in medical education curricular design and instruction for faculty (Mann, 2011). Through learning theory application, clinical faculty can tie their teaching practice to the clinical practice context while encouraging medical student learners to participate and engage actively, moving from the periphery of the health care relationship to the center as the learners gain knowledge, skill, and experience (Mann, 2011). Faculty will benefit in their teaching practice if they come to understand the shift in medical curricular design from a positivism approach that emphasized that knowledge is objective, and learning was independent of both value and context to one that emphasizes how the learner actively constructs knowledge based on experience and perceptions gained in learning activities

(Mann, 2011). Faculty in their teaching practice can benefit from understanding their learners not as passive recipients but rather as actively building knowledge, resulting in a shift of agency in the teacher-learner relationship toward the learner (Mann, 2011). Faculty can understand that evolving expectations for medical education is supported by research in medical education and other educational disciplines and that teaching on the level of the teacher-learner can benefit from the thoughtful and deliberate application of learning theories employing evidence-based learning strategies (Mann, 2011).

Levy et al. (2016) compared an operant learning program to a teaching by demonstration approach for two specific behaviors used in orthopedic surgery by first-year orthopedic surgical residents and medical students. For the operant learning group, reinforcement for correct performance of the steps that make up the target behaviors was given non-verbally with a mechanical clicker (Levy et al., 2016). For the demonstration group, learning and reinforcement for correct performance of the target behaviors was given in discussion between the learner and preceptor (Levy et al., 2016). The results of the study support operant learning as an effective approach to mastering new behavioral skills resulting in more accurate replication of complex skills compared to demonstration (Levy et al., 2016). The results of this study demonstrate how an understanding of behaviorist learning theory is applicable in skill development in medical education settings and how a non-verbal operant reinforcement of behavior can help avoid the difficulties that can complicate the cultural interrelationship between a learner and a preceptor.

**Multicultural perspectives in clinical education settings.** Educational considerations are seen through a multicultural lens and have application in clinical education settings. Clinical faculty balance a variety of social and cultural perspectives including the identities of their patients, their students, their institution, their profession, and their own individual identity. As

part of creating a system supportive of multicultural education, institutions are encouraged to reflect on where along a multicultural spectrum that ranges from a monocultural perspective through stages of tolerance, acceptance, respect, and ultimately affirmation, solidarity, and critique (Nieto, 2008). Individual faculty cannot be held responsible for advancing the perspective of an entire institution but can assess her or his contribution to an institutional assessment of multicultural awareness (Nieto, 2008). If integration of multicultural perspectives and content is used to build knowledge, reduce prejudice, emphasize equality, and promotion of empowerment of learners by teachers, then a multicultural perspective can be integrated into the larger curriculum of an institution (Banks, 2016).

American medical education culture began when the 1910 Abraham Flexner Report of the Carnegie Foundation for the Advancement of Teaching made recommendations to the United States Congress that set the requirement for a bachelor's degree for enrollment and led to closure of many medical schools that admitted women and African Americans; changes that helped establish the elitist nature of the medical profession in the United States (Beck, 2004). Medical care institutions recognize a patient-centered mission where the institutions' curriculum connects medical science with the physical, psychosocial, socioeconomic, and familial impacts of illness (Gianakos, 1999). The patient-centered mission should encourage effective and respectful communication between health care providers and patients (Wiener et al., 2010). Individuals from all over the world make up 25% of physicians and learners, including resident physicians and medical students, in medical education in the United States (Whelan, 2005). These individuals integrate into American medical culture with little consideration for cultural, ethnic, racial, socioeconomic, or religious backgrounds (Whelan, 2005). Faculty and learners such as medical students should be prepared to care for patients with diverse social and cultural

backgrounds as faculty and learners often minimize the importance of culture in their practice of medicine (Boutin-Foster et al., 2008). Faculty and learners can be encouraged to use their own cultural perspectives to assist their understanding the cultures of their patients (Boutin-Foster et al., 2008).

Clinical faculty are often in clinical settings with medical students when the student encounters discriminatory behavior from a patient or family member (Paul-Emile et al., 2016). In a stepwise manner, faculty can assess why a patient or family member is declining care with a student, assess the patient's medical condition, assess the patient's decision-making capacity, discuss options including the impact of declining care on the patient's care and the student's learning (Paul-Emile et al., 2016). Clinical faculty can assist medical students develop strategies and build resistance when students encounter discriminatory behavior from patients and patients' family members by developing a culturally awareness along with assessing the level of illness acuity for patients, and strategies for cultivating therapeutic alliances with patients and families (Whitgob et al., 2016). Faculty can also help medical students to depersonalize the discriminatory event and ensure the student is maintained in a safe learning environment (Whitgob et al., 2016). Clinical faculty can also be aware of additional strategies in which the faculty can arrange or advocate for multidisciplinary group discussions regarding presumed discriminatory events to develop understanding of precipitating factors, developing skills in managing future events, and building resilience in the face of difficult encounters with patients and their families (Reynolds et al., 2015). Additionally, strategies such as standardized patient simulation sessions could be developed to help medical students improve readiness to respond to discriminatory behavior in clinical practice settings (March et al., 2018).

**Pedagogical strategies in clinical education settings.** Content knowledge regarding areas of specialty practice and knowledge regarding teaching (i.e., pedagogical knowledge) may contribute to faculty self-efficacy (Shulman, 1970), which shows the relationship between self-efficacy and the social cognitive framework. Social cognitive theory has contributed to advancing the understanding of human cognitive function and how programs can be designed to enhance educational processes (Shulman, 1970). Behavioral and cognitive science has impacted the education of children, but had not impacted university-based education, including professional educational programs such as medicine (Shulman, 1970). Teacher self-efficacy beliefs are influenced by teacher development that recognizes both domain expertise, the individual's command of the content being taught, and pedagogical knowledge as the individual's understanding of how to transmit content efficiently to learners (Shulman, 2000). Medicine as a profession defines a specific signature pedagogy that defines the characteristic methods of teaching and learning that guide future practitioners preparing to enter the medical profession (Shulman, 2005). How this process is functioning among clinical faculty at an institution can help describe how the challenges to teaching are functioning in a setting and how individual faculty self-efficacy beliefs may be influenced in their preparation for and application in teaching activities

Social cognitive theory and cultural awareness are represented in a study comparing two teaching strategies designed to prepare learners such as medical students and resident physicians to present patients. The ability for medical professionals to communicate effectively with their colleagues when formulating patient care plans is an important skill and will be included as pedagogical content in this proposed professional development program. Seki et al. (2016) conducted to compare two teaching approaches for resident physicians learning in case

presentations. Resident physicians and medical students are required to report the important clinical details of their patients to preceptors and colleagues as a competency of medical practice (Seki et al., 2016). One approach for teaching this skill is called SNAPPS, as an acronym for:

- summarize history and findings,
- narrow the possible diagnoses,
- analyze by comparing the likelihood and fit of the possible diagnoses,
- probe the uncertainties, difficulties, and alternative approaches,
- plan for the management of the patient's care, and
- select an issue related to the case for deeper self-directed learning (Seki et al., 2016).

The other approach is called the *one-minute preceptor*, or OMP, and consists of six microskills that include directing the learner to:

- make a commitment,
- probe for supporting evidence,
- review general rules for an approach,
- reinforce what is a correct approach,
- correct errors in reasoning, and
- identify with the learner the next steps in understanding the issues of the case (Seki et al., 2016).

Based on outcome measures that assessed learner performance presenting patients and learner evaluation of satisfaction with the strategy used, the SNAPPS approach performed better than OMP for the 71 participants from two hospitals over the two years of the study (Seki et al., 2016). As both SNAPPS and OMP strategies require close interaction between preceptors and learners, preceptors will better understand and employ these strategies with a detailed

understanding of the social cognitive and cultural factors that will help these approaches better serve learners. Because of the close interaction between preceptors and learners using these strategies, opportunities for preceptors to evaluate and reflect on their practice in evaluation, providing feedback, and providing mentoring are also present and can be addressed in a proposed professional development program.

Constructivism and cultural awareness are represented in a study that conducted semi-structured interviews with medical school faculty identified as expert clinical preceptors teaching learners with multiple levels of experience (Chen et al., 2015). Rather than relying on spontaneous teaching opportunities within the clinical workplace, expert clinical teachers can select clinical learning experiences for a variety of learners with differing levels of knowledge and skill in a manner that supports learning and preserves the progress of medical care and patient safety (Chen et al., 2015). A grounded theory approach was used to analyze the interview data from 19 clinical preceptors; findings included that expert clinical teachers structure and sequence encounters in the clinical space for different levels of learners (Chen et al., 2015). Clinical learning opportunities are sequenced by adjusting case content, case complexity, and by tailoring expectations for learners based on the learners' knowledge and experience level (Chen et al., 2015). Learning activities are selected strategically to support learning for each learner in an individualized developmental trajectory (Chen et al., 2015). The conclusion reached by Chen et al. (2015) was that expert teachers describe and use strategies for matching the available learning opportunities within a clinical practice context to the level of prior knowledge and experience of the learners while remaining mindful of patient safety and the need to maintain progress while engaged in practice.

For the proposed intervention, Chen et al. (2015) provides an application of a constructivist approach to structuring the learning environment as well as an opportunity to reflect on cultural aspects of the complex interactions between the preceptor, learners, patients, and staff within a clinical learning environment. Within this approach to teaching are also opportunities to reflect on providing feedback, evaluating learner performance, and mentoring learners in a clinical learning setting. Additional strategies to improve clinical learning skills among medical students include group learning approaches where students engage in interactive and practice-based learning in an inverted classroom design as opposed to individual learning experiences (Bösner et al., 2015). Authentic learning experiences have also been described for medical students working in clinical practice settings where learning experiences are deliberately structured and sequenced to fit the learning needs of individual students while maintaining patient safety during practice (Chen et al., 2015). A medical student education approach that emphasizes teaching and learning within the authentic clinical settings applies the social and cognitive aspects important to these learning activities.

Medical education has traditionally considered testing as tools to assess content knowledge among learners, assign grades, and assess the efficiency of curricular strategies (Larsen et al., 2008). A review of the cognitive psychology literature recognizes the potential value of repeated testing not simply as a tool of assessment, but as a strategy for improving information retention when compared to repeated study of information; this effect of repeated testing with effortful recall of information is defined as “the testing effect” (Larsen et al., 2008). Examples of effortful recall include short-answer formats that promote active retrieval of information requiring some effort as opposed to a multiple-choice format that promote recognition rather than recall (Larsen et al., 2008). The benefits of repeated testing with effortful

recall in combination with feedback that corrects errors and confirms correctly formulated information (Larsen et al., 2008). These researchers recognize the potential applying this cognitivist approach to teaching in clinical settings where teachers are asking questions with learners in a repeated sequence that challenges learners to recognize, reinforce, and expand knowledge in clinical situations will have benefit on learner retention and understanding of complex clinical content rather than solely as an assessment strategy (Larsen et al., 2008).

An example of how to apply effortful recall and spaced testing as a teaching strategy rather than solely as a learning outcomes assessment strategy is provided by Larsen et al. (2009), who conducted a randomized controlled trial in which two groups of resident physicians-in-training were provided a program on two important neurological diagnoses that were important to these resident physicians' training. Half of the group engaged the content presented with a format that provided repeated testing demanding effortful recall while the other half repeatedly studied a content summary of the material presented (Larsen et al., 2009). The repeated testing and effortful recall participants had an average of 13% higher score on retained clinical content 6 months after the education program was completed (Larsen et al., 2009). Continuing to explore the learning benefits of repeated testing with effortful recall in clinical settings, Larsen et al. (2012) conducted a study with 41 medical students learning three topics in clinical medicine that were presented in one of three different formats. Each of the student participants completed all three of the clinical topics but were randomized to encountering the learning content with written tests or studying a review sheet, followed by undertaking a standardized patient examination (Larsen et al., 2012). The results indicated these students were able to demonstrate improved retention of the content presented with repeated testing compared to repeated study immediately after learning content and then six months later (Larsen et al., 2012). These studies indicate that

repeated testing can be applicable to clinical situations. Larsen et al. (2013) continued to expand on the application of repeated testing in medical education settings in a study where 47 first-year medical students participated in a teaching session that included four clinical topics followed by four weekly learning sessions. During the learning sessions, students were randomized to participate in one of four activities that included: (1) repeated testing with repeated self-generated explanations regarding their learning experiences, (2) testing without explanations, (3) repeated studying a review sheet with self-generated explanations, and (4) repeated studying without explanations (Larsen et al., 2013). The results indicated that repeated testing with repeated self-generated explanations produced the best outcomes for assessment of content retention both immediately after the learning sessions and six months later (Larsen et al., 2013). This study suggests the combination of repeated testing and student self-reflection is an effective strategy for improving content retention in clinical education.

Applying cognitive principles in undergraduate medical education has produced insight into teaching and learning strategies most effective in improving long-term retention of information. Recurrent testing with feedback results in significantly greater long-term retention of information presented in a clinical didactic conference than repeated and spaced study (Larsen et al., 2009). Recurrent testing should be considered for impact on learning and not only as a method of assessment (Larsen et al., 2009). Recurrent testing can also be helpful in foundational or pre-clinical learning for students at risk to fail the summative final examination in a gross anatomy program (Azzi et al., 2015). This program identified and provided support for students that were underperforming in the anatomy program (Azzi et al., 2015). Combining written testing with clinical testing using standardized patient clinical scenarios provided a robust method to present, reinforce, and then later assess long-term retention of clinical learning when

compared to written testing alone or studying review material without either written testing (Larsen et al., 2012).

Another strategy that resulted in improved long-term learning combined recurrent testing with student reflection after a simulated or actual patient clinical experience where the students are asked to formulate based on factual and experiential knowledge obtained in the encounter an explanation for how the material learned fits together in the context it is presented, a process referred to as self-explanation (Larsen et al., 2013). Recurrent testing in combination with self-explanation reflection is an effective method for fostering long-term retention. When done independently, recurrent testing was superior to self-explanation reflection alone, though recurrent testing alone was inferior to the combination of both strategies (Larsen et al., 2013). Two of these studies (Larsen et al., 2009; Larsen et al., 2013) did not offer insight into how institutions should implement recommendations or how faculty might be prepared to teach using recurrent testing. Larsen et al. (2012) did offer recommendations for preparing standardized patients for the simulated exercises while Azzi et al. (2015) did state faculty utilized team-based learning in small groups for their medical students in anatomy laboratories but did not describe the process utilized. The decade after the publication of the second Carnegie Foundation Report on medical student education (Irby et al., 2010) has included efforts to improve medical student curricular and pedagogical strategies, yet concern persists these changes to date have not been entirely effective on the institutional level (Brauer & Ferguson, 2015).

These studies highlight the importance cognitivism and cultural awareness can have in clinical faculty teaching practice. Seki et al. (2016) emphasized the importance of developing communication skills in clinical practice settings that include aspects of information processing and intrapersonal interaction with a health care team. Chen et al. (2015) explore how experienced

expert clinical educators can assess learners in a clinical practice setting and design learning opportunities that fit the previous knowledge, skill level, and experience in a manner that promotes additional learning. The series of studies grounded in cognitivism where repeated testing in clinical practice settings as a basis for teaching rather than for assessment and feedback alone emphasizes that repeated testing can be an effective teaching strategy (Larsen et al., 2008). Repeated testing can enhance both immediate and remote recall of important content information compared to repeated study (Larsen et al., 2009) emphasizing the value a clinical faculty member can add to his or teaching by having learners engage in conversation that emphasizes effortful recall of content rather than asking the student to read a textbook on the subject. Larsen et al. (2012) demonstrated that repeated testing can enhance immediate and long-term retention of important information with patients in clinical settings. Repeated testing also improves learner retention of content long-term when combined with feedback (Larsen et al., 2008) and self-reflection (Larsen et al., 2013) when used as teaching strategies in addition to their functions as methods for evaluation and feedback.

**Evaluation, feedback, and mentoring for medical students.** Larsen et al. (2008) recognized the role of repeated testing that emphasizes effortful recall is also a strategy that will help clinical faculty to provide evaluation for their medical student learners that can be used to assign grades and promote self-reflection that evaluates the effectiveness of their teaching strategies. Azzi et al. (2015) used repeated formative evaluations to predict student outcomes on summative examinations in a clinical anatomy course given to first-year medical students during the first two semesters of their medical education. This study enrolled 164 participants where repeated formative quizzes consisting of multiple choice, short answer, fill-in-the-blank questions were given; at the conclusion of the two semesters the outcomes on the summative

midterm and final examinations the scores were compared to the previous year that used the same curricular design with the same summative examinations without the formative quizzes (Azzi et al., 2015). The results indicated that formative quizzes provide an opportunity to predict performance on summative examinations and allow intervention for students at risk for difficulties (Azzi et al., 2015). Formative assessment is like repeated testing where questions emphasize effortful recall can help clinical faculty assess their learners and perhaps recognize when students in clinical practice contexts are having difficulty mastering content knowledge or skill performance.

Feedback in health professions education is defined as information derived from previous performance employed with the intention of promoting positive and desired development (Archer, 2010). Feedback is intended to support the psychosocial needs of the learner while ensuring feedback is accurate relative to learner performance (Archer, 2010). Feedback models currently in use tend to be reductionist in approach, continue to reflect a hierarchical and diagnostic approach to learning (Archer, 2010). While emphasizing the importance of two-way communication, feedback often remains an instructor-driven, one-way interaction (Archer, 2010). Clinical faculty can benefit from an understanding between facilitative and directive feedback and how to apply each strategy in combination for providing effective feedback (Archer, 2010). Facilitative feedback provides comments and suggestions that encourage learners to form their own revisions of their practice while directive feedback informs learners explicitly what needs correction (Archer, 2010). Faculty can benefit from understanding how the timing of feedback can affect learner performance, taking into consideration the focus and difficulty of the task (Archer, 2010). Immediate feedback may be effective for short-term teaching and in developing procedural skills while delayed feedback may better support transfer of knowledge

for more complex cognitive tasks (Archer, 2010). Faculty can use many sources to share feedback including feedback from learners' colleagues, patients, or from teachers while forms can include face-to-face discussion, recorded, written, or numerical information sharing (Archer, 2010). Though feedback can be timed and structured in many ways, feedback that occurs with a supportive facilitator such as an experienced faculty member is likely to have the best influence on learner performance over time (Archer, 2010).

In clinical practice settings, staff development that encourages the use of a tool designed to provide guidance for teachers to give learners performance-based feedback developed from a literature review is presented (Ramani & Krackov, 2012). The practical points that form an approach and provide a tool for clinical faculty to better structure and deliver feedback more likely to be adequate, useful, and effective for learners are to: (a) establish a respectful learning environment, (b) communicate the goals and objectives for the feedback, (c) provide feedback based on direct observation, (d) provide feedback in a timely and regular manner, (e) start the discussion with the learner's self-assessment, (f) reinforce and correct observed behaviors as needed, (g) use specific, neutral language focused on performance, (h) confirm the learner's understanding and acceptance of the feedback, (i) conclude with an action plan, and (j) the teacher should reflect on feedback skills (Ramani & Krackov, 2012). Engaging in staff development opportunities will help create an institutional culture that is supportive of effective feedback that should be considered an essential element of the educational process for learners in clinical practice settings (Ramani & Krackov, 2012).

While medical educators and trainees do not often recognize the value of a mentoring relationship, mentoring in medical education settings is recognized as a crucial step fostering career success for trainees (Ramani et al., 2006). A program for faculty development in

mentorship skills was described that combined the experience of two half-day workshop sessions and a literature review to form a list of suggestions for faculty mentorship skill enhancement (Ramani et al., 2006):

- mentors should define clear expectations for their roles while enhancing listening and feedback skills,
- mentors need to be aware of culture and gender issues,
- mentors need to both support and challenge their mentees,
- mentors need to be able to express uncertainties and problems encountered while mentoring,
- mentors need to understand and enforce professional boundaries,
- mentors can benefit from mentoring,
- mentors need recognition,
- mentors need to be rewarded,
- mentors need protected time,
- mentors need support,
- mentoring should be encouraged among peers in addition to traditional dyadic mentoring, and
- mentoring and mentors should be evaluated for effectiveness over time (Ramani et al., 2006).

Mentoring is an important activity for clinical faculty and can be part of a faculty professional development program that includes attention to multicultural education, provides information on the basics mentoring while exploring options for future faculty professional development and learning.

Medical schools are trying to provide formal mentoring programs within their institutions; however, it is essential for clinical faculty to understand their essential role in these programs in measured efficiency and effectiveness for student participants (Meinel et al., 2011). A survey of medical schools in Germany reported that 61% of 36 institutions have mentoring programs, most feature faculty physician mentors assigned on a one-to-one basis with medical student mentees (Meinel et al., 2011) supporting the importance of individual faculty member participation in mentoring in as a teacher professional activity. Bhatia et al. (2013) reported the experience of a new mentoring program at a single medical school involving 55 volunteer faculty physician mentors matched with two to three student mentees each over a year. Respondents among the faculty and students reported over 95% considered mentoring to be a good idea, yet about one-third of students did not participate because of a lack of time and commitment to the program (Bhatia et al., 2013). Faculty development can support mentoring as an activity that students who participate feel supported, can develop professional identities, and the humanitarian characteristics desired in future physicians (Bhatia et al., 2013).

Mentoring is an important component of what a preceptor provides a medical student in clinical learning situations as an expression of social cognitivism and cultural awareness. Michalec (2012) presented a study that evaluated how preceptor behavior influenced 10 first-year and 10 second-year medical students who were assigned to shadow faculty preceptors engaged in clinical practice. In-depth interviews were conducted with the twenty medical students and the resulting data were analyzed using a subset of deductive codes obtained from previously published literature, inductive codes, categories, and themes that emerged from subsequent analysis (Michalec, 2012). The results indicated that the students were able to identify both positive and negative examples of preceptor professionalism behaviors while

shadowing the physicians during their clinical practice (Michalec, 2012). This study provides evidence of the importance of how physician professionalism behaviors during clinical practice influences the socialization of medical student learners in their socialization as future physicians (Michalec, 2012). Though the conclusion of this study focused on the importance of clinical experiences with practicing physicians for medical students early in their medical school careers to foster the professional socialization required to become physicians (Michalec, 2012), the study also emphasized the importance the exhibited behaviors of the physicians as mentors had on the socialization process. Mentoring as a topic within a proposed professional development program will be tied to Bandura's social cognitive learning theory (Michalec, 2012) and will be framed within the cultural relationship the medical student and the physician create within the clinical learning experience.

### **Summary and Proposed Intervention**

A professional development program in medical education could provide components of effective professional learning as defined by Darling-Hammond et al. (2017) when the program is focused on pedagogical knowledge and incorporates active learning. Of the seven components identified as characteristics of effective professional learning (Darling-Hammond et al., 2017), a program may not have the resources to fully support collaboration between participants, modeling effective teaching behaviors, coaching, expert support, self-reflection, and feedback. A program less than one year in duration is likely not sufficiently sustained (Darling-Hammond et al., 2017). A pilot asynchronous professional development program may support pedagogical knowledge on a platform that is readily available to clinical faculty that have limited opportunities for attending time-specific faculty professional development. A pilot faculty professional development program could introduce what constitutes meaningful sustained faculty

professional development as understood by Darling-Hammond et al. (2017). Participants in a pilot faculty professional development program could consider options for future professional development that might include collaboration with colleagues, coaching, expert support, feedback, and reflection. Darling-Hammond et al. (2017) emphasizes that a teaching and learning culture should become permanently incorporated into an institution, such as a medical school at the level of clinical departments where medical students learn in collaboration with faculty.

The Learning Forward (2011) standards for professional learning define a well-established teacher professional learning program that requires the commitment of the institution, teachers, learners, and the community for the most effective implementation. The institution of this problem of practice is not prepared to meet all the requirements of the Learning Forward (2011) standards for professional learning. A faculty professional development program could, however, conclude with a survey that explores participant interest in future professional development that applies the standards professional learning (Learning Forward, 2011) to support ongoing engagement and improvement in the institutional professional development process.

An initial clinical faculty professional development program, therefore, can provide the basis and the incentive for the development of a more complete, sustained, learning community-based approach that empowers all clinical faculty and will be driven by a commitment to approval based on teacher and learner performance outcomes. After participants engage with content related to effective teacher professional development, the final activities can include a questionnaire regarding interest in developing and participating in a more robust, ongoing professional learning culture that will include meeting the standards for professional learning

(Learning Forward, 2011) and the seven characteristics of effective professional development (Darling-Hammond et al., 2017). If there is sufficient interest expressed by participants, then a larger future professional development program can be considered that can meaningfully address the issues of faculty professional learning and improvement in student learning outcomes.

## Chapter 4

### Intervention Design and Method

I created an online, asynchronous teacher professional development pilot program for clinical faculty teaching medical students based on the factors of my problem of practice (Chapter 1), which were clarified within my medical school institution through a needs assessment (Chapter 2), and then defined with a review of intervention literature (Chapter 3). The institution was placed on shutdown for medical education in March 2020 due to the COVID-19 pandemic. The online program was opened to clinical faculty when my institution was permitted to resume in-person clinical education on July 1, 2020, with the start of the academic year for third year medical students as components of the online program required faculty to work directly with medical student learners in clinical settings. I assumed the COVID-19 pandemic was a major factor contributing to lack of participation, but I acknowledged that a systematic approach to identify all the factors involved was necessary to improve future program participation. Root cause analysis has been used as a strategy for applying contribution analysis in finding the important factors contributing to an adverse outcome encountered during medical practice. Santen et al. (2019) describe a root cause analysis approach that defines domains of inquiry (i.e., environment, equipment, materials, process, measurement, and people) to focus the analysis on what contributed to the issue.

### **Context of the Study**

This chapter provides an overview of the study context, including the original online, asynchronous, module-based clinical faculty professional development program. The chapter also provides the purpose, research questions, participants, measures, and procedures of the

subsequent research project that was undertaken to investigate issues with clinical faculty participation.

### **School of Medicine**

Prior to the onset of the pandemic, clinical faculty in my context were engaged in a wide range of medical practice areas including primary and specialty care in both surgical and non-surgical functions. These physicians provide outpatient, inpatient, and to a small extent, virtual or online patient care. The use of technology in medical practice was rare, except for the Psychiatry Department who were using telemedicine commonly prior to the pandemic. Each physician had a wide range of medical education responsibilities including undergraduate medical education with medical students in both the pre-clinical or foundational sciences portion of the medical student curriculum and the clinical sciences portion of the curriculum. Many had roles teaching in the institution's graduate medical education program that includes residency and fellowship training, and teaching learners from other medical specialty programs (e.g., physician assistant program). Teaching strategies used include large group didactic lectures, small group conferences, and preceptorship for learners in clinical practice settings. Clinical faculty were also engaged in departmental and/or institutional committees, non-education roles in their departments or the institution, professional organizations, and their personal lives.

Teacher professional development largely involved in-person opportunities.

My roles in the college of medicine include director of the third-year medical student required clerkship in obstetrics and gynecology. I have been a full-time member of this institution's clinical faculty for 26 years. All the participants in my study are my colleagues in various roles within the college of medicine. The faculty participants practice and teach in other clinical departments and are not faculty in my department. Among the administrators, I am

directly supervised in my educational role by three and work collaboratively with the remaining three in a non-hierarchical relationship. Among the leaders, I work directly with them as fellow clerkship directors in their respective clinical departments. I have regular contact related to educational responsibilities with the participants in the administrative and leader groups. I had minimal contact with the faculty participants. I have worked with a few of the faculty participants, caring for patients, when our clinical specialties required but was not a supervisor for any of these participants. I had regular, sometimes daily, work-related contact with the administrative directors and leaders. As I am not a supervisor for any of the participants in this study, I conducted the consent process, interviews, member checks, and data analysis myself.

### **Clinical Faculty Professional Development Program**

A pilot teacher professional development program study was approved, built in the institution's online learning management system (i.e., Blackboard), and offered to clinical faculty. The mixed methods convergent design (Creswell & Plano Clark, 2018) pilot program would have explored the feasibility and evaluated the potential efficacy of an innovative and theory-based intervention as described by Gellar et al. (2012) and Gamrat et al. (2014). Additionally, teacher self-efficacy was to be measured using a single-group, pretest-posttest design (Flasch et al., 2017) and fidelity of implementation was to be measured as in Ellaway and Masters (2008) and O'Donnell (2008). To promote and create interest among faculty for the pilot online asynchronous teacher professional development program, I contacted administrators and directors in clinical educational programs (courses and clerkships) within the institution to provide me a list of names of clinical faculty who actively teach medical students and other learners as part of their clinical practice responsibilities. With these lists I contacted clinical faculty members individually to invite participation in the online program using the institutional

email platform. Eleven clinical faculty members signed up and were entered into the online program. Enrollment opened on the first day of the 2020-2021 academic year. After 10 weeks, 11 faculty members expressed interest in the program and three completed the informed consent process. However, none had completed a module, each of which were expected to take 2–4 weeks to complete. It was not clear if the COVID-19 pandemic or other factors independent of the pandemic may have played a role in the lack of programmatic involvement among faculty.

The topics of the online, asynchronous modules were teaching, learner assessment, curriculum development, mentoring and advising, and educational leadership and administration. Module content outlines and screen shots of a module in Blackboard are provided in Appendix D. The format for module structure was based on a faculty development program to build capacity for community-engaged scholarship using their EDGES concept of learning goals, activities, and assessment. Opportunities for reflection was to begin with the e-portfolio through the combination of the pedagogical knowledge questionnaire, the 3-2-1 reflection questionnaire, and the satisfaction questionnaire. The pedagogical knowledge questionnaire assesses a measured change in participant perceived pedagogical knowledge. The 3-2-1 reflection questionnaire would have allowed participants to describe in writing three things learned from the module, two ways the module content was applied in teaching, and one area in which they still had a question. The satisfaction questionnaire assesses what was learned in the module related to ease of learning, application, and usefulness. The quantitative and qualitative data from the e-portfolio would have been evaluated and triangulated to document any correlation between perceived pedagogical knowledge increase and the reflections on teaching experience applying the module content. The added value of qualitative analysis provided by written reflection would produce specific examples where module learning objectives were applied, providing possible

explanations for why participants assessed their pedagogical knowledge the way they did. Reflection also would have provided an opportunity, through written responses, for challenges related to the content presented or application of content.

### **COVID-19 Pandemic**

On March 17, 2020, my institution was shut down by the American Association of Medical Colleges (AAMC) due to the COVID-19 pandemic (Ayoub et al., 2020). Medical practices around the country reported steep declines in practice revenue (Rubin, 2020). The Journal of the American Medical Association, for example, reported 97% of practices surveyed experienced negative financial effect related to the COVID-19 pandemic including a 68% reduction in work hours and 62% reduction in salary (Rubin, 2020). Medical practices saw a 60% reduction in clinical visits due to governmental shut down orders across the United States, with 6% of practices closing and 35% reporting employee furloughs (Rubin, 2020). Frontline healthcare services (e.g., emergency medical services, emergency departments, and inpatient acute care settings) are not only challenged by increasing numbers of patients due to SARS-CoV-2 infection, but also due to patient fear that delays care for usual medical conditions such as chest pain (Rubin, 2020). Under the guidance from the Association of American Medical Colleges and national public health experts, medical students were restricted from in-person large and small group learning and clinical activities in medical schools across the United States (Hueston & Petty, 2020). Students were excluded from participating in some procedures, surgeries, or patient care situations that would require use of personal protective equipment for patients suspected of having or known to be infected with SARS-CoV-2 virus (Hueston & Petty, 2020). At my medical school, clinical education programs were halted due to concern for students (a) contracting the SARS-CoV-2 virus while taking care of patients or (b) transmitting

the virus to patients. Many of our clinical faculty and their practices were affected by the COVID-19 pandemic as reported by Rubin (2020), including reduction in patient visits, practice income, healthcare provider income, and patient care opportunities needed for teaching.

As noted in Abruzzo et al. (2019), the intended participants (i.e., clinical faculty members) are challenged by economic and administrative forces that compete with teaching, often resulting in less time for teaching. The reduced time for teaching was further exacerbated by the coronavirus pandemic. Healthcare professionals all over the world were facing an unprecedented situation where decisions are made under situations of extreme stress, such as allocation of limited resources for patients in great need and how to balance their own physical and mental wellness with those of patients (Greenberg et al., 2020). The long-term impact of the pandemic on medical education and career development is unclear; however, it is expected to be extensive (Ferrel & Ryan, 2020). Many clinical educators are working harder, as they are working outside of their usual scope of practice to serve on the pandemic frontline (Roberts, 2020).

### **Purpose of the Study**

Given the continuation of the pandemic through fall of 2020, the needs assessment findings were no longer relevant or applicable given the altered state of potential participants' personal and professional lives. As important as the COVID-19 pandemic is as a worldwide crisis affecting medical education and practice, it would be simplistic to assume the lack of interest in my pilot program was solely the result of the pandemic. A broader investigation into the factors that reduced clinical faculty interest in the pilot program was, therefore, undertaken to gain an understanding of how the pilot program failed to function as intended and to identify changes that may help improve future participation while taking the short- and long-term

realities of the pandemic into consideration. The purpose of this dissertation study was to conduct an educational root cause analysis, as described by Santen et al. (2019), to determine the factors that contributed to a lack of participation in a pilot clinical faculty professional development program. The research questions that guided this study were:

3. What do key stakeholders perceive as factors that reduced clinical faculty participation in a pilot program?
4. How do key stakeholders describe modifications that may increase clinical faculty participation in an online teacher professional development program?

### **Research Design**

The theoretical framework for this study is complex adaptive systems theory. Woodruff (2019) argues that medical education is incomplete when future healthcare professions understand the application of medical knowledge in clinical situations in a reductionist approach. As clinicians gain deeper understanding and apply a greater spectrum of solutions when complexity science is applied to medical practice using the complex adaptive systems approach that is derived from complexity theory (Woodruff, 2019). Application of complex adaptive systems theory in medical education suggests that clinicians must deal with a multifaceted health care system that includes team-based care and patients with complex medical issues (Cristancho et al., 2017). This broadened approach to problem-solving enables advocacy for novel approaches to effectively manage problems in complex health care settings (Cristancho et al., 2017).

Contribution analysis is a process grounded in complexity theory that promotes a systematic method to make credible causal statements under complex conditions to describe differences a program has made in observed outcomes (Van Melle et al., 2017). Contribution

analysis as explained by Van Melle et al. (2017) is a method for understanding program implementation as a process to “open up the black box” (p. 753) of program implementation to seek an understanding of how and why the outcomes occurred during program implementation. Contribution analysis provides plausible description of the factors influencing program activities and the relationship of these factors to program outcomes by considering multiple hypotheses outside of the original framing of the program (Van Melle et al., 2017). The six steps of contribution analysis are:

1. identify the cause-and-effect relationship to be addressed,
2. develop a theory of change,
3. gather existing evidence,
4. assemble the contribution story,
5. seek out additional evidence, then
6. refine the contribution story.

A contribution story is built when the context is described in detail, a plausible theory of change is defined, activities, outputs, and outcomes are thoroughly described (Van Melle et al., 2017).

Complex adaptive systems theory is a medical practice-specific application of complexity theory (Woodruff, 2019), and can be applied in a structured evaluation (Van Melle et al., 2017), such as a root cause analysis (Santen et al., 2019).

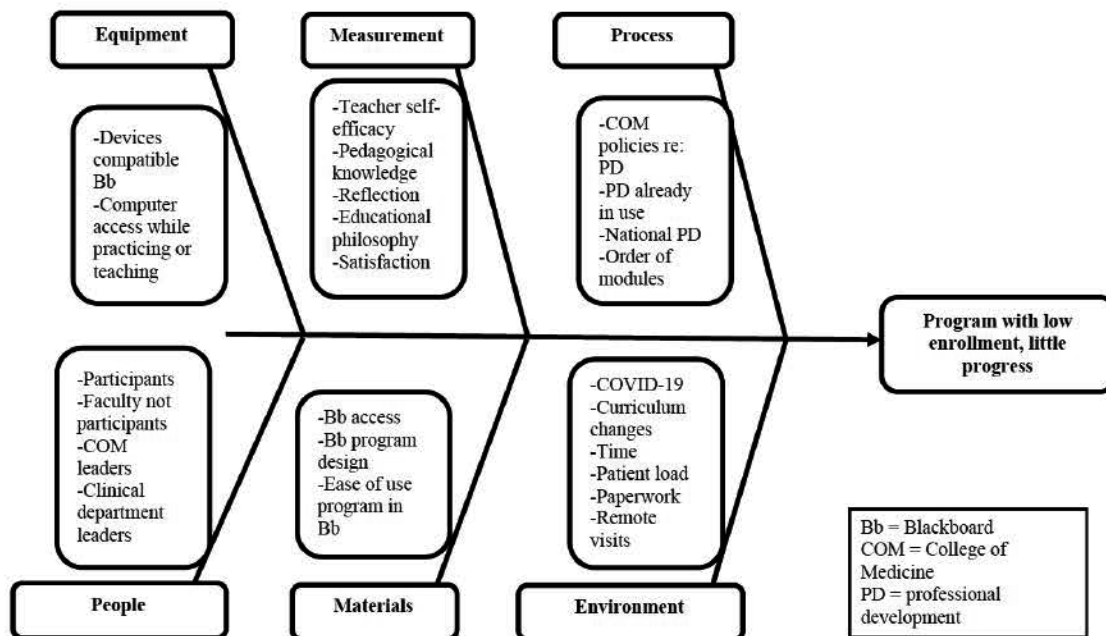
### **Root Cause Analysis**

Root cause analysis is a specific strategy applying contribution analysis in solving an identified issue. Santen et al. (2019) defined root cause analysis as a method to study the potential factors that contribute to errors that occur during medical practice. The first step of root cause analysis is to define a problem statement. The next step is to create a system flow diagram

that visually displays the potential contributors and components of a problem this accessible to the stakeholders studying the problem (see Figure 4.1). The system flow diagram brings together broad areas of concern that potentially contributed to the adverse educational outcome defined as “domains”. Under each domain, stakeholders create lists of specific parts of the system under study that can be analyzed and changed with the intention of improving system performance.

**Figure 4.1**

*Fishbone Systems Flow Diagram*



*Note.* A system flow diagram, specific to this study, allows stakeholders to discuss and refine common domains of causes and explore why and how the domains contributed to the problem. Adapted from “Employing a Root Cause Analysis Process to Improve Examination Quality” by S. A. Santen, K. L. Grob, S. U. Monrad, C. M. Stalburg, G. Smith, R. R. Hemphill, and N. L. Bibler Zaidi, 2019, *Academic Medicine*, 94(1), p. 72 (<https://doi.org/10.1097/ACM.0000000000002439>). Copyright 2018 by the Association of American Medical Colleges. Used with permission.

Santen et al. (2019) list the domains of cause as: equipment, measurement, process, people, materials, and environment. The “equipment” domain focuses on the computers and software tools used in delivering an educational program. The “measurement” domain includes all the strategies and tools used to document and measure participant engagement in the program. The “process” domain focuses on what order to content topics are presented, what time frame is available for program engagement and completion, and what institutional policies and procedures are applicable to the program. The “people” domain focuses on changes among program stakeholders, faculty familiarity with the program, and competing priorities among participants. The stakeholders in this study are the leadership of the college of medicine, chairs, graduate medical education directors, and clerkship directors in the clinical departments of this medical school. The “materials” domain includes the program content, how it displays, and familiarity of participants with software. The “environment” domain deals with the physical spaces and circumstances of where the program is experienced (Santen et al., 2019).

A root cause analysis grounded in contribution analysis principles (Van Melle et al., 2017) define the problem statement (Santen et al., 2019): out of a faculty of about 1,500 members, few enrolled and none had made progress moving toward completion in over 10 weeks. The next step was to meet with stakeholders to review the program and the system flow diagram to understand the identified core root causes more deeply and to add additional insights (Santen et al., 2019).

## **Method**

This section presents the participants, instrumentation, and procedure.

### **Participants**

The stakeholders in this root cause analysis include clinical faculty members, college of medicine curriculum administrators, and departmental clinical education leaders. The

interrelationships between these stakeholders within a single institution for medical education can be understood with the assistance of ecological systems theory (Neal & Neal, 2013). The clinical faculty members are part of the microsystem as the focal individuals that play a direct role and would have had direct experiences within the program. The departmental clinical and education leaders form a mesosystem that encompasses the clinical faculty members and include direct and indirect social interactions related to the function of the clinical faculty members in their clinical and teaching functions. The curriculum administrators form an exosystem that encompasses and is networked with the faculty member microsystem and the departmental mesosystem in the areas of curricular design, learning objectives, and learning outcome measures, but rarely interacts directly with clinical faculty members. The networked understanding of ecological systems theory proposed by Neal and Neal (2013) defines how these groups of stakeholders are related to the factors outlined in the system flow diagram created as part of this root cause analysis. These groups of stakeholders are all integral and important components of the undergraduate program of this College of Medicine and have a potential interest in teacher professional development for clinical faculty members. Their insights into the functioning of the teacher professional development program may be helpful improving clinical faculty member participation in the future.

The 16 stakeholder participants included 14 physicians and two non-physician medical education experts. Four faculty participants were enrolled in the online teacher professional development program but did not complete it; they are identified as “faculty” and labeled FAC-1 through FAC-4. Six medical school administrative directors are identified as “administrators” and labeled ADM-1 through ADM-6. Six medical school clinical clerkship directors are identified as “leaders” and labeled LDR-1 through LDR-6. Faculty interact directly with leaders

while leaders interact directly and indirectly with administrators. Faculty and administrators do not often interact directly. The participants had a range of 2–48 years of experience at the institution and a range of 2–26 years in their current roles. See Table 4.1 for complete information on participant experience.

**Table 4.1**

*Participant Duration of Service at Institution and In Current Role in the Institution*

Participant Code	Years at Institution	Faculty Member Level	Years in Current Role
<b>Faculty</b>			
FAC-1	2	Junior	2
FAC-2	42	Senior	26
FAC-3	17	Senior	13
FAC-4	9	Junior	6
<b>Administrators</b>			
ADM-1	10	Senior	2
ADM-2	17	Senior	2
ADM-3	6	Junior	2
ADM-4	26	Senior	8
ADM-5	6	Junior	4
ADM-6	9	Senior	7
<b>Leaders</b>			
LDR-1	30	Senior	20
LDR-2	48	Senior	10
LDR-3	4	Junior	2
LDR-4	13	Junior	3
LDR-5	13	Junior	3
LDR-6	13	Junior	3

*Note.* Years at Institution may include medical school, residency and/or fellowship training, and faculty appointment. Faculty listed as “Junior” represent those at the instructor or assistant professor level, while faculty listed as “Senior” represent associate professors, professors, or faculty with more than 8 years of experience.

## **Instrumentation**

Interviewing participants is a method for documenting individual perspectives, opinions, and attitudes regarding their experiences in a social context (Saldaña, 2011). Interview formats can be highly structured with a set of carefully prepared and specific questions presented to a participant in a particular order (Saldaña, 2011) and can be conducted in a one-on-one format in the same room or via a web-based platform (Creswell & Poth, 2018). Individual in-depth interviews provide the opportunity to explore reactions and compare differences and similarities when stakeholders come from a wide variety of experience and levels of responsibility within an institution (Azzara, 2010). Individual interviews are particularly valuable when researchers are most interested in individual reactions based on the context of individual experience free of influences from a group (Azzara, 2010).

Once the system flow diagram was constructed (see Figure 1), insights that come from the domains reviewed were used to construct questions that guided the discussions undertaken with individual stakeholders contributing to the root cause analysis (Santen et al., 2019). These questions were designed for medical school leaders, clinical leaders, and faculty members who have signed up for the program as all these individuals are practicing clinicians and teach medical students.

Examples of questions that emerged from this system flow diagram were presented to participants included:

- Equipment: What type of device (e.g., desktop, laptop, or mobile) did you use to access the program?
- Measurement: What is your opinion of the number and types of assessments included in this program?

- Process: Are you experiencing problems either accessing or using the program with university computers or your personal devices? Please describe.
- People: What is the importance of faculty development to our institution?
- Materials: Compared to other faculty development programs you have completed how would you assess the amount of material presented in this program?
- Environment: How much of your time in a week is spent providing patient care?

These questions were used to design three protocols for interviews with individuals from the clinical faculty that expressed interest in the original pilot teacher professional development program (see Appendix G), clinical department education leaders (see Appendix H), and curricular administrative leaders in the college of medicine (see Appendix I).

## **Procedure**

This section describes the procedure undertaken to recruit participants and collect and analyze data.

### ***Participant Recruitment***

A total of 47 individuals were invited as stakeholders within the institution where the online teacher professional development program was offered. Eleven of the invited individuals enrolled in, but did not complete, the pilot program were clinical faculty members of the departments of family medicine and pediatrics. Clinical departmental education leaders such as departmental chairs, residency program directors, and medical student clerkship directors were invited from the departments of anesthesia, emergency medicine, family medicine, internal medicine, neurology, neurosurgery, pediatrics, physical medicine & rehabilitation, psychiatry, radiation oncology, radiology, surgery, and urology. Individuals who are members or leaders of my clinical department (Obstetrics and Gynecology) were excluded to reduce bias. A total of 30

individual clinical department leaders were approached to participate. These clinical department leaders have responsibility providing medical student education experiences within the specialty areas of their departments. Clinical faculty teacher professional development is an important component of each clinical department's educational responsibility and mission. Six college of medicine undergraduate medical education administrators, such as the university president, dean of the medical school, associate, and assistant deans with responsibility for medical student education or faculty development were approached.

I sent each potential participant from the faculty group, the clinical department education leader group, and the college of medicine administrator group an email, specific to their role (see Appendix E). Potential participants responded and scheduled individual virtual meetings with me. I emailed each participant a copy of the approved informed consent instrument (Appendix F), a link for our one-on-one Zoom meeting, and instructions for accessing the pilot online program on the institution's Blackboard platform. During each scheduled Zoom meeting, I obtained a signed copy of the consent instrument, activated the recording feature, and conducted the interview.

### ***Data Collection***

I conducted semistructured interviews with each participant between November 2020 and March 2021. Each individual interview lasted approximately 45 minutes. An online meeting using Zoom was scheduled at the convenience of the participant.

Germain (2016) described the interview as a safe forum that allows the participant to express his or her views in a comfortable and safe space. The transcript of the interview becomes an individual's story that is then de-identified, combined with stories from other individuals, and shared in aggregate to protect individual anonymity (Germain, 2016). The interview is designed

to flexible with the intention of assisting the participant to express his or her own narrative. The interviewer should be careful to not lead a participant's narrative in a specific direction regarding the topic of discussion. The goal of the interview should be to provide a "complex, detailed, illustrative, and realistic account of research participants" to describe the experience of each participant as fully as possible (Germain, 2016, p. 18).

An interviewer should facilitate rather than conduct the interview, allowing the discussion to be a process where interviewer and participant work collaboratively to understand factors involved in the topic of discussion (Germain, 2016). An interview process in which the interviewer and the project are working for and with participants instead of merely being about participants encourages more meaningful discussion and deeper understanding of the factors involved for the topic under investigation (Germain, 2016). Therefore, I carried out each meeting with individual participants using the following format:

1. I greeted each participant and assured the online meeting system connection in Zoom was fully functional.
2. I discussed the informed consent process and reviewed the purpose of the research study.
3. I explained my role as a student investigator and how the study was part of my research as a degree candidate in the Johns Hopkins University School of Education Doctor of Education program.
4. After answering questions, the potential participant had, I obtained and documented informed consent.
5. After confirming the participant agreed to have the meeting interview recorded, I started the Zoom recording.

6. I proceeded with the appropriate interview protocol appropriate for each of the participants based on his or her role within the institution.
7. At the conclusion of the interview, I ended the recording and assured each participant that anything discussed by the participant would be treated with confidentiality, anonymity, and would be maintained in a secure fashion.

Zoom recordings were submitted to an online professional transcription service (i.e., Datalyst) to create a transcript of each interview. Each transcript was then forwarded to the corresponding participant to ensure accuracy of transcription. Transcripts were de-identified after member checking was complete.

### ***Data Analysis***

DeCuir-Gunby et al. (2011) described how to create a codebook for interview data that is theory-driven and data-driven as a method to establish reliability. A codebook is a set of codes, definitions, and examples that guide the analysis of interview data (DeCuir-Gunby et al. 2011). Codes are defined as “tags or labels for assigning units of meaning to the descriptive or inferential information compiled during a study” (DeCuir-Gunby et al., 2011, p. 137). Codes are assigned to phrases, sentences or paragraphs connected to specific context that are designed to produce meaningful labels representing data. Codes are developed through an iterative process that refines definitions and provides a richer understanding of the examples associated with the codes. Detailed codes are more consistently applied and more likely to make connections that either support or refute the theoretical basis of the study (DeCuir-Gunby et al., 2011). Codes can be developed from existing theory or concepts as theory-driven, can emerge from raw data as data-driven, or grow from the research process itself as structural codes (DeCuir-Gunby et al., 2011).

Interview transcripts were reviewed for themes and codes that formed the data set for each individual participant (Creswell & Poth, 2018). The data from individual participants were organized and represented (Creswell & Poth, 2018), comparisons were undertaken between the data from participants in the same group (e.g., faculty) and compared among groups (e.g., faculty group and leader group). Coding began with the domains from the root cause analysis (e.g., equipment, measurement, process, people, materials, and environment) are the theory-driven concepts that provide the initial structural codes as suggested by DeCuir-Gunby et al. (2011). Emerging themes were reviewed with the intention of identifying potential modifications to this program that will increase the likelihood of participant enrollment and program completion.

First cycle coding was descriptive coding, and second cycle coding was pattern coding (Saldaña, 2021). Descriptive coding summarizes the basic topic of a passage appearing in qualitative data, including structured interviews (Saldaña, 2021). Along with thematic and descriptive coding, I evaluated the saliency of the emerging codes as described by Buetow (2010). Saliency includes consideration of initial codes as having the following characteristics: highly important and recurrent, highly important but not recurrent, not highly important but recurrent, and not highly important or recurrent (Buetow, 2010). Saliency analysis has been applied in medical practice qualitative research (Tickle & Braham, 2012). Pattern coding pulls together a volume of material from first cycle coding into a “meaningful and parsimonious” series of themes that outlines an explanation for what is occurring in a qualitative data set (Saldaña, 2021, p. 322). Data were reviewed iteratively to assure constructs, categories, explanations, and interpretations were consistent and logical (Creswell & Miller, 2000), to support reliability and credibility.

## **Reliability and Credibility**

“Novice researchers, in particular, can become increasingly perplexed in attempting to understand the notion of validity in qualitative inquiry” (Creswell & Miller, 2000, p. 124).

The statement above certainly describes my experience as a qualitative researcher. Creswell and Poth (2018) explain that reliability reflects the rigor of the research process employed and Saldaña (2011) explains that credibility reflects the unity of the work presented, representing the believability of the work.

### **Reliability**

Reliability describes the consistency a researcher demonstrates when processing interview data (DeCuir-Gunby et al., 2011), even though “reliability” is a term typically reserved for quantitative research. Attention to the design and construction of the codebook contributes to the reliability of the interview research. For a codebook to be reliable, DeCuir-Gunby et al. (2011) recommend the following steps:

1. Forming a codebook is a complex, tedious process that benefits from a team approach that includes input from experienced qualitative researchers.
2. Developing a codebook is time intensive and therefore benefits from a methodical approach that promotes consistency in how each code is developed and structured.
3. Theory plays a critical role in codebook creation; the researcher should refer to the theoretical frame often when selecting, defining, and providing examples for each of the codes to ensure consistency between theory and the codes created.
4. Checking to assure consistency in how the codes are applied to the interview data from individual participant to participant.

The open-ended responses obtained in the individual interviews were analyzed using qualitative methods that have been used in nursing and allied health care research such as Hsieh and Shannon (2005). For this research study, a codebook was created by me, the student investigator, under guidance of my dissertation committee that included members with extensive background in qualitative research. A codebook approach combines a structured method for coding procedures that emphasize ensuring reliability and accuracy in coding with depth of engagement in the coding process (Clarke & Braun, 2018). A methodical and iterative approach was used to create the individual codes formed. A detailed coding process was undertaken within and among the three groups of participants to assure consistency of application.

### **Credibility**

Empirical qualitative studies that involve the collection of data in the field should demonstrate credibility, which helps to establish that the research done was sound and can be trusted (Brantlinger et al., 2005). Credibility is enhanced when the researcher conducts member checks with participants to review and confirm the accuracy of interview transcriptions before analysis (Brantlinger et al., 2005). The development of a detailed description of the data obtained, along with direct quotes, acts as evidence for interpretations, conclusions, and transferability to other situations provided evidence for the validity of the conclusions reached (Brantlinger et al., 2005). Member checks were carried out with participants who reviewed their own completed transcriptions to confirm the accuracy of the final documents. Peer debriefs between me and the experienced qualitative research experts on my dissertation committee were carried out and contributed to the credibility of this study, as did thick, detailed descriptions with direct quotes from multiple participants and different stakeholder groups.

Brantlinger et al. (2005) provides quality indicators as distinct from standard measures of credibility for interview studies that call for transparency by providing clear descriptions of the methods used, including:

1. Ensure appropriate participants were selected, purposefully identified, effectively recruited, and adequate in number.
2. Interview questions were reasonable, clearly worded, did not lead the participant, appropriate and sufficient to explore the domains of interest.
3. Robust and accurate tools were used to record and transcribe the interviews
4. Participants are treated fairly and accurately in the interpretations and conclusions derived from the gathered data.
5. Sufficient attention was given to assure participant confidentiality.

Stakeholders were identified from the group of clinical faculty members that originally expressed interest in the teacher professional development program, clinical department educational leaders, and medical school educational administrative leaders. Interview protocol questions were created and reviewed by those experiences in qualitative research methods. I used videoconferencing software (i.e., Zoom) with recording features and transcription (i.e., Datalyst) to archive the data. Transcription services offer protection that is compliant by Healthcare Insurance Portability and Accountability Act, or HIPAA, standards. By presenting the data collected as groups and then comparing data collected between groups, individual participant confidentiality was preserved. By employing strictly defined interview protocols designed specifically for the identified stakeholder roles, participants were treated fairly, and the information provided was likely to reflect the situation under investigation for the root cause analysis. Finally, collaborative work between novice researchers and experienced qualitative

researchers assures the interpretations of the data to reduce idiosyncrasies and bias (Brantlinger et al., 2005). My regular meetings with my dissertation chair and my acknowledgement of my reflexivity further support how I strove for credibility.

### **Researcher Reflexivity**

The researcher contributes to validity by describing the lens the researcher observes and the paradigm assumptions the researcher applies in a study (Creswell & Miller, 2000). My education, professional experiences, and perspectives have necessarily influenced how I conceived and perceived the design, implementation, and interpretation of this study.

I have been a physician and clinical educator for 30 years. My clinical training is in obstetrics and gynecology with a fellowship in internal medicine and medical intensive care. I have provided clinical educational experiences for medical students, resident physicians, and physicians in fellowship training in obstetrics and gynecology, obstetrical critical care, medical and surgical critical care, and medical subspecialty areas such as pulmonology, cardiology, nephrology, endocrinology, and rheumatology. I have taught on the undergraduate, graduate, and postgraduate levels. I have been the course director for the required third-year clerkship in obstetrics and gynecology at my institution for 10 years. I have been the assistant dean for clinical sciences at this institution. As described by Cooke et al. (2006) and Finn et al. (2011), I found that I functioned well within my clinical practice context as a content expert, but that I had little preparation as a clinical educator outside of my own experience working with both exemplary and poor clinical educators. This gap in my knowledge and experience is what brought me to the Doctor of Education program at the School of Education at Johns Hopkins University.

I have published 11 articles in medical journals that were largely quantitative in nature. My first dissertation proposal (i.e., pilot online teacher professional development program for clinical faculty), however, was a mixed method design in which the quantitative data would have been the primary focus. I was willing to learn about qualitative research but did not imagine using qualitative strategies would become a major focus in my dissertation work. As it became obvious that my original online pilot program was not going to be successful, I realized that I would need to develop new skills and apply qualitative research approaches in a way I did not previously anticipate so that I could determine the issues that prevented the level of participation expected for the pilot online program based on my needs assessment findings.

Preparing learners to become practicing physicians, healthcare providers, and clinical educators has been the essence of my career. My work as a Doctor of Education (EdD) student at Johns Hopkins University School of Education has been a logical extension of my interest in clinical education. As a practicing physician and a clinical educator, I have often wondered if my medical students, residents, and fellowship learners succeeded because of my teaching or despite my teaching. I want to understand how my learners learn, not based on what my experience suggested, but by taking a deep dive into the application of effective instructional strategies in a medical education setting. As convoluted as my time at Johns Hopkins has been, I have been focused on bringing what I am learning and experiencing in education to what I do as a clinical educator.

Through the process of defining my problem of practice, I concluded that teacher professional development and learning provides a starting point for effective clinical faculty learning. I had designed a teacher professional development program for clinical faculty members who see patients and teach medical students. I had reason to believe that this online

program would be successful, as my approach was guided by the results of a needs assessment survey with the faculty intended as the target audience for the intervention program, as detailed in Chapter 2. Final preparations for opening the online program were made just as the COVID-19 pandemic started.

I was directly impacted in all my professional activities during the COVID-19 pandemic. As an obstetrician that is also certified in critical care medicine, I organized and presented educational experiences for my institution and the 17-county referral area the institution serves. I also participated in a national discussion panel for obstetrical considerations related to severe COVID-19 illness during pregnancy. I helped manage obstetrical patients with COVID-19 infection. As a clerkship director, like my colleagues, I redesigned my clerkship experience, as did my colleagues, as fully remote and then a combined in-person and remote experience for my medical student learners when our institution was able to bring clinical learners back on campus. My experience and the experience of the participants in this study are shared experiences. While I was addressing these issues along with my colleagues in medical education, my online pilot program opened. As time progressed and we settled into something like a routine, I realized that participant enrollment—as well as the progress made by the participants who did enroll—was not going to produce the data I had hoped.

I must admit that the disappointment I experienced when few faculty members enrolled, and none completed the program, may be a source of bias for me as a novice qualitative researcher. My disappointment should not influence how I conducted this root cause analysis, as the purpose of this study is to identify factors that can be modified with the intent of improving clinical faculty participation in the teacher professional development program. As easy as it might be for me to blame factors external to my teacher professional development program such

as the COVID-19 pandemic, I must remain open to the possibility there may be factors within the program itself, my approach, my design, that also influenced faculty non-participation. This outcome was not expected and justifies the root cause analysis approach detailed by Santen et al. (2019). I hope that my description and justification for the qualitative approach to this dissertation study, rooted in a root cause analysis process, are clear and convincing. I hope is that my approach to this study was methodical and detailed to a degree that enhances reliability and credibility.

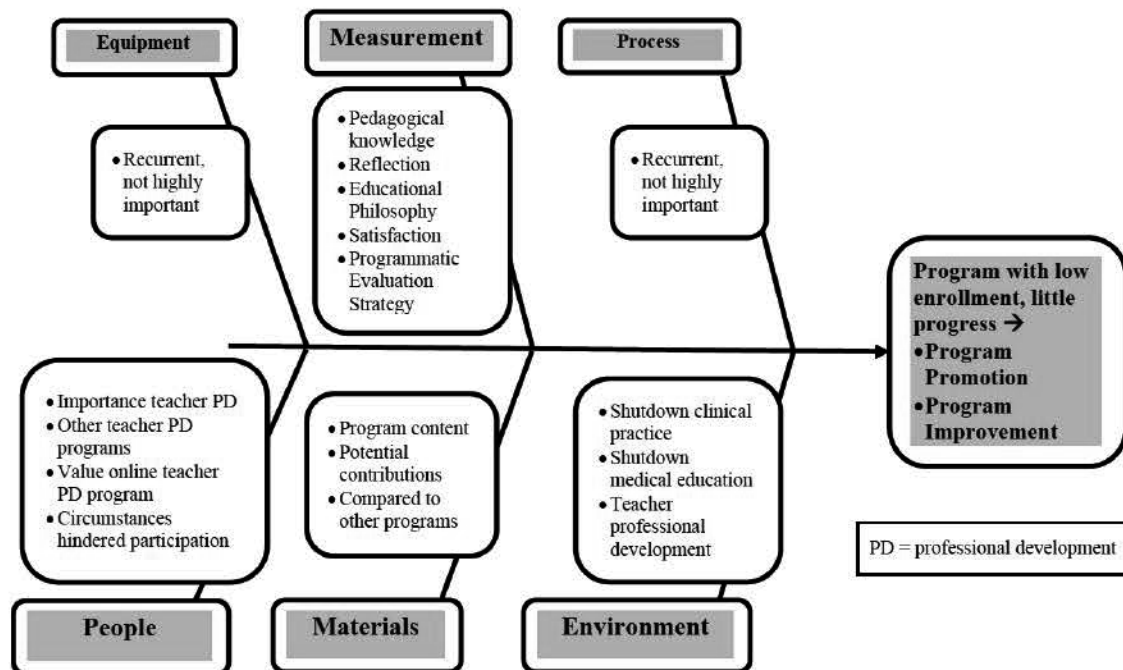
## Chapter 5

### Findings and Discussion

The chapter begins with the findings of the root cause analysis, which are summarized by research question and root cause analysis domain. The chapter concludes with a discussion of the findings as related to the research literature as well as its limitations and implications for future practice and research. Research questions were answered by interviewing key stakeholders, data were analyzed using descriptive and pattern coding (Saldaña, 2021), and findings were organized using a root cause analysis model (Santen et al., 2019). I returned to the systems flow diagram adapted from Santen et al. (2019), as seen in Figure 5.1 below. This figure summarizes participant responses related to the domains outlined in the root cause analysis.

**Figure 5.1**

*Fishbone Systems Flow Diagram with Domains of Root Cause Analysis After Evaluation of Findings*



*Note:* This second systems flow diagram, specific to this study and the findings of the root cause analysis after review of the data collected and exploration of why and how the domains contributed to the problem. Adapted from “Employing a Root Cause Analysis Process to Improve Examination Quality” by S. A. Santen, K. L. Grob, S. U. Monrad, C. M. Stalburg, G. Smith, R. R. Hemphill, and N. L. Bibler Zaidi, 2019, *Academic Medicine*, 94(1), p. 72 (<https://doi.org/10.1097/ACM.0000000000002439>). Copyright 2018 by the Association of American Medical Colleges. Used with permission.

## **Findings**

The findings of this study are arranged by research question, with the salient findings of the first research question presented using the domain structure suggested by the analysis model outlined in Santen et al. (2019). The findings of the second research question are presented as recommendations for online program promotion and recommendations for online program improvement.

### **Research Question 1: Factors Perceived by Key Stakeholders**

Research Question 1 asks: What do key stakeholders perceive as factors that reduced clinical faculty participation in a pilot program? Participants provided insights into how the online program may not have functioned effectively within this institution that were (a) related to the COVID-19 pandemic and (b) not directly related to the pandemic but perhaps made more obvious with the influence of the pandemic on the institution’s clinical and educational functions. The measurement, people, materials, and environment domains (Santen et al., 2019) provided complex and nuanced insight into how the pandemic and other factors exacerbated by the pandemic likely effected clinical faculty participation in the online program.

Findings related to the equipment and process domains were, as explained by Tickle and Braham (2012), “recurrent but not highly important” (p. 136). Within the equipment domain, participants revealed using both personal and institution-provided devices was not a major consideration related to online program participation (e.g., “I have used a tablet for Blackboard” [ADM-2]), with two noting that their personal device was more effective (e.g., “Personal devices are always faster!” [LDR-5]). Within the process domain, participants reported no difficulty managing the institution’s learning management system (i.e., Blackboard) “It [the online program] is well organized and easy to see how it flows; I did not find it technically difficult to access the materials or work my way through them” [LDR-3]. A few participants noted minor issues (e.g., “I had trouble with Blackboard for a while” [FAC-3]; “I think Blackboard is a little cumbersome, but it is not horrible” [ADM-4]). “I think docs are going to grow impatient with Blackboard” (LDR-5). Participants reported no difficulty using a wide variety of devices including tablets, laptop, and desktop computers that were of adequate quality to engage with the online program. While the equipment and the process domains did not identify factors that directly influenced faculty participation in the online program, I believe it is important to note that this institution provides robust technological, educational communications, and information management support for faculty. It is possible the experience in these domains may have differed in other circumstances.

### ***Measurement***

The measurement domain explored participant insight into how the instruments designed to measure clinical faculty engagement and experience in the program. The instruments used in the online teacher professional development program for clinical faculty were designed from evidence supported and validated sources. The pedagogical knowledge questionnaire included in

each module was based on a retrospective pretest-posttest strategy as described by Coulter (2012) and previously used in medical education settings (Bhanji et al., 2012). The reflection questionnaire was modeled on a 3-2-1 reflection instrument (Ménard & Ratnapalan, 2013; Sim & Radloff, 2008; Zygoris-Coe et al., 2004) that offers an opportunity for reflection on application of pedagogical knowledge in clinical teaching settings. The satisfaction questionnaire was designed to assess perception of program effectiveness, academic satisfaction (Zhao, 2003) and suggestions for programmatic improvement (Guskey, 2014). The educational philosophy statement is an activity that is part of the institution's suggested preparation for a teacher's portfolio clinical faculty prepare as part of the process for promotion from assistant to associate professor, securing tenure, or other academic activity application. The educational philosophy statement was a longitudinal activity that clinical faculty were to work on over the course of the five modules of the online program, completing the statement by the end of the last module. Table 5.1 summarizes participant insight and impressions of these instruments and activities related to influences on program completion.

Participants did not describe these instruments or activities as contributing directly to the lack of participation in the pilot online teacher professional development program for clinical faculty. However, ADM-2 commented: "I think the modules are pretty heavy [content volume] they ask you to do a lot of thinking so maybe people won't do it all." Some participants made statements that were not echoed by most participants, but I believe important to a complete understanding of how the measurement domain may influence program participation in the future. As such these statements are rare, but I believe are important and therefore salient to this analysis (Buetow, 2010). While the pedagogical knowledge and satisfaction questionnaires were described as efficient due to the check-box design based on a 5-point Likert-type scale, the

reflection questionnaire and the educational philosophy statement may result in lack of participation due to how time-consuming composing narrative responses might be. LDR-3 commented that “certainly the ones where you have to type something out requires more time...Oh my gosh, I’ll never get this done.” A few participants suggested the time to complete written assignments may be perceived as more valuable if faculty were permitted to work in groups rather than alone as this online teacher professional development program is designed. FAC-4 remarked, “I probably would not spend a lot of time on it if it were just for my own reflection...I think sharing it with someone else is nice.” ADM-4 suggested, “Idealistically, have a bunch of people do this the module reflection and then talk afterwards” regarding experiences applying content in their teaching.

**Table 5.1***Themes Related to the Measurement Domain*

Theme	Description	Categories	Frequency
Pedagogical Knowledge Questionnaire	Participants reviewed this instrument designed to evaluate clinical preceptor pedagogical knowledge for each module	Provides opportunity to reflect without summative testing	8/16
		Allows reflection and self-assessment on module content knowledge	5/16
Reflection Questionnaire	Participants reviewed this instrument designed to provide opportunities to reflect on application of module content in teaching practice	Value in reflective and iterative practice applying module content	7/16
		Applying module content in teaching with reflection promotes understanding of content	6/16
		Can be basis for collaborative practice with other clinical educators	6/16
Applicability Activities to Program	Participants commented on the overall strategy for program evaluation based on the instruments described	Methods hold interest	11/16
		Methods are fair to assess engagement	11/16
		Methods are time-consuming	4/16

The measurement activities included in each module included a writing exercise where faculty could compose an education philosophy statement that would serve as the introduction to their teacher portfolio. The teacher portfolio is required for faculty that are applying for promotion from assistant to associate professor within this institution. LDR-6 considered the exercise to be of value: “I really like the practical aspect of putting together something concrete [education philosophy statement] that could be of use professionally when you’re all finished” while FAC-2 commented: “I’m not sure how useful that [education philosophy statement] is...one option might be to save that for the last module for people interested in promotion.” Discussion with four participants suggested interest in this activity within the online program would be related to interest in promotion within the institution. This point is salient because how

faculty personally perceive the value of an activity will likely influence participation in the program overall.

The participants did not describe the pandemic as a factor that directly influenced their perception of the strategies and instruments created in the online program for measurement. The perception of the amount of content as high and the activities as time-consuming begins here, perhaps influenced by how the pandemic effected participants' perception of time. In Chapter 2, the findings of the needs assessment survey suggested faculty engaged in teaching in their clinical activities preferred faculty development that was online and asynchronous, allowing individuals to work on a program at their own pace on their own time. I believe it is possible that the social isolation that came with the pandemic may have increased participants interest in social aspects of faculty development that was not present at the time of the needs assessment survey.

### ***People***

The people domain explored how participants perceived how clinical faculty approached the online teacher professional development program as individuals. This domain considers how important teacher professional development is to clinical faculty and to the institution itself and why clinical faculty may have not completed the online program. Table 5.2 summarizes participant responses.

**Table 5.2***Themes Related to the People Domain*

Theme	Description	Categories	Frequency
Importance of Teacher Professional Development	Participants commented on the importance of professional development and circumstances that may have influenced clinical faculty participation	Participants believe professional development is important	16/16
		Clinical educators should value professional development	14/16
		Professional development needs to be associated with institutional success	8/16
		Institution does not protect clinical preceptor time for professional development	7/16
		Institutional leaders offer mixed messages regarding professional development	6/16
Value of this Teacher Professional Development Program	Participants described how they believed the program could potentially benefit the clinical faculty	Preparation for clinical preceptors to become clinical educators	13/16
		Potentially a mechanism for delivery professional development in this institution	9/16
		Background in evidence-based teaching skills	8/16
Circumstances That Hindered Participation	Participants commented on potentially why clinical faculty had difficulty completing the program	Program time-consuming	10/16
		Compromised self-motivation with COVID-19	9/16
		Program comprehensive	9/16
		Increased screen time with online patient care, teaching with COVID-19	7/16
		Increased personal responsibilities with COVID-19	5/16

All participants, faculty, administrators, and leaders, agree that teacher professional development for clinical faculty is important. “Without faculty development, we don’t have reliable medical education” (ADM-2) summarizes this view. LDR-2 stated: “I think there is a desire for it [faculty development] but the level to which everyone commits to it is variable.” Most agree that all clinical faculty that teach in their practice settings should value teacher professional development. “I think it [faculty development] is extremely important for any

department but ours especially because I don't think we have a good mechanism for it currently" (LDR-5). Ten participants recognized that the institution provides opportunities other than the online program for teacher professional development and four participants recognized that national organizations provide opportunities as well.

Even though all value teacher professional development, these discussions identified a disconnect between how professional development is valued and what mechanisms are in place to assure an important priority is addressed. ADM-1 summarized the situation:

I think that they [faculty] send mixed messages, and we [administrators] probably send mixed messages about it [teacher professional development]. We all say it's important, yet we don't provide faculty time to do it; we expect faculty to do it on their own time. And, at the same time, I think faculty say it's important, but I don't think they follow through with it or necessarily putting in the effort as well. So, I think it is a problem on both sides.

Six participants, representing faculty, administrators, and leaders, all recognized that the message from college of medicine medical student leaders to clinical faculty regarding the importance of teacher professional development is ambiguous at best. Participants identified a lack of protected time (i.e., time set aside from clinical, research, or other responsibilities to devote to teacher professional development) as evidence the institution is not fully committed to teacher professional development. "I think the COVID situation was the big thing...your program came out at the height, and I could not take on anything else because I was behind so much...it was unfortunate timing" (LDR-4). LDR-5 agreed: "A lot of us have been so busy over the last year asking anybody to do anything above what they're already doing is a hard ask with the pandemic." One administrator commented: "I think not wanting to do more screen time, not

having time to do it [online program] ...maybe they [faculty] don't see a need for it" (ADM-2). Participants described the issue of perceived institutional commitment to teacher professional development predated the release of this online professional development program and the pandemic.

The conversations with these key stakeholders suggested a disconnect between how important faculty development is for individuals and the institution, and how faculty development is delivered. Currently, the institution requires one faculty development program that consists of two half-day seminars with interactive sessions. One administrator commented "I did the [required] workshop within the last five years that everyone was required to do...I actually can't remember the workshop" (ADM-3). Among the medical student clinical course leaders, all run clerkships within their departments, and none reported their departments provided robust faculty development for faculty or residents who teach medical students. One of these leaders noted "we get notification of opportunities, but they're more outside the department" (LDR-4). An administrator mentioned "Some [residency] programs already had a very robust resident faculty development program for teaching residents to be [medical student] teachers; some departments have a lot of curricula already developed and implemented" (ADM-4).

Most participants are aware of other teacher professional development opportunities within their departments, the institution, or from national organizations and resources. One administrator described faculty development in this institution: "I know of a few examples, the [required for new faculty] workshop, optional workshops, shared electronic resources have been good, but narrow in terms of one-off seminars" (ADM-3). Participants found that the online teacher professional development program has the potential to be of value for the clinical faculty in this institution in their teaching practice.

Participants identified attributes of the program itself as potentially contributing to the lack of participation including the comprehensiveness and time-consuming appearance of the program content. “Some of the modules are text-heavy...when I’m trying to do something between other things, it [the online program] is intimidating” (FAC-4). “It [the online program] is a lot, it is dense compared to Doximity (i.e., an online faculty development application provided by a national organization), a three- to seven-minute read...people would be potentially limited by their own ability to stick with something” (ADM-2). Participants described lack of clinical faculty participation as a combination of the effect of the institution’s culture around teacher professional development, effects attributable to the pandemic, and characteristics attributable to the online program itself.

### ***Materials***

The materials domain explored participant insight into how the materials selected as content for the online teacher professional development program may have influenced completion of the program. The content included in the pilot online asynchronous teacher professional development program was designed to allow clinical faculty to work alone at their own pace (Fishman, 2016) and to focus on pedagogical knowledge that includes active learning (Darling-Hammond et al., 2017). An online asynchronous, module-based strategy has been used in medical education settings (Alexander et al., 2006; Steinert et al., 2006). Participants commented on how the materials included in the online program may have influenced program completion. Table 5.3 summarized participant insights and impressions.

**Table 5.3***Themes Related to the Materials Domain*

Theme	Description	Categories	Frequency
Topics Offered in Program	Participants commented on the program content	Topics appropriate for clinical teacher professional development	16/16
		Topics interesting	12/16
		Topics appropriate for new and early career clinical faculty	10/16
		Topics appropriate for multiple clinical education settings	10/16
Potential Value of Program Content	Participants commented on potential contributions this program could make to teacher professional development	Program is well-thought out and organized	10/16
		Could be helpful for clinical faculty struggling in their teaching	7/16
		Content includes mentoring and advising for learners	5/16

The participants described the content available in the online program as appropriate for faculty teaching medical students in a variety of clinical settings. One faculty member stated that “we community preceptors are pushed into the role as professional teachers without any education” (FAC-2) and continued by explain that this online program has potential to address the gap. One experienced leader commented: “I found them [the modules in the online program] good at the introductory and intermediate levels; perfect for young educators” (LDR-2). The participants described the program content to be well organized and presented. The content seemed potentially useful to clinical faculty as “these topics routinely come up in various settings; learner assessment, mentoring and advising, how to lead, and teach apply to everybody who can see how it matters as a teacher” (LDR-3). The online program was recognized as having the potential to be helpful to clinical faculty early in their teaching careers such as “residents, especially the ones who struggle [teaching]” (FAC-4). The online asynchronous format was

recognized as “a convenient way to do [faculty development] at home on your own time” (LDR-2). The participants described the materials and the manner the materials were presented as appropriate for teacher professional development; other factors present at the time of the program debut related to the pandemic, therefore, likely influenced participation.

Although mentioned by less than five participants, additional themes related to the volume of content and lack of incentives were identified as being salient, per Buetow (2010). “This looks like an awful lot compared to other faculty development I have done” (ADM-2). How the content was presented within each module at once also seemed overwhelming for some. LDR-6 exclaimed: “Oh God, I don’t have time to do this whole thing; it is really difficult logistically for me to have a block of time to do this [online program].” LDR-3 said: “There might be interest and passion for learning how to become a better teacher, but if I don’t have to do this [online program], it moves down the list because there are so many other pressing deadlines.” Other participants also discussed how the program did not offer deadlines or rewards as part of keeping clinical faculty engaged with the program, describing these deadlines and rewards as “carrots and sticks.” FAC-3 stated: “We are all carrot chasers; without a deadline or a requirement to do it [the online program], it keeps going to the bottom of the list.”

Though it is heartening to hear that participants considered the content included in the online program appropriate for teacher professional development at this institution, the comprehensive and overwhelming nature of how that material was presented was a barrier to engagement for those faculty that enrolled in the online program. It is not clear if the effect of the pandemic influenced how participants viewed the content in the online program, but it seems likely that the volume of the content was an independent factor.

## ***Environment***

The environment domain provided a space for the stakeholder participants to discuss how the clinical and educational environment, before and during the COVID-19 pandemic, may have influenced completion of the online teacher professional development program. Table 5.4 provides examples of changes related to the participants' working and teaching environments.

With the onset of the pandemic, participants noted changes in their clinical practice responsibilities. Due to federal and state regulations, there was a complete shutdown leading to the interruption of all outpatient and inpatient clinical services except for emergency and care otherwise unavoidable (e.g., pregnancy and childbirth). The initial shutdown required the removal of all medical students from clinical settings. Once telemedicine appointments became the norm, no clear method was found that would effectively involve students in patient encounters.

During the shutdown, participants described a wide range of experiences, depending on their individual medical practice focus. As the online program required faculty to report their experiences while teaching medical students in their clinical practice settings, the lack of patients due to the shutdown impeded participation in the online program. Those involved in primary and outpatient care services experienced the complete shutdown of their professional activities. "We had a total shutdown of our clinic before we started telemedicine....in summer, we opened up to see more patients in person" (FAC-1). LDR 4 concurred by saying that the "number of [pediatric] patients decreased dramatically." Similarly, as practice sites experienced financial stresses and reduced staffing, some clinical preceptors could not provide resources for medical students (e.g., personal protective equipment) further reducing opportunities for faculty to interact with medical students while caring for patients. The issues with clinical practice, lack of

patients, challenges hosting medical students on clinical sites, and managing last minute scheduling changes contributed to the lack of faculty participation in the online program; these challenges varied among departments.

**Table 5.4**

*Themes Related to the Environment Domain*

Theme	Description	Categories	Frequency
Changes in Clinical Responsibilities	Shutdown of all clinical practice other than emergency services followed by reopening of clinical activities	Return to clinical practice with limited direct patient contact, increased use of remote technology	12/16
		Complete shutdown in-person non-emergent care, initiating remote technologies	10/16
		Return to clinical education: limited direct patient contact supplemented with technology and remote learning	10/16
		Direct patient contact limited by policies/procedures: social distancing, PPE, technology limits	8/16
		Reduction in available patients for clinical UME experience	7/16
Changes in Needs for Teacher Professional Development	The pandemic inspired participants to consider teacher professional development needs	Need for skill building: increase understanding and applying technology in teaching	8/16
		Need for basic skills that contribute to faculty pedagogical knowledge in clinical teaching	7/16

*Note.* PPE = personal protective equipment (e.g., masks, gowns, gloves, eye protection), COVID-19 = disease related to infection with the severe acute respiratory coronavirus type 2 (SARS-CoV-2), and UME = undergraduate medical education (i.e., medical student to physician education).

Those involved in surgical and inpatient care services had a more complex experience. For those involved in acute care (e.g., emergency medicine, trauma surgery and critical care,

hospitalist internal medicine) the pandemic was a busy and challenging time. “That [COVID-19 pandemic] led to a situation where surgeons were caring for patients that were not surgical patients” (LDR-3). One leader noted they were “short-staffed because we were increasing the number of [patient care] teams” for the expected influx of COVID-19 patients (LDR-5). For those involved in hospitalist pediatric care, there was a reduction in inpatient care as school closures, masking, and social distancing contributed to a reduction in all infectious diseases normally seen in children during the winter and spring months. “In pediatrics physical distancing, wearing masks, and hand hygiene drove down illness in children” (LDR-4). During the height of the pandemic, even when medical students were allowed by national and institutional leaders to return to clinical sites, regulations prohibited medical students from seeing patients that were suspected or confirmed to be infected with COVID-19 (Ayoub et al., 2020) further reducing opportunities for faculty and medical students to interact as required by the online program. Those who perform electively scheduled surgeries, for example, noted a reduction in clinical activities: “I think it [the pandemic] led to a huge reduction in surgical volume” (LDR-3).

During shutdown, participants not involved in acute care directly or indirectly related to the COVID-19 pandemic managed new challenges such as initiating or expanding telemedicine services, staff reductions and reassignments, and dealing with personal challenges such as home schooling their children. Once state and federal regulations and guidelines allowed for reopening of non-urgent or emergent patient care, participants reported issues related to securing sufficient personal protective equipment, establishing protocols for patients and staff to return to practice settings, managing patients with telemedicine, and balancing patient care around who must be seen in-person versus remotely. As medical students returned to clinical settings, participants

noted that the adaptations made to accommodate safety in patient care reduced teacher learner interaction. One faculty participant described “a lot of hassle with telemedicine because of the ability to make it happen with elderly folks who don’t know how to figure it out and a large Mennonite population who don’t have video access” (FAC-2). Challenges with telemedicine contributed to limiting how medical students participate in patient care. “It has changed [Emergency Department practice] in terms of donning and doffing [putting on and removal] of PPE [personal protective equipment] seeing COVID patients” (FAC-3).

In addition to the challenges outlined, last minute scheduling changes led to challenges in providing consistent opportunities for medical students to join faculty during patient care encounters, as “individual patient care considerations include the safety of the patient, whether it’s they are coming in for a visit, [or] scheduling something later [when an appointment] isn’t immediately necessary” (ADM-3). These challenges reduced opportunities for faculty to interact with medical students in clinical teaching and, therefore, ability to participate in the online program that requires interaction with medical student learners to apply and understand the module content.

When the AAMC shut down my institution in March 2020, the medical school program rapidly switched from in-person clinical education to a remote model that substituted online didactics, video recordings, and remote encounters for in-person patient care experiences. Participants described their experiences initiating and adapting to remote learning followed by a gradual and orchestrated return to in-person clinical experiences based on organizational, federal, and state regulations and guidelines. Challenges discussed included understanding evolving guidelines and how to apply them for medical student learners, assuring the safety of patients, learners, and staff in clinical environments, securing, and providing training for use of personal

protective equipment, and hoping enough patients would be available for learners to engage either in-person or remotely. “I feel it is much easier to have a student go into the room when the patient is here in person...with telemedicine, I usually have them shadow, which is not an active learning experience” (FAC-1).

Faculty may have had less time to engage in the online program as they were busy remediating medical student learners on basic knowledge and skills that traditionally would have been covered earlier in the medical student curriculum. Some participants described the challenges involved in adapting didactic and small group teaching to online formats and involving students in telemedicine encounters. “It’s hard to teach physical exam skills virtually...they are used to practicing on each other and it is hard to do virtually” (FAC-1). Another effect of the pandemic was to modify and perhaps reduce medical student preparation for onsite clinical learning once medical students were permitted to return to clinical care.

## **Research Question 2: Recommendations to Improve Program Participation**

Research Question 2 asks: How do key stakeholders describe modifications that may increase faculty participation in an online teacher professional development program? After I discussed the potential factors identified in the root cause analysis approach, I then continued the root cause analysis strategy (Santen et al., 2019) by discussing with each participant what changes I could make regarding promotion of the program at this institution and what changes I should consider that may potentially increase clinical faculty participation in a future version of the program. Table 5.5 summarizes what recommendations participants offered regarding promotion of the program and Table 5.6 summarizes recommendations regarding program change.

**Table 5.5***Recommendations for Improving Program Participation*

Categories	Frequency
Clinical department meetings	7/16
Link program with institution's required teacher professional development program	5/16
Meet with clinical department education committees	5/16
Present program to clinical department chairs	4/16

Key stakeholder participants in this root cause analysis suggested I consider collaborating directly with clinical departments by attending department meetings, department education committee meetings and appealing directly to clinical department chairs. To promote interest on a departmental level, I should create a shorter version of one of the modules in the original online program for chairs, committee members, and department members to access and explore as part of a wider program promotion strategy. ADM-2 offered: "You could do a mini module at one of the departmental monthly conferences." ADM-3 suggested: "Is there a part of the program that was particularly engaging? You could show it at Phase 2 [monthly meeting of clerkship directors and medical school administrative leaders], at department meetings, grand rounds, or to key educators in departments."

The College of Medicine Office of Faculty Affairs & Faculty Development at this institution requires the Build Excellent Skills for Teaching (BEST) program that is given by the Academy of Upstate Educators, a group of faculty members from the colleges within the university who have distinguished themselves in education. The BEST workshop is offered over two half-days in October or in May and is a group meeting of new and interested faculty who must attend both sessions, usually given on a Tuesday and a Thursday the same week. The

workshop includes didactic and interactive activities. Five participants suggested that I offer to incorporate the online program with the BEST workshop program. ADM-1 offered: “Give a sample mini course [of the online program] during the BEST Workshop” while ADM-3 suggested: “I think the whole thing [the online program] can be turned into something useful to the faculty, as a precursor for the BEST workshop.” Participants supported adding this online program to the required and ongoing voluntary opportunities for teacher professional development available at this institution.

**Table 5.6**

*Recommendations for Improving the Online Program*

Categories	Frequency
Add an interactive group component around reflection questionnaire	12/16
Offer CME credits	9/16
Offer badging, micro-credentialing, or certificate for module completion	9/16
Emphasize bias, discrimination, inclusion, cultural awareness, generational differences, advising, and mentoring	7/16
Offer program to residents, fellows, and early career clinical faculty specifically	7/16
Link participation to promotion or tenure	6/16
Present content in modules in sequence rather than all at once	6/16
Allow clinical preceptors to select topics in order of interest	6/16
Engage clinical faculty who complete program to mentor next groups	6/16

Participants offered a range of suggestions to potentially improve clinical faculty engagement in a future version of the online program. Even as participants discussed how the burden of other responsibilities resulted in lack of time for program participation, both before and during the pandemic, 12 of 16 agreed the online program experience would be improved by

a social or interactive component where clinical faculty could share and discuss experiences applying module content in their teaching practices. FAC-1 recommended: “Have a list of other people who are doing the course [online program], like a roster, so that you can work together on some stuff or implement some of the changes together” and explained: “I think it would be motivating to work with someone, then you can set deadlines with each other, whereas when I working just myself, I don’t feel quite as accountable.” LDR-3 agreed: “Have some people going through the modules work in a group with check points to get together and have a discussion about modules or educational philosophy.” LDR-1 commented: “We need to build off the thoughts of others.”

With the online professional development protocol is now no longer part of a research protocol, I can now consider suggestions that were prohibited due to concerns for introducing bias such as offering continuing medical education (CME) credits, micro-credentialing, certificates of completion, and linking programmatic completion to requirements for promotion or tenure. FAC-2 emphatically recommended: “You’ve got to give CME for this [online program] for people!” One leader suggested: “If you could attach some formalized CME, then you might get more takers” (LDR-2). One administrator speculated: “I don’t know what extent it would be attractive to get CME, or a micro-credential, or if it [program completion] were tied to a tenure or promotion requirement” (ADM-1). Participants were interested in how the online program might be linked with promotion. “Some of the stuff about how you get promoted is almost the equivalent of a hidden curriculum; it is almost impossible to know what you don’t know” (ADM-6). “As someone who will be applying for promotion, I think the part about creating and building your educator’s portfolio is good advertising [for the program]” (FAC-4).

Participants suggested that I allow clinical faculty to select modules in order of personal preference rather in the required sequence found in the original online program. One of the administrators recommended:

Sometimes it is helpful if you don't have to do everything [all the online program modules] in order...the biggest bang for the buck to help people get something out of the program if they [faculty] don't have much time they can try any module, as opposed to well, they can't do it all, so they won't do any of it" (ADM-2)

One faculty participant emphasized flexibility in choosing modules offers an advantage for clinical teaching. "Especially for the activities with medical students, being able to choose [which module or modules to complete] would be helpful" (FAC-1).

To reduce the intimidating impact of seeing all the content in one module at once, I should redesign the module so that clinical faculty will see the content unfold as the faculty move through the module. "When I see long text boxes, I'll do this [the online program] later...when I see short bits of the same amount of text broken up into lists, it seems more manageable to me" (FAC-1). Two participants suggested creating a glossary of medical education terms with definitions clinical faculty use while engaging the online program. "Produce a glossary of medical education terms with a blue link to a two-sentence description they can use" (FAC-2).

Seven of 16 participants mentioned the need to emphasize topics in the program content related to learning theory but also bias, cultural, intergenerational awareness, advising and mentoring. These topics are included to some degree in the "Learner Assessment" and "Mentoring and Advising" modules in the online program, but I will consider emphasizing and expanding coverage of these topics. "This [online program] really gets into to some of the

learning theory, obviously no one teaches that to us in medical school or anywhere else” (FAC-4). The interest in social aspects of medical education was expressed by leaders. “We’re not up to speed on social determinants of health, bias, racism, discrimination, gender, and sexual orientation” (LDR-2). “I know our department is looking for resources that we can disseminate providing diversity education and increasing awareness” (LDR-6). Interest in content regarding mentoring students appears to be strong: “How do you structure learning with a patient and a student? Mentoring is just that. If you are not a formal mentor, there’s a lot of work that you can do with students about moving through their careers” (FAC-2). ADM-3 explored balancing teacher adaptability and coaching learners in adaptability: “How to coach learners to be adaptable, but also our own adaptability; that might be learning for teaching.”

Participants suggested targeting new clinical preceptors for this online program, including resident and fellowship physicians in training who often teach medical students as part of their training programs. “Another thing that is available to our residents is an educational or teacher elective...this [online program] would be neat if it was offered to residents interested in academics” (LDR-4). “Residents, especially the ones who tend to struggle, [the online program] addresses things [faculty development] through a teacher-learner lens” (FAC-4). Participants also suggested targeting newly hired clinical faculty and newly appointed clinical course or clerkship leaders for the program. “Target trainees [resident or fellowship physicians in training] or soon to be faculty members” (LDR-6). “This [online program] is going to be perfect for young educators who decide they want to build a career in that direction...I am going to reengage with it [the online program] with my new assistant clerkship director” (LDR-1).

Participants suggested including clinical faculty who have completed the online program and medical education experts from the institution to act as mentors when clinical faculty new to

the program join interactive groups. “It would be really nice to have a live group to associate with; a group of people going through it, and we would meet periodically to debrief or discuss, with a bit of mentorship with more senior faculty” (FAC-3). Another faculty participant explained: “I think the sort of mentoring for curriculum development, how to teach in a clinical setting, what different kinds of questions to ask students, teach the fundamentals of educational theory” (FAC-2) would be helpful for future participants in the online program.

Two administrators who are heavily engaged in medical student education and their development as future physicians suggested adapting the program to prepare senior year medical students for their role as clinical preceptors once they graduate and start their residency programs and will begin teaching medical students themselves. “Create a teaching elective from this program for medical students to go through the modules” (ADM-5). Another suggestion was to adapt the program so that medical students can understand what the clinical portion of their medical education program intends for their neurocognitive and professional development as physicians. “I can have conversations with students about how they’re studying and how they’re testing...I can give them suggestions, but I don’t have the background in the science” (ADM-6).

Participants discussed their experience with the pandemic and thinking about teacher professional development. They expressed interest in focused professional development that would aid in their use of online technologies such as the institution’s learning management system (Blackboard), online meeting platforms (e.g., Zoom, Cisco Webex), and telemedicine when engaging with medical student learners. “The telehealth [i.e., telemedicine] thing, even once the pandemic has settled down, is going to be a bigger part of our lives” (FAC-2). “I think that none of us are experts on Zoom and some of the other technologies that are out there” (FAC-3).

Participants recognized that the challenges they encountered during the pandemic in making considerable changes in their clinical teaching was an opportunity to reflect and recognize a need for the basics of clinical teaching such as learning theory applied in clinical educational settings, providing learners with evaluation and feedback, and mentoring learners. “We can always be honing our balance between being a clinician and educator and learning to do that better” (LDR-4). “I think people were comfortable saying, tell me how to be a good teacher, tell me how to give feedback, how to interface with students to get the message across. Now they are realizing it's much more” (ADM-3).

### **Conclusions**

The COVID-19 pandemic influenced the environment into which a pilot online asynchronous teacher faculty development program for clinical faculty was introduced. Therefore, I conducted a root cause analysis with key stakeholders to evaluate the factors related to clinical faculty participation. Key stakeholders included members of the faculty who enrolled but did not complete the pilot program, administrators of the medical school curriculum, and leaders in clinical education. Participants described the impact of the pandemic on this institution, including a complete shutdown of clinical practice and medical education followed by a limited, measured reopening of clinical practice (Ayoub et al., 2020; Rubin, 2020) and education (Hueston & Petty, 2020), consistent with experienced reported nationally in the medical education literature.

Findings indicated that the pandemic had direct and indirect influence on how the online program may have been perceived by clinical faculty participants who were not able to complete the program. The direct effects include an overwhelming increase in patient care responsibilities and federal, state, and institutional regulations that prevented medical student participation in

patient care and reduced contact between faculty and students. When the online program opened, the AAMC and the institution, in compliance with state regulations, allowed medical students to return to clinical education with limitations including no direct contact with patients suspected of having COVID-19 disease (i.e., any symptoms suggestive of respiratory or systemic infection), as described by Ayoub et al. (2020). This direct effect reduced the number of clinical encounters in which faculty could interact with a patient, thus hampering faculty ability to engage the teaching activities included in the content of each of the five modules within the online program. Clinical practices that host medical students were hampered by fewer patients, facility shutdown, financial burdens (e.g., reduced staffing, costs related to providing PPE), which occurred nationwide, as noted by Rubin (2020). This was a direct and indirect effect of the pandemic that further reduced opportunities for faculty to work with students while seeing patients and effectively engage with the online program. Participants reported that making urgent and profound changes in clinical and education practice due to the pandemic (e.g., the shift to telehealth) likely reduced interest among clinical faculty in spending more time in front of computer screens that this online program would require. Participants agreed that factors related to the equipment used or the process required to engage with the online program did not contribute to the lack of clinical faculty participation.

One important indirect effect of the pandemic identified by participants is a disconnect between how the institution and faculty value faculty development and that the institution does not provide mechanisms to ensure faculty development participation. This disconnect existed prior to the pandemic but was illuminated by the additional stressors on faculty time created by the pandemic. All participants, for example, endorsed the importance of teacher professional

development for clinical faculty and the institution, but then discussed mixed messages from the institution and the lack of incentives and protected time that potentially hindered participation.

Additionally, the findings of a needs assessment indicated clinical faculty preferred an online, asynchronous design for the convenience of working independently. In contrast to the findings of the needs assessment, however, participants in this root cause analysis recommended adding in group activities to enhance their experience, such as discussing how to apply the online program content in teaching applications. Participants endorsed adding a social interactive component to the online program, which could be centered around the reflection questionnaire included in each module where clinical faculty could work in small groups based on practice specialty. The desire for group activities may reflect a response to the pandemic and a desire to limit the negative effects of social distancing.

Participants reflected on teacher professional development and discussed how the effect of the pandemic on the institutional environment highlighted the need to reinforce fundamental pedagogical knowledge and skills in clinical education and expand knowledge and skill in applying technology and remote teaching and learning strategies. Overall, participants agreed that the materials included in the online program were appropriate, interesting, and applicable in multiple clinical educational settings. Compared to other teacher professional development programs, 10 of 16 participants described the material included in this program as comprehensive but potentially overwhelming for clinical faculty facing the environmental challenges described above. Participants agreed that the measurement strategies used in the online program were appropriate to identify the programmatic outcomes intended, but the measures were described as time consuming by four of 16 participants, again suggesting a potential for reducing clinical faculty online program completion.

Overall, participants described the online program as having potential to add to the teacher professional development resources of the institution. Participants offered suggestions to promote the online program more effectively by engaging clinical departmental leadership. Other suggestions included adding incentives and a scheduled structure to encourage clinical faculty participation and completion. Finally, participants suggested targeting the program toward clinical educators early in their academic teaching careers such as senior medical students, resident and fellowship program physicians, and early career clinical faculty.

### **Discussion**

The debut of the pilot online teacher professional development program in my institution occurred just as medical students were returning to clinical education in a limited and regulated way dictated by the COVID-19 pandemic. A small number of clinical faculty enrolled, but none had made progress after a period sufficient to have completed at least two or three of the five modules in the program. Though it was reasonable to assume the effects of the pandemic were largely to blame, I used complex adaptive systems theory (Woodruff, 2019) and contribution analysis (Van Melle et al., 2017) to explore the potential factors broadly and systematically, as has been done when unexpected, adverse events occur during patient care to determine factors that potentially contributed to the event and to explore recommendations for improved practice.

Participants described contributions in the materials domain related to the relatively large volume of content, lack of incentives, and lack of deadlines as contributing to the rate of program completion, which was likely enhanced by the pandemic-based clinical challenges described by Ayoub et al. (2020) and Rubin (2020) and medical education regulations described by Hueston and Petty (2020). The regulations, resource limitations, and professional and personal sources of stress were a direct result of the pandemic. The online program itself did not offer incentives or

deadlines due to research strategies intended to reduce potential bias in participation or completion. This would not be an effect attributable to the pandemic but may have been exacerbated by the presence of the pandemic.

Participants described the measurement domain around the reflection questionnaire within each module as an impediment to completing the online program. The reflection questionnaire was constructed based on the 3-2-1 reflection strategy, described by Zygoris-Coe et al. (2004), that includes (1) summarizing three important points gained from the content, (2) identify two insights gained from applying the content, and (3) reflecting on one remaining question regarding the content presented. Similar approaches have been used in online medical professional development (e.g., Sim & Radloff, 2008) and reflection during clinical practice (e.g., Ménard & Ratnapalan, 2013). Related to the pandemic, participants identified reduced opportunities to interact with students while seeing patients. Unrelated to the pandemic, participants mentioned coming back to the program module after teaching and then writing out reflections as a burden on their free time that was potentially prohibitive to program completion.

Participants provided insight into the people domain that also shared a combination of pandemic-related and non-pandemic-related program completion factors. The pandemic increased participant awareness of professional and personal responsibilities, as clinical practice and teaching relied more on remote technologies and increased screen time. This seemed to result in a loss of motivation to complete the program likely due to the desire to reduce screen time with an online program competing with increased teaching and clinical practice on computer screens. Participants acknowledged the importance of faculty development for themselves and the institution but considered the comprehensive program content as time-consuming and a further impediment to completion not related to the pandemic.

The findings also illustrated a disconnect between what administrators perceived as faculty development given within clinical departments as preparation for medical student teaching by resident and fellowship physicians within departments versus what leaders perceived as a lack of faculty development for their resident and fellowship physician medical student faculty. This finding is striking, given that according to the AAMC, resident and fellowship physicians spend up to 25% of their time teaching medical students and their peers (Gill & Frank, 2004). Though this disconnect predated the pandemic, the pandemic likely highlighted this issue within this institution and, more specifically, for my participants. This disconnect provides insights into the mixed messages shared by medical school administrator, leader, and faculty participants as explored in the people domain of the root cause analysis.

Borkoski and Prosser (2020) identify an analogous issue in higher education—a mismatch between university faculty perception and practice, specific to implementing service-learning: “Although faculty see many benefits implementing service-learning and report interest in learning about and using this pedagogy, service-learning practices are still considered an addition to faculty workloads rather than an integrated and expected role” (p. 39). The disconnect discussed between the institutional value given service-learning and institutional support for implementing service-learning (Borkoski & Prosser, 2020), is analogous to how teacher professional development is described as a value in my institution but is not supported in a way that encourages implementation. This “mismatch,” a term used by Borkoski and Prosser (2020), resulted in an increase in faculty stress, lower job satisfaction, and reduction in time engaged in teaching. It seems that a similar response is occurring in my institution related to teacher professional development as a priority without structure or support within the institution and is a potential factor in the lack of participation in the online program.

Any mission that an institution considers to be of value should (a) be actively supported by institutional leadership who are tasked with providing the leverage required to promote engagement and (b) provide unambiguous messaging that a mission goal is an expectation for the institution's faculty (Borkoski & Prosser, 2020). "The incongruence between faculty professional identity and the stated or perceived institutional norms or values may represent a significant and often overlooked barrier to faculty decisions to engage with the work of the public mission" (Borkoski & Prosser, 2021, p. 77). Incentives for supporting desired faculty engagement by institutional leadership can include incorporation of values in tenure decisions, provide dedicated time for participation, and create cultural shifts in institutional values that influence faculty involvement (Borkoski & Prosser, 2021). This institution would benefit by applying the recommendations put forth by Borkoski and Prosser (2020, 2021) in understanding and supporting teacher faculty development as an expectation rather than as an aspiration.

A second disconnect in this dissertation study was related to the finding in the needs assessment survey ( $N = 66$ ), in which faculty respondents expressed an interest in a faculty development program that was online and asynchronous promoting independent engagement, and the findings of the dissertation study ( $N = 16$ ), in which faculty and leader participants recommended interactive activities. Both the needs assessment survey and the root cause analysis were carried out in the same institution although I am unaware if any individuals participated in both studies. As suggested in the findings, the interest in an interactive component being added to this online program may be related to the pandemic (i.e., a desire to interact with colleagues after a period of prolonged social isolation). It may be related to a response to the use of the reflection questionnaire included in each module that requires active reflection on how content influenced application of module content in teaching practice. Participants in the root

cause analysis discussed how group interaction would likely improve individual engagement in the activity and enrich the experience by sharing insights and experiences with a group.

Finally, there may be a recognition of the intrinsic value in group learning as part of teacher faculty development, as described in education and medical education literature. Exploratory research designs have been used for teacher professional development in medical education settings in the past (e.g., Brooke et al., 2015; Gellar et al., 2012) and have been applied in developing and evaluating the online programs presented in the review of the literature. The education literature (e.g., Learning Forward, 2011) defines robustly implemented professional learning as an approach that enlists teachers, staff, leaders, and the institution as active partners in improving learning effectiveness as a team effort. A collective and interactive approach, often termed as “communities of practice”, combines medical practice and medical education in specific practice contexts (Taylor & Hamdy, 2013).

Communities of practice can enhance the quality and constancy of teaching practice related to clinical skills for medical students (Kern & Thomas, 2016). Faculty can be empowered as change agents and leaders in curricular development and curricular innovation for medical students (Hughes, 2016). Leaders in medical education settings who manage limited resources are encouraged to allocate those limited resources in a manner that enhances the institution’s educational mission (Lindeman & Lipsett, 2016). Regardless of how the participants in this root cause analysis found their way to recommending the incorporation of an interactive component, this suggestion must be considered in future versions of my online program. The interactive component could be centered around the reflection questionnaire included in each module and involve grouping potential participants by clinical practice specialties (e.g., internal medicine hospitalists) or level of medical student teaching experience (e.g., senior resident physicians

ready to graduate). Incorporating a group component, which is supported by the findings of this study and the education literature, seems likely to increase program completion.

Schneider et al. (2016) also provided an insight that I should consider in a future iteration of the online program: “Working in a combination of synchronous and asynchronous online activities during the academic year helped participants maintain enthusiasm and energy for taking calculated risks in teaching, attending to student thinking, and trying out teaching and assessment practices” (p. 223). Online learning management systems (e.g., Blackboard) provide opportunities for faculty participating in an online professional development program to interact asynchronously using features including blogging, discussion boards, forums, and Wiki pages that permit multiple learners to add and edit content (Rice, 2012). In my online program, these features may be used to allow faculty to share ideas and experiences with each other (Zygouris-Coe et al., 2004) in the 3-2-1 reflection activity as described by within each module of the online program. The reflection activity asks faculty to think about what has been learned, what applying module content has been like in teaching practice, and then what questions remain; this activity that would lend itself well to group interaction. For the educational philosophy statement, an iterative writing assignment that builds over each of the modules, access to documents stored in a cloud feature could allow commenting and editing from multiple individuals on, for example, a shared collaborative online document such as Google Docs (Darby & Lang, 2019).

### **Limitations and Delimitations**

This study had limitations and delimitations. A limitation was that the population of key stakeholders was constrained to faculty, administrators, and leaders available to schedule interviews during the COVID-19 pandemic. Of the 47 potential participants that were approached, only 16 agreed to participate in the root cause analysis. A small sample is a

limitation and was likely due to the (a) influence of the pandemic on the availability of participants with clinical practice challenges (Ayoub et al., 2020; Rubin, 2020) and (b) changes in medical education necessitated by the pandemic (Hueston & Petty, 2020).

Though this sample was small, the interviews lasted an average of 36 minutes with a range of 23–56 minutes. First cycle descriptive coding and second cycle pattern coding was undertaken as described by Saldaña (2021) iteratively until I could not identify new codes. Creswell and Poth (2018) explain that when a researcher “attempts to ‘saturate’ the categories” (p. 203) the researcher has examined and reexamined the text (e.g., transcripts) for categories of information and reaches a point where no new insights are found. The small number of participants and depth of the interviews, therefore, were sufficient from the data collected to allow me to gather evidence, identify possible cause-and-effect relationships, and form a contribution story as outlined by contribution analysis (e.g., Van Melle et al., 2017) and apply the data in a root cause analysis for an unexpected educational program analysis (Santen et al., 2019).

Prior to the scheduled interviews, each participant was provided access and invited to review the online program prior to the scheduled interview. None of the 16 participants reviewed the program, which was a study design limitation. During the interview, I did take each participant through parts of the program relevant to the interview prompts. Although I do not doubt the responses I received during the interviews with each of the participants were accurate and true to the extent each participant was familiar with the program, I recognize that the lack of in-depth review of the online program content was a limitation to the utility of the data in understanding the factors contributing to the lack of online program completion or how valuable the recommendations for programmatic improvement will be in future application. Because the

online program was presented as part of a research project, I was limited in what I could offer as incentives or enforceable deadlines for completion. Another limitation was how this study took place at a single institution and may not be generalizable to other medical schools or other educational settings.

One important delimitation of this study involves the theoretical framework and problem of practice. The problem of practice identified medical school curriculum as suboptimal for transmitting complex content to medical students (Cooke et al., 2006) that has not improved after a decade of interventional effort (Brauer & Ferguson, 2015). Clinical faculty have less time and engagement in medical student education as they are balancing clinical practice and administrative responsibilities (Abruzzo et al., 2019). Medical education often presents problems as simple and solvable (Cristancho et al., 2017). In the absence of a single focus for understanding a problem, complex adaptive systems recognize how sets of beliefs or professional characteristics influence the how a system of individuals functions (Woodruff, 2019). Reflecting on the interrelationship between how clinical faculty interact with medical students through a complex adaptive systems lens, I concluded that a teacher professional development program that emphasized pedagogical content knowledge for clinical faculty was a potential solution. However, I chose not to design an intervention that targeted the institution itself, such as introducing clinical applications robustly in the curricula of courses traditionally taken during the preclinical portion of a medical education (e.g., Hortsch & Mangrulkar, 2015; Muller et al., 2008; Wiener et al., 2010).

Delimitations include the scope of the kinds of participants included as key stakeholders. For example, I could have more actively sought the participation of non-clinical educators, clinical and non-clinical department chairs, and medical students. The domains explored in the

root cause analysis as defined by Santen et al. (2019) was a delimitation that may have narrowed my choices by limiting my consideration of other domains, such as loss of practice income that might occur with committing time to the online program. Finally, the study was undertaken over a few months; the short duration may have limited key stakeholder participants to fully understand the influence of the pandemic on clinical practice and education, to fully appreciate other factors that may have influenced online program completion, and to allow a more detailed evaluation of the online program itself.

### **Implications for Practice**

Although faculty may express interest in teacher professional development that allows for independent engagement, having components that include collaborative activities potentially add value. Teacher professional development programs tend to be more successful when focused on pedagogical knowledge and incorporation of active learning that includes interactions such as collaboration between participants, modeling teacher performance, coaching, reflection, and feedback (Darling-Hammond et al., 2017). Feedback from key stakeholders after my attempt to implement an online, asynchronous module-based program provides evidence that including synchronous, interactive components is not only prudent but consistent with the literature in general education (e.g., Fishman, 2016; Schneider et al., 2016) and medical education (e.g., Skye et al., 2011; Wilkinson et al., 2015). Additionally, Darling-Hammond et al. (2017) emphasize that a teaching and learning culture can be robustly and permanently embedded in the fabric of an institution's overall culture.

I believe the online program offers potential value for my institution. The online program, for example, could be offered as an introduction to teacher professional development to new faculty hires followed by the institution's required four-hour program (i.e., the BEST

Program), which is given onsite over two days using interactive activities. This approach would recognize how participants in the root cause analysis emphasized the value of the online program for new medical educators such as resident or fellowship physicians and new faculty. Those who participate could then form learning communities supporting each other in applying the clinical teaching strategies in their individual practices as new clinical educators.

Junior faculty participants in this root cause analysis appreciated the iterative program-wide exercise of writing an individual educational philosophy statement, as this is a required component of the application for promotion from assistant to associate professor at my institution. Senior faculty participants in this root cause analysis were less interested in this activity. A future version of the online program that is specifically targeted toward new clinical educators will include the educational philosophy statement for junior faculty seeking promotion or for those who may wish to include such a statement on job applications or letters of interest for academic positions after completing training. The educational philosophy statement would be optional for senior faculty participants but will be emphasized for its reflective value and use in future professional opportunities.

A teaching and learning culture must be supported on an institutional level, where faculty clearly understand the value of a teaching and learning culture through establishment of unambiguous expectations and meaningful support. Borkoski and Prosser (2020) describe a service-learning initiative as a model for how institutions should support important objectives by providing protected time, incentives, and requirements. This approach can help medical education institutions move participation in teacher professional development from a worthy idea to an ingrained part of institutional culture and function. This shift would require an institutional commitment to teacher professional development that includes allocation of valuable resources

such as time, recognition, and enforced requirements. Applying the insights gained from developing the online program and the root cause analysis that followed, I will commit to working with institutional leadership in establishing department- and institution-wide learning communities that I hope will endure and benefit the teacher professional development and teacher practice for our medical student learners.

When education programs produce unexpected adverse outcomes, complex adaptive systems theory (Cristancho et al., 2017) can provide a framework and a root cause analysis (Santen et al., 2019) can be used to organize key stakeholders, define factors that contributed to the unexpected outcome, and identify solutions for educational programmatic improvement. The findings from this root cause analysis have afforded me insight into a future version of this online teacher professional development program that promotes the program with clinical department chairs, and to make explicit to potential participants the value this program offers over other faculty development programs available at our institution and nationally. The root cause analysis strategy described by Santen et al. (2019) allowed me to systematically evaluate the factors that contributed to the lack of participation in my online program and provided me with a plan for moving forward with a next iteration of my online program at my institution.

### **Implications for Research**

Decisions regarding the design and implementation of teacher professional development programming remain an important consideration in medical education research. Institutions of medical education have employed team-based learning in delivering content to medical students; however, faculty preparedness to employ team-based learning was unclear (Azzi et al., 2015). Brauer and Ferguson (2015) describe institutional efforts to improve medical student curricular and pedagogical approaches, yet these changes were not entirely effective. Further research is

needed about faculty and learner preparedness for curricular or pedagogical change, particularly at the institutional level.

Research that relates the design of teacher professional development to medical student experience is warranted. Standardized, often computer-based, testing of factual knowledge often does not reflect medical student learning on clinical services seeing patients or working with standardized patients in authentic clinical simulations (Brown et al., 2014). Given that faculty have limited time for teaching (e.g., Augustin, 2014; Azzi et al., 2015; Brown et al., 2014), research that explores a combined teacher professional development aligned with a medical student-focused learner development program could provide both faculty and medical students with an understanding of how the tools and skills required for clinical learning differ from the tools and skills used in traditional didactic instruction. If faculty and medical students were better prepared to attend to the learning that occurs in clinical settings, the experience could potentially become more efficient and effective for both. Future research building on this online program at this institution can extend to a learner development model for medical students that runs parallel and in collaboration with the teacher professional development portion of the original online program.

The design of the online pilot program allowed enrolled faculty to work on their own time at their own pace. Many of the stakeholders in the root cause analysis indicated a desire for some of the activities to include working in groups. The social dimensions of effective teacher professional development and professional learning have been described by Darling-Hammond et al. (2017) in general education and by Singh et al. (2013) in medical education. Additional research can focus on understanding how to balance independent or asynchronous learning with social or synchronous learning in medical education teacher faculty development for optimal

efficacy and efficiency. Future research involving this program at this institution can focus on finding a balance between independent, asynchronous participation and interactive, group participation where different interaction strategies for varying lengths of time are piloted and studied for experience gained and satisfaction among future participants.

Root cause analysis as a strategy for program evaluation should be applied in other setting to determine the overall value of this approach to understanding unexpected outcomes in medical education. Santen et al. (2019) described how the root cause analysis strategy was employed to understand unexpected low student performance on a multiple-choice examination in a single medical school. This dissertation offers another application to understand unexpected faculty participation and completion of an online teacher professional development program. Given the systematic and detailed approach this method provides, additional research in the application of the root cause analysis strategy for evaluating unexpected programmatic outcomes is warranted. This approach can potentially provide insights into adverse and successful programmatic outcomes. I plan on applying this root cause analysis strategy in my own teaching practice for the courses I run at my institution and will offer my insights to the leadership in my institution in evaluating programmatic outcomes that are problematic or successful.

Next, exploring strategies for emphasizing the importance of teacher professional development in institutional culture will be important for moving “teacher professional development” to “professional learning” in medical education settings. In a systematic review of literature published regarding faculty development programs designed to increase teaching effectiveness in medical education settings, Steinert et al. (2016) identified future directions to include fostering community involvement and increase institutional support for faculty development initiatives. Institutions can support faculty development financially for participants

and programs while providing protected time for faculty to participate (Steinert et al., 2016). Borkoski and Prosser (2020) describe how higher educational institutions working with external communities to foster service-learning among faculty are less successful in those endeavors when mixed messages exist around the value of service-learning. Consistent requirements, protected time, and recognition for participation increase participation (Borkoski & Prosser, 2020). Future research on the impact of institutional commitments with clear messaging around teacher professional development in medical education settings could address institutional factors in faculty engagement. As I move forward with my online program, I will collaborate with my institution's leadership to promote and foster participation among early career clinical educators.

Finally, the COVID-19 pandemic had a major impact on the clinical and educational function in medical education institutions. Research in teacher professional development would benefit from increased understanding of how the pandemic and similar major events effect clinical practice and education from the perspectives of medical students, patients who seek care at academic medical institutions, and staff who support patient care and medical education missions. Research in this area can focus on how to build in flexibility into a program to minimize impacts from unexpected changes. This dissertation is a snapshot in time of how the COVID-19 pandemic may have influenced participation in an online program in teacher professional development. After I revise the online program based on participant feedback, future research will be an evaluation of the same factors as this root cause analysis, as well as any additional factors that emerge, to reflect a module of continuous improvement (Woodruff, 2019).

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## Appendix A

### Consent Document for SUNY Upstate Clinical Faculty Survey



#### Informed Consent

#### Survey of Clinical Faculty at SUNY Upstate College of Medicine

**PURPOSE OF THIS RESEARCH STUDY:** The purpose of this research study is to gather information regarding faculty members at the SUNY Upstate Medical University College of Medicine that are engaged in clinical teaching. With the information gathered, it is our hope to identify insights into how to efficiently and effectively provide opportunities for faculty development through our College of Medicine Curriculum Office. We are hoping for participation from over 2,600 recognized faculty members in the COM, 75% of which are voluntary faculty over the next five to six weeks.

**PROCEDURES:** This study will involve completion of an on-line survey instrument provided by a familiar survey platform (SurveyMonkey). The survey should take 10 to 30 minutes to complete.

**RISKS/DISCOMFORTS:** As this survey is intended to be confidential, and will not collect identifying information such your name, SUNY Upstate Medical University identification number, department affiliation, or specific practice specialty or your role within your practice setting we anticipate minimal risk to your confidentiality. We have no plans to share gathered information on an individual respondent basis with leadership within departments or the College of Medicine or SUNY Upstate Medical University.

**BENEFITS:** Potential benefit in participating in this study can include contributing to improved faculty development within the College of Medicine clinical services. With such improved faculty development, we individually and as a College of Medicine enjoy greater satisfaction in our clinical educational endeavors as well as improved clinical learning as well as more favorable evaluations by our students.

**VOLUNTARY PARTICIPATION AND RIGHT TO WITHDRAW:** Your participation in this study is entirely voluntary. You may choose to participate by opening the link to the survey on the email sent to your SUNY Upstate Medical University GroupWise account and agree to participate by checking the question indicating your willingness to participate. You may also choose to not participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled as a member of the SUNY Upstate Medical University faculty. If you have any questions, you may contact John J Folk at (315) 470-2676 or via email at [folkj@upstate.edu](mailto:folkj@upstate.edu) or the Curriculum Office at (315) 464-5187.

**CONFIDENTIALITY:** We will not be collecting specific identifying information such as your name, your SUNY Upstate Medical University employee ID number, and the department you are affiliated, or your area of specialty practice or your role within your practice setting. Information submitted via the on-line survey instrument platform will be password protected on a password protected computer that is owned by SUNY Upstate Medical University and will be kept confidential to the extent possible by law and will be reviewed directly only by the investigators. Only grouped data will be included in presentation of results or publication.

**COMPENSATION:** You will not receive any payment or other compensation for participating in this study.

**QUESTIONS OR CONCERNS:** If you have any questions or concerns regarding this research study or your rights as a research participant in this study, or feel that you have not been treated fairly, please call John J. Folk (315) 470-2676 or email [folkj@upstate.edu](mailto:folkj@upstate.edu) or call the Homewood Institutional Review Board at Johns Hopkins University at (410) 516-6580.

## Appendix B

### Clinical Faculty Survey of the Medical University

#### Survey Questions

1. By checking the YES response on the survey instrument presented on this platform you are indicating that you understand the information presented above and that you agree to allow the information you provide to become part of this study. You also understand that you have not waived any rights or legal rights by participating in this study.
  - a. Yes
  - b. No (please exit survey)
  
2. Are you a member of the faculty of the Medical University?
  - a. Yes
  - b. No (please exit survey)
  
3. As a faculty member of the Medical University, you are classified as a member of the:
  - a. Voluntary faculty
  - b. Part-time faculty
  - c. Full-time faculty
  - d. Resident or clinical fellow
  
4. Are you involved in patient care?
  - a. Yes
  - b. No (please exit survey)
  
5. What degree(s) do you hold? (Please check all that apply to you)
  - a. MD (or equivalent)
  - b. DO
  - c. PhD
  - d. Doctoral (please specify if not above)
  - e. Masters (please specify)
  - f. PA
  - g. NP
  - h. CNM, CM
  - i. Other (please specify)

6. Are you board-certified or certified in your area of clinical practice?
  - a. Yes
  - b. Yes, including sub-specialization certification
  - c. No
  - d. Other clinical credentials (please specify)
  
7. What is your academic rank?
  - a. Clinical Assistant Instructor
  - b. Clinical Instructor
  - c. Clinical Assistant Professor
  - d. Clinical Associate Professor
  - e. Clinical Professor
  - f. Instructor (Academic Track)
  - g. Assistant Professor (Academic Track)
  - h. Associate Professor (Academic Track)
  - i. Professor (Academic Track)
  - j. I am not sure of my rank
  
8. Whom do you teach? (Please select all that apply to you)
  - a. Medical students (first year)
  - b. Medical students (second year)
  - c. Medical students (third year)
  - d. Medical students (fourth year)
  - e. Graduate medical education: resident physicians
  - f. Graduate medical education: clinical fellows
  - g. Physician assistant students
  - h. Nurse practitioner students
  - i. Nursing students
  - j. Master of public health students
  - k. PhD candidates
  - l. Other graduate students
  - m. Other physicians in training
  - n. Other physicians in practice
  - o. Other learners (please specify)
  
9. How long have you been in clinical practice? (Please do not include time in training programs, residencies, or fellowships, etc.)
  - a. Less than 5 years
  - b. 5 to 10 years
  - c. 11 to 15 years
  - d. 16 to 20 years
  - e. 21 to 30 years
  - f. Over 30 years

10. How long have you been involved in teaching medical students?
- Less than 5 years
  - 5 to 10 years
  - 11 to 15 years
  - 16 to 20 years
  - 21 to 30 years
  - Over 30 years
  - I do not teach medical students (please exit survey)
11. I believe teaching medical students is personally fulfilling. (RQ1)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
12. In my opinion, high quality medical student teaching enhances the reputation of my department. (RQ1)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
13. In my opinion, teaching medical students is as valuable a scholarly activity comparable to research and publication. (RQ1)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
14. In my opinion, teaching medical students is as valuable an activity as generating clinical practice or research income. (RQ1)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree

15. Teaching medical students is considered an important activity within my department. (RQ2)
- a. Strongly agree
  - b. Agree
  - c. Not sure
  - d. Disagree
  - e. Strongly disagree
16. In my opinion, teaching medical students is as important as teaching resident or fellowship physicians. (RQ1)
- a. Strongly agree
  - b. Agree
  - c. Not sure
  - d. Disagree
  - e. Strongly disagree
17. Teaching medical students in the third and fourth years of medical school is most effective when faculty members are active in clinical practice. (RQ1)
- a. Strongly agree
  - b. Agree
  - c. Not sure
  - d. Disagree
  - e. Strongly disagree
18. Teaching medical students in the third and fourth years of medical school is most effective when faculty members are engaged in research. (RQ1)
- a. Strongly agree
  - b. Agree
  - c. Not sure
  - d. Disagree
  - e. Strongly disagree
19. I would like to have more time for teaching medical students than I do now. (RQ2)
- a. Strongly agree
  - b. Agree
  - c. Not sure
  - d. Disagree
  - e. Strongly disagree

20. I find that the need to maintain or increase my practice income reduces the time I have for medical student teaching. (RQ-2)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
21. I find that the need to meet documentation requirements, governmental, board certification, and practice society regulations reduces the time I have available to teach medical students. (RQ-2)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
22. I find that it is easy to excel in teaching, research, and clinical practice at the same time. (RQ1)
- Strongly agree
  - Agree
  - Not sure
  - Disagree
  - Strongly disagree
23. I believe that the recognition for excellence in teaching should be equal to the recognition given for clinical productivity, research and publication. (RQ1)
- Strongly agree
  - Agree
  - Neutral or not sure
  - Disagree
  - Strongly disagree
- Comment here if needed (text box)
24. Fundamentals of education science and theory was part of my preparation for teaching medical students. (RQ3)
- Strongly agree
  - Agree
  - Neutral or not sure
  - Disagree
  - Strongly disagree

25. I feel I would benefit as a medical student teacher if I had more background in fundamentals of educational science and theory. (RQ3)
- Strongly agree
  - Agree
  - Neutral or not sure
  - Disagree
  - Strongly disagree
- Please include comment here if needed (text box)
26. Which of the following areas for faculty development do you think would be of interest and help you as a medical student teacher? (Please check all that apply.): (RQ4)
- Preparing and presenting large group lectures
  - Preparing and presenting small group teaching sessions
  - How to mentor medical students
  - Time management for medical student teachers
  - Planning a career in academic medical education
  - Becoming a better preceptor: teaching students while with a patient
  - Becoming a better preceptor: teaching medical students while in specific settings such as OR, ambulatory, ED, hospital rounds, etc.
  - Systems-based practice educational approach
  - Problem-based learning educational approach
  - Case-based learning approach
  - Providing more effective evaluation and feedback for medical students
  - How to design and implement a curriculum for medical student education
  - Understanding guidelines from national organizations that oversee undergraduate medical education
  - How to incorporate foundational (MS 1 and MS2 years) with clinical (MS3 and MS4) science learning my teaching
  - Understanding Entrustable Professional Activities (EPAs)
- Other suggested topics or areas of interest (text box)
27. What educational strategy would you consider best for faculty development? (RQ4)
- Day long retreat
  - Half day seminar series
  - Hour lecture series
  - Online platform in a synchronous (learning together as a group) session
  - Online platform independent learning sessions to work at your own pace
- Please add suggestion in comment field if your preference is not listed above (textbox)
28. Are there any other issues or challenges related to teaching medical students we should consider?
- Yes
  - No
- Please comment (text box)

29. Do you have any other suggestions for us to help improve your medical student teaching experience?

- a. Yes
- b. No
- c. Please describe (text box)

## Appendix C

### Characteristics of Clinical Faculty Respondents <sup>a</sup>

Questionnaire item	Proportion of respondents (percent)	Number of Respondents
Faculty type		
Voluntary	37.5	25
Part-time	25.0	16
Full-time	28.0	19
Resident or fellow	9.4	6
Involved in patient care	100.0	66
Degrees held <sup>b</sup>		
MD or DO	86.8	59
PhD	10.3	7
Master's degree	6.0	4
Advanced practice	14.7	10
Certified in area of practice	88.0	60
Institutional academic rank		
Clinical Instructor	9.0	6
Assistant Professor	34.3	23
Associate Professor	23.8	16
Professor	17.9	12
Not sure of rank	12.9	10
Teaching medical students <sup>b</sup>		
First-year students	27.3	19
Second-year students	27.3	19
Third-year students	91.0	62
Fourth-year students	62.0	43
Clinical practice experience		
Less than 5 years	11.8	7
5 to 10 years	8.8	5
11 to 15 years	14.7	10
16 to 20 years	22.1	15
21 to 30 years	23.5	16
Over 30 years	19.1	13

Note: <sup>a</sup> *N* = 66. <sup>b</sup> multiple answers possible.

## Appendix D

### Clinical Faculty Pedagogical Knowledge for Undergraduate Medical Education

(Pilot Online Asynchronous Teacher Professional Development Program)

<b>Module 1: Teaching</b>			
<b>Objectives</b>	<b>Content</b>	<b>Activities</b>	<b>Assessments</b>
<p>After completing this module, you will:</p> <ul style="list-style-type: none"> <li>Evaluate if pedagogical knowledge changed</li> <li>Reflect on module content and apply to clinical teaching</li> <li>Analyze your application of module content to your practice</li> <li>Create draft of educational philosophy statement: focus on role as a teacher</li> </ul>	<p><i>Medical teacher identity</i></p> <ul style="list-style-type: none"> <li>Irby (1994) What clinical teachers in medicine need to know</li> </ul> <p><i>Learning theories in medical education</i></p> <ul style="list-style-type: none"> <li>Kay &amp; Kibble (2016) Learning theories 101: Application to everyday teaching and scholarship</li> <li>Ozuah (2005) First, there was pedagogy and then came andragogy</li> </ul> <p>(Seven related videos)</p>	<ol style="list-style-type: none"> <li>Watch the seven videos</li> <li>Review the PowerPoint with voiceover</li> <li>Access the supplementary articles as needed</li> <li>Complete the questionnaires</li> <li>Work on educational philosophy statement</li> </ol>	<p>E-portfolio</p> <ul style="list-style-type: none"> <li>Pedagogical knowledge questionnaire</li> <li>3-2-1 reflection questionnaire</li> <li>Satisfaction questionnaire</li> <li>Work on educational philosophy statement</li> </ul>

Module 2: Learner Assessment			
Objectives	Content	Activities	Assessments
<p>After completing this module, you will:</p> <ul style="list-style-type: none"> <li>Evaluate if pedagogical knowledge changed</li> <li>Reflect on module content and apply to clinical teaching</li> <li>Analyze your experience using this module in your teaching practice</li> <li>Revise educational philosophy statement: focus on theory of learning</li> </ul>	<p><i>Feedback and assessment</i></p> <ul style="list-style-type: none"> <li>Cantillon &amp; Sargeant (2008) Giving feedback in clinical settings</li> <li>Thomas &amp; Arnold (2011) Giving feedback</li> <li>Ogburn &amp; Espey (2003) The R-I-M-E method for evaluation of medical students on an obstetrics and gynecology clerkship</li> <li>Espey et al. (2007) To the point: Medical education review of the RIME method for evaluation of medical student clinical performance</li> <li>Ramani &amp; Krackov (2012) Twelve tips for giving feedback effectively in the clinical environment</li> </ul> <p><i>Connections:</i> behaviorism, cognitivism, social cognitivism, social constructivism, adult learning</p> <p>(Five related videos)</p>	<ol style="list-style-type: none"> <li>Watch the five videos</li> <li>Review the PowerPoint with voiceover</li> <li>Access the supplementary articles as needed</li> <li>Complete the questionnaires</li> <li>Continue to work on educational philosophy statement</li> </ol>	<p>E-portfolio</p> <ul style="list-style-type: none"> <li>Pedagogical knowledge questionnaire</li> <li>3-2-1 reflection questionnaire</li> <li>Satisfaction questionnaire</li> <li>Work on educational philosophy statement</li> </ul>

Module 3: Curriculum Development			
Objectives	Content	Activities	Assessments
<p>After completing this module, you will:</p> <ul style="list-style-type: none"> <li>Evaluate if pedagogical knowledge changed</li> <li>Reflect on module content and apply to clinical teaching</li> <li>Analyze your application of module content to your practice</li> <li>Revise educational philosophy statement: focus on characteristics of good teachers</li> </ul>	<p><i>Procedural skills development</i></p> <ul style="list-style-type: none"> <li>Sawyer et al. (2015) Learn, see, practice, prove, do, maintain: An evidence-based pedagogical framework for procedural skill training in medicine</li> <li>Levy et al. (2016) Is teaching simple surgical skills using an operant learning program more effective than teaching by demonstration?</li> </ul> <p><i>One-minute preceptor (OMP)</i></p> <ul style="list-style-type: none"> <li>Furney et al. (2001) Teaching the one-minute preceptor</li> <li>Gallagher et al. (2012) Developing the one-minute preceptor</li> </ul> <p><i>SNAPPS</i></p> <ul style="list-style-type: none"> <li>Pascoe et al. (2015) Maximizing teaching on the wards: Review and application of the one-minute preceptor and SNAPPS models</li> <li>Seki et al. (2016) How do case presentation teaching methods affect learning outcomes? - SNAPPS and the one-minute preceptor</li> </ul> <p><i>Snippets</i></p> <ul style="list-style-type: none"> <li>Bar-On &amp; Konopasek (2014) Snippets: An innovative method for efficient, effective faculty development</li> </ul> <p><i>Teaching different levels of learners</i></p> <ul style="list-style-type: none"> <li>Chen et al. (2015) Sequencing learning experiences to engage different level learners in the workplace: An interview study with excellent clinical teachers</li> </ul> <p><i>Connections:</i> behaviorism, cognitivism, social cognitivism, social constructivism, adult learning</p> <p>(Six related videos)</p>	<ol style="list-style-type: none"> <li>Watch the 12 videos and read one article link</li> <li>Review the PowerPoint with voiceover</li> <li>Access supplementary articles as needed</li> <li>Complete the questionnaires</li> <li>Continue to work on educational philosophy statement</li> </ol>	<p>E-portfolio</p> <ul style="list-style-type: none"> <li>Pedagogical knowledge questionnaire</li> <li>3-2-1 reflection questionnaire</li> <li>Satisfaction questionnaire</li> <li>Work on educational philosophy statement</li> </ul>

Module 4: Mentoring and Advising			
Objectives	Content	Activities	Assessments
<p>After completing this module, you will:</p> <ul style="list-style-type: none"> <li>Evaluate if pedagogical knowledge changed</li> <li>Reflect on module content and apply to clinical teaching</li> <li>Analyze your application of module content to your practice</li> <li>Revise educational philosophy statement: focus on role/responsibility of learners</li> </ul>	<p><i>Read current articles related to:</i></p> <ul style="list-style-type: none"> <li>Value of mentoring and advising (Dalgaty et al., 2016; Ramani et al., 2006)</li> <li>Culture of medicine (Boutin-Foster et al., 2008).</li> <li>Hidden curriculum (Hafferty, 1998)</li> <li>Mindfulness and resiliency (Dobkin &amp; Hutchinson, 2013; Wald et al., 2016)</li> <li>Compassion fatigue, burnout, and mistreatment (Dyrbye et al., 2014; Cook et al., 2014)</li> <li>Special circumstances in mentoring (Larsen et al., 2012; Larsen et al., 2013; Whitgob et al., 2016; Wong &amp; Ginsburg, 2017)</li> </ul> <p><i>Connections:</i> social cognitivism, social constructivism, adult learning</p> <p>(Nine related videos)</p>	<ol style="list-style-type: none"> <li>Watch the five videos</li> <li>Review the PowerPoint with voiceover</li> <li>Access the supplementary articles as needed</li> <li>Complete the questionnaires</li> <li>Continue to work on educational philosophy statement</li> </ol>	<p>E-portfolio</p> <ul style="list-style-type: none"> <li>Pedagogical knowledge questionnaire</li> <li>3-2-1 reflection</li> <li>Satisfaction questionnaire</li> <li>Work educational philosophy statement</li> </ul>

Module 5: Educational Leadership and Administration			
Objectives	Content	Activities	Assessments
<p>After completing this module, you will:</p> <ul style="list-style-type: none"> <li>Evaluate if pedagogical knowledge changed</li> <li>Reflect on module content and apply to clinical teaching</li> <li>Analyze your application of module content to your practice</li> <li>Revise and finalize educational philosophy statement</li> </ul>	<p><i>Review professional development available at State University Medical School</i></p> <p><i>View National organizations for medical student education based on clinical specialty</i></p> <p><i>Professional development and professional learning</i></p> <ul style="list-style-type: none"> <li>Darling-Hammond et al. (2017) Effective teacher professional development</li> </ul> <p><i>Professional development and learning medical education</i></p> <ul style="list-style-type: none"> <li>Finn et al. (2011) How to become a better clinical teacher: A collaborative peer observation process</li> <li>Singh et al. (2013) Impact of a fellowship program for faculty development on the self-efficacy beliefs of health professions teachers: A longitudinal study</li> </ul> <p><i>Connections: social cognitivism, social constructivism, adult learning</i></p> <p>(Four related videos)</p>	<ol style="list-style-type: none"> <li>Watch the four videos</li> <li>Review the PowerPoint with voiceover</li> <li>Access the supplementary articles as needed</li> <li>Complete the questionnaires</li> <li>Continue to work on educational philosophy statement</li> </ol>	<p>E-portfolio</p> <ul style="list-style-type: none"> <li>Pedagogical knowledge questionnaire</li> <li>3-2-1 reflection</li> <li>Satisfaction questionnaire</li> <li>Finish educational philosophy statement</li> </ul>



## VT

This is the most important content in this module. This presentation is about 35 minutes long.

This is the most important content in this module. This presentation is about 35 minutes long.

Model 4 Results and Supplemental Presentations A8

*As noted here by teachers and students, there are few relationships between water education and learning. Though formal teacher-student relationships remain important in medical professional education, a clinical educator can still provide important mentoring and advising to a learner that is linked to a short time or particular situation. Conversely those mentoring normally will establish long-term relationships; as mentors and mentees both achieve a clinical learning situation. Duggan et al. (2017) describe the value of mentoring as it helps students to find new solutions while applying acquired knowledge constructively, and also learning opportunities. Ryan et al. (2018) present 17 tips to help the development of effective mentorship programs: a Medical education culture has to be adaptable to new methods of education.*

- [illegible]

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ga-sallatlas (2019, November 13). *Winchuan's* | medicine, health care and society [video file]. Retrieved from <https://www.youtube.com/watch?v=UW31Tt118k8>



Wong, P (2014, December 6). 93% of medical students report abuse [Video File]. Retrieved from: <https://www.youtube.com/watch?v=22Pw>



Canadian Women's Issues (2010, September 5). Addressing compassion fatigue. Video file. Retrieved from <http://cwif.ca/pdf/infocf11feng>. (Blackboard can't find the file, but if you click on it said then follow the link, you can get to the video)

Med School Insider (2016, February 2). Why are doctors educated? The OUCHOUT epidemic [Video file]. Retrieved from <https://youtu.be/34-ff-1x010>



1

1

Think about your knowledge and how it changes over the course of this module regarding mentoring and advising. How familiar are you with the material before you went through the module compared to now after you have seen the material?

1

3. Think about how you would

7. How do you provide context about observing your teaching practice and the development of the character traits, the values of mentoring and advising, the use of medicine, the hidden curriculum, mindfulness, wellness, compassion, fatigue, burnout, and resilience?
8. How do you connect the hidden curriculum to the understanding of where you teach in a range of forms of the culture of medicine and the hidden curriculum?
9. Have you explored strategies to improve your own resilience, wellness, compassion, fatigue, or burnout? How do you share your insights with your learners?
10. Do you consider learner development to be a series of problems, questions, or burnout? How do you help a learner deal with an issue of medicine?
11. Have you ever been asked to be a mentor and been unsure about your qualifications in direct advising, or when advising a professional, and/or when?
12. How does your learner accept or refuse it with your understanding of social learning beyond cognitive, experiential, and moral learning?
13. How does your learner accept or refuse advice with the COVID-19 pandemic?

### Assessments in the e-portfolio

• **Pedagogical knowledge questionnaire:** Think about your knowledge and how it changed over the course of this module regarding mentoring and advising. How familiar were you with the material before you went through the module compared to now after you have seen the material? Click on the link to the questionnaire below.

• **Reflection questionnaire:** This instrument asks you to think about how the material in this module influenced your teaching practice. Please write your responses in the areas provided. Click on the link to this questionnaire below.

• **Satisfaction questionnaire:** This instrument gives you the opportunity to let me know what your experience working with this module has been. Click on the link to this questionnaire below.

• **Educational philosophy statement:** Continue to work on your educational philosophy statement. You have thought about and written about how you see your role as a teacher, what is your theory of learning, and what are the characteristics of good teachers. Now think about what you consider to be the role and responsibilities of learners and add it to your statement!

## References

Ramard, S., Grapen, L., & Kachee, F. K. (2008). Twelve tips for developing effective mentors. *Medical Teacher*, 29(5), 431-438. doi:10.1080/01446850701665555



Continue to work on your education.

When you are ready, click on the title above, and either attach a word document, or compose your thoughts right in the journal field. When you have submitted your journal entry, a Satisfaction Questionnaire will appear below this journal.



This questionnaire gives you the opportunity to

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## Appendix E

### Email Templates for Contacting Stakeholders in the

#### Pilot Online Asynchronous Teacher Professional Development Program

##### **Email Template for contacting clinical faculty members who expressed interest in the UMU-FACD-2020 program:**

Dear Dr. \_\_\_\_\_:

I hope you recall hearing about or looking at the faculty development program I have on Blackboard entitled UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education (Clin Pedagogical Knwldg for UME).

We have all been through a great many challenges over the last few months that have changed how we practice medicine, teach medical students, and live our lives. With all the changes that have occurred and continue to happen, progress with my program has not been as I originally expected.

I am writing to ask you for your help in understanding the factors that have influenced participation in the program. I am conducting an interview study based on the clinical model for root cause analysis (RCA) that has been adapted for unexpected educational program outcomes.

As a member of the clinical faculty who expressed interest in the UMU-FACD-2020 Clin Pedagogical Knwldg for UME program, I would like to invite you to participate in this RCA research study entitled “How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development” at the School of Education, Johns Hopkins University. I am the student investigator as I continue to work on my EdD degree. The principal investigator is Carey Borkoski PhD EdD at Johns Hopkins University.

I believe your insight and opinion will be valuable to me as I move forward with the program. Please find the consent document attached to this email. If you wish to review the program, you continue to have access on SUNY Upstate Blackboard.

If you have the time to discuss your thoughts with me, please contact me by return email to schedule a time to meet on Zoom. The meeting should take about 30 to 45 minutes to complete. The meeting will be recorded if you agree.

If you have any questions, please feel free to contact me via email [folkj@upstate.edu](mailto:folkj@upstate.edu) or my cell (315) 420-7047. Thank you for your time and I look forward to meeting with you.

Sincerely,

John J. Folk, MD  
Associate Professor  
Clerkship Director  
Department OB GYN  
EdD Degree Candidate, School of Education, Johns Hopkins University

**Email Template for contacting clinical department leaders about the UMU-FACD-2020 program:**

Dear Dr. \_\_\_\_\_:

I hope you recall hearing about or looking at the faculty development program I have on Blackboard entitled UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education (Clin Pedagogical Knwldg for UME).

We have all been through a great many challenges over the last few months that have changed how we practice medicine, teach medical students, and live our lives. With all the changes that have occurred and continue to happen, progress with my program has not been as I originally expected.

I am writing to ask you for your help in understanding the factors that have influenced participation in the program. I am conducting an interview study based on the clinical model for root cause analysis (RCA) that has been adapted for unexpected educational program outcomes.

As a clinical department leader in medical student education in our College of Medicine, I would like to invite you to participate in this RCA research study entitled “How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development” at the School of Education, Johns Hopkins University. I am the student investigator as I continue to work on my EdD degree. The principal investigator is Carey Borkoski PhD EdD at Johns Hopkins University.

I believe your insight and opinion will be valuable to me as I move forward with the program. Please find the consent document attached to this email. I have enrolled you in the UMU-FACD-2020 program on SUNY Upstate Blackboard as a student for your review.

If you have the time to discuss your thoughts with me, please contact me by return email to schedule a time to meet on Zoom. The meeting should take about 30 to 45 minutes to complete. The meeting will be recorded if you agree.

If you have any questions, please feel free to contact me via email [folkj@upstate.edu](mailto:folkj@upstate.edu) or my cell (315) 420-7047. Thank you for your time and I look forward to meeting with you.

Sincerely,

John J. Folk, MD  
Associate Professor  
Clerkship Director  
Department OB GYN  
EdD Degree Candidate, School of Education, Johns Hopkins University

**Email Template for contacting UME educational administrative leaders about the UMU-FACD-2020 program:**

Dear Dr. \_\_\_\_\_:

I hope you recall hearing about or looking at the faculty development program I have on Blackboard entitled UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education (Clin Pedagogical Knwldg for UME).

We have all been through a great many challenges over the last few months that have changed how we practice medicine, teach medical students, and live our lives. With all the changes that have occurred and continue to happen, progress with my program has not been as I originally expected.

I am writing to ask you for your help in understanding the factors that have influenced participation in the program. I am conducting an interview study based on the clinical model for root cause analysis (RCA) that has been adapted for unexpected educational program outcomes.

As an administrative leader in medical student education in our College of Medicine, I would like to invite you to participate in this RCA research study entitled “How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development” at the School of Education, Johns Hopkins University. I am the student investigator as I continue to work on my EdD degree. The principal investigator is Carey Borkoski PhD EdD at Johns Hopkins University.

I believe your insight and opinion will be valuable to me as I move forward with the program. Please find the consent document attached to this email. I have enrolled you in the UMU-FACD-2020 program on SUNY Upstate Blackboard as a student for your review.

If you have the time to discuss your thoughts with me, please contact me by return email to schedule a time to meet on Zoom. The meeting should take about 30 to 45 minutes to complete. The meeting will be recorded if you agree.

If you have any questions, please feel free to contact me via email [folkj@upstate.edu](mailto:folkj@upstate.edu) or my cell (315) 420-7047. Thank you for your time and I look forward to meeting with you.

Sincerely,

John J. Folk, MD  
Associate Professor  
Clerkship Director  
Department OB GYN  
EdD Degree Candidate, School of Education, Johns Hopkins University

## Appendix F

### JOHNS HOPKINS UNIVERSITY HOMEWOOD INSTITUTIONAL REVIEW BOARD (HIRB)

#### RESEARCH PARTICIPANT INFORMED CONSENT FORM

**Study Title:** How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development

Application No.: HIRB00010954

**Principal Investigator:** Carey Borkoski, PhD, EdD, Assistant Professor, School of Education, Johns Hopkins University

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You are being asked to join a research study. Participation in this study is voluntary. Even if you decide to join now, you can change your mind later.

#### 1. Research Summary (Key Information):

The information in this section is intended to be an introduction to the study only. Complete details of the study are listed in the sections below. If you are considering participation in the study, the entire document should be discussed with you before you make your final decision. You can ask questions about the study now and at any time in the future.

The purpose of this research study is to identify the factors that influenced clinical faculty non-participation in a pilot program for an online teacher professional development program, including the COVID-19 pandemic. We anticipate that approximately 47 people will participate in this study.

This research study will request that you spent 10 – 30 minutes reviewing the online, module-based teacher professional development program for clinical faculty on the SUNY Upstate College of Medicine Blackboard platform. You will then have a scheduled meeting on Zoom with Dr. John Folk to discuss your insights regarding the program. Your meeting will be anywhere from 15 – 45 minutes long.

#### 2. Why is this research being done?

This research study is being done to understand how the clinical faculty perceive an online, asynchronous, module-based teacher professional development program that was

designed as part of a dissertation project to qualify the student investigator for a Doctor of Education at the School of Education at Johns Hopkins University. This study will define and explore reasons for non-participation among clinical faculty teaching medical students while caring for patients. The program is housed in the College of Medicine Blackboard platform as UMU-FACD-2020 Clin Pedagogical Knowldg for UME. The program opened on July 6, 2020, and, after 10 weeks, enrollment was unexpectedly low and, therefore, could not proceed as planned.

This research study is designed to explore factors, such as the COVID-19 pandemic, that may have influenced clinical faculty participation in the online teacher professional development program. The researcher hopes this study will provide insights into the participation issue and changes to the program that may improve future participation in the same or similar program.

Participant recruitment will include academic leaders for medical student education in the College of Medicine, clinical department education leaders, and clinical faculty members who expressed interest in the program.

We anticipate that about 47 people will take part in this study. You will be asked to review the online program and meet with Dr. Folk, the student investigator. The review and meeting should take about 1 – 2 hours total. The entire research study will be completed over a two-month time span. There is no direct benefit to you from participating in this research study. There are no significant risks or costs associated with your participation in this research study.

### **3. What will happen if you join this study?**

If you agree to be in this study, we will ask you to do the following:

- Review the UMU-FACD-2020 Clin Pedagogical Knowldg for UME program found on the College of Medicine's Blackboard platform. This will take about 10 – 30 minutes.
- Schedule a meeting with the student investigator, Dr. John Folk, on the Zoom platform at your convenience. This meeting is expected to take about 30 – 45 minutes.
- Participate in a meeting with Dr. Folk. You will be asked to answer questions about the UMU-FACD-2020 program using a root cause analysis strategy adapted for evaluating unexpected education outcomes. The domains covered in the root cause analysis include equipment, measurement, process, people, materials, and environment.
- Dr. Folk may be contacting you to ask additional questions if any come up while reviewing or analyzing the information and data your meeting provides.

### **Audio recordings:**

As part of this research, I am requesting your permission to create and use an audio recording of our meeting. Any recording made will not be used for advertising or non-study related purposes.

You should know that:

- You may request that the audio recording be stopped at any time.
- If you agree to allow me to use the audio recording and then change your mind, you may ask me to destroy the recording. If the recording has had all identifiers removed, I may not be able to do this.
- I will only use these recordings for the purposes of this research.
- The audio recording will be transcribed by an outside company that has agreed to keep all data confidential.
- The purpose of the audio recording is to assure I will have an accurate transcription of our discussion and will have accurate data when looking at the research study outcomes. Making this recording is required for this research to be successful.

### **How long will you be in the study?**

You will be in this study until you schedule and conduct your meeting with the student investigator, Dr. Folk. You will be in the research study until your meeting is completed and perhaps another few weeks if Dr. Folk has questions or needs more detail regarding your answers.

### **What are the risks or discomforts of the study?**

a) There are no foreseeable risk risks or discomforts anticipated with this research study.

### **4. Are there benefits to being in the study?**

There is no direct benefit to you from participating in this study.

A potential benefit of this study is to increase insight into how an online teacher professional development program can be improved to serve clinical faculty that teach medical students while carrying out their patient care activities.

### **5. What are your options if you do not want to be in the study?**

Your participation in this study is entirely voluntary. You choose whether to participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled.

**6. Will it cost you anything to be in this study?**

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

**7. Will you be paid if you join this study?**

You will not receive any payment or other compensation for participating in this research study.

**8. Can you leave the study early?**

- You can agree to be in the study now and change your mind later, without any penalty or loss of benefits.
- If you wish to stop, please tell me right away.
- If you want to withdraw from the study, please contact Dr. Folk at [folkj@upstate.edu](mailto:folkj@upstate.edu) or cell phone (315) 420-7047.

**9. How will the confidentiality of your data be protected?**

Your audio-recorded discussion with Dr. Folk and the transcript made from the discussion will not be shared with anyone else at the College of Medicine. Once the audio-recording has been transcribed and verified for accuracy, Dr. Folk will destroy the audio recording and retain the transcript without your name or any other identification other than the general category you fit as a participant (e.g., administrator, leader, or faculty).

Any study records that identify you will be kept confidential to the extent possible by law. The records from your participation may be reviewed by people responsible for making sure that research is done properly, including members of the Johns Hopkins University Homewood Institutional Review Board and officials from government agencies such as the National Institutes of Health and the Office for Human Research Protections. (All of these people are required to keep your identity confidential.) Otherwise, records that identify you will be available only to people working on the study from the student investigator's dissertation committee at Johns Hopkins School of Education.

Records and data from this study will be kept on the student investigator's password-protected laptop provided by the College of Medicine.

## 10. What should you do if you have questions about the study?

You can ask questions about this research study now or at any time during the study, by contacting the student investigator, Dr. Folk at [folkj@upstate.edu](mailto:folkj@upstate.edu) or cell phone (315) 420-7047. You may contact the principal investigator, Carey Borkoski, PhD, EdD at [cborkoski@jhu.edu](mailto:cborkoski@jhu.edu). If you wish, you may contact the principal investigator by letter. The address is on page one of this consent form. If you cannot reach the principal investigator or wish to talk to someone else, call the IRB office at 410-516-5680

If you have questions about your rights as a research participant or feel that you have not been treated fairly, please call the Homewood Institutional Review Board at Johns Hopkins University at (410) 516-6580.

### **Future Contact**

Dr. Folk would like your permission to contact you in the future if he has any questions regarding your meeting after making the transcription of your discussion. The purpose of a follow-up meeting will be to clarify or expand on the information you discussed with Dr. Folk at your original meeting.

**Please sign and date your choice below:**

YES ☐ \_\_\_\_\_  
Signature of Participant Date

NO ☐ \_\_\_\_\_  
Signature of Participant Date

**11. What does your signature on this consent form mean?**

Your signature on this form means that: You understand the information given to you in this form, you accept the provisions in the form, and you agree to join the study. You will not give up any legal rights by signing this consent form.

**WE WILL SEND YOU A PDF COPY OF THIS SIGNED AND DATED  
CONSENT FORM**

---

Signature of Participant

(Print Name)

Date/Time

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Signature of Person Obtaining Consent

(Print Name)

Date/Time

**NOTE: A COPY OF THE SIGNED, DATED CONSENT FORM MUST BE KEPT BY THE PRINCIPAL  
INVESTIGATOR; A COPY MUST BE GIVEN TO THE PARTICIPANT.**

## Appendix G

### Root Cause Analysis Interview Protocol for Clinical Faculty Members

**Study Title:** How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development

**Participants:** 11 clinical faculty members who expressed interest in the UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education teacher professional development program on the College of Medicine's Blackboard space

**Facilitator:** John Folk, student investigator

**Materials:** interview protocol, Zoom platform, voice recorder and software, access to Blackboard program, consent document

**Purpose:** To discuss with important stakeholders factors that may have contributed to clinical faculty non-participation in the UMU-FACD-2020 program

#### **Prior To Interview:**

- Contact 11 clinical faculty members individually who expressed interest in the program via email
- Invite each faculty member to review the content of the UMU-FACD-2020 program and the informed consent document prior to scheduling an RCA interview with the student investigator, John Folk
- Schedule an interview with each faculty member who agrees to participate

#### **Procedure:**

- Greet participant: student investigator greets the participant and assures the Zoom connection is fully functional
- Thank participant for his or her time
- Facilitator introduction: student investigator introduces himself, his role as the student investigator for the UMU-FACD-2020 program and this root cause analysis research study
- Discuss consent process
- State purpose of the research study
- Review bounds of confidentiality, anonymity, security of the meeting and the discussion to follow
- Participant opportunity to ask questions
- Confirm participant's consent
- Discuss the role of a voice recording in this research, and if agreeable, begin recording
- Proceed with interview

#### **Interview:**

#### **Introduction:**

I have asked you to meet with me to discuss the asynchronous teacher professional development program UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education on the College of Medicine's Blackboard space. As a clinical faculty member in our College of Medicine's undergraduate medical education program, I believe your observations will be of great value as I move forward with this program. We are certainly living in challenging times as clinicians, as medical educators, and as people. I am conducting this research study to see if I can describe how these challenges may be affecting the UMU-FACD-2020 faculty development program. Our discussion is part of a research study I am conducting for my dissertation project for a Doctor of Education degree at Johns Hopkins University School of Education. This research study and interview is designed using the clinically based root cause analysis as a way to understand the factors involved in an educational program. I will be asking about factors related to environment, equipment, materials, people, process, and measurement. Our discussion will take about 30 to 45 minutes.

**Prompts:**

**Question 1:** How did you hear about the UMU-FACD-2020 program?

**Question 2:** Were you able to log onto Blackboard and review the program?

**Question 3:** Would you like me to share screen with you and go over the program?

**Environment:**

**Question 4:** What are your clinical responsibilities?

**Question 5:** How much of your time in a week is spent providing patient care?

**Question 6:** Describe your role as a clinical educator:

- Who do you teach?
- How much time do you spend teaching?
- Do you teach while you are seeing patients?

**Question 7:** Do you have other responsibilities that take up your time other than clinical practice and teaching?

- Please describe.
- What difficulties do these other responsibilities create?

**Question 8:** How has your medical practice changed since the COVID-19 pandemic began?

**Question 9:** How has your teaching with medical students changed since the start of the pandemic?

**Question 10:** With these changes in mind, have your needs for faculty professional development changed? If so, please describe.

**Question 11:** How have the changes that have occurred in your clinical practice, medical student teaching, or other responsibilities influenced your ability to participate in the UMU-FACD-2020 program?

- Do you believe the changes that have taken place due to the COVID-19 pandemic influenced your participation in the program?
- If yes, how?

**Equipment:**

**Question 12:** What type of device (e.g., desktop, laptop, or mobile) did you use to access the program?

**Question 13:** Do you find you access the program more often on University devices or on your personal devices? Which device or devices work best for you?

**Question 14:** On what device and where (e.g., work, home) would it be best for you to access the program?

**Materials:**

**Question 15:** What is your opinion of the topics selected for the UMU-FACD-2020 program?

- Were they appropriate for this program?
- Why or why not?

**Question 16:** What is your opinion of the order in which the topics are presented?

**Question 17:** What is your opinion of the potential helpfulness of the course materials in your teaching?

**Question 18:** What is your opinion of the potential application and utility of the teaching strategies presented in the program?

**Question 19:** Compared to faculty development you have completed how would you assess the amount of material presented in this program?

**People:**

**Question 20:** How important do you feel faculty development is in your career?

**Question 21:** In your experience, how have faculty development programs been important to your understanding of processes such as promotion and tenure, if at all?

**Question 22:** How has the completion of faculty development programs contributed to your ability to your ability to be a successful clinical teacher, if at all?

**Question 23:** Were there other faculty development programs happening simultaneous to the UMU-FACD-2020 program? Are you enrolled in another faculty development program?

**Question 24:** Do you feel the content for this program was too similar to previously offered faculty development programs?

**Question 25:** Do you believe the UMU-FACD-2020 program has something to offer you for your professional development?

- Can you give me an example of something that would be of value?

**Question 26:** What circumstances do you think hindered you from completing the program?

**Process:**

**Question 27:** When you log onto the College of Medicine Blackboard platform, have you experienced difficulties moving around within the program?

- Please describe.
- Were the difficulties related to Blackboard or the program itself?

**Question 28:** Are you able to access the program at your clinical practice site when you are working with medical students?

**Question 29:** Are you able to access the program where you carry out your academic work such as in your office, home, or on your mobile device? How would you describe that experience?

**Question 30:** Are you experiencing problems either accessing or using the program with University computers or your personal devices? Please describe.

**Question 31:** Do you have any suggestions for how I might better inform your colleagues about the UMU-FACD-2020 program?

**Measurement:**

**Question 32:** Do you understand what the assessment are designed to measure?

- the initial teacher self-efficacy questionnaire
- the pedagogical knowledge questionnaire
- the reflection questionnaire
- the educational philosophy statement
- the satisfaction questionnaire
- the final teacher self-efficacy questionnaire

**Question 33:** What is your opinion of the number and types of assessments included in this program?

**Question 34:** Do you believe these assessments give an accurate account of what you are doing in the program? Why or why not?

**Final Question:**

**Question 35:** Is there anything I have not covered that you would like to share regarding this program content or your ability to participate?

**Following Interview:**

- Review how the voice recording will be used to create a transcript of the conversation
- Review how the student investigator may need to contact the participant in the future to clarify questions about the transcript
- Thank the participant for her or his time
- Provide last opportunity to address questions

## Appendix H

### Root Cause Analysis Interview Protocol for Clinical Department Education Leaders

**Study Title:** How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development

**Participants:** Clinical department chairs, residency program directors, and clerkship directors who supervise the medical student clinical education activities within their departments.

**Facilitator:** John Folk, student investigator

**Materials:** interview protocol, Zoom platform, voice recorder and software, access to Blackboard program, consent document

**Purpose:** To discuss with important stakeholders factors that may have contributed to clinical faculty non-participation in the UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education teacher professional development program on the College of Medicine's Blackboard space.

#### **Prior To Interview:**

- Contact the chairs, residency program directors, and clerkship directors of the clinical departments of the College of Medicine via institutional email
- Invite each departmental leader to review the content of the UMU-FACD-2020 program and the informed consent document prior to scheduling an RCA interview with the student investigator, John Folk
- Schedule an interview with each departmental leader who agrees to participate

#### **Procedure:**

- Greet participant: student investigator greets the participant and assures the Zoom connection is fully functional
- Thank participant for his or her time
- Facilitator introduction: student investigator introduces himself, his role as the student investigator for the UMU-FACD-2020 program and this root cause analysis research study
- Discuss consent process
- State purpose of the research study
- Review bounds of confidentiality, anonymity, security of the meeting and the discussion to follow
- Participant opportunity to ask questions
- Confirm participant's consent
- Discuss the role of a voice recording in this research, and if agreeable, begin recording
- Proceed with interview

## **Interview:**

### **Introduction:**

I have asked you to meet with me to discuss the asynchronous teacher professional development program UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education on the College of Medicine's Blackboard space. As a clinical department education leader in our College of Medicine's undergraduate medical education program, I believe your observations will be of great value as I move forward with this program. We are certainly living in challenging times as clinicians, as medical educators, and as people. I am conducting this research study to see if I can describe how these challenges may be affecting the UMU-FACD-2020 faculty development program. Our discussion is part of a research study I am conducting for my dissertation project for a Doctor of Education degree at Johns Hopkins University School of Education. This research study and interview is designed using the clinically based root cause analysis as a way to understand the factors involved in an educational program. I will be asking about factors related to environment, equipment, materials, people, process, and measurement. Our discussion will take about 30 to 45 minutes.

### **Prompts:**

**Question 1:** How did you hear about the UMU-FACD-2020 program?

**Question 2:** Were you able to log onto Blackboard and review the program?

**Question 3:** Would you like me to share screen with you and go over the program?

### **Environment:**

**Question 4:** What are your department's clinical responsibilities?

**Question 5:** How much of your department's time in a week is spent providing patient care?

**Question 6:** Describe your role as a clinical education leader.

- How much of your department's time and effort is dedicated to medical student teaching?
- How are medical student teaching responsibilities shared among the members of your department?

**Question 7:** Do the members of your department have other responsibilities that take up their time other than clinical practice and teaching?

- Please describe.
- What difficulties do these other responsibilities create?

**Question 8:** How has your department's medical practice changed since the COVID-19 pandemic started?

**Question 9:** How has your department members' interactions with medical students changed since the start of the pandemic?

**Question 10:** With these changes in mind, have the needs for faculty professional development changed? If so, please describe.

**Question 11:** How have the changes that have occurred in your department's clinical practice, medical student teaching, or other responsibilities influenced your faculty's ability to participate in the UMU-FACD-2020 program?

- Do you believe the changes that have taken place due to the COVID-19 pandemic influenced your faculty's participation in the program?
- If yes, how?

**Equipment:**

**Question 12:** What type of device (e.g., desktop, laptop, or mobile) did you use to access the program?

**Question 13:** Do you find you access the program more often on University devices or on your personal devices? Which device or devices work best for you?

**Question 14:** On what device and where would it be best for your department's faculty to access the program?

**Materials:**

**Question 15:** What is your opinion of the topics selected for the UMU-FACD-2020 program?

- Were they appropriate for this program?
- Why or why not?

**Question 16:** What is your opinion of the order the topics are presented?

**Question 17:** What is your opinion of the potential helpfulness of the course materials in your faculty's teaching?

**Question 18:** What is your opinion of the potential application of the teaching strategies presented in the program for your faculty's teaching?

**Question 19:** Compared to faculty development you have completed how would you assess the amount of material presented in this program?

**People:**

**Question 20:** How important do you feel faculty development is in your department?

**Question 21:** In your experience, have faculty development programs been important to your understanding of processes such as promotion and tenure for your faculty?

**Question 22:** How has completion of other faculty development programs contributed to your faculty's ability to be successful clinical teachers?

- How do you know?

**Question 23:** Were there other faculty development programs happening simultaneous to the UMU-FACD-2020 program?

**Question 24:** Do you feel the content for this program was too similar to previously offered faculty development programs?

**Question 25:** Do you believe this program has something to offer your faculty in their professional development?

- Can you give me an example of something that would be of value?

**Question 26:** What circumstances do you think hindered your faculty from completing the program?

**Process:**

**Question 27:** When you log onto the College of Medicine Blackboard platform, have you experienced difficulties moving around within the program?

- Please describe.
- Was the problem related to Blackboard or the program itself?

**Question 28:** Based on your experience with the program do you anticipate your faculty should be able to access the program at their clinical practice sites when they are working with medical students?

**Question 29:** Based on your experience with the program, do you anticipate your faculty should be able to access the program where they carry out their academic work such as in their offices, homes, or on their mobile devices? How would you describe that experience?

**Question 30:** Are you experiencing problems either accessing or using the program with University computers or your personal devices? Please describe.

**Question 31:** When I opened the UMU-FACD-2020 program, I sent emails to clerkship administrators and directors asking them to share with their faculty who teach medical students. I also presented briefly about the program at the Phase 2 (sub-committee for clerkship and MS 3 course directors, associate directors, and administrators).

- Do you have any suggestions I can use to better promote the program?

### **Measurement:**

**Question 32:** Do you understand what the assessment tools are designed to measure? (i.e.,

- the initial teacher self-efficacy questionnaire
- the pedagogical knowledge questionnaire
- the reflection questionnaire
- the educational philosophy statement
- the satisfaction questionnaire
- the final teacher self-efficacy questionnaire

**Question 33:** What is your opinion of the number and types of assessments included in this program?

**Question 34:** Do you believe these assessments give an accurate account of what your faculty are doing in the program? Why or why not?

### **Final Question:**

**Question 35:** Is there anything I have not covered that you would like to share regarding this program content or your ability to participate?

### **Following Interview:**

- Review how the voice recording will be used to create a transcript of the conversation
- Review how the student investigator may need to contact the participant in the future to clarify questions about the transcript
- Thank the participant for her or his time
- Provide last opportunity to address questions

## Appendix I

### Root Cause Analysis Interview Protocol for College of Medicine Undergraduate Medical Educational Administrative Leaders

**Study Title:** How the COVID-19 pandemic and other factors influenced clinical faculty participation in a pilot program for teacher professional development

**Participants:** College of Medicine undergraduate medical education administrative leaders who supervise the medical student clinical education activities within the institution.

**Facilitator:** John Folk, student investigator

**Materials:** interview protocol, Zoom platform, voice recorder and software, access to Blackboard program, consent document

**Purpose:** To discuss with important stakeholders factors that may have contributed to clinical faculty non-participation in the UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education teacher professional development program on the College of Medicine's Blackboard space.

#### **Prior To Interview:**

- Contact undergraduate medical education administrative leaders of the College of Medicine via institutional email
- Invite each administrative leader to review the content of the UMU-FACD-2020 program and the informed consent document prior to scheduling an RCA interview with the student investigator, John Folk
- Schedule an interview with each administrative leader who agrees to participate

#### **Procedure:**

- Greet participant: student investigator greets the participant and assures the Zoom connection is fully functional
- Thank participant for his or her time
- Facilitator introduction: student investigator introduces himself, his role as the student investigator for the UMU-FACD-2020 program and this root cause analysis research study
- Discuss consent process
- State purpose of the research study
- Review bounds of confidentiality, anonymity, security of the meeting and the discussion to follow
- Participant opportunity to ask questions
- Confirm participant's consent
- Discuss the role of a voice recording in this research, and if agreeable, begin recording
- Proceed with interview

#### **Interview:**

### **Introduction:**

I have asked you to meet with me to discuss the asynchronous teacher professional development program UMU-FACD-2020 Clinical Pedagogical Knowledge for Undergraduate Medical Education on the College of Medicine's Blackboard space. As an administrative leader in our College of Medicine's undergraduate medical education program, I believe your observations will be of great value as I move forward with this program. We are certainly living in challenging times as clinicians, as medical educators, and as people. I am conducting this research study to see if I can describe how these challenges may be affecting the UMU-FACD-2020 faculty development program. Our discussion is part of a research study I am conducting for my dissertation project for a Doctor of Education degree at Johns Hopkins University School of Education. This research study and interview is designed using the clinically based root cause analysis as a way to understand the factors involved in an educational program. I will be asking about factors related to environment, equipment, materials, people, process, and measurement. Our discussion will take about 30 to 45 minutes.

### **Prompts:**

**Question 1:** How did you hear about the UMU-FACD-2020 program?

**Question 2:** Were you able to log onto Blackboard and review the program?

**Question 3:** Would you like me to share screen with you and go over the program?

### **Environment:**

**Question 4:** What are your clinical responsibilities?

**Question 5:** How much of your time in a week is spent providing patient care?

**Question 6:** Describe your role as an education leader.

- How much of the faculty's time and effort is dedicated to medical student teaching?
- How are medical student teaching responsibilities shared among the clinical departments?

**Question 7:** Do faculty have other responsibilities that take up their time other than clinical practice and teaching?

- Please describe.
- What difficulties do these other responsibilities create?

**Question 8:** How has the role of the faculty in medical practice changed since the COVID-19 pandemic began?

**Question 9:** How has faculty interaction with medical students changed since the COVID-19 pandemic began?

**Question 10:** With these changes in mind, have the needs for faculty professional development changed? If so, please describe.

**Question 11:** How have the changes that have occurred in our institution's clinical practice, medical student teaching, or other responsibilities influenced the faculty's ability to participate in the UMU-FACD-2020 program?

- Do you believe the changes that have taken place due to the COVID-19 pandemic influenced faculty participation in the program?
- If yes, how?

**Equipment:**

**Question 12:** What type of device (e.g., desktop, laptop, or mobile) did you use to access the program?

**Question 13:** Do you find you access the program more often on University devices or on your personal devices? Which device or devices work best for you?

**Question 14:** On what device and where would it be best for the faculty to access the program?

**Materials:**

**Question 15:** What is your opinion of the topics selected for the UMU-FACD-2020 program?

- Were they appropriate for this program?
- Why or why not?

**Question 16:** What is your opinion of the order the topics are presented?

**Question 17:** What is your opinion of the potential helpfulness of the course materials in the faculty's teaching?

**Question 18:** What is your opinion of the potential application and utility of the teaching strategies presented in the program?

**Question 19:** Compared to other faculty development programs you have completed how would you assess the amount of material presented in this program?

**People:**

**Question 20:** What is the importance of faculty development to our institution?

**Question 21:** In your experience, have faculty development programs been important to your understanding of processes such as promotion and tenure for the faculty?

**Question 22:** Has the completion of other faculty development programs contributed to the faculty's ability to be successful clinical teachers?

- How do you know?

**Question 23:** Were there other faculty development programs happening simultaneous to UMU-FACD-2020 program?

**Question 24:** Do you feel the content for this program was too similar to previously offered faculty development programs?

**Question 25:** Do you believe this program has something to offer the faculty in their professional development?

- Can you give me an example of something that would be of value?

**Question 26:** What circumstances do you think hindered the faculty from completing the program?

#### **Process:**

**Question 27:** When you log onto the College of Medicine Blackboard platform, have you experienced difficulties moving around within the program?

- Please describe.
- Was the problem related to Blackboard or the program itself?

**Question 28:** Based on your experience with the program do you anticipate the faculty should be able to access the program at their clinical practice sites when they are working with medical students?

**Question 29:** Based on your experience with the program, do you anticipate the faculty should be able to access the program where they carry out their academic work such as in their offices, homes, or on their mobile devices? How would you describe that experience?

**Question 30:** Are you experiencing problems either accessing or using the program with University computers or your personal devices? Please describe.

**Question 31:** When I opened the UMU-FACD-2020 program, I sent emails to clerkship administrators and directors asking them to share with their faculty who teach medical students. I also presented briefly about the program at the Phase 2 (sub-committee for clerkship and MS 3 course directors, associate directors, and administrators).

- Do you have any suggestions I can use to better promote the program?

#### **Measurement:**

**Question 32:** Do you understand what the assessment tools are designed to measure?

- the initial teacher self-efficacy questionnaire
- the pedagogical knowledge questionnaire
- the reflection questionnaire
- the educational philosophy statement

- the satisfaction questionnaire
- the final teacher self-efficacy questionnaire

**Question 33:** What is your opinion of the number and types of assessments included in this program?

**Question 34:** Do you believe these assessments give an accurate account of what the faculty are doing in the program? Why or why not?

**Final Question:**

**Question 35:** Is there anything I have not covered that you would like to share regarding this program content or your ability to participate?

**Following Interview:**

- Review how the voice recording will be used to create a transcript of the conversation
  - Review how the student investigator may need to contact the participant in the future to clarify questions about the transcript
  - Thank the participant for her or his time
- Provide last opportunity to address questions