SIMULATION-BASED LEARNING AND SENIOR INTERNAL MEDICINE RESIDENTS' MOTIVATION: A QUALITATIVE STUDY

by

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A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Capella University

February 2020

Abstract

Simulation-based training has become an integral and desirable format for educating and improving performance of healthcare professionals. Physicians' training-in-residency programs provide a unique transition from formative education to autonomous medical practice. Perspectives and descriptions of experienced learners' experiences in simulation-based learning were scarce in the literature; likewise, studies describing experienced learners' motivations in simulation-based learning were limited. The purpose of this study was to understand the experiences of senior internal medicine residents in simulation-based learning and to explore how they described their motivation in those experiences. Experiential learning and self-determination theories were the framework for understanding participants' experiences of simulation-based learning in graduate medical education. The research question for this study was How do senior residents in internal medicine residency programs describe their experience with simulation-based learning? The methodology for this study was qualitative with a basic qualitative research design. Eleven participants were audio-recorded during one-on-one interviews; transcripts were verified by member checks and analyzed by the researcher. Data analysis consisted of descriptive and axial coding. Atlas.ti and hand-coding were used to organize the codes into categories and then themes. Three themes resulted from the data analysis: simulation-based learning is beneficial, barriers impact further learning in simulation-based learning, and motivation varies in simulation-based learning. Findings from the study indicated that participants regarded simulation-based training as a positive experience and that their motivation increased as a result of participating in simulation-based training. Repetition and debriefing were among the most beneficial activities associated with simulation-based training. Participants also identified the opportunity to self-assess and develop nontechnical

skills as particular strengths in their experiences. Participants identified barriers of applicability or relatedness of the content in training and difficulty in balancing program and clinical requirements. Participants explained that simulation-based training supported and reinforced their motivation. As experienced learners, participants described simulation-based training as a component of self-determination theory that consistently resonated with participants. Findings of this study implied the potential for investigations with more diverse samples and research sites and consideration of the sex of participants and the country in which they completed their medical training.

Dedication

My commitment to this doctoral process has been one of the most difficult endeavors I have ever experienced. Along the way, many individuals have made sacrifices, willingly and not, that afforded me the opportunity to pursue this distinction. I am truly humbled by those that have kept watch over me; without all of you, none of this would be possible.

Dyan, thank you for your love, encouragement, and (perhaps most of all) patience throughout this process. I could not have done this without you. I am grateful for the life we have built together and look forward to our next adventure. I love you.

To my parents and grandparents, thank you for preparing me for all that life has presented so far. I have no doubt where I got the work ethic and resolve necessary to complete this process. The phone calls and conversations during weekend visits always reminded me how much you believed in me. As well to my brothers, we have our own way of showing it. Thank you for doing brother-things throughout all of our years. I love you all!

To my surrogate children (Max, Robert, Carter, Brady, and Georgia Grace), I hope that my work here will show you that anything in your life is possible if you are willing to work for it. Don't live with your dreams—WORK for your dreams! I love you all!

Finally, I want to recognize my brothers at the fire department and fellow educators at the hospital. You have all been more supportive, generous, and caring than I ever thought I deserved from you. Thank you for looking out for me.

Acknowledgments

I first need to recognize my mentor and faculty chair, Dr. Elizabeth Bruch. Of the many times that I doubted myself, she was unwavering with her commitment to me and this study. Dr. Bruch's patience and support throughout this process have incomparable and inspiring. Thank you, Dr. Bruch.

I would also like to thank my committee members, Dr. Behrooz Sabet and Dr. Joy Kieffer, who supported this study to completion. I appreciate their audience and insight so that this study was the best it could be.

Finally, I would like to recognize the contributions of Dr. Jerry Halverson. Dr. Halverson was a committee member at the time in which this study commenced; he sadly passed before the completion of this study.

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CHAPTER 1. INTRODUCTION

Simulation-based learning has emerged as a viable and reliable methodology across a variety of formative and professional applications. In medical education, simulation-based learning serves as a mechanism to supplement or replace experiences previously acquired in the clinical environment with actual patients (Jeffries, 2015). The benefits associated with this method are to improve performance and reduce medical errors (Mariani, Cantrell, Meakim, & Jenkinson, 2015; Rubulotta, Scales, & Halpern, 2016; Stroud, Wong, Hollenberg, & Levinson, 2013). In addition, simulation-based learning can be used as a mechanism to encourage participants' motivation, which can lead to higher levels of engagement and performance (Younan, 2017). Chapter 1 includes a brief background of the study, the need for the study, the purpose of the study, the significance of what this study may contribute to the field, the research question and subquestions, definition of terms used in this study, and a description of the research design used in this study. Assumptions used and limitations identified in the design and execution of this study conclude Chapter 1.

Background of the Study

Medical educators have integrated simulation-based learning as a reliable method of instruction in both undergraduate and postgraduate professional programs. This study focused on the field of graduate medical education and participants' experiences with simulation-based learning in an internal medicine residency training program. The field of medicine exists in a constant state of evolution, adaptations emerge in response to challenges in the prevention and treatment of diseases and lead to increasingly in-depth knowledge and technological integration (Boudoulas, Triposkiadis, Stefanadis, & Boudoulas, 2017). Medical educators must evolve teaching strategies to ensure learners can keep pace with new evidence and improved practices.

The continuous transformation of medical practice and education forces leaders in medical education to re-evaluate the design and content of their curricula to keep pace with the industry, adjusting to both external and internal forces that affect the quality of education and healthcare delivery (Association of American Medical Colleges, 2015; Rose, 2015). External forces may include restrictions on the amount of time residents can work and a requirement to maintain a focus on efficiency in education and care (Choma, Vasilevskis, Sponsler, Hathaway, & Kripalani, 2013; Kamine et al., 2013; Rajaram et al., 2016). Internal factors such as increased reports of fatigue and burnout have received significant attention and reaction (McCormick et al., 2013; Nuckols & Escarce, 2012; Ripp et al., 2017; Wang & Myers, 2018). In the struggle to manage the learning environment and experience of residents, educators must consider curriculum design strategies and perspectives that have not previously been explored (American Medical Association, 2014). Simulation-based learning is one such strategy.

Simulation-based learning is appropriate to examine individual, departmental or programmatic, and organizational performances. Simulation-based learning is a technique that presents a situation or setting intended to replicate real-life events for individuals to experience for practice, learning, evaluation, testing, or to appreciate viewpoints beyond their own experiences (Lopreiato, 2016). Much of what is known about simulation-based training derived from high-risk environments such as aviation and nuclear engineering; the training has since found application in the field of medicine and medical education to improve overall learning by students and professionals, increase the quality of care provided to patients, and increase patient safety (Mileder & Schmölzer, 2016). The use of simulation-based learning in the field of graduate medical education has been strongly recommended (Riley, 2015); however, little scholarly research offers insight into its integration and impact from the perspective of residents.

The aim of this study was to explore how residents describe their experience with simulation-based learning and their motivation as impacted by that experience as they progress through their training programs to become more knowledgeable and skilled. Experiential learning theory was the appropriate theoretical framework to establish the context and phenomenon of simulation-based learning in graduate medical education. D. A. Kolb (1984) defined experiential learning theory as "the process whereby knowledge is created through the transformation of experience" (p. 41). D. A. Kolb further defined experiential learning theory by framing four stages: an experience or incident, a reflection period, conceptualization of new ideas, and experimentation. Learners progress through the stages of the experiential learning cycle in a nearly continuous pattern, using the experimental stage as an opportunity for a new experience that can repeat through the experiential learning cycle. Each of the stages and their relevance to simulation-based learning are explored in Chapter 2.

Self-determination theory was identified by the research as a suitable tool to investigate the perspective of motivation described by participants. Initially established in the field of psychology and study of motivation, self-determination theory describes inherent human behavior in which intrinsic and extrinsic variables/characteristics influence an individual's motivation and psychological needs (Ryan & Deci, 2000). Exploring the intrinsic and extrinsic types of motivation that an individual may experience and describe, self-determination theory was based on three fundamental psychological concepts: autonomy, competence, and relatedness (Lyness, Lurie, Ward, Mooney, & Lambert, 2013). Curricula that enhance learners' motivation through any or all of the psychological concepts can increase the amount of learning (Kusurkar & Croiset, 2015). Participants in this study were internal medicine residents who had participated in simulation-based learning throughout their entire residency training program.

Application of the components of experiential learning and self-determination theories supported exploration of the participants' experiences with simulation-based learning and descriptions of their motivation as they related to those experiences. A review of previous literature on the topic also helped establish the foundation for this research.

Improvements in medical education can lead to improvements in the professions and practice of medicine. The goal and purpose of simulation-based learning are to provide an opportunity for participants to practice their individual, team, and organizational tasks without any risk exposure to patients. Industry demands to increase patient safety by reducing errors have resulted in increased demand for safe and repeatable training. The methodology of *see one, do one, teach one* (Nwomeh, 2012) was long the standard for medical educators to use when providing instruction within the clinical setting; however, the associated risk to patients, as mentioned above, during possible learning opportunities is no longer permissible, and innovative alternatives are needed. Training programs were slow to integrate simulation-based learning due to the significant costs and resources associated with development and maintenance (Lazzara, Benishek, Dietz, Salas, & Adriansen, 2014; Mathai et al., 2014).

The application of simulation-based learning has evolved to provide a variety of opportunities to improve performance. During the infancy of simulation-based learning, nontechnical skills such as teamwork and communication were the primary outcomes to be analyzed. Using the experiential learning theory framework, educators designated times for reflection, called *debriefings*, to allow participants to understand and make sense of what they experienced in a simulated experience (Lyons et al., 2015). Because of technological advances in computers and materials, learners can develop technical skills in performing medical procedures with less need to learn or practice on real patients.

The field of graduate medical education represents a different transition from undergraduate medical education to professional practice (Association of American Medical Colleges, 2015), particularly when compared to other professions such as nursing or other allied health professionals. While participants in a graduate medical education program receive formative education and direct supervision at times, they also receive increasing responsibilities and autonomy as they progress through their training. The development of technical and nontechnical skills for these individuals has become ever more challenging with external pressures such as duty hour regulation and fatigue mitigation awareness (Shea et al., 2012). The design and perception of the training curriculum can influence the motivation of participants, positively or negatively (Shweiki et al., 2015).

Training programs designed with concepts such as relatedness and perceived value can increase the motivation of participants (Bjerregaard, Haslam, & Morton, 2016). In contrast, programs that fail to establish the relatedness of learning objectives or a perception of value by learners might not positively motivate learners or could inhibit their motivation. In simulation-based learning formats, more intensive levels of simulation can replicate high-acuity situations from the clinical environment and challenge the competence of individuals (Ballangrud, Hall-Lord, Persenius, & Hedelin, 2014), resulting in a more highly motivated learner. Much of the previous research regarding motivation in medical education emanated from the perspective of undergraduate medical education for medical students, nurses, and other students of healthcare professions (Banerjee et al., 2016; Bronson, 2016; Fawaz & Hamdan-Mansour, 2016; Holland, 2016; Kusurkar & Croiset, 2015; Mehrabi, Behzadi, Sabouri, & Alavi, 2016; Yardimci et al., 2017). No supporting literature was identified to establish the perspectives of learners who had graduated from medical school and begun to develop their professional identities.

Evidence regarding the use and benefit of simulation-based learning in medical and graduate medical education supports continuation and expansion of this method (Flannery & Zahorsky, 2014). To achieve the desired learning outcomes, program directors need to keep their training programs fluid and responsive to the needs and intricacies of individuals. Simulation-based learning represents a venue for intensive yet flexible learning. For participants such as senior residents who have advanced experience, knowledge, and skills, no descriptions of simulation-based learning and motivation have been reported. This study was designed to enhance understanding of the experiences of senior internal medicine residents in simulation-based learning and capture their descriptions of their motivation in those experiences.

Opportunities to teach and learn through simulation-based learning have been inspiring for both the researcher and participants alike. The field graduate medical education represents a unique community in the medical field. At the beginning of their careers, residents possess minimal clinical knowledge, experience, and etiquette. Within the next two to three years, the same individuals quickly evolve into a role within the medical professional ranks as experts, master proceduralists, and team leaders. Considering the evolving educational needs of residents as they progress through their training programs, simulation-based learning seems to be an ideal platform to support meaningful and sustainable learning.

Because the methodology of qualitative research has slowly gained acceptance in the fields of medicine and medical education (Dornan & Kelly, 2017; Farghaly, 2018; Greenhalgh et al., 2016), further research demonstrating the utility and value of qualitative research will create new opportunities to improve the field of medicine and medical education. This research study originated on the premise that simulation-based learning provides a beneficial learning experience for residents (Dernova, 2015); however, clear descriptions and rationale that could lead to more effective and appropriately designed simulation programs, particularly for experienced participants such as senior internal medicine residents, are needed (Ojha, Liu, Rai, & Nanan, 2015; Touchie, Humphrey-Murto, & Varpio, 2013).

Need for the Study

Gaps in knowledge and conclusions identified during the review of the literature established the need for this study. A review of the literature on simulation-based learning in medical education indicated that educators could use the experiential learning theoretical framework to address and develop necessary skills in the field of medicine (Hamstra & Philibert, 2012; Obi et al., 2015; Ojha et al., 2015). Medical students and junior/intern residents, assumed to be a less experienced group of learners and healthcare professionals, have described benefits such as increased confidence and motivation as a result of their participation in simulation-based learning (Barsuk, Cohen, Feinglass, McGaghie, & Wayne, 2011; Miloslavsky et al., 2012; Owolabi, Afolabi, & Omigbodun, 2014; Ricciotti, Dodge, Head, Atkins, & Hacker, 2012; Schroedl et al., 2012). Increased motivation in healthcare professionals, defined as when the three psychological needs identified within self-determination theory have been satisfied (Podlog & Brown, 2016), has been associated with better performance in patient care and increased awareness of patient safety practices (Escher et al., 2017; Kusurkar, Ten Cate, Vos, Westers, & Croiset, 2013). A summation of the literature review indicated, however, that how the senior residents in an internal medicine residency program, who are more experienced learners and healthcare professionals, describe their experiences from simulation-based learning and their motivation related to those experiences, is unknown.

Purpose of the Study

The purpose of this study was to understand the experiences of senior internal medicine residents in simulation-based learning and their descriptions of their motivation in those experiences. The goal was to provide a richer understanding of the experiential learning framework and how it can be applied in the field of medical education. Equally, the experiences described by participants may provide insight into the effectiveness of simulation-based learning from a perspective that has yet to be reported. The findings of this study add to existing literature describing how motivation can be used in the field of medicine and graduate medical education to enrich educational programs and learning opportunities (Johnson & Beehr, 2014; Wouters, Croiset, Galindo-Garre, & Kusurkar, 2016). Teaching faculty from residency training programs need a better understanding of residents' motivation and how to leverage it, for example, through the framework of self-determination theory to maximize learning opportunities in the clinical environment (Hoffman, 2015), in addition to simulation-based learning.

Significance of the Study

The findings may also advance the field of education and professional studies because they will present a new perspective and insight into an area that has received limited scholarly attention. Physician training programs have faced several challenges in the delivery of educational content and needed to adapt outdated curriculums (Sawatsky, Zickmund, Berlacher, Lesky, & Granieri, 2015). Simulation-based learning has become an accepted educational technique for medical educators to meet the needs of their learners and the demands of the field of medicine. Senior internal medicine residents represent a group of professional learners who can describe their experiences with their training program and simulation-based learning opportunities and relate their motivation related to those experiences. The broader perspective and potential application of this study reach other types of graduate medical education programs and beyond to the entire field of experienced medical professionals. Educators who are considering the use of simulation-based learning or who have already adopted simulation-based learning may benefit from the findings of this study to better understand the learners' perspective of participating in simulation-based learning.

The Research Question and Subquestions

Research Question

How do senior residents in internal medicine residency programs describe their experience with simulation-based learning?

Research Subquestions

RQ_1. How are the components of experiential learning theory (A. Y. Kolb & Kolb, 2005) described, as applied through simulation-based learning, by senior internal medicine residents?

RQ_2. What aspects of simulation-based learning have provided the most benefit or hindrance to the senior residents in their development as learners?

RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents in the context of simulation-based learning?

Definition of Terms

The following terms were operationally defined for the purpose and design of this study:

Autonomous motivation. Autonomous motivation describes the way an individual initiates action and behavior from a feeling of personal desire to engage in the activity itself and not for any external reasons or purpose (Hagger & Chatzisarantis, 2016).

Experiential learning theory. Experiential learning theory is "the process whereby knowledge is created through the transformation of experience" (D. A. Kolb, 1984, p. 41).

Extrinsic motivation. Extrinsic motivation describes behavior that results in action for purposes of coercion, persuasion, or another force perceived by the individual from the outside (Hagger & Chatzisarantis, 2016).

Fidelity. Fidelity describes the extent to which replications of physical and psychological conditions are presented to participants in a simulation-based training experience (Hamstra, Brydges, Hatala, Zendejas, & Cook, 2014; Tun, Alinier, Tang, & Kneebone, 2015).

In-situ simulation. Education and training sessions conducted in the clinical environments where patient care is delivered are referred to as in-situ simulation (Klipfel et al., 2014).

Intern resident. An intern resident is a physician who is in their first post-graduate year of a residency training program.

Intrinsic motivation. Ryan and Deci (2000) defined intrinsic motivation as “the doing of an activity for its inherent satisfactions rather than for some separable consequence” (p. 56).

Self-determination theory. Self-determination theory describes inherent human behavior in which intrinsic and extrinsic variables or characteristics influence an individual’s motivation and psychological needs (Ryan & Deci, 2000).

Senior resident. A senior resident is a physician who is their second or third-year post-graduate year of a residency training program.

Simulation-based learning. Simulation-based learning is an educational technique that presents a situation or setting intended to replicate real-life events for individuals to experience for practice, learning, evaluation, testing, or to appreciate viewpoints beyond their own experience (Lopreiato et al., 2016).

Research Design

The methodology for this study was qualitative with a basic qualitative research design. Merriam and Tisdell (2016) described the fundamental objective of a basic qualitative study is to construct people's experiences and explain what those experiences mean to them. Semi-structured interviews were the means of uncovering the experience of simulation-based learning and descriptions of motivation with senior internal medicine residents. Semi-structured interviews are a common tool used to collect deep and rich descriptions of experiences (Merriam & Tisdell, 2016). The participants were sampled with a purposeful sampling design: inclusion criteria were set for only senior internal medicine residents who had participated in simulation-based learning in a residency program. Interviews were conducted face-to-face using a semi-structured format to collect individual responses; audio recording facilitated the transcription of the interviews to text. The qualitative data analysis software ATLAS.ti 8 for Windows (student license) was used to code the transcripts, and axial themes were derived from the codes. Member checks were used to confirm and triangulate codes and themes (Merriam & Tisdell, 2016). The researcher started a reflective journal before the first interview and supplemented it with the coding and analysis notes.

Assumptions and Limitations

Assumptions

Several assumptions impacted the design and execution of this study. The ontological assumption consisted of a relativist perspective to understand the experiences of senior internal medicine residents in simulation-based learning and their descriptions of their motivation in those experiences. Fundamentally, the researcher believed the best way to understand the reality of the participants' experienced was to collect and understand those experiences from the participants' perspective. Although the reality and recollection may vary from one participant to the next (Lincoln & Guba, 2000), data from participants were systematically analyzed and coded to understand the experience of simulation-based learning and motivation therein.

The epistemological assumption in this study involved identification and acceptance of an interpretivist approach to collecting and understanding the experiences and motivations reported by participants. In an interpretive approach, the researcher, the participants, and their experiences are related because the reality reported in this type of study is constructed through the researcher (Tubbs, 2016). In the effort to understand the perspectives and descriptions of the participants' experiences, semi-structured interviews were appropriate to consistently address core themes identified through the theoretical framework and literature review.

A final assumption related to the suitability of inclusion criteria for the sample. This study included purposeful sampling of senior residents enrolled in an internal medicine residency training program and excluded residents who were still in their first year of training. Grounded in Knowles's theory of andragogy, the assumption was that senior internal medicine residents represent adult learners who possess characteristics such as deep and rich experiences, extensive knowledge, connectedness of learning to life goals, and an understanding of the relevance of what is being learned (Dernova, 2015; Taylor & Hamdy, 2013). Compared to their senior counterparts, interns do not possess as much knowledge; they have not encountered as much of the clinical environment as a physician, received as much formal and informal education, and have not participated in as much of a simulation-based learning curriculum specifically designed for internal medicine residents.

Limitations

The following limitations shaped the design and execution of this study. First, nondescript and ambiguous descriptions from participants can limit the amount of insight the researcher can access to answer the research questions. The basic qualitative design depends on participants' providing deep and rich descriptions in their responses (Merriam & Tisdell, 2016). The semi-structured interview questions were used by the research to not only maintain the focus and context as related to the research question and subquestions but also afforded probing questions when responses were insufficient. Thus, when deemed appropriate, the researcher could ask probing questions to ensure that thick and rich descriptions of participants' experiences appeared in each response during the interviews.

A methodological limitation was that the interpretive and inductive nature of qualitative data analysis may limit the discovery of results and conclusions, depending on the researcher's skill and ability to manage such data (Merriam & Tisdell, 2016). To mitigate as much as possible the impact of this limitation, the researcher maintained a journal and analysis notes throughout the study. These records served not only to increase the transparency and reliability of results and conclusions presented in this study but also to minimize any presumptive limitations that the researcher's capabilities may have introduced.

The design of this study allowed for inclusion of only one internal medicine residency training program in the sample. The narrow inclusion of participants suggests possible limitations to the generalizability of results and conclusions to other internal medicine residency training programs (Essers, Van Weel-Baumgarten, & Bolhuis, 2012). The potential benefits of collecting data from only one program justified the potential decrease in generalizability, however. Residency training programs exercise latitude in their design and content based on local needs and resources; variations in simulation curriculums and experiences could, therefore, vary significantly from one program to another. A purposeful sampling of participants from the same institution and training program was necessary to ensure those study participants had the opportunity for similar experiences with a simulation-based training curriculum, thus strengthening the credibility and reliability of the study.

A final limitation was the possibility that the simulation program established for the target sample may not reflect the outcomes from other internal medicine residency programs' simulation curricula. The formation and maintenance of a simulation program require substantial resources (Lazzara et al., 2014); depending on a given program's development of such resources, their residents could have a unique experience with simulation-based learning. Therefore, residency training programs other than those for internal medicine that integrate simulation-based learning offer limited application to their specialization because of the unique characteristics of their respective fields.

Organization of the Study

This study is presented in five chapters, with the remaining four chapters below. Chapter 1 is used to introduce this qualitative study that is designed to understand the experiences of senior internal medicine residents in simulation-based learning and their descriptions of their motivation in those experiences. Chapter 2 describes the strategies used for performing the literature review, the theoretical framework, the review of literature, a synthesis of research findings, and a critique of previous methods. Chapter 3 includes a description of the research design, procedure, data analysis procedures, interview questions, ethical considerations. Chapter 4 presents the findings from the interviews and the results of the data analysis. Chapter 5 presents an in-depth exploration of the meaning of this study and recommendations for future research.

CHAPTER 2. LITERATURE REVIEW

The purpose of this study was to understand the experience of senior internal medicine residents in simulation-based learning and their descriptions of their motivation in those experiences. This literature review describes what is known within the field of medical education regarding the application of experiential learning theory and self-determination theory. This chapter also specifies the methods of searching to discover the current literature related to the research topic. Furthermore, a theoretical orientation is established before the presentation of the literature review. Chapter 2 concludes with a synthesis of findings and a critique of previous work, which transitions to the methods in Chapter 3.

Methods of Searching

A careful and systematic review of the existing literature is indispensable to the research process. The utilization of multiple databases ensured that a diverse and accurate depiction of what was known about the research topic guided the development of the research question and subsequent design. Databases reviewed for this study included Academic Search Premier, Education Research Complete, ERIC, Google Scholar, Ovid Nursing Full Text PLUS, PsycINFO, ProQuest Medical Library, SAGE Journals Online, and Summon. Search terms used within the databases noted above included *autonomy, adult learning theories, competence, debriefing, experience, experiential learning theory, graduate medical education, intern residents, internal medicine, interviews, medical education, motivation, qualitative research, relatedness, residency, residents, self-determination theory, senior residents, simulation,* and *simulation-based learning*.

The search terms were combined in a way to diversify search results. For example, terms such as *medical education,* representing the population, was combined with *self-determination* *theory*, representing the theoretical framework, to locate specific studies applying the two respective subjects. Publication dates and chronological filters restricted references that emerged before 2012. Original works were initially identified through recent publications, followed by a review of the original publication. Additional filters used within the databases included restricting the content type to journal articles and dissertation/thesis. Collectively, these methods for uncovering sources yielded more than 200 sources that established the theoretical orientation, literature review, and methods for this study.

Theoretical Orientation for the Study

The purpose of grounding a study in a theoretical orientation is to provide guidance and context to the study and its findings (Lodico, Spaulding, & Voegtle, 2010). This section has two goals in grounding the theoretical orientation for the overall study. First, the application of qualitative research requires researchers to identify their philosophical assumptions in reality and knowledge before committing to a methodology; those assumptions will be explored and articulated as they pertained to this study. Second, this study involved applying experiential learning theory to establish a framework for simulation-based learning; self-determination theory was appropriate to explore aspects of motivation described by participants while engaged with simulation-based learning. These theories and their application to this study will be further explained below.

Philosophical Assumptions

Philosophical assumptions are often overlooked and undervalued in the development of the research process. Fundamental philosophical assumptions must all align with the research question in any study. The process leading up to a selection of methodology can begin with the analysis of three separate but related studies of philosophy: ontology, epistemology, and axiology. The three philosophical assumptions have long been used to guide individuals to understand the world around them and make meaning of the phenomena they wish to explain using research.

Defining the assumptions that guide the pursuit to answer a research question first requires the researcher to establish their ontological position or how they understand reality and the nature of its existence, particularly in the pursuit of understanding in the social sciences (McLachlan & Garcia, 2015). Consequently, the researcher must realize that what is real and appreciable depends on the meaning of truth. On a spectrum of those researchers who have tried to explain the nature of reality and existence, the concept of realism represents one extreme.

Researchers who apply a realist perspective, also known as positivists, assume that the world around them and their subjects exists independently of human perceptions and interpretations (Anastas, 2012). Positivists also assert that one singular truth exists in the context of existence (Wong, Greenhalgh, Westhorp, & Pawson, 2012). From a realist perspective, researchers assume that reality is removed from the individual experience; therefore, the meaning that each person forms or interprets as their experience is unimportant or irrelevant, and singular, correct relativity exists independently. Realist researchers assume an external perspective and utilize a deductive approach, working from the broad and diverse world down to objective and isolated variables that exist regardless of the human experience around them (Wong et al., 2102). Thus, the purpose of the realist researcher is to explain what is happening in the world through scientific discovery.

At the opposite end of the spectrum of researchers attempting to explain the nature of reality and existence, the concept of relativism describes a reality that exists in multiple versions based on the subjective individual experience (Lincoln & Guba, 2000). In this worldview, experience and context, not objectivity and sterility, shape reality. Reality and truth may exist in a more fluid state that cannot be isolated down to absolutes. Relativist researchers use qualitative methodologies to define and explain concepts by describing the features that make a phenomenon unique (Goertz & Mahoney, 2012). This approach can create challenges for the qualitative researchers because without the proper context established for the audience, accurate and rich descriptions are unlikely to have value. Walker (2015) suggested that qualitative research is evolving in a way that such definitions should be avoided; instead, qualitative researchers need to rely more firmly on the interpretations of their findings to create a persuasive case. For this study, the relativist ontological perspective was appropriate to address the research question of how residents' motivations are understood through their descriptions of their experiences with simulation-based learning.

Epistemology is the theoretical study of knowledge and how knowledge can be acquired. The goal of epistemology is to determine what, if any, relationship the researcher has with the knowledge found through research (Farghaly, 2018). In other words, researchers must answer the question How will knowledge be discovered and established? Two opposing perspectives constitute the range of epistemological assumptions: the etic and the emic (Punnett, Ford, Galperin, & Lituchy, 2017). First, the traditional assumption from natural scientists is that reality and knowledge exist separate from the individual experience and therefore must be viewed objectively; this perspective is known as the etic. Knowledge is be established through objective means in which experimental conditions eliminate the context of the knowledge or influence from an inquisitive process or study. Accordingly, the researcher also needs to stay objective and independent from the data source to avoid influencing the reality they are trying to describe or explain.

Opposing the etic approach to studying knowledge and how it can be obtained is the emic approach. The emic viewpoint holds that knowledge comes from within the context in which it is known and assumes the subjective approach to reality is consistent with relativism (Punnett et al., 2017). To understand the knowledge from the context in which it is known, the researcher is then required to assume a position in which the context can be fully appreciated and described, leading to a more accurate conception of the knowledge. The potential influence of the researcher on the reality and knowledge being investigated needs to be acknowledged and overseen; however, the position and presence of the researcher do not necessarily compromise the ability to review an individual's experience objectively. The epistemological perspective of this subjective nature provided impetus to the interpretivist approach (St. Pierre, 2012). Researchers apply interpretivism to make sense of the individual experience of reality under the ontological assumption of relativism (Creswell, 2013). Due to the relativist ontological assumption adopted for this dissertation topic, the interpretivist approach was determined to most accurately describe the relationship between the researcher and the knowledge to be gained through the research design.

The axiological assumption accounts for beliefs and values related to the research question. The axiological assumption includes the presumption that the knowledge to be acquired has a purpose or context; accordingly, the assumption needs to be communicated by the researcher in the purpose of the research. Examples of research purposes may include an attempt to explain a new or unique phenomenon, calculate or predict a fact, or provide a deeper understanding of something that has already been established in a different application. For this study, this researcher selected an axiological perspective to address the research question of how residents' motivations are understood through the residents' descriptions of their experiences with simulation-based learning and clinical practice as one that will provide a deeper understanding of their experience. As such, the researcher's beliefs and values will be inevitably integrated into the research process.

The axiological assumption also requires the researcher to assess any potential biases that may be pertinent to the available methodologies. Seshia, Makhinson, Phillips, and Young (2014) discussed potential biases that could impact the quality and reliability of data gathered and reported in qualitative studies. Possible biases or conflicts that could precipitate during a qualitative investigation include fiscal incentives to publish or provide suggestive conclusions, self-serving research that seeks to enrich the individual researcher, or subconscious biases of which the researcher may be unaware of and which are most often unmitigated because they are difficult to resolve (Seshia et al., 2014). The elements of the axiological assumptions used in this study will be more deeply explored in Chapters 3, 4, and 5.

The researcher's methodology refers to the philosophies that guide how knowledge should be gathered to answer the research question. The methodology reflects through the ontological, epistemological, and axiological assumptions, as previously described. With a methodological framework established, researchers select methods to gather knowledge or information that reflect the kind of truth, the perspective in which that truth will be described, and the beliefs that are integrated will be reported. Axiological considerations should also be made while forming the methodology. Ontological assumptions dictate the epistemological assumptions, which dictate the methodology and methods. This dissertation topic aligned with relativist and emic assumptions and therefore resulted in the selection of a qualitative methodology. Two theories formed the framework for this study.

Experiential Learning Theory

Although traditional associations between learning and experience reach back to theorists such as John Dewey and Kurt Lewin, the modern theory used for this study to explain how learning occurs from experience derived from D. A. Kolb's (1984) experiential learning theory (Seaman, Brown, & Quay, 2017). The versatility and application of experiential learning theory can be found in applications from K-12 classrooms through continuing education programs for professionals (A. Y. Kolb, Kolb, Passarelli, & Sharma, 2014). D. A. Kolb (1984) described his model for learning as follows: "Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it" (p. 41).

To summarize and describe the process by which an experience creates knowledge, D. A. Kolb (1984) identified six fundamental elements ingrained within experiential learning theory: learning is a process, learning is best achieved when associated with previous knowledge, conflicts in knowledge and application need to be resolved, learning is progressive, learning increases with experience, and learning results in creation of new knowledge. The creation of knowledge through experiences, as demonstrated by the many components listed above, does not appear to be intrinsic and therefore needs to have a structure to be effective.

The process of transforming experience into knowledge was operationalized into four stages, otherwise known as the learning cycle (D. A. Kolb, 1984). The learning cycle is a holistic interpretation of what learners go through when learning from an experience. Learners can enter the learning cycle at any stage but often begin with an experience or event, followed by abstraction or reflection, then a conceptualization stage, and finally an experimentation stage (A. Y. Kolb & Kolb, 2005). The four steps of transforming experience into knowledge occur cyclically with an experience initiating the learning process. A. Y. Kolb and Kolb (2005) referred to the *grasping time* as the period between when an experience occurs to the time an individual reflects and understands what has occurred. The grasping steps allow the individual to reflect on the experience.

After the grasping steps, the person generates new ideas based on their reflection on the experience; this stage of the cycle is *conceptualization*. Reflection and conceptualization stages can occur as the result of external facilitation by an instructor or peer, or they can intrinsically transpire within the individual's mind. The final step in transforming an experience into knowledge is the process of taking the new ideas and using them to determine or change future behavior during *experimentation*.

The experiential learning theory from D. A. Kolb (1984) has not been without skeptics. McMullan and Cahoon (1979) were early critics of Kolb's emerging work, citing that experience and reflection alone are inadequate if the learner is unable to ground his or her conclusions in theory-based concepts. Later on, Schlesinger (1996) referred to the learning cycle as an over-simplification of what happens when learning occurs. Matsuo (2015) also described shortcomings in the experiential learning theory based in the theory's minimal or nonexistent recognition of the role of the social context and goal orientation in learning. Despite these objections, far more acceptance than rejection of experiential learning theory has been demonstrated, including within the medical education field.

Self-Determination Theory

Self-determination theory has been applied in a variety of contexts and fields. Conceived initially through studies of motivation and psychology, self-determination theory was used to describe inherent human behavior in which intrinsic and extrinsic variables or characteristics influence an individual's motivation and psychological needs (Ryan & Deci, 2000). Three psychological needs comprise self-determination: autonomy, competence, and relatedness (Lyness et al., 2013; Ryan & Deci, 2000). *Autonomy* describes an individual's desire to be in control of his or her behavior and destiny. *Competence* describes an individual's capability to perform within a range of expectations. *Relatedness* depicts an individual's desire to feel connected with their activities, the people around them, or their environment. All three elements of self-determination theory have immediate practical application for professionals in the field of medicine, though not all three attributes need to be fulfilled for an individual to feel motivated. The three psychological needs can be fulfilled through two competing sources: autonomous motivation and external motivation.

Autonomous motivation describes the way an individual initiates action and behavior from a feeling of personal desire to engage in the activity itself and not for any externally imposed reason or purpose (Hagger & Chatzisarantis, 2016). Autonomous motivation can serve as a characteristic for educators to identify and cultivate to enhance engagement and improve performance. Supporting autonomy and autonomous motivation within the context of medical education has generally been evident in efforts to empower learners with control of what they will learn, to provide supportive and positive feedback, and to present challenging situations in which learners can create their success (Kusurkar & Croiset, 2015). For graduates and professionals new to an environment, clinical educators need to take additional steps to support the autonomous motivation, which can be weakened by stressful circumstances.

The counterpart to autonomous motivation is external motivation, also known as controlled motivation (Kusurkar & Croiset, 2015). *External motivation* is behavior that results in action for purposes of coercion, persuasion, or another force perceived by the individual from the outside (Hagger & Chatzisarantis, 2016). External motivation represents variables that exist outside of an individual, such as money, career achievement, notoriety, or external influences from sources such as teachers, family, or academic programs. Individual learners have the least amount of control of the external motivation variables. Educators can utilize and integrate external motivators; however, the resulting motivation levels are generally lower than outcomes from autonomous motivation.

Summary for the Theoretical Orientation for the Study

The theoretical frameworks of experiential learning and self-determination, along with the philosophical assumptions, were key in establishing the research question and subquestions that drove this study. Experiential learning allowed the researcher to systematically explore the experiences of participants during simulation-based learning. The relativist ontological perspective was appropriate to address the research question of how residents understand their motivations through their descriptions of their experiences with simulation-based learning through experiential learning theory. Equally, self-determination theory served as a framework to better understand participants' descriptions of motivation as related to simulation-based learning. A literature review was performed by the researcher, including that of experiential learning and self-determination, to establish what was known and where potential knowledge is yet to be established.

Review of the Literature

A review of the literature from the fields of education and medicine illustrates how previous researchers have individually and jointly applied the experiential learning and self-determination theories. The first consideration from the literature addresses the clinical environment where medical education takes place and how that dynamic relates to the learning process in medical education. An in-depth exploration of what is known about simulation-based learning and its respective components establishes the context for this study's setting. Likewise, the body of knowledge and application of self-determination theory further frames the context of the study.

Learning in Medical Education

Teaching in the field of medicine presents a variety of unique challenges, as does performing research in the field of medical education. As mentioned above, previous clinical educators applied the see one, do one, teach one methodology to allow novice providers to establish competency for a given skill or procedure (Nwomeh, 2012). In a literal interpretation, the learner would observe the skill performed by an individual who had already achieved mastery, attempt to complete the skill, and conclude the process by teaching the skill to the next novice clinician-learner. However, the see on-do one-teach one method had its drawbacks.

Previous findings indicated teaching in the clinical environment created an additional burden, including on patients (Camp, Martin, Karam, Ryssman, & Turner, 2016; Horowitz, Gramling, & Quill, 2014). Resident physicians who performed poorly on credentialing and board exams were more likely to be involved with medical errors and malpractice lawsuits (Dent et al., 2018). Teaching faculty must fulfill many roles to meet the expectations of students, co-workers, peers, and patients (Reitz, Simmons, Runyan, Hudgson, & Carter-Henry, 2013). The comparison of procedure statistics, including surgical statistics from teaching hospitals to those from nonteaching hospitals, provided insight into what disturbance teaching by faculty physicians and the presence of learners may have in the clinical environment. Most of the surgical cases analyzed took longer to complete in teaching hospitals than the same types of cases completed in nonteaching hospitals (Vinden et al., 2016). Surgeries took longer because the surgeon was teaching the procedure to a resident or allowing the resident to perform the surgery had negative implications, including fatigue on staff, over-utilization of resources, and impact on patients (Vinden et al., 2016). Although education in the subspecialty of surgery has demonstrated risks, as described above, researchers have explored other areas concerning the risks that occur when residents are being educated during practice.

Au, Padwal, Majumdar, and McAlister (2014) argued that general internal medicine programs at teaching hospitals demonstrated no difference in patient outcomes compared with patient outcomes at nonteaching hospitals. Many elements in the hospital setting, other than the presence of a learning environment, ultimately impacted patient outcomes. High risk, difficult cases such as cancer surgeries (Castleberry et al., 2013) or complex abdominal surgeries (Relles et al., 2014) required rich experiences for learners to maximize observational benefits. With the residents' experience in these types of complicated procedures, overall death rates and postsurgical complications declined.

Experiential Learning in Medical Education

Elements of experiential learning theory are evident throughout medicine and medical education. In the past few decades, undergraduate and medical school programs have been integrating students into the clinical environments, allowing them to see real patients and disease conditions and interact with healthcare professionals to connect those experiences with the concepts they encounter in the classroom (H. Chen, Kelly, Hayes, van Reyk, & Herok, 2016). Educators can facilitate reflective exercises within simulation-based learning to reduce participants' anxiety and improve understanding of the experience (L. Kim, Hernandez, Lavery, & Denmark, 2016), which could then lead to better learning outcomes. Bailey, Barber, and Nelson (2017) noted that merely having an experience, such as participating in an internship, is not sufficient for learning to occur; instead, the three remaining steps in the transformation process, reflection, conceptualization, and experimentation, also need to occur. For example, during a psychology rotation, students were required to keep a diary and then had to write a paper that expanded the ideas and thoughts they encountered during the clinical practice.

Practitioners in professional development and education have also applied experiential learning theory to improve performance and learning outcomes. Graduate medical educators must follow strict regulations regarding the time residents can be present in the clinical environment (Peets & Stelfox, 2012). Using a theoretical framework such as experiential learning requires residents to reflect on what they experience in complex settings, such as an intensive care unit, and facilitate an understanding of what they experienced in a more time-efficient manner on-demand and without risk to real, critically ill patients. Schoenborn and Christmas (2013) applied an experiential learning framework to help residents recognize that they needed to change the procedures for discharging patients from the hospital because of unsafe communication and practices. While researchers have investigated the effectiveness of experience-based interventions through quantitative measures (Keung et al., 2018; Zendejas, Brydges, Wang, & Cook, 2013), few have used a constructivist perspective to understand what professionals think and how they interpret experiential learning. Further qualitative research is needed to understand how medical professionals describe the experience of applied experiential learning theory.

The format in use in medical education has remained relatively unchanged for more than 100 years, particularly for physicians (Bennett & Higgens, 2016). For example, didactic sessions in the classroom are followed by the classic see one, do one, teach one methodology for skill development; this methodology has been challenged regarding its effectiveness for learning and the safety risks for patients (Guze, 2015; Nwomeh, 2012; Wunder et al., 2014; Zahiri, Park, Pugh, Vassiliou, & Voeller, 2015). The introduction and adaptations of modern adult learning theories and technologies into medical education have also gained widespread acceptance, further challenging long-standing philosophies of medical education. One such adaptation of adult learning theory by medical educators is simulation-based learning.

Simulation-Based Learning

Simulation-based learning in medical education is a method that uses an artificial environment and prompts for participants to experience the context of real clinical situations that require knowledge and skills to respond to behavior as patients demonstrate in real-life (Lopreiato et al., 2016). Much of what is known and applied to simulation-based learning in medicine came from the simulation training used by industries such as aviation and nuclear engineering (Mileder & Schmölzer, 2016; Riley, 2015). The goal of simulation-based learning in medical education is to provide an opportunity for meaningful learning that will improve participant performance, including technical and nontechnical skills that will be discussed later, without any additional risk to patients (Keskitalo, Ruokamo, & Gaba, 2014). An emerging focus on patient safety has led to reconsideration of the practice of allowing students to learn by working on real patients in the clinical environment (Stone, Patterson, Reid, Geis, & Auerbach. 2016). Ballangrud et al. (2014) interviewed intensive care nurses to find that those nurses recognized deficits in care and wanted simulation training that could produce safer care and improved team performance. Altogether, the field of medicine has embraced the potential of simulation-based learning as an asset for student and professional learning (Ball & Kilger, 2016; Jeffries, 2015).

Simulation-based learning has been implemented in the medical field for undergraduate training programs (McGarry, Cashin, & Fowler, 2014; Miloslavsky et al., 2012; Nelson, 2016; Raurell-Torredà & Romero-Collado, 2015) as well as continuing education programs for healthcare professionals (Garvey, Liddil, Eley, & Winfield, 2016; Swick, Doulaveris, Bagnall, & Womack, 2012; Zambricki, Horowitz, Blumenreich, & Fallacaro, 2015). Educators have advocated to replace the method of teaching skills in the clinical environment during the care of real patients with a simulation-based learning format (Jeffries, 2015). Support for the change in methods comes from nurses, who represent a majority among the many groups of professionals in the medical field (Sharafkhani, Armat, & Emami Zeydi, 2015). The National League of Nursing (2015) has also endorsed the incorporation of simulation-based learning in the profession across all levels. One of the first issues to be addressed in this shift is fidelity, or the extent to which simulations mimic actual procedures.

The concept of fidelity as applied to medical simulation has yet to be unanimously defined (Tun et al., 2015); however, for purposes of this study, *fidelity* referred to the extent to which replication of physical and psychological conditions were presented to participants (Hamstra et al., 2014; Tun et al., 2015). Focused learning formats, also known as task-training or low-fidelity training, allow participants to focus on unique skills with limited feedback from simulators (Isenberg et al., 2011). An example of a low-fidelity simulation is a plastic arm with latex tubing to replicate veins that would be used to practice the insertion of an intravenous catheter. High-fidelity and fully immersive scenarios, designed to replicate real-life as much as possible, include the use of human patient simulators that engage learners with additional feedback to support higher-level thinking and learning (Presado et al., 2018). When resources are available, educators can select and integrate simulators that reflect curricular and training design.

The debate regarding how much the fidelity impacts learning during simulation-based learning and training has received significant attention by experts and novice adopters alike; the prevailing assertion is that higher fidelity simulations equate to higher levels of effectiveness and learning (Brady, Bogossian, & Gibbons, 2015; Bultas, Hassler, Ercole, & Rea, 2014). Current researchers have questioned whether high-fidelity is universally superior in all applications of simulation-based learning. Norman, Dore, and Grierson (2012) concluded that high fidelity simulation offered no statistically significant advantage over low fidelity simulation. In one explanation for the similar results, Norman et al. (2012) referenced cognitive load theory and asserted that the additional features of high-fidelity simulators over-stimulated the working memory, resulting in cognitive overload. Other researchers maintained that the fidelity of the simulator and scenario should be appropriately matched to the goals and objectives for more effective training (R. Chen, Grierson, & Norman, 2015; Hamstra et al., 2014; J. Kim, Park, & Shin, 2016). If similar results can be achieved with lower capital and operating costs, medical educators should consider this proposal because of the significant investment required for high-fidelity simulation (J. Kim et al., 2016). Concerns about the impact on learning environments accompany debates about the efficacy of simulations.

The role that training content and environment contribute to learning and experience has also emerged as an important consideration for medical educators and the field of medical education. Traditionally, learners in medicine begin their training in a classroom or laboratory before entering the clinical environment. The evolution of simulation-based learning has seen the movement of simulators from artificial training laboratories to the clinical environment in place of real patients. Education and training sessions conducted in the clinical environment where patient care is delivered are referred to as *in-situ simulations* (Klipfel et al., 2014). In-situ simulations often bring a patient simulator and the corresponding case into the care of an individual provider or team to establish a context of conditions. With many individuals from different departments of the hospital, in-situ simulation creates the opportunity for multiple levels of assessment and learning to occur with a single case for these teams (Klipfel et al., 2014). Sorensen et al. (2015) found that participants of in-situ simulations found a minimal benefit to training in their native clinical setting; instead, participants found the question of whether the simulation case was genuine and applicable to their job performance to be the more important consideration. In-situ simulations may offer insights to organizational and logistical components of participant learning and patient care; however, the intrusion into the clinical site may fail to produce enough benefit to be justified.

Accessibility to learners is another consideration related to simulation-based educational applications. Distance learning platforms, portable patient simulators, virtual reality (VR), and robotic surgery represent many of the current issues at the interface between technology and medical education. Some allied health and nursing education programs have demonstrated a commitment to distance learning platforms and expanding access to learners (Terry, Terry, Moloney, & Bowtell, 2016). Distance learning in graduate medical education and post-graduate physician education has yet to emerge as a consistent resource (Welch & Harrison, 2016). Formative and continuing education programs could be made available through web-based media for high-demand and rare specializations (Jackson et al., 2014) to enhance healthcare services available to a community. Educators use VR simulators to recreate both task-training and highly complex scenarios. Chien et al. (2013) suggested that training with portable VR equipment outside of the operating room could improve skills and efficiency during real surgeries. While the experiences with patient simulators and VR equipment received significant attention, as noted above, learning from simulation training experiences requires an analysis of those experiences.

Following a simulation or training experience, a common practice is for the participants to reflect on the experience. The reflective period can be facilitated by a medical educator, clinical educator or expert, or even a peer. The reflective period, commonly referred to as the debriefing, is intended to provide a constructivist opportunity for participants to evaluate and more deeply explore the cognitive, psychomotor, and affective aspects of the experience (Waznonis, 2014). Dismukes, Gaba, and Howard (as cited in Dreifuerst, 2012) noted that debriefings were first used in military contexts with pilots returning from combat to acquire battlefield and strategic intelligence. The goal was to learn as much as possible from a particular experience.

Theoretical frameworks that complement the use of debriefing following a simulation experience have included experiential learning theory (D. A. Kolb, 1984) and reflective learning theory (Schön, 1983). The process of translating an experience into knowledge through the experiential learning cycle occurs in four steps: actual experiences, abstraction or reflection, conceptualization, and experimentation (Dernova, 2015; D. A. Kolb, 1984). The participants' experience consists not only of events within the simulation but also of all previous real-life experiences the participant has had and can compare to the simulation (Hay, Smithson, Mann, & Dornan, 2013). The reflection and conceptualizing steps may be achieved through the debriefing session (Reierson, Haukedal, Hedeman, & Bjørk, 2017). The experimentation step may occur in the short term through repeated simulation cases or may be delayed until new concepts can be applied in the real world. During those experimentations, learners may or may not receive feedback that reinforce or correct performance.

The process of providing feedback can be very complex, particularly for individuals who have never received formal training for providing feedback to others. Common obstacles encountered by medical educators who led debriefings that followed learning experiencs included a lack of preparation and training, inadequate allotted time with learners following the simulation for a complete analysis of the case, and a lack of feedback to support improvements (Fey & Jenkins, 2015; Mariani, Cantrell, & Meakim, 2014). Physicians who provide feedback and instruction to residents receive no formal training on how to be an educator and are more likely to rely on subjective and emotional opinions based on their practice rather than the empirical and objective ability of the resident (Kogan et al., 2012). Debriefing sessions should occur as quickly after an experience as possible (Rivera-Chiauzzi, Lee, & Goffman, 2016), which can be difficult for faculty in the clinical environment who are responsible for supervising learners and providing care to patients. The Peer Assessment of Debriefing Instrument (PEDI) was developed for debriefing feedback and demonstrated strong reliability for educators and their peers to evaluate a debrief session (Saylor, Wainwright, Flannery, Herge, & Pohlig, 2016). Without proper quantitative and qualitative feedback on debriefing techniques, medical educators struggle to improve their effectiveness during the debrief session.

To supplement the limited availability of trained medical educators and experienced physicians to facilitate clinical education, peer feedback and debriefing has been one alternative to finding ways for residents to expedite the reflective process while in the clinical environment. A learning environment where peer feedback is common can complement the principles of adult learning by allowing personal experience and collaboration to drive the learning narrative

(Taylor & Hamdy, 2013). To prepare residents to give feedback to their peers, Tofil et al. (2014) suggested that simulation-based learning could identify weak feedback skills among residents, and development of those skills would result in more useful feedback to learners in the simulation and clinical environments. Being more engaged with teaching and feedback can also improve confidence in one's own ability (C. C. Smith, McCormick, & Huang, 2014). The holistic design of a training program for physicians based on theory and evidence would seem likely to produce competent and confident physicians.

The use of debriefing techniques in simulation-based learning has extended into the clinical environment following critical or stressful cases. Using the same debriefing techniques in the clinical environment could lead to the same potential for learning outcomes as learners have achieved in simulations (Eppich, Mullan, Brett-Fleegler, & Cheng, 2016). Clinicians can learn about not only what happened in a particular event by review and discussion but also why it happened and how they might be able to improve the outcome of similar events in the future (Rivera-Chiauzzi et al., 2016). Reducing errors and increasing patient safety will be discussed later in this paper. In addition to improving what individuals can learn from a critical incident, debriefing has also been shown to reduce stress and other psychological complications (Healy & Tyrrell, 2013). The transfer of simulation learning techniques into clinical practices further supports simulation's role and value for the field of medicine.

Research to improve the debriefing process identified a variety of options for the medical educator to consider when debriefing simulation experiences. Possible ways to enhance the quality of the debriefing sessions are to video record (Ha, 2014; Stephanian et al., 2015) the simulation or collect real-time data (Park & Holtschneider, 2016) during the simulation. Similar video-assisted debriefings have been used in the clinical environment, where review of recordings real procedures supports improvement of future performances (Seamans et al., 2016). The use of a scripted or prewritten debriefing plan may allow novice facilitators to more clearly and consistently meet the goals and objectives of a simulation case (Cheng et al., 2013; Kolbe et al., 2013). As there has been no single best practice identified for educators, debriefing techniques for simulation-based in medical education is yet another aspect that requires further consideration and investigation.

Simulation-Based Learning in Medical Education

The distinction between technical skill development and nontechnical skill development has created a new perspective and opportunity for medical educators who use simulation-based learning. Educators must consider many factors before the selection of an educational intervention used to improve targeted competencies for the healthcare students and professionals (Dieckmann, Friis, Lippert, & Østergaard, 2012). The higher specificity of training goals and outcomes used in combination with actual patient outcomes may provide a better return on investment for medical educators.

Simulation-based learning programs designed for technical skill development have primarily focused on novice learners. Procedures such as central line insertion (Alsaad et al., 2017; Barsuk et al., 2015), airway management (Wolf et al., 2017), and lumbar puncture (McMillan et al., 2016; Millichap, 2012) are examples of common technical skills developed by learners in graduate medical education. These skills in particular have been the focus of development through simulation-based learning because of the inherent risk to patients during these procedures. Systematic development of technical skills begins with simulation and concludes with performing the skill on real patients in the clinical environment (Sawyer, Leonard, Sierocka-Castaneda, Chan, & Thompson, 2014). One of the main concerns with simulation-based learning is whether what is learned in simulations transfer to real-life clinical practice.

Todsen et al. (2013) reported that participants who participated in simple task-training simulations for urethral catheter placement skills were able to subsequently complete the task in the clinical environment with real patients. When medical students who are unskilled in urethral catheter placement practice the technique, the biggest concern is infection; however, medical students who practiced the catheterization via simulation were able to be as effective in preventing infections in real patients as experienced staff (Yang et al., 2012). Some previous outcomes implied that skills from simulation-based learning transferred to the clinical environment, but further research is necessary to understand what methods result in the best patient outcomes.

Even if the skills established during simulation-based education and training do legitimately translate into real-world practices, skill deterioration for infrequently used skills, particularly highly complex skills, has also emerged as a concern (Stephenson, 2015). Varley et al. (2015) used simulation to determine that deterioration of surgical skills could occur in as few as four weeks following training. Some clinical skills less complex than surgical procedures were maintainable beyond three months after training (Nimbalkar et al., 2015), though the researchers did not reveal the duration of retention for those skills. Continuing education programs for professionals have the potential to slow or reverse skill deterioration (M. Patterson, Geis, LeMaster, & Wears, 2013); however, other educational strategies, such as standardized testing and distance learning, may not offer the skill recovery potential as behavior-based formats like simulation-based learning (Weaver, Newman-Toker, & Rosen, 2012).

Simulation-based education is not exclusive to instruction of technical skills, as described above. Nontechnical skills include communication, teamwork, decision-making, and situational awareness. Research indicated that simulation-based learning can be specifically designed for non-technical skill development (Wunder, 2016), or it can be integrated with training for technical skills (Sevdalis, Hull, & Birnbach, 2012). Some nontechnical skills require no additional training to be assessed (Lyk-Jensen et al., 2016), whereas others require further education and training before assessment and validation can be completed (Gat et al., 2016; Spanager, Dieckmann, Beier-Holgersen, Rosenberg, & Oestergaard, 2015). The concept of situational awareness describes an individual's sensitivity and comprehension of the environment they are in, which can then relate to their decision-making (Tanoubi et al., 2016). Similarly, situational awareness between members of a team can be improved through simulation-based training and education (Morgan et al., 2015). Improving students' and healthcare professionals' situational awareness can allow better decision-making during the care of patients with critical conditions. Though individuals may become more aware of what is happening in their environment, the ability and necessity to communicate with coworkers and patients is necessary for situational awareness to translate to a meaningful skill.

Poor communication is one of the most frequent complaints from patients and causes of errors by healthcare professionals, resulting in less-than-optimal patient outcomes (Kmietowicz, 2015; Starmer et al., 2014; Starr, 2015). Muller-Juge et al. (2014) used simulation-based training in a qualitative study to identify characteristics of excellent communication such as role assignment (particularly the establishment of the leader), listening, shared responsibility, and decision-making. Resident physicians, who typically have minimal experience as team leaders, can develop such necessary teamwork skills in simulated cases and environments so that errors present no risk to patients. Simulation can also be used to improve communication among medical staff and between staff and patients (Sweeney, Warren, Gardner, Rojek, & Lindquist, 2014). Effective communication is a critical characteristic in promoting teamwork between physicians and nurses, as well as with patients, and a requirement for better care for patients (Klipfel et al., 2014; Middaugh, 2013). The literature review lacked information about how clinicians perceive their communication skills and how simulation-based learning can be used to improve communication skills.

The end goals of simulation-based learning and training in medicine are to improve the performance of clinicians and achieve better care to patients. Following the safety practices set by industries such as aviation and nuclear engineering, researchers have increased focus on improving cultural awareness and integration of safe practices in the delivery of healthcare (Mileder & Schmölzer, 2016). Therefore, investigations of patient outcomes as related to simulation-based learning and other educational interventions are particularly important (Bansal, Simmons, Epstein, Morris, & Kelz, 2016; Holtschneider & Park, 2015). Improving the performance of nurses through educational interventions has has been shown to improve the quality of patient care (Battié & Steelman, 2014; Kelly & Faraone, 2013), but the impact of such interventions on other health-care providers has not received scholarly attention.

Other shortfalls in medical education complicate the process of evaluating the efficacy of educational interventions. For instance, most professionals in healthcare did not receive formative instruction about how to establish and maintain a culture of safety; this deficit has resulted in ignorance of patient safety and fear of litigation as a consequence of patient safety failures (Varjavand, Bachegowda, Gracely, & Novack, 2012). Knowledge and performance gaps between expectations and results demonstrated a need for educational interventions.

Some results implied the efficacy of simulations to improve safety and patient outcomes. Mariani et al. (2015) used simulation-based learning to enhance patient safety by improving the accuracy of reporting patient safety events. Implementation of new methods to monitor students' progress through a competency-based program (Jarvis-Selinger, Pratt, & Regehr, 2012) increased potential employers' confidence in how programs prepare students for working in the clinical environment (Payne, Ziegler, Baughman, & Jones, 2015). Use of new methods also created the opportunity for employers to reduce errors committed by employees (Rubulotta et al., 2016) and improve the handling of the errors that do occur (Stroud et al., 2013). The successes of learning more about patient safety through simulation-based education and training further demonstrates the need to explore and understand the role of simulation in healthcare.

Despite promising insights from previous studies, acceptance of simulation-based learning as the ultimate solution to training and improving patients' outcomes has yet to be empirically established. Although Norman et al. (2012) advocated that simulation had a positive impact on learning outcomes, they also highlighted the variability that different applications of simulation can create in outcomes. Han et al. (2014) compared traditional teaching methods for advanced cardiac life support skills with a simulation-based program, but results did not indicate a difference in patient outcomes between the control and treatment groups. Therefore, Han et al. concluded there was no apparent advantage or benefit to using simulation-based learning.

Whether the lack of impact on patient outcomes was the result of the instructional methodology or other variables requires further investigation. Skepticism in the different applications and the resulting value of simulation-based instructional models should continue through both qualitative and quantitative perspectives. While this study was designed to investigate all phases of experiential learning theory as described by senior internal medicine residents, additional perspectivea regarding participants' descricptions of motivation using self-determination theory were included.

Self-Determination Theory in Medical Education

It is crucial for medical educators and healthcare leaders to create environments where the assumptions of self-determination theory can be applied to form and maintain motivation among learners because high motivation can lead to better academic and clinical performance (Baeten, Dochy, & Struyven, 2013). Resident training programs designed within the scope of self-determination theory, including concepts such as relatedness and perceived value, can improve motivation (Bjerregaard et al., 2016; Pass & Neu, 2014; Rosenkranz, Wang, & Hu, 2015), which can then result in improved program outputs such as retention and investments. Both intrinsic and extrinsic motivation reflect the psychological origin of self-determination theory (Ryan & Deci, 2000); however, as researchers applied the theory to medical education and simulation-based learning, new applications have emerged.

A collection of investigations and insights into motivation within the field of medicine have been concentrated in undergraduate medical education for medical students and nurses (Banerjee et al., 2016; Bronson, 2016; Fawaz & Hamdan-Mansour, 2016; Holland, 2016; Kusurkar & Croiset, 2014; Mehrabi et al., 2016; Yardimci et al., 2017). The challenges, characteristics, and internal and external motivations across the variety of students and professionals in the field of medicine varied between and within each group of learners. Individual analysis of each of the respective backgrounds and specializations within the field of medicine are needed for the medical educators to design and implement educational strategies founded in self-determination theory appropriately. The use of other teaching methods such as problem-based learning has revealed improvements in motivation (Roh & Kim, 2015), suggesting that educators will need to integrate multiple strategies rather than relying solely on motivation.

Industry standards and research in the field validate the focus on motivation along with other factors. The Accreditation Council for Graduate Medical Education (ACGME; 2019), the organization responsible for accrediting resident training programs, has prioritized resident engagement with patient safety and quality improvement programs within the healthcare system. Podlog and Brown (2016) suggested that self-determination theory was a feasible theoretical framework to promote patient safety and improve patient care, and increasing external motivation through the curriculum and community-based activities could lead to a proliferation of intrinsic motivation to improve patient care.

Cultivating the intrinsic motivation of residents, however, could be a difficult task (Cortright, Lujan, Blumberg, Cox, & DiCarlo, 2013). Hoffman (2015) noted several variables that can inhibit the internal motivation of resident physicians in their journey to becoming autonomous. Resident physicians encounter variables that may provide positive or negative sources of motivation, including limits on working hours, access to patients, changing program requirements and accreditation standards, and interprofessional competition (Hoffman, 2015). Self-determination theory appears to have the potential for the future of graduate medical education; nonetheless, further research is needed because of changing conditions within the medical field and ways that simulation-based learning continues to evolve.

The application of self-determination theory in real-world settings has fulfilled both need and utility within the field of medical education. For example, Biondi et al. (2015) described a clinical learning environment wherein a disconnect had developed between resident physician learners and faculty. Faculty physicians asserted the resident physician learners lacked the proper motivation and discipline to function as autonomous clinicians, and resident physician learners described their working conditions as over-managed and restrictive. Elements of self-determination theory were weak or absent in Biondi et al.'s study; however, such weaknesses could also be present in other programs and fields of medical education.

In another example, Dath, Hoogenes, Matsumoto, and Szalay (2013) concluded that surgeons subconsciously applied principles of self-determination theory when mentoring junior and senior surgical residents. With junior residents, surgeons were more likely to employ direct and purposeful techniques to increase external motivation, whereas with senior residents, surgeons more often used indirect and delicate techniques to cultivate intrinsic motivation (Dath et al., 2013). Although these two studies were premised on adverse and favorable circumstances, respectively, the frameworks established through self-determination led to the understanding of how the real-world learning environments could be explained and improved.

Elements of self-determination theory are also evident in studies of attrition among health-care professionals. Attrition of staff in healthcare is an ongoing concern that requires solutions from multiple perspectives. Researchers who work to understand why employees leave organizations have suggested that improvements in individual motivation could reduce attrition rates (Chang et al., 2015). Employees who remain with an organization report higher satisfaction, lower burnout, and more confidence in executing their responsibilities (Jadon & Upadhyay, 2018). However, new employees and recent graduates have been identified as at-risk hires; therefore, educational programs have implemented specialized orientation programs and simulation-based learning to lower turnover and increase retention (Friedman, Delaney, Schmidt, Quinn, & Macyk, 2013). Team-based learning for new employees and recent graduates has also eased the transition into the work environment (Ouellette & Blount, 2015). Together, reduced turnover and improved retention represent the potential for improved safety (Perreira, Berta, & Herbert, 2018) and significant financial savings for healthcare institutions.

The concept of accountability has also been closely correlated with patient outcomes and safety. Accountability and patient safety have been recommended as requirements to re-establish society's opinion of the medical field (Meltsch, 2012). The length of a patient's stay in the hospital is a measure of patient outcomes that has guided clinical education and practice (Caminiti et al., 2013); increasing physician accountability correlated with a decrease in the total time that patients spent at the hospital. The standards of transparency and accountability have also been assimilated into the nursing profession. Researchers have suggested peer-education and peer-teaching as ways to improve accountability and patient outcomes and thereby enhance the intrinsic motivation of healthcare providers (Deutsch, Orioles, Kreicher, Malloy, & Rodgers, 2013; Dotters-Katz, Hargett, Zaas, & Criscione-Schreiber, 2016). Improvements in staff morale have aligned with improvements in patient satisfaction, patient safety, and inter-professional relationships (Jeffs et al., 2013). The association between intrinsic motivation and accountability in healthcare professionals is a promising area to yield better outcomes; however, further research is needed to realize and apply the full potential of this dynamic.

Developing competent and confident rather than disengaged and mechanical providers is a critical distinction for medical educators. Empowering confidence in learners who do not have an appropriate level of competence could result in medical error. Schroedl et al. (2012) noted that although confidence among learners may appear equal with the use of simulation-based instruction or traditional lecture and clinical rotations, the actual performances were better with simulation-based instruction methods. For example, performing chest compressions as part of cardiopulmonary resuscitation (CPR) is a basic skill used during a cardiac arrest event. Learning and refreshing CPR using simulation-based learning programs improved not only learner confidence but also survival rates of cardiac arrest victims in hospitals (Banks & Trull, 2012). Further investigations are needed to clarify the relationship between confidence, performance, and patient outcomes (Dowson, Russ, Sevdalis, Cooper, & DeMunter, 2013).

Synthesis of the Research Findings

The application of experiential learning through simulation-based training represents a viable alternative to traditional instructional methods in medical education (Schroedl et al., 2012). Experiential learning theory (D. A. Kolb, 1984) was a logical framework to apply to simulation-based learning because while experiences do offer the opportunity for learning to occur, learning in clinical medicine with real patients is no longer as acceptable a practice as in the past (Guze, 2015; Nwomeh, 2012; Wunder et al., 2014; Zahiri et al., 2015). Simulation-based learning offers a safer alternative for undergraduate healthcare professionals to experience situations in ways that can be just as meaningful as those involving real patients. Likewise, simulation-based learning for experienced professionals offers way to learn and improve performance in the same way it does for undergraduate learners (McGarry et al., 2014; Miloslavsky et al., 2012; Nelson, 2016; Raurell-Torredà & Romero-Collado, 2015) and novice professionals. A better understanding of how those experienced professionals in the healthcare field describe simulation-based learning is necessary so that medical educators can appropriately and accurately use this training tool.

The field of graduate medical education represents a unique crossroads within the field of medicine. Resident physicians find themselves positioned between years of academic immersion and professional autonomy. Efforts to ensure the safest and most effective learning have resulted in regulation of variables such as what residents will learn, how long they can work (Block, Wu, Feldman, Yeh, & Desai, 2013), and program-required support services (Weiss, Bagian, & Nasca, 2013). The use of simulation-based learning as an alternative teaching method and mechanism to develop autonomy for resident physicians received some scholarly attention (Nousiainen et al., 2016; Schroedl et al., 2012; Williams & Deci, 1998). Nevertheless, the use of simulation-based learning is still regarded as a vacuum experience, and further research is needed to understand and demonstrate a better way of preparing resident physicians to provide better and safer care.

In addition to a better understanding of new methods of instruction that could be used with resident physicians, insight into the way resident physicians describe their motivation while participating in simulation-based learning may direct medical educators towards more efficient and practical curriculum design. Developing and maintaining learner motivation is critical for physicians in a residency training program (Kusurkar et al., 2013). Resident physicians transition the source of their motivation throughout their programs; their motivation is intrinsically sourced early in their training program and replaced with extrinsic motivation as they near completion (Sockalingam et al., 2016). Although simulation-based learning has been shown to increase the motivation of medical students (Escher et al., 2017), no research included descriptions of motivation by experienced learners such as residents in the latter stages of their training programs.

Critique of Previous Research Methods

Researchers have used quantitative and mixed methodologies to understand simulation-based learning and motivation in medical education (Biondi et al., 2015; Escher et al., 2017; Kusurkar et al., 2013; Wouters et al., 2016). The types of phenomena and research questions that quantitative and mixed methodology studies are intended to address differ from those in qualitative designs; therefore, knowledge to be discovered through qualitative studies would presumably also differ. Quantitative instruments, such as surveys and questionnaires, often provide low return in responses and fail to provide deep and rich responses from participants (Kusurkar et al., 2013); those instruments could also introduce opportunity for bias due to intrinsic characteristics, such as wording or phrasing, or external characteristics such as social or professional pressures (Varjavand et al., 2012; Wetzel, Dow, & Mazmanian, 2012).

Qualitative methodologies are emerging as a promising alternative to understanding issues within the field of medicine and medical education (Dornan & Kelly, 2017; Farghaly, 2018; Greenhalgh et al., 2016). Although new research questions can be explored with an alternative philosophical approach, qualitative studies exhibit some fundamental limitations. Assuming a portion of qualitative researchers are concerned with a particular phenomenon or experience, generalizability is often difficult because said data regarding the phenomenon or experience was unique to a single institution (Dath et al., 2013). Similarly, the reproducibility of a study is often associated with sound methodological execution in quantitative studies; however, the unique conditions under which a qualitative study is completed complicate efforts to replicate those inquiries.

The selected data collection method for this qualitative study was in-depth interviews. In-depth interviews are a highly versatile data collection method that may be applied to both realist and relativist ontological assumptions (McLachlan & Garcia, 2015). The in-depth interview is a method best utilized when a personal description is needed to understand the context of an event or experience (Namey et al., 2016). The interview questions were presented to experts from the fields of education and medicine, who were experts in their respective fields. Probing questions were used to investigate key concepts further and emerging themes to provide a personal interpretation that vividly described the reality that the participants have experienced.

Considerations for alternative methods included phenomenological and ethnographic designs. The phenomenological design focuses the study on a particular event or shared experience by study participants (Creswell, 2013). The simulation-based learning experience and curriculum failed to fit the phenomenological criteria in that all participants did not necessarily share the experience in question and thus could have conveyed different meanings. The ethnographic design was considered with the perspective that senior internal medicine residents represent a unique, independent culture-sharing group (Creswell, 2013); however, the focus of the study was more directed at how the participants described the experience of simulation-based learning rather how the group behaved during the experience of simulation-based learning. Thus, with phenomenology and ethnography determined to be unsuitable, a basic qualitative inquiry emerged as the appropriate design for this study.

Summary

Chapter 2 incorporated concepts from the current literature to ground simulation-based learning in the theoretical framework of experiential learning theory and establish the importance of better understanding residents' motivation through the framework of self-determination theory. The challenges of learning in the clinical environment have prompted medical educators to seek and implement alternative instructional methods. Simulation-based learning has been well-documented in the undergraduate and novice populations; additionally, those populations have consistently demonstrated improved motivation, which leads to improved learning, when simulation-based learning has been used in their educational processes. Despite the promising results observing novice, no supporting research was found regarding more experienced learners and their motivation as it related to their use of simulation-based learning.

Therefore, the aim of this generic qualitative inquiry was to understand the experiences of senior internal medicine residents in simulation-based learning and gather their descriptions of their motivation during those experiences. The study goal was to provide a richer understanding of the experiential learning framework and how it can be applied in the field of medical education. Chapter 3 describes the study design, target population and sample, procedures, and instrument employed to gather and analyze data to fill the gap in knowledge.

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CHAPTER 3. METHODOLOGY

Common features across all types of research are that a detailed description of the methodology reflects the theoretical framework upon which the study is built and that studies are designed to answer the research question(s). The use of qualitative research methods in the field of medical education, as compared to quantitative methods, has only recently been received as a viable and reliable tool to better understanding events and phenomena (Dornan & Kelly, 2017; Farghaly, 2018; Greenhalgh et al., 2016). Chapter 3 provides an expansive description of the design and procedures of this study, as introduced in Chapter 1. This chapter concludes with a thorough explanation of the ethical considerations that shaped this study.

Purpose of the Study

The purpose of this study was to provide a deep understanding of the experiences of senior internal medicine residents in simulation-based learning and capture their descriptions of their motivation in those experiences. Practitioners in the fields of medicine and medical education have adopted simulation-based learning as a strategy and method to improve learning and performance (Mileder & Schmölzer, 2016). The findings and conclusions of this study can be incorporated into the pre-existing understanding of simulation-based learning for other medical professional groups.

Understanding the experiences of individuals who participate in simulation-based learning may lead educators and leaders in medical education to utilize this instructional strategy more effectively. Additionally, insight on how participants describe their motivation might allow those leaders to adapt simulation-based learning experiences to complement participants' motives and provide guidance to educators to incorporate more meaningful and engaging experiences (Kusurkar & Croiset, 2015). Together, a deeper understanding of the participants' experience in simulation-based learning and descriptions of their motivation as it relates to simulation-based learning activities may be relevant to the field of internal medicine in graduate medical education and the medical education field overall.

The Research Question and Subquestions

Research Question

How do senior residents in internal medicine residency programs describe their experience with simulation-based learning?

Research Subquestions

RQ_1. How are the components of experiential learning theory (A. Y. Kolb & Kolb, 2005) described, as applied through simulation-based learning, by senior internal medicine residents?

RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners?

RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents in the context of simulation-based learning?

Research Design

The methodology for this study was qualitative with a basic qualitative research design. The research questions aimed to generate further understanding of the experiences of senior internal medicine residents in simulation-based learning and capture participants' descriptions of their motivation during those experiences. Merriam and Tisdell (2016) described the goal of the basic qualitative study as a way to construct people's experiences and what those experiences mean to them. The aim and purpose of this study implied that other qualitative study designs were not as appropriate or likely to yield suitable conclusions to the research question and subquestions.

For example, phenomenological studies are used to understand participants' experience and the essence of a particular phenomenon or event (Merriam & Tisdell, 2016). The simulation-based learning curriculum adopted by the training program from which participants were drawn arranged for designated learning sessions to occur once every five weeks throughout the entire three-year training program. All residents in the training program were required to attend these training sessions; therefore, participants' experiences with simulation-based learning occurred over the years and with many repeated occurrences within each year, not a single phenomenon. Another example of incompatible qualitative research design would have been ethnography. An ethnographic study would have focused on the culture within the group of internal medicine residents (Merriam & Tisdell, 2016) rather than their experiences in simulation-based learning. A basic qualitative design adequately addressed the research question and subquestions for this study.

The process of collecting participants' experiences from simulation-based learning and descriptions of their motivation was completed through semi-structured, one-on-one interviews. The purposeful sampling design targeted only senior internal medicine residents who had participated in simulation-based learning while in a physician residency training program. The face-to-face semi-structured interview format allowed the researcher to collect individual responses, and audio recording of the interviews facilitated transcription of interviews into text documents. Manual analysis of the interviews/text documents was completed using descriptive and axial coding in the first and second rounds, respectively. Axial themes derived from the descriptive codes, and final interpretations were based on the literature review and respective research questions and subquestions. The qualitative data analysis software ATLAS.ti 7 for Windows (student license) was used to organize and manage codes from the data analysis procedure. Member checks and an audit trail were used to confirm and triangulate codes and themes (Merriam & Tisdell, 2016). Final themes that emerged from the data analysis will be presented in Chapter 4 to address the research question and subquestions.

Target Population and Sample

As noted above, the purpose of this study was to understand the experience of senior internal medicine residents in simulation-based learning and their motivation in those experiences. Because this study focused on internal medicine residents with experience in simulation-based learning, it was necessary to limit the sample to one internal medicine residency training program so that all potential participants had equal access and exposure to the simulation-based learning conditions. The generalizability of a study with a small population is often regarded as weak; however, the ACGME Program Requirements for Graduate Medical Education in Internal Medicine (2019) stipulated that residents must be offered access to education that uses simulation-based learning. It would then be reasonable to believe that internal medicine residents outside of the sample group, for example, those at different hospitals or institutions, could have similar experiences, and generalizability is plausible based on overall consistencies between training programs accredited by the ACGME.

The setting for this research was a community-based hospital system with an accredited internal medicine residency training program. The study's target population was senior internal medicine residents. For this research, senior internal medicine residents were defined as physicians in their second- or third-year post-graduate year and enrolled in an accredited training program discussed above. Intern residents were defined as resident physicians in their first post-graduate year and enrolled in the accredited training program discussed above.

Procedures

The procedures detailed below represent the step-by-step implementation of this study. The procedures included: participant selection, protection of participants, expert review, data collection, and data analysis.

Participant Selection

Recruitment of the sample was purposeful so that only those senior internal medicine residents who had participated in simulation-based learning through a residency training program were included in the study (Creswell, 2013; Merriam & Tisdell, 2016). The simulation-based training program participants experienced are described above in the Research Design section. The purposeful sampling strategy also ensured the data collected from the participants would be a rich representation of the experience (Merriam & Tisdell, 2016).

The internal medicine residency training program was purposely selected by the researcher because of the researcher's familiarity with the simulation-based training program used by the program, as well as the convenience and access to potential participants. A list of current senior residents was publically available on the training program's website. The researcher contacted the program director via e-mail, discussed the study and potential participants with the program director, and obtained written consent to contact potential participants from the program director (who also signed as the organization representative). All intern residents were immediately removed from the recruitment list as their experience and exposure to simulation-based training was outside the scope of this study. Additionally, individuals who self-identified a lack of simulation-based learning experience and those who did not want to participate in the study were excluded.

First contact with potential participants was to inquire about their interest and to begin the informed consent procedure for the study by providing the research information. Information shared with the potential participants included a description purpose of the study, the research question, a brief description of the procedures, and methods to be used. Introductory material also noted that time participation in the study was voluntary and independent of a training program and associated responsibilities (Kraus, Guth, Richardson, Kane, & Marco, 2012). Informed consent was obtained in a face-to-face interaction to ensure all questions and concerns were addressed to the best of the researcher's ability.

The next contact with the participant was via phone or e-mail to establish a meeting time for the interview. Participants were scheduled in the order in which they responded and were available. Potential participants received an e-mail contact for the researcher and were to reach out if interested. Interested respondents who contacted the researcher by e-mail were given a time and location to meet so that the informed consent information could be provided; participants were afforded at least 24 hours to review the information before signing and enrolling in the study. After participants were enrolled in the study, they were contacted by the researcher via e-mail to arrange for a convenient time and location to conduct the interview.

Estimating the sample size to be collected for the qualitative study is often difficult. Merriam and Tisdell (2016) recommended that sample sizes used in the proposal stages of the study be tentative and minimal to avoid tunnel vision or premature notions about data collection or saturation. The sample size for this basic qualitative research study was estimated to be 11 interviews to reach saturation and was calculated by averaging the reported sample sizes within similar qualitative studies (Ahern, Doyle, Marquis, Lesk, & Skrobik, 2012; Backåberg, Gummesson, Brunt, & Rask, 2015; Chapman & Clucas, 2014; Fackler, Chambers, &

Bourbonniere, 2015; Mankaka, Waeber, & Gachoud, 2014; Mellor, Cottrell, & Moran, 2013). As the study was being completed, the initial estimation of 11 interviews was found to be satisfactory for data saturation.

Protection of Participants

The expectation that a research study will create an environment that ensures the safety and wellbeing of human subject participants is non-negotiable in modern research, particularly that which involves human subjects. The researcher considered components of ethical and rigorous research such as voluntary participation and informed consent. In the design of this study, the informed consent process was reviewed by both Capella University's Institutional Review Board (IRB) and the IRB at the study site.

As noted above in the Participant Selection section, potential participants for the study were first able to express interest in enrolling by e-mailing the researcher to avoid any pressure or coercion directly from the researcher or indirectly from their peers. When participants were presented with the informed consent document, information shared with participants also included expectations of the participant during the research, potential sources of harm, strategies to manage and minimize those sources of harm, and the possible benefits of the research (Ahem, 2012). It was also important to inform potential study participants that their enrollment in participation in the study would have no impact or bearing on their current status or future status within their academic program or employment status.

The researcher reported a previously existing relationship with potential participants in that the researcher provided instruction to participants; however, no authoritative or power gradient existed between the researcher and potential participants. Likewise, consideration of potential participants' relationship with the employer they shared with the researcher suggested that the participants could be compelled considered a vulnerable group. Accordingly, further considerations about participant vulnerability will be covered later in the Ethical Considerations section.

Expert Review

A field test of the interview questions took place before submitting for IRB consideration. Interview questions may be leading or suggestive to participants, especially if the interviewer has previous and assumed knowledge (Powell, Hughes-Scholes, & Sharman, 2012). Two content experts reviewed the interview questions for feasibility and relevance to the study. Neither of the expert reviewers was eligible or considered for participation in the research study. One of the reviewers was a Ph.D.-trained and certified medical researcher. The second reviewer was a medical doctor trained in internal medicine and a faculty member of the Department of Internal Medicine at the research site.

Each of the reviewers received a copy of the research plan, the semi-structured interview questions, the rationale for each interview question, and possible follow-up/probing questions that might be posed to participants. Neither of the reviewers requested any additional information before returning their feedback to the researcher. Of the feedback received, the following summarizes points of discrepancy and changes made to the interview questions:

- Question 2: The original plan was to ask participants, “Discuss how simulation-based learning has been integrated into your residency training.” This question did not originally contain any follow-up questions; the first reviewer suggested, and the second reviewer concurred, asking participants to describe in detail the ways that they saw simulation-based learning integrated into their curriculum. Therefore, the researcher added probes such as “What kinds of simulations do you participate in?”

"Who is with you while you are participating in these simulations?" and "How often are you participating in simulations?"

- Question 6: The original question was to ask participants, "What are the most important elements you have taken from participation in simulation-based learning?" The first reviewer suggested asking participants for a finite number of examples of important elements of simulation-based learning; therefore, participants were asked to list and describe just three important elements to list and describe.
- Question 8: The original question was to ask participants, "Internal motivation can be thought of as the desire, action, and behavior that come from a personal desire (Hagger & Chatzisarantis, 2016). What are your internal motivations to participate in simulation-based learning?" (Hagger & Chatzisarantis, 2016)." This question asked participants to describe internal and external sources of motivation, respectively. The reviewers hypothesized whether or not participants would coherently and consistently interpret the differences between internal and external motivations. Therefore, the differentiation between internal and external motivation was removed, and probing questions were used to elicit further details of the motivation described in participants' responses.
- Question 13: The original question was to ask participants, "What most strongly inhibits or discourages your motivation?" The reviewers replied that the question was too open-ended and failed to connect with the research question and subquestions. Therefore, the addition of "to participate and learning in simulation-based learning courses" was added to the end of the question to establish context and applicability to the research question and subquestions.

After the revisions based on feedback provided by the expert reviewers, both noted that they approved of the interview questions.

Data Collection

The type of data needed to answer the research question and subquestions was to be drawn from accounts and descriptions provided by senior internal medicine residents who had simulation-based experiences during their residency training program (Merriam & Tisdell, 2016). Data were collected during one-on-one semi-structured interviews that allowed the participants to explore their experiences; these interviews also allowed the researcher to tease out emerging themes from the participants' responses (Merriam & Tisdell, 2016). The detailed descriptions and meanings corresponded with the research question, subquestions, and supporting theoretical framework.

The interviews were audio recorded using a device placed on a table between the researcher and the participant for optimal sound quality. Participants were notified of the recording device during the informed consent stage of the study, and none of the participants objected to being recorded. The audio recording served the purpose of preserving responses for later transcription and freeing the interviewer from attempting to transcribe by hand; latter practices tend to overwhelm the interviewer and make it more difficult to ask questions probing questions (Creswell, 2013). Audio recording meant that the interviewer could actively listen to the responses and probe responses and emerging themes.

Also, this recording provided the interviewer an opportunity to review the semi-structured interview protocol and individual probes unique to each participant. Review of the audio recordings facilitated improvement in the interview process or skill of interview (Merriam & Tisdell, 2016). The audio recordings were transferred from the handheld device to a password-protected computer. The original recordings of the interviews on the handheld device were deleted after the transfer to the password-protected computer. Copies of the audio recordings maintained on the password-protected computer will be maintained for a minimum of three years following the completion of the study.

The location and setting of an interview is an important consideration for researchers (Merriam & Tisdell, 2016). The interviews in this study took place at the hospital where the residents were currently employed, a convenient and comfortable setting for participants (Lodico et al., 2010). The pre-selected room at the hospital was reserved and its location communicated to the participants. The room was prepared for the interview to ensure availability, comfortable furniture, and adequate lighting to ensure comfortable and satisfactory accommodations. Space was controlled to minimize unnecessary interruptions and distractions.

Following the interview and initial data analysis, the researcher conducted member checks to verify the individual results and triangulate emerging themes (Creswell, 2013; Merriam & Tisdell, 2016). The researcher e-mailed participants to provide an attached text document of the interview so that participants could verify their responses; participants responded via e-mail if they had any concerns or changes. If no response was received during the member check, one additional e-mail was sent. No feedback or concerns were received, and the raw transcripts were accepted as the data set.

Beyond the member checks, no further contact with the participants was necessary. Contact information for the principal investigator was presented to and reviewed with the participants so that if any additional questions or concerns arose after the interview and member check communications could be maintained. The researcher maintained an audit trail to reinforce the credibility, dependability, and transferability of the research and data analysis

(Merriam & Tisdell, 2016). The audit trail included records of the data the researcher received from the interviews and how they was used to formulate themes; additional steps and decisions during the analysis phase are also covered in the audit trail.

Data Analysis

Data collection from the interviews and data analysis of the transcripts occurred concurrently. After an interview was completed, the audio file was sent to a third-party transcription service, rev.com, for conversion into a verbatim text document. The text document was then uploaded to the computer-assisted qualitative data analysis software (CAQDAS), Atlas.ti. Participants in interviews were assigned numbers to conceal their identities; any information that could identify the participant was removed from the text document before any analysis began. Within the Atlas.ti software, the researcher reviewed the text documents while listening to the audio files to ensure accurate transcription. After the text document was verified to be accurate, initial coding began. The process of the interview-transcription-member check was repeated as new interviews were completed.

Different types of coding methods can be used to analyze and begin to understand data. The first-cycle coding method selected for the text documents was descriptive coding (Saldaña, 2015). Descriptive coding is a commonly used technique, particularly for basic qualitative designs in which data derived from interviews. The researcher applied this technique to identify the basic topics in each of the responses. In addition to descriptive coding, in vivo coding was utilized to describe specific phrases and statements that participants made during their interviews. In vivo coding is particularly useful because the participants' words can be directly linked in answering the research question and subquestions (Saldaña, 2015). The Atlas.ti software provided the researcher the opportunity to differentiate descriptive codes from in vivo codes; therefore, descriptive coding and in vivo coding could coincide while still differentiating the analysis method.

The second round of coding was axial coding. Axial coding is a common technique that follows in vivo coding and complemented the design of this study because the properties of experiential learning theory and self-determination theory could be used begin to link the theoretical framework with emerging data trends (Saldaña, 2015). Sorensen et al. (2015) used a conventional content analysis technique that required a highly iterative process of reading and inferring meaning. The analysis in the second round of coding for this study required multiple iterations for the emergent themes to become apparent.

To ensure that data were accurate and represented the information being reported, it was important for the researcher to reference more than two sources for data in a process known as triangulation. Verifying data by cross-checking two or more sources mitigates the temptation for researchers to include or exclude data or trends that refute the hypothesis or expectations and could easily shape or alter the findings of a study (Merriam & Tisdell, 2016). The use of an audit trail also supports both triangulation and maintenance of integrity (Alak et al., 2014). An audit trail is a written record of what and how the researcher completed each step so that the audience can understand the evolution and conclusions of the study (Baillie, 2015). Other methods of triangulation might include member checks that provide preliminary data analysis to the participants to review for accuracy, peer review during which independent researchers or content experts review the data for accuracy, and document mining wherein secondary resources are reviewed for valuable knowledge related to the primary data source (Merriam & Tisdell, 2016).

Instruments

The basic qualitative research design and implementation of semi-structured interviews imply that the researcher will play a primary role as an instrument for data collection (Merriam & Tisdell, 2016). The Instruments section presents the role of the researcher and the semi-structured interview questions, including the probing or follow-up questions and the rationale for each question.

The Role of the Researcher

Although the researcher served as one of the primary instruments of data collection for this study, the impartiality of an unbiased approach to soliciting deep and rich descriptions from participants remained a priority during the interviews and data analysis. The researcher took several steps to establish an impartial and consistent approach to the interview process with each of the 11 participants. Identification and self-exploration of any potential biases that the researcher may have possessed before the start of the study were documented in the dissertation research plan (Merriam & Tisdell, 2016). With any potential biases identified, interview questions could be created and selected in such a way to avoid or minimize potential conflicts.

Interactions between the researcher and participants during interviews, particularly during semi-structured interviews, have the opportunity to yield both deep and focused insights from participant and directionally biased follow-up questions from the researcher (Merriam & Tisdell, 2016). Applying the core elements of experiential learning theory and self-determination theory helped ensure the discussion during interviews stayed within the scope of the study. For example, probing questions ensured that each of the prospective topics could be adequately explored while keeping the appropriate focus on the research question and subquestions

(Merriam & Tisdell, 2016). In this way, the theoretical boundaries helped prevent bias from impacting the findings.

The qualifications of the researcher should be briefly explored. At the time of this study, the researcher had 13 years of teaching experience, six years of teaching undergraduate courses at a university and seven years of teaching at a community-based hospital system for graduate medical education, where postgraduate healthcare professionals received simulation-based training. The researcher has integrated and applied experiential learning theory for many years, particularly in instruction at the community-based hospital system. There, interviews regarding simulation-based training experiences were common practice. In addition to professional experience, the researcher has also been enrolled in a PhD program at Capella University and completed graduate-level courses and research methods courses. In compliance with the IRB from both Capella and the research site, CITI Program training for human subject research was completed. With the above experience and education, the researcher was qualified to complete the study.

As a medical educator, a member of a professional healthcare organization, and regular consumer of the healthcare industry, the researcher maintains extensive knowledge on the topics of experiential learning theory and simulation-based training. At the same time, the researcher for this study was responsible for maintaining an impartial and unbiased position in the development of the study, collection and analysis of data, and interpretation of results. To do so, the researcher maintained that the focus of the study would remain on around two basic sources: the research questions and subquestions and the data collected from participants. From this resolution, the researcher intended to minimize or prevent potential biases from previous experiences, particularly those of an educator in the community-based hospital system, from affecting or intruding in the research process (Merriam & Tisdell, 2016).

Guiding Interview Questions

The semi-structured interview questions used in this study were designed by the researcher with the intent to provide participants the opportunity to explore their experiences with simulation-based learning and describe their understanding of what those experiences meant. In-depth interviews have been described as a highly versatile data collection method that could be applied to both realist and relativist ontological assumptions (McLachlan & Garcia, 2015), although this dissertation topic specified a methodology consistent with the latter, as noted above. Namey et al. (2016) described the in-depth interview as a method best utilized when a personal description is necessary to understand the context of an event or experience.

The following list provides the semi-structured questions, the rationale for each one, and follow-up probing questions that were posed to participants:

1. Tell me about yourself. Where did you go to medical school? What PGY (post-graduate year) are you in? (The interview began with a casual conversation to allow the participant to relax and acclimate to the interviewing environment. Demographic information was also collected to describe the participants.)
2. Discuss how simulation-based learning has been integrated into your residency training. (This question was designed to initiate a casual discussion of what the participant had experienced in a cumulative sense. The following probing questions were options to solicit further elaboration on particular experiences: What kinds of simulations do you participate in? Who is with you while you are participating in these simulations? and How often are you participating in a simulation?)

3. How has your experience with simulation-based learning changed from PGY-1 to PGY-2, and (if applicable) PGY-3? (This question extended the casual exploration of experiences by the participants; however, this question also sought more clarification on participants' experiences with simulation-based learning.)
4. Talk about the reflective or debriefing practices used in simulation-based learning and how they changed your experience of learning in simulation cases versus real-life cases. (The four stages of transforming experience into knowledge included actual experiences, abstraction or reflection, conceptualization, and experimentation (A. Y. Kolb & Kolb, 2005). This question probed into Kolb and Kolb's experiential framework beyond the experience of simulation.)
5. How does simulation-based learning change the way that you understand concepts and apply them in the clinical environment? (This question extends the framework from A. Y. Kolb and Kolb (2005) applied in the previous question. Here, the participants described the process of conceptualization.)
6. What are the three most important elements you have taken from participation in simulation-based learning (Joseph et al., 2015)? (Joseph et al. (2015) reported that medical students regarded simulation-based learning as a highly valuable and beneficial method to learn. This question allowed the participants to identify what experiences in simulation-based learning were important to them.)
7. In a very basic sense, motivation has been described as the reason a person does something (Ryan & Deci, 2000). How do you define or describe the concept of motivation? (Question 8 allowed the participants to conceptualize their perspective of their motivation. Follow-up questions focused the participants on exploring what

motivated them to participate in simulation-based learning. For example, probing questions addressed how variables such as peer pressure, money, academic or career demands may have contributed to their participation in simulation-based learning (Hagger & Chatzisarantis, 2016).)

8. With your years of experience, why have these particular elements emerged and persisted in shaping your experience and motivation in simulation-based learning? (This question was intended to improve understanding of the relationship between the participant's motivation and simulation-based learning, including thick and rich descriptions. Probing questions asked for further elaboration or association with elements identified in previous questions.)

9. How has simulation-based learning enhanced your clinical knowledge and skills as a PGY-2 and PGY-3? (Kusurkar and Croiset (2015) explained that autonomy is fostered by appropriate demand. This question sought information to explain how the participant identified appropriate demand and translated that demand from simulation-based learning to clinical applications. Probing questions more specifically addressed the concept of autonomy and how participants described it in the context of simulation-based learning.)

10. Talk about a time in which you, as a senior resident, experienced simulation-based learning that you thought was particularly relatable or transferable to your clinical practice (Lyness et al., 2013). (This question was intended to address the concept of relatedness, an essential component of self-determination theory (Ryan & Deci, 2000). Probing questions solicited further details about the relatedness or additional examples of simulation-based learning experiences.)

11. Describe the challenges you face with simulation-based learning and how these challenges change you as a physician (Orsini, Evans, & Jerez, 2015). (This question was intended to explore how the participants described how simulation-based learning challenged them. The participants reflected on how their competence was challenged or matched with the experience (Ryan & Deci, 2000).)
12. Describe the weaknesses of simulation-based learning for internal medicine residents in general and then the weaknesses specifically for senior internal medicine residents. (Matsuo (2015) described shortcomings in experiential learning in that minimal or no recognition or account is made for the role of the social context and goal orientation. Probing questions framed the critique of social context and goal orientation from Matsuo (2015). In order to avoid narrowing results with a probing question that focused on social context, other elements, and potential weaknesses in experiential learning, such a lack of autonomy, relatedness, or appropriate level of demand can be assessed.)
13. Of the challenges you described, which of them most strongly inhibits or discourages your motivation to participate and learning in simulation-based learning courses (Hoffman, 2015). (Hoffman (2015) noted several variables that may inhibit the motivation of resident physicians in their journey to becoming autonomous clinicians. Variables that may provide positive or negative sources of motivation include limits on working hours, restricted access to patients, changing program requirements and accreditation standards, and inter-professional competition.)

As noted above interview questions were designed and written by the researcher, as well as reviewed and approved by two experts.

Ethical Considerations

The consideration of the ethical aspects of any research project involving human subjects must be undertaken with the utmost care and transparency. Ethical challenges can be inherent in the design of the qualitative research study, particularly in the aspects of risk and potential harm participants may encounter (Sanjari, Bahramnezhad, Fomani, Shoghi, & Cheraghi, 2014). While the concepts of risk and harm could be interpreted with a subjective assessment, they must be considered with a liberal interpretation to afford the most protection. Informed consent procedures are one of the most important ethical challenges to be managed and mitigated. Areas of particular concern within the qualitative inquiry process include the research design and the interaction between the researcher and the participants (Sanjari et al., 2014).

Research Design

While the considerations and design of any basic qualitative study are important to explore and explain, the setting and population of this study raised unique issues. Woith, Jenkins, Astroth, and Kennedy (2014) described several challenges related to conducting qualitative research within a community-based hospital. Of particular relevance to this study design was the time commitments being asked of the participants. The amount of time the participants are on duty at the hospital is a closely monitored and regulated component of the graduate medical education experience (Jena & Prasad, 2013; Sen et al., 2013). Therefore, in addition to seeking approval from the research site's IRB, as noted above, the researcher communicated with the participants' direct supervisor to ensure that duty hours and other restrictions were not compromised or affected.

The qualitative researcher must provide the same protective measures for all research participants (Franklin, Rowland, Fox, & Nicolson, 2012), regardless of their backgrounds or other personal characteristics. Participants must be allowed to review and accept the conditions under which the research is to be conducted. Informed consent documentation must include the purpose of the study so that participants can understand how the design will be applied and that participation in the research study is voluntary. Describing the study at a level at which the participants can understand should include strategies such as using nomenclature and sentence structure similar to their everyday usage.

Participants from the field of graduate medical education do not traditionally have extensive backgrounds or training in the field of education theory and therefore may require additional explanations or clarification to understand completely. Also, some participants may have originated from a country where English is not their first language, in which case, researchers must include thorough design considerations in the process of informed consent when investigating at-risk and vulnerable populations. Participants should be provided with sufficient information and evidence about a research project so that informed and voluntary participation in the project is maintained. Examples of information to be shared with participants may include expectations of the participants during the research, potential sources of harm, strategies to manage and minimize those sources of harm, and the possible benefits the research looks to establish (Ahem, 2012).

Interaction Between the Researcher and Participant

The intimate nature of the interview format for this study required personal and vulnerable disclosures from the participants, suggesting that additional considerations needed to be taken to protect any of the sensitive experiences participants shared (Fisher, 2012). Because the participants were professionals from the field of medicine, they were likely to understand how even the most rigorous efforts to protect personal information can be compromised, thus data breaches may have been a legitimate concern for participants (T. T. Smith, 2016). With a professional relationship already established between potential participants and the researcher, coercion and guilt to contribute were possible emotions felt by participants (Aluwihare-Samaranayake, 2012). Participants may choose to join a study to look enthusiastic and selfless or so that they can contribute to their profession (Sikweyiya & Jewkes, 2013); therefore, the researcher must be vigilant and prioritize protecting the participants above acquiring data for the study.

In this study, the researcher had a pre-existing and known relationship with all potential participants; however, that relationship did not exist in an authoritarian or supervisory status. The progress or status of the potential participants cannot be influenced or changed by the researcher, and the researcher clarified and emphasized the nature of this relationship during the IRB and informed consent processes. Even when the motives of participants and their desire to contribute to the knowledge base appears to be altruistic (Sikweyiya & Jewkes, 2013), the researcher must be careful in how the study is designed to collect data.

The assertion that the intended sample of resident physicians may be a vulnerable population could be considered from more than one perspective. Vulnerable populations in human subject research have been characterized as individuals who lack the freedom of choice to participate (Shivayogi, 2013). First, Keune et al. (2013) suggested that residents in the graduate medical education program could, in theory, be an at-risk population. Although residents are practicing physicians in hospitals, they are still regarded as learners or students in the hospital-clinical environment. Participants in a study who are also students have been suggested to be considered vulnerable until proven otherwise (Cleary, Walter, & Jackson, 2014), especially if the student has a relationship with the researcher.

Residents in graduate medical education, as argued by Kraus et al. (2012), could experience pressure to participate in various research studies within their respective institutions because, as students, they serve a subordinate role and may seek to gain favor by participating. Second, resident physicians are also commonly employed by the medical institution at which they are learning. Utilizing employees for research studies requires the researcher to specify that the participant's employment status, benefits, and any other relationship between the participant and employer will not be affected by enrolling or refraining from participation. Specific language and procedures were included in the informed consent process and overall methodology to account for the student and employee characteristics of the intended sample.

Summary

Chapter 3 described the selection and rationale for this study design. The purpose of this study was to provide a deeper understanding of the experiences of senior internal medicine residents in simulation-based learning and to capture how they described their motivation during that experience. The basic qualitative design served to enrich the researcher's ability to study the replies from participants in semi-structured interviews. The semi-structured interview questions were reviewed and approved by two experts to ensure validity and reliability. Descriptive and axial coding was used in the first and second round data analysis, respectively. Although several ethical concerns were identified as related to this study, appropriate and thorough mitigating steps were taken to minimize their impact. Altogether, the study design data analysis may yield new insights on how experienced senior internal medicine residents describe their experiences and motivation in simulation-based learning. Chapter 4 presents the findings of the study, including a description of the sample, analysis of the research methodology as applied to data analysis, and a presentation of the data and emergent themes.

CHAPTER 4. PRESENTATION OF THE DATA

The focus of Chapter 4 is to present the data collected, findings, and an explanation of the data analysis conducted in this study. This chapter will include an introduction to the presentation of the data, a description of the participant sample from whom data were collected, a review of how the basic qualitative study methodology was applied to the data analysis process, a presentation of the data by the research question and subquestions, the results of the analysis, and a summary of Chapter 4.

Introduction: The Study and the Researcher

The presentation of the data and explanation of the analysis for this study is an essential component to provide answers to the research question and subquestions. The research question and subquestions were addressed using the basic qualitative research design through data collected in one-on-one interviews with participants. Before the data are presented, reviewing the researcher's experience and credentials to qualify for leading this study is important because the researcher served as the primary means for data collection and analysis.

As a medical education professional who has contributed to the simulation-based training curriculum participants had experienced, the researcher acknowledged a substantial personal and professional investment in the goal of this study. A better understanding of the experiences that senior internal medicine residents have during simulation-based training may provide key insights to further developing their training curriculum and serve as a template for other programs to apply in their simulation-based training programs. Perhaps one of the first studies that demonstrated the need for this investigation was from Barsuk et al. (2011), who found that senior and intern residents that participated in simulation-based trainings reported different experiences.

The researcher used components of this study to develop the premise that senior internal medicine residents' experiences of simulation-based learning could be distinct from those of residents with less educational and clinical experience and therefore needed to be more completely understood through senior residents' perspectives and descriptions. Additionally, Escher et al.'s (2017) suggestion that the motivation of participants in simulation-based training can be associated with their attitudes towards patient safety was particularly impactful on the researcher and ultimately integral to this study. The use of targeted, participant-specific, and evidence-based interventions through simulation-based training that improves overall patient safety represents a personal and professional goal for the researcher.

A description of the researcher's qualifications and experience may establish expertise. The researcher has 13 years of teaching experience: six years teaching university-based undergraduate courses and seven years teaching in a community-based hospital system for graduate medical education and postgraduate healthcare professionals, including simulation-based training and education. The researcher has applied experiential learning theory to teaching for many years, particularly to experiences during community-based hospital system education. In that system, the researcher often conducted interviews regarding simulation-based training experiences. In addition to professional experience, the researcher has also been enrolled in a PhD program at Capella University and completed graduate-level courses and research methods courses. The formative education process at Capella University allowed the researcher to become acquainted with self-determination theory and its application in the field of education. Summarizing the personal commitment and professional experience as described above, the researcher believes that simulation-based training has inherent value for learners in all experience levels. Participants who have not been involved with simulation-based learning for as long or at as much depth as the researcher may not necessarily agree in the same valuation, as has been anecdotally reported during previous simulation-based training sessions. Notwithstanding, the researcher remained committed to identifying and truthfully reporting those experiences described by participants represented in this study.

While reflecting on any personal aspects that may have impacted the study's findings, the researcher must disclose the following considerations. The researcher believes that simulation-based training is a necessity in the sustainment of professionals in the healthcare industry. The integration of simulation-based training for graduate medical education has been one of the primary assignments at the researcher's place of employment. Personal and professional relationships with participants were a consideration in both the solicitation of participants and semi-structured interviews. Specific safeguards as noted above, were in place to eliminate or at least minimize interference by those relationships with this study.

Additionally, the researcher continues to practice as a healthcare professional in emergency medicine and is involved in simulation-based learning as a participant. This commitment demonstrates that the researcher believes not only in the use of simulation-based learning as an educator but also in his personal development as a learner. Altogether, the researcher does not believe that any of these personal aspects or experiences inherently rendered the researcher biased in the development of this study, collection of data, and interpretation of findings.

Description of the Sample

A description of the sample is a feature of qualitative research that generally establishes the characteristics of the participants of a study, unlike the generalized criteria that shape the sample in a quantitative study (Miles & Huberman, 1994). The estimated sample determined before the start of data collection was 11, as noted in the Procedures section of Chapter 2. Data collection stopped after 11 participants had been interviewed because data saturation had been achieved.

The purposeful sampling strategy was designed to ensure that only second- and third-year residents could participate; therefore, the study required careful and targeted recruitment. The small sample size for this study was consistent with other studies and ensured that more in-depth and rich descriptions could be collected and analyzed to answer the research question and subquestions (Miles & Huberman, 1994; Miles, Huberman, & Saldaña, 2014). All interviews began with an open-ended question that allowed participants to describe their demographic information. Table 1 provides a summary of the participants and their respective demographics (PGY, gender, medical school).

Table 1

Demographics of Participants

Participant No.	Post-Graduate Year	Sex
1	PGY2	M
2	PGY2	M
3	PGY3	M
4	PGY2	M
5	PGY2	M
6	PGY3	M
7	PGY3	M
8	PGY3	M
9	PGY2	F
10	PGY2	M
11	PGY2	M

Table 2 presents additional demographic data, including participants' self-identification of their country of origin as the United States or a country other than the United States (Non-

US). Additionally, participants reported whether they attended medical school within the United States (US) or a medical school located outside the United States (Non-US). This information provided additional background information on the participants and did not directly impact the overall data analysis.

Table 2

Participants' Country of Origin and Medical School

Participant	Country of Origin	Medical School
1	United States	Non-US
2	United States	Non-US
3	Non-US	Non-US
4	Non-US	Non-US
5	Non-US	Non-US
6	United States	United States
7	Non-US	Non-US
8	United States	United States
9	United States	Non-US
10	United States	Non-US
11	United States	Non-US

Specific information regarding what part of the United States or what non-US country of origin disclosed by the participants were de-identified; also, the specific school in which participants attended were also de-identified.

All potential participants recruited by the researcher ultimately enrolled in the study. No participants withdrew or were removed from the study by the researcher. In addition, at no time did any of the participants express any concerns about their participation in the study. The only follow-up request by one of the participants was that they receive an e-mail notification when the final study was approved and published.

Research Methodology Applied to the Data Analysis

The methodology for this study was qualitative with a basic qualitative research design. All 11 participants contributed to semi-structured interviews consisting of 13 questions and associated follow-up probing questions, as described in Chapter 3. The semi-structured interview was audio-recorded, transcribed by a third-party service, and verified for accuracy by the researcher.

The researcher e-mailed participants and provided a transcription of the interview so that participants could verify their responses; they were asked to respond via e-mail if they had any concerns or changes. No participants offered feedback or expressed concerns; therefore, the raw transcripts were accepted as an accurate and genuine data set. Beyond the member checks, no further contact with the participants was necessary.

Data collection from the interviews and data analysis of the transcripts occurred concurrently. Atlas.ti and hand-written notes were initially used to organize the verified transcripts and coding results. The first-cycle coding methods were descriptive coding (Saldaña, 2015) and in vivo coding; this combination resulted in 409 separate codes and quotes across the 11 interviews. Axial coding was then applied to the code set using the category sets, as described in the next section. These categories were selected because of their alignment with the research question and subquestions (Saldaña, 2015).

The researcher experienced difficulties in managing the codes and establishing their alignment with the research question and subquestions. As a result, much of the analysis was conducted using hard copies of the interview documents and handwritten code tracking. Copies of the manually analyzed transcripts were retained by the researcher to supplement the journal the researcher maintained to support triangulation. Codes, along with the categories, were further analyzed until themes emerged. While, as noted above, much of the data analysis occurred concurrently while data were being collected, the latter stages of data analysis did not occur until the entire data set was compiled. Therefore, data saturation was initially identified in the descriptive coding and later confirmed in the axial coding.

Presentation of Data and Results of the Analysis

The purpose of this study was to understand how senior internal medicine residents describe their experiences and motivation during simulation-based learning. The data will be presented using the research question and subquestions. The research question for this study was How do senior residents in internal medicine residency programs describe their experience with simulation-based learning?" and the subquestions were as follows:

RQ_1. How are the components of experiential learning theory (A. Y. Kolb & Kolb, 2005) described, as applied through simulation-based learning, by senior internal medicine residents?

RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners?

RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents in the context of simulation-based learning?

The first section presents the data and the codes and themes that emerged during analysis to answer the main research question. The next section addresses the first research subquestion by categorizing responses by the components of experiential learning theory: experience, reflection, conceptualization, and experimentation. Data for the second research subquestion are presented with the codes and themes aligned with the benefits and barriers identified by participants. The final research subquestion and data analysis are presented across four categories in descriptions of motivation, autonomy, relatedness, and competence.

The codes, themes, and categories generated during the data analysis are presented in the following sections. Representative quotes from participants have been included to highlight the experiences they described and emphasize the emerging themes detected by the researcher (Merriam & Tisdell, 2016). Quotes and specific data illustrate that all the participants were able to answer interview questions about their experiences with simulation-based learning and associated motivation (Creswell, 2013).

Research Question

This section focuses on presenting the categories and codes discovered within the data as they relate to the research question: How do senior residents in internal medicine residency programs describe their experience with simulation-based learning? Interview Question 2 (IQ2) asked participants to discuss how simulation-based learning had been integrated into their residency training, and IQ3 was How has your experience with simulation-based learning changed from PGY-1 to PGY-2, and (if applicable) PGY-3?. Data and descriptions related to participants' general regard of experiences in simulation-based learning. More specific descriptions and examples provided by participants will be discussed in sections that address specific research subquestions. Many of the categories used to summarize the data in the remaining sections were provided. All categories and codes will be considered and summarized in the conclusive themes. Table 3 presents the categories and respective codes for the research question.

Table 3

Categories for the Research Question: Experiences from Current Program

Categories	Codes	No. of Participants Responding
Format of current training program	Combination of different skill levels	11
	Frequency of simulation sessions	9
	Types of sessions	11
Procedure and equipment familiarization	Knowing the equipment	6
	Hands-on experience	6
	Practice procedures	5

Format of current training program. The first category reflected participants' descriptions of the simulation-based training integrated into their residency training programs. Three codes emerged during the analysis and are presented in detail below.

Combination of different skill levels. The first code used to present participants' descriptions of the format of their current training program referred to the variety of skill levels evident during the simulation training sessions. All the participants addressed this idea of the combination of different skill levels, or post-graduate year (PGY), of resident physicians. Participants described that residents from all three (PGY-1, PGY-2, and PGY3) levels were present and participating in each of the simulation sessions. Participant 10 shared, "It consists of all three years. We have the seniors, third years, second years, and first years. The dynamic is usually we go through the simulation." "Typically, during the simulation, it's a small group. Typically, it's going to be two first-year residents, two second-year residents, and one senior resident," according to Participant 1. Participant 4 added, "You can see the differences in experience between the three of the levels."

Frequency of simulation sessions. The next code referred to the frequency of those sessions. Most of the participants (1, 3, 4, 5, 7, 9. 10, & 11) addressed the frequency of simulation sessions. For example, Participant 11 explained, “The simulations are once every five weeks. We have four weeks of rotation, and then we have a clinic week. The clinic week is strictly outpatient; during that week we have Wednesday blocked off, and we just do simulations.”

Types of sessions. The final code for this category addressed the different types of simulation training sessions reported by participants. All of the participants addressed at least some procedures they had experienced in the training program. Participants discussed a variety of simulation sessions; however, only two examples will be presented: one task training and one case-based simulation. First, all the participants mentioned task training of the central line insertion procedure: “Start in simulation, learn all the tools you need for a central line, have the tools in front of you, know how to use them, how to drape, it is going to make the actual procedure itself much easier” (Participant 6). Another common example was a case-based approach to cardiac life support: “We actually had the whole room. It was pretty much a live simulation; we had live feedback, the crash cart, every component minus the real patient, minus the actual event” (Participant 10).

Procedure and equipment familiarization. Participants identified procedure and equipment familiarization as a core element of participating in simulation-based learning. Eight of the 11 participants included procedure and equipment familiarization in their responses to the interview questions. Participants 1, 6, and 7 specified that the hands-on nature of reviewing procedures and equipment made the experience beneficial: “You get familiar with the equipment, you get familiar with the steps (of the procedure), and to some extent you get familiar with the actual technique” (Participant 7). Each of these elements was differentiated and explored in more detail below.

Knowing the equipment. The most common code identified with the benefits of simulation-based learning was participants' ability to get to know the equipment they would be using in the clinical environment (Participants 1, 3, 5, 6, 7, and 10). Examples of such procedures included the placement of a central line, airway management, intraosseous needle insertion, and chest compressions during cardiac arrest. Participants primarily referred to equipment associated with the central line procedure tray and ultrasound machine. Participant 10 noted,

> I would say the opportunity to use the same equipment that we use in practice is one of the most important things about simulation. The same kits, all of that. It helps us become very familiar with what we're using. It's almost taking the emergent situation out of the scenario. Everything else is the same. I think that's one of my favorite parts about it.

Hands-on experience. The next code for this category referred to participants' descriptions of the hands-on nature of simulation-based training, which is different from the clinical experience because during a real procedure with real patients, the equipment must remain sterile and the urgency of the situation can preclude residents' gaining any valuable experiences (Participants 1, 2, 5, 6, 7, & 9). Participant 6 stated, "Getting a hands-on approach before you do something is always favorable to just rushing in because you're going to hurt patients if you just rush in without knowing what you're doing." Participant 1 concurred, "I think hands-on training is some of the best training you could ever do." "The hands-on training is better than any other training like theoretical, slide shows, PowerPoints, or anything else" (Participant 5).

Practice procedures. The next code referred to the opportunity to practice the procedures (Participants 3, 4. 8, 9, & 10). Compared to the previous two codes, the practice of procedures referred to the aggregation of knowing the equipment and receiving the hands-on experiences described above: "The biggest help to third years, or even second years, is being able to take what they thought maybe they could do, and practice it" (Participant 8). Participant 3 noted, "There are some things that we don't do on a daily basis, so if you don't practice, you get rusty and simulation is particularly helping in that sense." "We got a chance to practice the language terms that we speak to each other in critical situations" (Participant 10).

Research Subquestion 1: Experience

This section is focused on presenting the categories and codes from the data analysis as applied to RQ_1. How are the components of experiential learning theory described by senior internal medicine residents, and specifically to the concept of experience and simulation-based learning? IQ3was How has your experience with simulation-based learning changed from PGY-1 to PGY-2, and (if applicable) PGY-3? IQ3 asked participants to further explore their experiences with simulation-based learning. Only responses about the participants' descriptions and comments that related to their first-person experience, as opposed to the programmatic experiences as presented in the previous section, appear in this section.

Table 4

Experience in Simulation-Based Training

Categories	Codes	No. of Participants Responding
Previous experience	Specificity	4
	Feedback	3
	Frequency	2
Intern experience	Learning how to do things	11
	Feedback	6
Role as a senior	Teaching	7
	Refresh knowledge	5
	Transferability	5

Previous experience. Participants provided descriptions of the simulation-based training experiences that occurred prior to the start of their residency training program. Most of the experiences described by participants were drawn from their medical school experiences. Participant 8 recalled their first cardiopulmonary resuscitation (CPR) from 19 years prior to the interview, when they worked on a simple, low-fidelity training mannequin for chest compressions. The codes provided for previous experiences summarize the participants' descriptions.

Specificity. The specificity of simulation-based training described by participants often related to the narrow and restrictive nature of those experiences (Participants 8, 9, 10, & 11). Many of the participants referred to basic life support (BLS), advanced cardiac life support (ACLS), and CPR training as examples of the types of simulation-based training they experienced in medical school: "The only simulation that we really had was ACLS. It wasn't as thorough as it was here" (Participant 10). Participant 11 noted that their previous experience had nothing to do with the specialty of internal medicine: "The only time I had simulations as a med student was during surgery rotations. The curriculum was designed to help surgery people to do it. Not anything from an internal medicine standpoint."

Participants 8 and 9 differed from the other participants in that they described a more well-rounded simulation experience in medical school. Their experiences included a variety of task training simulations, ACLS, and other experiences: "We did intubations, we did peripheral IVs, central lines, and we did some codes. We had to do ACLS when we were students" (Participant 9). Participant 8 described many similarities between their previous experiences and their current simulation training program:

> It was very similar to how we do it here. We had an airway station. We had a venous access station. We did the full integrated mannequin with different code scenarios and such. We also had standardized patients, as well. Each of the simulations was designated to either rotation or a task that we needed. For instance, ED rotation may have certain procedures expected of a medical student, so the rotation first began with the sim lab in which we would go there; get exposure to those particular procedures, or what was expected of us. We would also review ACLS and things that they thought would be pertinent for the ED. Then we also had certain competencies we had to meet through the school with standardized patients, or with simulations with the mannequins and whatnot.

Feedback. The final code used for the previous experience category demonstrated the feedback participants qualified their simulation-based training experience prior to starting their residency training program. Many of the participants (Participants 3, 5, & 10) described experiences that failed to provide sufficient or satisfactory feedback that resulted in improvements or learning opportunities: "We were never given live feedback" (Participant 10). Participant 5 noted that their experience was rarely translated from a theoretical perspective to practical application: "I had other training, like theoretical, slide shows, PowerPoints, but no hands-on or feedback." Participant 3 also reported a failure to receive feedback from simulation experiences: "If you nail it, good; if you didn't, you are going to fear [the next time the situation would be encountered]."

Frequency. The frequency of simulation-based training opportunities featured in descriptions from Participants 3 and 9. Most of the participants described their simulation experiences as very infrequent before they started the residency training program. Participant 9 described their simulation-based training experience as a course that lasted one-week, once per year. Participant 3 completed simulation training as needed rather than as a sustained and constant curriculum: "Most places would just give you a simulation training a week before starting [a new clinical rotation]."

Intern experience. Participants described their experiences with simulation-based training in the residency program. Two categories summarized codes from the data analysis.

Learning how to do things. All of the participants included a description of their intern experiences in simulation-based training as an opportunity for learning how to complete tasks and procedures. Participant 11 described the first thing an intern does in simulation: "You're just trying to get a process as to how you do things. And you're trying to understand how things work and what exactly the steps are." Because the interns generally have the least amount of experience and knowledge (Participant 6), they are likely to get the most volume of knowledge from any particular simulation session: "The most learning is done by the first years because it's all new" (Participant 10).

Simulation-based training also presented interns the opportunity to understand what is expected of them: "When you go into [the clinical environment], a lot of interns don't really know what to expect. [Simulation helps interns] getting aligned with what to expect" (Participant 9), and Participant 8 explained that interns "get exposure to something, hopefully, prior to seeing it in the hospital or in the clinic." It is important for the learning cycle to begin in simulation for the intern because "you learn it, then you can start implementing it, practicing it, and then you hear it again, then you once again hear it or practice, practice, practice, and then you've got it" (Participant 6).

Feedback. As interns, participants noted that simulation-based training was an opportunity to receive feedback from senior residents (Participants 1, 2, 5, 6, 7, 8, & 11). While in simulation, seniors could gauge the knowledge and understanding of interns and address any potential gaps. Conversely, in the clinical environment, senior residents may be distracted with patient care or other responsibilities and do not have time to provide sufficient and appropriate feedback to interns (Participant 1). Likewise, interns can ask questions about the seniors' experience with a particular procedure that might not be regularly experienced (Participant 11). Participant 6 stated, "Simulation is more hands-on for the junior, and the senior is basically observing [junior] and is pointing out what are the areas [the junior] would have done better."

Role as a senior. The final category for this section addressed participants' descriptions of being senior residents in simulation-based training. Three categories were created to summarize the respective codes.

Teaching. As senior residents, Participants 1, 2, 5, 6, 7, 8, and 11 consistently identified simulation-based training as an opportunity to teach and provide feedback to the less experienced residents. Teaching during simulation-based learning was described more for the supervisory-role for senior residents, where they were responsible for the development of the interns than any of the other descriptions: "I think, as a senior, my focus is more learning to teach how to do the procedure" (Participant 5). Participant 2 noted that while teaching, they improved their practice: "You get to be more of the teacher and that kind of helps you highlight things that you were doing wrong before, and you can hopefully help someone out who's coming in behind you" (Participant 2). As a senior and peer-teacher, Participant 11 related, "You are there to kind of let the interns know, 'Here's what you could run into; here's what could happen.'" Participant 7 added to the teaching aspect by noting that simulation was an opportunity to evaluate interns: "As a senior resident, because I have exposure those simulations . . . when a junior is with me, I would let the junior resident to have that exposure more, and I would just observe him how he's doing" (Participant 7).

Refresh knowledge. Participants 2, 3, 4, 8, and 11 described their experience with simulation-based training as an opportunity to refresh or revisit things they had previously learned or seen, but not in some time. Participant 4 shared, "Once you get to the point of actually doing [procedures you haven't done in a while], you realize how much you forgot. [Simulation] was a good refresher because we don't see some stuff as often as we should." "If you don't practice and talk about the procedure, I think you get rusty and [simulation] is particularly helpful in that sense" (Participant 3).

Transferability. The final category for this section referred to participants' descriptions (Participants 1, 2, 3, 8, 10, & 11) of the transferability of what is learned during simulation to the clinical environment, as well as from the clinical environment into simulation-based training. First, the simulation-based training content was recognized to be directly related to what participants saw in their clinical experience (Participant 10). In the simulation environment, Participant 8 explained, the residents attempted to solve problems they would later encounter in the clinical environment:

> In one regard, at least, from our personal learning experience, we can take issues that we've encountered in the field and be able to try to work those out here. Sometimes it's done second year, but in the third year, you really have much more experience and exposure, so the idea is if I have something that I'm experiencing that's an issue, whether technically or whatnot, I can try to work that out here in the sim[ulation] lab versus on the patient.

Other participants described how what they have experienced in simulation-based training changed how their critical thinking and planning when performing in their clinical role: "Our thinking changes after the simulation. There's a higher-level thinking where you're four, five, six, seven steps ahead. As an intern, you're thinking one step ahead, if that" (Participant 10).

Research Subquestion 1: Reflection

This section is focused on presenting the codes and themes as the data analysis is applied to RQ_1. How are the components of experiential learning theory described by senior internal medicine residents, and specifically to the concept of reflection and debriefing following simulation-based learning experiences? IQ4, "Talk about the reflective, or debriefing, practices used in simulation-based learning and how it changed the experience of learning in simulation cases versus real-life cases," was presented in the semi-structured interviews to explore the participants' experiences with the reflection stage of experiential learning. The reflection stage of simulation-based learning, otherwise known as debriefing, was generally described as an essential component for senior internal medicine residents' experiences. Analysis of the data resulted in the categories found in Table 5. Details for each of the categories and respective codes follow.

Table 5

Debriefing for Senior Internal Medicine Residents

Category	Codes	No. of Participants Reporting
Codes	Codes/cardiac arrests	8
Evaluation	Improvement	5
	Reinforcement	4
	Feedback	4
Knowledge	Understand what happened	7
	Adds to learning	5
	Clarity	2
Real-world application	Does not happen	6
	Dynamics of debriefing	6
	Using lessons from simulation	3

Codes. The most frequently described element (Participants 1, 2, 4, 5, 8, 9, 10, & 11) related to debriefing in simulation-based learning was associated with cardiac arrest events, otherwise known as codes. Referrals to debriefing codes occurred for both simulation-based training and real-life codes. For codes in simulation-based training, debriefing occurred regularly after the training experience: "After the simulation, we always have a debriefing before we leave" (Participant 9). Debriefing "has more value in specific simulation: definitely codes" (Participant 11). In real-life code cases, debriefing occurred with much less frequency. Many of the categories and codes discussed below occurred in code debriefing experiences; therefore, participants offered substantive and rich support with those insights.

Evaluation. The next category from the data analysis for debriefing was evaluation. The evaluation category was supported by four generalized codes; each of these codes was selected because of the way participants described the debriefing process as an assessment tool.

Improvement. Five participants (Participants 1, 2, 4, 10, & 11) specifically described the debriefing experience as an opportunity and venue for improvement. Participants described evaluating their performance by asking themselves questions such as "Was there anything that I could have done differently?" (Participant 2). Participant 11 shared, "You can see where things could improve, or you can talk about what went well." Participants also described experiences in which content experts, such as teachers and physicians, used the debriefing session as an opportunity to improve residents' performance: "Having some supervisors and having professionals like [simulation educators], who have run many codes, to stop us and let us know where we can improve" (Participant 1).

Reinforcement. The second code for the evaluation category was reinforcement. Four participants (Participants 1, 2, 3, & 4) discussed that the debriefing experience was useful for reinforcing knowledge and skills demonstrated during simulation sessions. Debriefing "reinforces what was running through your head…how to set yourself up for success next time"

(Participant 1). Participant 3 described, “Coming back for a second time and knowing that this is like, yes, I nailed it.” “It's always good to reinforce that hey, you did this, this, and this right. It’s not just about what you did wrong or what you miss doing” (Participant 4).

Feedback. Four participants (Participants 1, 4, 10, 11) provided descriptions of the debriefing experience as one in which participants received clear feedback. “The more debriefing we can do, the better our approach will be for the next scenario. I think that’s a huge component of feedback because you think about what happened and how you could have done that differently” (Participant 10). Participants 1 and 11 provided similar descriptions of the feedback component of debriefing, noting that peers and other observers could identify what may have gone wrong in the simulation and how it could be done better. Participant 4 regarded the feedback cycle in debriefing as one that helped them understand not only right and wrong but also that “debriefing is your chance to know why and how to make it better” (Participant 4).

Knowledge. The next category that emerged from data was participants’ debriefing practices used in simulation-based learning and how those practices changed the experience of learning in simulation cases to that of knowledge. This category represented ways participants described how the debriefing process changed their knowledge.

Understand what happened. Participants described the debriefing experience as a time to understand events, whether the occurred during a simulation-based training experience or in real life. Seven participants (Participants 1, 2, 4, 5, 8, 9, & 10) provided responses that made up this code. Participant 1 said that debriefing was an opportunity for learners to “go through the mental map that you’ve created” (Participant 1) and manage a particular situation. Participant 2 described the debriefing experience after code simulations as time during which “we’ve probably paid the most attention to the debriefing, analyzing what exactly happened and if they were done according to protocols" (Participant 2). If a situation arose that participants did not understand during a simulation, Participant 5 added that the debriefing session was when "you have a chance to come up with questions and observations that don't come up in the simulation" (Participant 5).

Adds to learning. Many of the participants (Participants 4, 5, 7, 8 & 10) described the debriefing experience as one that added to or enriched to the overall learning experience of simulation-based learning: "Debriefing is a kind of reminder as well what important points you have discussed. I think debriefing is very important at the end of the whole teaching session" (Participant 7). "Debriefing becomes an experience in itself. It gives you an experience that you're not getting otherwise. If you're not thinking or talking about it, you're not doing it, then you're getting no experience" (Participant 8). "I think debriefing helps you learn a lot more about the situation. I think it's important for the learning process" (Participant 10). Finally, one of the most powerful insights came from Participant 5: "If there were no debriefing, you would just take that experience home and have no way to break it down and actually get some teaching points from it" (Participant 5), referring to both simulation-based training and real-life events. Participant 10 reiterated this point: "We are learning, but not as much as we could be" if there were debriefing after important experiences.

Clarity. The final code related to how the debriefing experience changed participants' knowledge was that of clarity. Two participants (Participants 2 & 4) specifically discussed an increased clarity of both the simulation case and their own knowledge through the debriefing process. "I think debriefing definitely adds a little bit of clarity . . . revisit those things and make sure that when you're doing it, you're performing those tasks by thinking and not just behaving and reacting" (Participant 2). "It's essential to have a debriefing, not just to teach because some people might misunderstand a certain topic. I think it's very important to have that as a part of the simulation class" (Participant 4).

Real-world application. The final category represented how participants described their experiences and application of debriefing in real-life clinical situations.

Does not happen. When asked about how debriefing occurs in their clinical experiences, a majority of participants (Participants 1, 4, 8, 9, 10, & 11) noted that debriefing does not regularly occur. Participants provided a variety of reasons why the debriefing did not occur with any regularity. Among those reasons, participants provided examples such as they were too busy managing patients (Participant 1), individuals and teams had dispersed (Participant 1), inability to initiate (Participant 2, discussed in the dynamics of debriefing below), and everyone feels their individual/team performance was satisfactory and debriefing was not necessary (Participant 4).

Dynamics of debriefing. Dynamics of debriefing summarized participants' descriptions (Participants 1, 2, 4, 7, 8, &10) of the difficulties and challenges of debriefing in the real world. Participants 2, 4, and7 agreed that as interns, they did not know what debriefing was or how it could be used; however, as seniors, they took a more proactive role to see that debriefing occurred because "as a senior, myself, I realize how, just as in the simulation setting, a debriefing is important so that you can make what happened known and try to gain knowledge from that. Same thing in the actual real world" (Participant 8). Despite an understanding of how important debriefing was to them, the participants expressed difficulties performing debriefings themselves. Debriefing is "a very dynamic environment" (Participant 1) because the debriefing process is not necessarily "an intuitive process" (Participant 2).

Using lessons from simulation. The final code in the real-world application category presented how participants' transferred what they learned in simulation to real-world clinical practice. Four participants' (Participants 2, 4, 8, & 10) comments contributed to the category. Participant 4 stated,

> The fact that you also talk about what we did right also helps reinforce those skills because later on, you're just going to be like oh, I remember I was the one who was told that I did this, this right, and then you'll remember to do it in real life.

Participant 2 echoed this same idea of recalling lessons learned from the simulation and debriefing when managing situations in real-life. Recalling experiences and being able to apply them in the debriefing process lent "higher value in debriefing for senior residents who have all that experience" (Participant 10).

Research Subquestion 1: Conceptualization

This section focuses on presenting the codes and themes from the data analysis applied to RQ_1. How are the components of experiential learning theory described by senior internal medicine residents, and specifically to the concept of conceptualization following simulation-based learning experiences? IQ5 was How does simulation-based learning change the way that you understand concepts and apply them in the clinical environment? asked participants to explore their experience with simulation-based learning and conceptualization.

Table 6

Conceptualization in Simulation-Based Training

Categories	Codes	No. of Participants Responding
New Ideas	Practice	2
	Real-world	2
Social Learning	Observation	2
	Debriefing	2

New ideas. This category illustrated participants' descriptions of new ideas and practices generated through simulation-based learning.

Practice. Participants described the generation and realization of new ideas and indicated higher levels of understanding had also come through the opportunity to repeat and practice skills that were otherwise unavailable in the clinical setting. "The biggest help to third years, or second years who have had some experience, is being able to take what they thought maybe they could do, practice it…then realize a better way, a more efficient way [to perform skills or procedures]" (Participant 8). Participant 4 used the repetition in simulation-based training to realize opportunities to better understand, for example, a procedure and how it might be executed differently: "I'll start to think, oh, maybe we should do this, maybe we should do that. Let's try this next time; let's try this next time, let's try that next time" (Participant 4).

Real-world. While some of the participants described the conceptualization stage occurring during simulation-based training, others described the generation of new ideas occurring after the simulation when they were with real patients. While performing actual procedures, participants recognized the value and utility of what was being learned in simulation-based training. Participant 5 described a situation in which "going back into real life, that exact same learning from that [simulation session] is what helps me deal" with a difficult situation and what they had learned from that experience. The experience from simulation-based training "helps to kind of visualize, conceptualize what you've done before" (Participant 6) so that real-world tasks can be completed.

Social learning. Simulation-based training offered a social venue for learning with other residents that does not exist in the clinical setting. Whether watching other residents engaged in simulation-based training or analyzing how they performed or immersed in the learning process with debriefing, participants perceived simulation-based training as a valuable step in their maturation as developing physicians.

Observation. Watching their fellow residents complete simulated procedures and cases was one way participants identified that new ideas and understandings were created. Participant 9 stated,

> As a senior resident . . . I've built this model in my head, and I went out and did it one way, and then I came back to simulation training and I saw how other people were doing it. And then that resulted in a change in the way that I was doing it.

Participant 8 described their evolution from an inexperienced and ignorant first-year resident to a keen senior resident looking at every procedure as an opportunity to learn:

> I remember when I was a first year, I didn't see the utility of me watching somebody else do the procedure. As much as now that I'm a third-year, every time I watch somebody do something, I see either one, something that they're doing incorrectly that I may be doing incorrectly, or something that is done in a way that I didn't think was appropriate or was probably not good. I would keep in my mind, that's ineffective, don't do that when you're doing it. I am taking what I'm watching in others and using that to help train me. Then opposite to that is when they do something really well. I'm like, "Wow, that was really good and that will make me more efficient if I could now come back and practice that myself." Do what they did and if I could reproduce that, maybe have the same success they have.

Debriefing. The generation of new understanding and ideas, according to participants, was closely related to the debriefing process of simulation-based learning. Debriefing is an important part of the residency training program because learners need the opportunity to analyze and understand what and why things happen, "especially when you're in the role of a learning physician, and a resident that's training, I think it is even more crucial that you do have that opportunity to come back and explore" (Participant 2). Participant 7 noted the "interconnected" (Participant 7) relationship between debriefing and building new ideas. "A new idea . . come[s] when we are talking during the topic discussion or debriefing, and everybody shares his or her experience. That sharing that experience is basically sharing the new ideas" (Participant 7). Participant 2 stated, "The process of debriefing and then creating new ideas off of that reflection, they're almost intuitively related. As soon as you identify something that's either gone good or bad, then you immediately connect that.

Research Subquestion 1: Experimentation

This section is focused on presenting the categories and codes as the data analysis was applied to RQ_1. How are the components of experiential learning theory described by senior internal medicine residents, and specifically to the concept of experimentation following simulation-based learning experiences? IQ3. How has your experience with simulation-based learning changed from PGY-1 to PGY-2, and (if applicable) PGY-3? and IQ5. How does simulation-based learning change the way that you understand concepts and apply them in the clinical environment? were used primarily to collect data for descriptions and analysis. Responses and descriptions from participants were relatively less frequent for this subquestion compared to the other sections of the data analysis. Two categories were established to summarize the codes collected (Table 7).

Table 7

Experimentation in Simulation-Based Training

Category	Codes	No. of Participants Reporting
Types of experiments	Minor adjustments	2
	Tweaking	2
Where to experiment	Practice in simulation	3
	Putting into practice	2

Types of experiments. This category summarized two codes identified with descriptions about the experimentation stage of experiential learning in simulation-based training. Though the codes were collected and analyzed separately, they will be presented and discussed together.

This category represented the way participants described their approach and experience with experimentation: “The adjustments they’re making, once they go back out and experiment, they are going to be relatively minor” (Participant 11). Improvements and adjustments being applied in the experimentation stage are going to be smaller because with more experience, “you’re not building from the ground up” (Participant 11). “After you've done like two years of simulations…as a PGY-3when you’re doing the simulation, that’s when you probably want to experiment during a little bit more; maybe you can somehow again tweak it to make it better” (Participant 11). Participant 8 shared,

> You start experimenting with other ways to do things to make your process faster, better, safer, more efficient. . . . [Senior residents can] take what they thought maybe they could do, practice it, because they’ve already got the other skills cemented, but now they’re practicing something sort of experimental. Then they realize a better way and more efficient way to do it.

Where to experiment. This category summarized the two codes identified with descriptions about the experimental stage of experiential learning in simulation-based training. Though the codes were collected and analyzed separately, they will be presented and discussed together. This category represented how participants described the setting in which their experimentation took place. The first example provided by participants was experimentation in simulation training. Experimentation occurs through the “practice, repetition of stuff that you are likely to encounter. You can encounter [those events] in the sim lab first” (Participant 9). Participant 4 described the desire to experiment in the simulation setting: “I want to make mistakes [in simulation] so I can learn from them. Do it now when you can afford making some mistakes than making those mistakes when you were supposed to be the guy leading everybody” without any harm to any patients. “I would much rather mess [up] in a practice setting than when someone's life actually depends on you" (Participant 1). Experimentation can be "when you're coming back [from patient care], after having that experience, and you're able to retest whatever you were unsure of" (Participant 8) in the safe environment of the sim lab. Participant 8 continued,

> You take these things that, maybe, you thought of in the field, and you get a chance to actually put them to use somewhere, instead of on the patient. See if that really does work in the model and if that works in the model, and I can do that, that's a feasible activity; maybe I can translate that to in the clinic.

Participant 6 differentiated their experimentation by noting that it was "putting [experiments or changes] into practice, seeing how it affects a patient, seeing how it changes our practice, really, which I think is important."

Research Subquestion 2: Benefits

This section focuses on presenting the categories and codes as the data analysis was applied to RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners, and specifically to the concept of benefits of simulation-based learning experiences? IQ6, What are the three most important elements you have taken from participation in simulation-based learning? was presented to participants in the semi-structured interview so that they could self-identify their top three benefits of simulation. Of the three benefits participants shared, no ranking or preference was to be considered or applied. Table 8 presents the categories and associated codes for this section.

Table 8

Benefits of Simulation-Based Learning

Category	Codes	No. of Participants Reporting
Self-assessment	Identify weaknesses	6
	Compare how others perform	3
Opportunity for repetition of skills	Repetition	6
	Confidence	1
Non-technical skill review and practice	Communication	4
	Teamwork	3
	Role assignment/familiarization	2
	Leadership	1
Closing knowledge gaps, knowledge-building	Knowledge building	4
	Knowledge gaps	2
	Updates in best practices	1

Self-assessment. The most frequent benefit of simulation-based, according to participants, was self-assessment. Seven of the 11 participants included self-assessment in their responses to the interview question. Participant 4 described their use of simulation-based learning for self-assessment:

> It sort of lets you take a step back and look at how much you thought you knew and how much you still have to learn to actually do the things properly because when you're in the real world, you can get away with not doing stuff and hiding the fact that you don't know stuff because most of the time, the other people don't know the stuff either, so you don't have anybody there who knows enough about it correct you or to guide you or make sure you're doing, you guys aren't there at every code. So, the fact that you sit there, and you're like okay, fine, I have holes here, here, and I need to fill these up.

Participant 3 noted that simulation sessions were sometimes a confirmation of knowledge or skills that were used in their clinical practice, and simulation-based learning "helps you gain a second level of experience . . . reaffirm what you already have." The self-assessment category was closely related to the next category, the opportunity for repetition of skills.

Opportunity for repetition of skills. Participants described one of the benefits of simulation-based learning to be the opportunity for repetition of skills. Six of the 11 participants (1, 2, 3, 4, 7, and 9) included repetition among the three benefits in responses to IQ6. "I think that is the biggest thing is practice, repetition; stuff that you are likely to encounter, you can encounter in the [simulation] lab first" (Participant 9). Participant 2 associated the repetition of skills with increasing their confidence with a given skill:

> The more I have done it here under the simulation, the more I have done it in real clinical practice, . . . I have definitely developed confidence that I feel like I have the tools to then go out and handle things.

Nontechnical skill review and practice. One of the aggregate categories that participants identified as a benefit of simulation-based learning was the opportunity for nontechnical skill review. Six of the 11 participants (1, 2, 4, 5, 6, and 11) included at least one form of nontechnical skills as a benefit of simulation-based learning to senior internal medicine residents. Subcategories of the nontechnical skills included, in order of highest frequency to lowest: communication (Participants 1, 4, 5, & 6), teamwork (2, 5, & 11), role assignment/familiarization (2 & 4), and leadership (5). Participant 6 mentioned communication as one of the benefits of simulation-based learning and expressed the desire for even more simulation-based training in communication and associated tools: "I wish we did more of [communication]. . . . I think it would be extremely helpful." Participant 5 noted that communication practice specifically applied to lead a resuscitation team during a cardiac arrest event: "I think the nontechnical things are more important for the seniors…As a senior, you are now expected to actually run the code [team]."

Similarly, Participant 11 described how teamwork can be impacted by watching how other residents perform during simulation sessions: "We're working a lot with our peers. And for the most part, it's nice to how an intern…does in simulation because when I actually work with that intern, I know I can rely on him/her to do specific things." "Simulation helps reinforce the relationship between the senior and the intern. You're building trust through the experiences during simulation that transcends into practice. You give them a task assignment and trust them to take care of it" (Participant 9)

With regard to role assignment and familiarization, Participant 4 described a situation that occurred while managing a real cardiac arrest victim in which one of the assisting team members was noncompliant in their role assignment. Participant 4 recalled a similar scenario from a simulation:

> I want everyone to be in their own role, and I don't want people to flip-flop around. I think if I hadn't seen that in simulation, I don't think I would have had the presence of mind [to address the problem]. It wouldn't have been something I was thinking about. (Participant 4)

Commenting on being familiar with other roles and what it means to fulfill them, Participant 2 stated,

> I think it's important to learn those [other] roles; you kind of understand what it may be like to be someone in a different role, sort of receiving instruction, taking that instruction and doing whatever it is you're being asked.

Closing knowledge gaps, knowledge-building. The final category for the section was closing knowledge gaps and knowledge building. Five of the 11 participants provided a description that pertained to this category. Codes for this category included knowledge building, knowledge gaps, and updates on best practices. The most frequently used code in this category was knowledge building. Participant 2 stated, "You learn, not just step-by-step procedural things, there are really good fundamental physiology and things that we learn [in simulation-based training] or that we further expand our understanding." Participant 6 described simulation as an opportunity to reinforce what they already knew, as well as a chance to receive updates on new and innovative clinical practices: "You always receive the new data, the new ACLS guidelines, and I think that is huge because otherwise we just are doing the same old thing."

Research Subquestion 2: Barriers

This section is focused on presenting the categories and codes from the data analysis was applied to RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners, and specifically to the concept of barriers found within simulation-based learning experiences? IQ13. Of the challenges you described, which of them most strongly inhibits or discourages your motivation to participate and learning in simulation-based learning courses? was presented during the semi-structured interview for the participants to describe barriers that inhibited or discouraged their experience with simulation-based learning. Table 9 presents the categories and associated codes for this section.

Table 9

Barriers of Simulation-Based Learning

Category	Codes	No. of Participants Reporting
Applicability	Applicability, relatability	4
	High-frequency opportunities	3
	Need for specificity to career goals	2
	Failure to prepare for real life	2
Program requirements	Program requirements	5
	Workload/duty hours	3
Variability of experiences	Fidelity of simulation	3
	Variability	2
Repetition	Repetition	3

Applicability. The most frequently described barrier in simulation-based training was applicability. The applicability category consisted of four codes drawn from the interviews, as noted in Table 9 and as described below.

Applicability, relatability. Four participants (1, 2, 4, & 11) specifically identified the degree to which simulation-based training could be applied to clinical practices as a barrier in simulation-based training experiences. Participant 2 stated that "there are certain elements of procedural-based things that are probably not going to apply to me down the road." Participant 4 described a similar perspective:

> Sometimes I walk into a simulation and be a little more motivated to participate than others because I know this really, really applies; versus that all to a few things here but it's not really going to help me prepare for the actual real-life scenario.

Although the material and objectives presented within the simulation-based learning format drew interest from participants, the notion that they would not be able to apply the lessons learned undermined the experience (Participants 4 & 11). Also, as senior residents, participants maintained the perspective of what their long-term career goals were as they prepared to graduate from the residency training program (Participants 1 & 2).

High-frequency opportunities. Three participants (Participants 2, 4, & 8) described the need for simulation-based training to apply not only to what they werer doing in the clinical environment but also to activities that occurred more frequently. Likewise, simulation-based training that focused on low-frequency events and skills in the clinical environment was not useful and was detrimental to motivation. Participant 2 provided examples of high-frequency skills versus low-frequency skills:

> I probably find myself more interested, motivated in learning things like central lines and then kind of revisiting the ACLS stuff, because those are things that I'm going to do on a fairly routine basis. Whereas things like intubations, lumbar punctures even, aren't something that I've had a lot of even exposure to in my clinical duties. So, it's probably not something I'm going to be really focused on doing very frequently.

Need for specificity to career goals. Participants 1 and 2 described one of the barriers associated with simulation-based learning to be a disconnection between the goals and objectives of simulation-based training and their career goals. "I think some simulations don't necessarily apply as you advance in your career, and some of the simulations may not be the most applicable" (Participant 1). Participant 2 shared,

> I myself am interested in sort of the primary care world, so I can kind of recognize that there are certain elements of procedural based things that are probably not going to be that applicable to me down the road. . . . I may never see this again and why should I even know it?

Failure to prepare for real life. Two participants described barriers within simulation-based training in the context that the training fails to prepare for real-life scenarios and situations the participants face. Two examples illustrated the difference between what happens in simulation-based training and clinical experiences, respectively:

> The biggest weakness is that the simulation has not prepared us for a lot of the people that challenge role on the floors. A lot of energy goes into standing your ground. In the simulation, you are learning about what you need to do, but nobody really challenges your role; in real life, it happens all the time. (Participant 10)

> In simulation, we have things that are readily available. In the real world, when they are that can be a demotivating factor. In [simulation], we're taught to do things this way, but in the real world…it doesn't happen. Real people just kind of do their own thing or they do it differently. (Participant 11)

Program requirements. The category of program requirements had the second most responses from participants describing barriers or that which most strongly inhibited or discourages motivation to participate and learning in simulation-based learning courses. Two codes were applied to this category and are supported with evidence below.

Program requirements. Five participants (Participants 5, 6, 7, 8, & 11) described elements of their residency training program and incorporated requirements that created barriers to their simulation training experiences. Examples of program elements included punitive implications for not attending/participating in the simulation-based training activities (Participant 5) and traveling from one hospital to another to complete simulation courses (Participant 7). Participant 6 described the presence and observation of faculty members and supervisors during simulation sessions as more stressful than supportive: "If our supervisors are with us, they're more uptight, which makes us more uptight" (Participant 6). Finally, Participant 11 suggested that the redundant nature of the curriculum could lead to a negative outlook toward simulation in general.

Workload/duty hours. Four participants (Participants 3, 4, 5, & 11) expressed concern that the amount of time they were afforded to complete their other responsibilities with the training program, as well as participate in simulation-based training, negatively impacted their experience with simulation. Participant 3 provided a detailed description of how the workload related to the simulation experience:

> I would say the main thing would be workload because we all enjoy this, we all like to do it, but if you think you have to be here for an afternoon where you have like 20 notes to type, you have like five phone calls to make, 20 refills, or you know that after this, I have to go and work on your research probably for another four hours at night and study for a test that's going to be a few weeks from now but if you don't study right now you're not going to keep up, you're not going to catch up. By that I mean the whole workload, it's going to make it significantly less appealing and less enjoyable. You know, because it just gets clouded because you're not seeing beyond the tip of your nose. You're see all this workload that you have to do, but you're not foreseeing the future and how you're going to feel when you actually have to place a central line.

Although Participants 4 and 11 agreed with Participants 3 and 5 that duty hours were a concern; they also noted that the burden of time commitments to simulation-based training along with the other program responsibilities was sufficiently addressed and managed: "Work hours play a role, but I don't think it's a barrier" (Participant 4). "For me, duty hour management wasn't ever an issue…some people might find it more of a time drain than others" (Participant 11).

Variability of experiences. The third category applied to the data was the variability of experiences. This category was compromised of two different codes, both of which are described in detail below.

Fidelity of simulation. The fidelity, or degree to which a simulation-based training replicates real-life (Hamstra et al., 2014; Tun, Alinier, Tang, & Kneebone, 2015), was described as a barrier by three participants (Participants 4, 7, & 10). "The fact that you can't simulate the real world to a *T* is going to always keep me, to a certain level, it's going to keep me from giving 100%" (Participant 4). "I don't know how often it happens in the real world, but in the simulation, we have things that are readily available" (Participant 10). The concept of stress experienced was also included when participants discussed the restrictive nature of poor fidelity in a simulation experience. "You cannot exactly match this simulation with the patient. But at least those initial steps…it reduces a lot of anxiety" (Participant 7). "Obviously the main weakness is the situation is very calm in a simulation. The situation is rarely ever calm in the real life" (Participant 10).

Variability. Participants 1 and 11 noted that the simulation training experience and possible barriers are widely variable, though they provided no specific descriptions of the types or range of variabilities. Rather, participants provided generalized descriptions that different individuals in the residency training program and participants in simulation-based training are likely to have different simulation experiences and different barriers. "I think [barriers are] going to vary individual to individual" (Participant 1).

Repetition. The final category for this research subquestion was the repetition of simulation-based learning. More specifically, two participants (7 & 9) stated that limited access and the need for more opportunities to experience simulation-based training were inhibitory to their experiences. "Make them more frequent…if you are having one simulation per year, which may not be enough. I think increasing the frequency is necessary. By the next time you are able to use what you learn, you forget things" (Participant 7).

Research Subquestion 3: Description of Motivation

This section presents the categories and codes from the data analysis applied to RQ_3, How are the elements of self-determination theory and motivation described by senior internal medicine residents? and specifically to how participants related the concept of motivation to their simulation-based learning experiences. IQ7 first asked participants to provide a definition or concept of motivation. IQ8, With your years of experience, why to have these particular elements emerged and persisted in shaping your experience and motivation in simulation-based learning? was a follow-up question to explore further how participants described their motivation as associated with simulation-based training and their clinical experiences. The two categories presented in Table 10 represent participants' general descriptions of motivation and associations of motivation with simulation-based learning.

Table 10

Descriptions of Motivation

Categories	Codes	No. of Participants Responding
Definition	Drive to do, achieve something	7
	Improvement	5
	Interest	4
	Do no harm	3
Motivation in simulation	Perform the best I can	9
	Fear, bad outcomes	7
	Social, teaching	7
	Patient care	4

Definition. The first category used to present participants' descriptions of motivation summarizes their generic definitions. The definition category, as shown in Table 10, contained four codes. Among the four codes, all the participants in the study contributed to at least one code in defining motivation.

Drive to do, achieve something. The most common code associated with participants' descriptions of a generic motivation definition referred to the sense that motivation was the drive to do or achieve something (Participants 1, 3, 4, 5, 8, 9, & 11). Participant 4 described motivation as "wanting to achieve something, achieve a certain goal and wanting to do it" (Participant 4). Participants 8 and 9 were more succinct and identically stated motivation is "a desire to do something." "Motivation is something that drives you," according to Participant 11. Two participants specifically referred to an intrinsic element that contributed to their motivational drive: "Inner drive. I want to be good. I don't want to be lost during a code" (Participant 5) and "At the senior level, things are driven much more intrinsically" (Participant 8).

Improvement. The second category used to present participants' descriptions of motivation revolved around the idea of doing something with the intent to improve or correct a deficit (Participants 2, 4, 6, 9, & 11). Participants 9 and 11 maintained a generic description with "something that makes you want to do something better or more" (Participant 11). Participants 2 and 4 internalized the idea of motivation and improvement: "Most physicians who are going through this should be highly motivated and strive to improve yourself. I think that if you truly respect the process, as you should, then you should find motivation in just improving your ability" (Participant 2). "I see it as a deficit in yourself and wanting to correct it or wanting to make it better" (Participant 4).

Interest. The third category of participants' descriptions of motivation revolved around the idea of an individual's interest, enthusiasm, or engagement with a given task (Participants 4, 5, 7, & 8). "Motivation means how enthusiastic you feel during a particular thing" (Participant 7). Participant 8 discussed the role of engagement with interest and motivation:

> You show an active role in that process. The person who's in the classroom, sitting on the edge of their seat listening to the lecture, raising their hand to answer questions, or ask questions. That person shows motivation. That's the big difference, the want to learn, or the willingness, and then that active process of doing it.

Do no harm. The final code that illustrates participants' descriptions of motivation addressed an area more specific to the practice of medicine: do no harm. Participants provided their definitions in the context in which they sourced their motivation, first, that everything they do should be performed with the intent to cause no harm to their patients. "I think it's the oath that we take. That's the motivation. The oath that we take is to do no harm, first off" (Participant 10). Participant 6 noted the service of providing care is where their motivation begins:

> You have got to do what's right for the patient because at the end of the day you're not as important as that patient is. To you, that patient should be the most important thing. If you're stepping up and doing medicine, it's not for whatever other goal, it's to make sure they walk out of this hospital at least back to the way they were before, if not better.

Motivation in simulation. The remaining category for this section was a presentation of participants' descriptions and associations with simulation-based learning. Four codes summarized the data, and details are provided below.

Perform the best I can. The first and most common code referred to participants' desire and interest in performing their job, role, or responsibility to the best of their ability (Participants 2, 3, 4, 6, 7, 8, 9, 10, & 11). To achieve that best-level-performance, participants regarded simulation-based training as an optimal medium to achieve that goal. "It's our responsibility to perform the best we can. That's my motivation, and I take it very seriously. That's my main motivation, to be able to perform as best we could because there are people that depend on that" (Participant 10). "I want to come in and do this. I want to make mistakes. I want to make mistakes so I can learn from them so I can be the best" (Participant 4). Participant 9 noted, "You can always get better. None of us are perfect at anything." The idea of pursuing continuous improvement also appeared in this code. "No matter whatever stage you attend these simulations, they will improve your technique. I would learn something new, and whatever experience I had in the past, I would definitely learn something new that I can improve my prior experience" (Participant 7).

Fear, bad outcomes. The next description of motivation in simulation-based learning (Participants 1, 2, 5, 6, 8, 9, 10, & 11) referred to participants' fear and the possibility of bad outcomes. "Bad outcomes, I think that's a pretty big positive motivator. No one wants to see bad things happen" (Participant 9). Participant 1 combined using fear as a motivator with self-improvement and empathy by stating "My motivating fear is to get better so that I don't have to tell a family member I made a mistake or I did something I shouldn't have done, and we can have as best of an outcome" (Participant 1). "The fear of how this is going to happen in real life. You're thinking you don't want to end up going to the patient and not knowing how to do it" (Participant 8). Participant 2 noted,

> When you learn those skills and develop, it's sort of like adding to your arsenal. You have the tools now to where you're not fearful of what might happen, you're not fearful that if you're the first person to arrive on a code or rapid situation, that you may not be equipped to handle what you find. That fear goes away and you know that, whatever is needed, I'm going to be able to achieve that.

Social, teaching. The next code was used to described participants' social associations with motivation and simulation-based training, as well as those with teaching (Participants 2, 6, 8, & 11). "I think it's motivating from your peers. You don't let somebody down, and it's pretty crushing to have something like that happen" (Participant 6). Participant 4 noted the social component of simulation-based training was positive because "having to have to do it in front of your peers, seniors, interns, instructors, you want to do the right thing so everybody can see you doing the right thing."

With regard to teaching, Participant 8 noted,

> My motivation is I like teaching. I like the idea that I can do a certain number of procedures in my lifetime. That's a finite number, and I'll hit that, but if I teach others how to do it, they'll hit their number, and if they can teach others how to do it, they'll hit their number. I might only be able to do 1,000 procedures, but if I taught 10 other people and they taught 10 other people, it becomes this massive amount of legacy that, without my name, is carried on. I get a sense of satisfaction if there's something that I feel like I taught them. That, to me, teaching is important. It's a motivation for me to be there to teach and to see them learn.

Participant 7 also commented about teaching: "I think what value is for me is that I would see, which areas the junior needs to improve regarding that particular simulation. So, I think indirectly it is learning for me as well and basically improving myself."

Patient care. The final code that addressed participants' descriptions of motivation related to patient care (Participants 2, 3, 6, & 8). Participant 6 noted, "Nothing to me is better than seeing a family member get better and their family just happy that they're better. It brings everybody together." "You should find motivation in just improving your ability to provide good patient care" (Participant 2). Participant 8 stated,

> There's going to come a time in which I am the only person to be there for that patient. If I don't know how to do a procedure, I don't know how to interact with them, or I don't know things I could have learned in simulation, then I've essentially malpracticed. I haven't done what's best for the patient and given them everything that I could because I failed at the step prior to getting there.

Research Subquestion 3: Autonomy

This section is focused on presenting the codes as the data analysis was applied to RQ_3, How are the elements of self-determination theory and motivation described by senior internal medicine residents? and specifically to the concept of autonomy as related to simulation-based learning experiences. IQ9, How has simulation-based learning enhanced your clinical knowledge and skills as a PGY-2 and PGY-3? asked participants to explore their experiences with autonomy. All of the participants universally agreed that their simulation-based training experiences positively contributed to the development of their sense of autonomy. Simulation-based training "played a pretty significant role" (Participant 10), and "It's definitely increased" (Participant 9) a sense of autonomy. The remainder of the data are summarized with the categories in Table 11.

Table 11

Autonomy in Simulation-Based Training

Codes	No. of Participants Reporting
Confidence	8
Development	8
Leadership	6
Intern experience	4

Confidence. The most frequently described (Participants 1, 2, 3, 4, 5, 6, 8, & 10) code that participants associated with the concept of autonomy and simulation-based learning was confidence. "You won't feel like you are able to do a thing until you practice it [in simulation]. The more you practice, the more you feel like you can do by yourself. Simulation is important in that sense" (Participant 7). "The more simulation I do, the more confident I become, the more autonomy I can develop" (Participant 5). Participant 4 associated confidence with one specific clinical procedure following simulation training:

> Since simulation really helps with your confidence, so let's say I go into a simulation about intubation, and then an hour later I'm called to do an intubation. I'm going to have a lot more confidence in myself to actually go do it because just learned about it. I was just taught about it, and I feel comfortable doing it. That helps with me having some autonomy of myself.

Simulation training "gives me the tools of feeling more secure, saying, 'Okay, I got this,' and that becomes more self-fulfilling" (Participant 3). Once that sense of confidence and autonomy has been established in the experienced senior resident, simulation experience "helps confirm your autonomy and helps you become more confident in playing your role as a senior" (Participant 10).

Development. The second most frequently described association of simulation-based training with autonomy referred to the individual's development as learner, physician, and teacher (Participants 1, 2, 3, 5, 6, 7, 8, & 9). Participant 8 noted, "Simulation is an accelerator of autonomy." "You have to go through the process…The idea of simulation is that it's giving you a pathway [to becoming more independent and competent]" (Participant 3). Going back and forth between simulation-based training and clinical practice maintains skills and confidence "so that you can turn around and still believe that you have the skills and that you can remain autonomous" (Participant 2). Participants characterized developing knowledge and skills as an autonomous physician as optimal. Participant 9 noted, "The faster you can just get things done on your own and do it yourself without someone having to supervise you." This goal was also perceived as one of the biggest benefits to the simulation training program, as noted by participants in RQ_2: Benefits section. Finally, Participant 8 included their development as an autonomous teacher through simulation-based training: "You can teach without any help. You can get a little bit more a sense of empowerment and autonomy there" (Participant 8).

Development also encompassed descriptions from participants that referred more to the procedure and skill execution. "You don't have time to run to your attending [physician] most of the time. You need to figure out what is going on. [Simulation] gives you [the opportunity to develop] the tools you need to act" (Participant 6). "I've been signed off on all the procedures that I do. I wouldn't have got to that autonomous point if I didn't have the simulation to be that stepping block" (Participant 8). Likewise, regarding critical thinking situations that involve skills, Participant 1 stated, "The different situations we deal with in simulations prepare you to keep a cool head through real-life situations."

Leadership. The next code for participants' descriptions of autonomy in simulation-based learning was leadership (Participants 1, 4, 6, 10, & 11). Participants regarded simulation-based training as an opportunity to address and improve leadership. "You need to assume a leadership role, so it gives you the confidence to step into that role and to direct traffic when needed, but it also allows you to think critically, think calmly" (Participant 1). "I think simulation does help with autonomy because you're going to take that leadership role in simulations and its practice" (Participant 4). Participant 8 described looking forward to simulation as they transitioned from a junior to senior resident, asserting that simulation training "gives me the opportunity to take somewhat of a leadership role in helping." Participant 10 stated, "As an intern, you're learning to become a member of the team, and as a senior, you're learning to become the leader of the team."

Intern experience. The final code that summarized participants' descriptions of autonomy focused on the intern experience (Participants 6, 7, 8, & 10). Participants described their intern experiences in simulation-based learning as a venue to understand their roles:

> The difference, I think, as an intern, you don't feel that much like you're able to do [clinical skills or lead a team]. If you also feel that you are not able to do it, then I think you won't be having any concept of autonomy then. So, you really have to be good, at least in simulation, before you feel like that you can do it by yourself. (Participant 7)

> I'd need more repetition before I was confident enough to do what I'm doing now. It did help me, it did, but in these situations, that's still run by the senior, and it's better to rely on them because they've had more experience than an intern running that. I will say it

gives you more; you still have to have supervision, though, because whether we're doing procedures like we've done here, you still need supervision. (Participant 6)

Research Subquestion 3: Relatedness

This section presents the categories and codes from the data analysis applied to RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents? and specifically to the concept of relatedness as related to simulation-based learning experiences. IQ10, Talk about a time in which you, as a senior resident, experienced simulation-based learning that you thought was particularly relatable or transferable to your clinical practice, was presented in the semi-structured interviews to explore the participants' experiences with relatedness. Three categories emerged to summarize participants' responses and experiences (Table 12).

Table 12

Description of Relatedness in Simulation-Based Learning

Categories	Codes	No. of Participants Reporting
Application	Real-life	9
	Motivation	7
	Important	6
Senior	Experience	5
	Value	5
Intern	No experience	9
	Going through the motions	4
	Knowing what is relatable	4

Application. The first category used to present and summarize the data referred to how the participants associated the relatedness of their simulation-based training experiences. Three codes summarized this category and are described in detail below.

Real-life. The most frequently discussed code for the application category referring to the relatedness of simulation-based training experiences was that of real-life (Participants 3, 4, 5, 6, 7, 8, 9, 10, & 11). More specifically, participants remarked that simulation-based training should relate to what they saw and did in real-life practices. Participants indicated most all the experiences associated with their current training program reflected what they had experienced in the real-world. "I think all our simulations are relatable because they're all scenarios that we actually have been able to do" (Participant 11). "Anything we do here is exactly what we see out there. The stuff that we see daily or weekly, and you want to see that in a controlled setting" (Participant 8). "Models are pretty similar, landmarks are pretty similar, and anatomy is pretty much the same. Tools that we use are exactly the same tools you use in real life. It's pretty accurate" (Participant 3).

Motivation. The next code that described participants' experiences with relatedness in simulation-based training was motivation (Participants 1, 2, 3, 7, 8, 9, 10, & 11). In describing the importance of the relatedness of the content in simulation-based training sessions, participants associated the relatedness to an increased motivation:

> Obviously, the more relatable the simulation is, the more motivational it will also be. I think overall, they're as relatable as we can get at this point. I think that plays a big role. If the situation is not relatable at all, it'll be hard for us to get motivated. If we can't take any lessons from here and apply them there, there's no point in contributing. So I think it plays a big role. (Participant 10)

Additionally, Participant 11 remarked, "I think it's very important because if it's not relatable, you're not going to want to do it. I think all our simulations are relatable because they're all scenarios that we actually have been able to do." When identifying a session that lacked relatedness, Participant 9 continued the same logic: "If we can't do it in the clinical setting, the motivation to participate goes down."

Important. The final code for this category referred to the relatedness of simulation-based training and participants' recognition of the importance of those experiences. The motivation code was used first used to summarize participants' perspectives that relatedness was a very important aspect of their training and experience (Participants 6, 7, 8, 9, 10, & 11). "I think it's very important. I mean, the nice thing is that we have a program that has been tailored to what" (Participant 8). Participant 6 noted that "whatever it is you're going to do [in simulation], it's important that you can go out and use it right away."

Senior. The next category summarized aspects of relatedness specific to participants' experiences as a senior resident. This concept of the senior experience was posed to participants as a comparison to their experiences as less-experienced intern residents, which appears in the final category of this section. Participant 4 described why this comparison was important by stating, "Interns and seniors get completely different things out of simulation." Two codes comprised the senior category and are described below.

Experience. The first code was experience (Participants 1, 2, 4, 7, & 11). The experience code represents responses that referred to the experience accumulated by senior residents, particularly compared to that of intern residents. When comparing the two perspectives, Participant 10 noted, "I think it's important both, but maybe more important for the senior." "As a senior resident, you definitely have an idea of what you know, what you don't know; you pay attention to what you don't know, try to learn that, and then apply it on the patient" (Participant 7). The experience of senior residents can then more easily correlate with what training will translate because "You've seen it all kind of happen; you know that everything that we do in simulation does have a role. It is something that you can and will see when you're on the floors or in the ICU" (Participant 11).

Value. The second code used to summarize participants' descriptions of the senior resident experience with relatedness in simulation-based training was the value (Participant 2, 3, 4, 8, & 10). This code represented participants' valuations of the simulation-based training experience as a senior resident compared to that of their experience as intern residents. Participants 8 and 10 described the relatedness of simulation-based training to be more valuable for senior residents than for less experienced residents. With their experiences in the clinical environment, many of the participants (Participants 2, 3, 4, & 8) described the value of relatedness in simulation-based training to be grounded in the idea that they could come back to the simulation laboratory to improve their techniques or troubleshoot problems they encountered when working with real patients. "For a senior, I think it's fine-tuning what you already know. Fine-tuning your skills is just as important as learning a new skill because that's going to go back to suggesting new things" (Participant 4).

Intern. The final category to present participants' descriptions of relatedness covers the intern experience. As noted above, this perspective was to compare the experience of relatedness as a senior resident to that of interns' experience.

No experience. The first and most popular code used in the intern category referred to descriptions of interns' lack of experiences (Participants 1, 2, 4, 6, 7, 8, 10, & 11). "As an intern, when you do procedures, you haven't quite experienced all the things that can happen in an ICU or on the floor" (Participant 11). Participant 9 noted that the relatability of simulation-based training was more difficult because they would be "coming in and training on something you can't immediately relate to your practice." Though participants noted that "interns need to have some exposure" (Participant 6) to real-life experiences to be able to get the most out of the simulation-based training, Participant 7 maintained that the simulation-based training experience was invaluable for their development and success in the clinical environment.

Going through the motions. Following the ideas that intern residents have the same amount and quality of experiences as senior residents and that lack of experience compromises the relatedness of simulation-based training sessions, many of the participants described their intern experience as situations wherein they went through the motions of the simulation-based training regardless of their experience (Participants 1, 4, 7, & 11). "I think initially as a first-year, you kind of tend to go into the simulations, at least I did, probably erroneously, go into a situation thinking am I really going to need to know this stuff?" (Participant 1). "You may just kind of go about it and do what you're expected to do and not have any more insight or questions as to why we do it" (Participant 11).

Knowing what is relatable. The final code for this the intern category addressed the idea that the intern experience did not establish a sense of relatedness because of fundamental knowledge gaps (Participants 1, 4, 10, & 11). "It's not that the intern doesn't know that what we're doing is of value, it's just because they haven't seen it or been taught it. So, that connection, that relatability connection isn't quite yet made" (Participant 11). "The intern gets the basics. It's almost like introducing him/her to this new concept. There's this whole new thing that you can do that you should know how to do, and you should learn it" (Participant 4).

Research Subquestion 3: Competence

The focus of this section is to present the categories and codes of the data analysis as applied to RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents? and specifically to the concept of competence as related to simulation-based learning experiences. IQ10, Describe the challenges you face with simulation-based learning and how these challenges change you as a physician encouraged participants to explore their experiences with competence. Three categories summarized the (Table 13).

Table 13

Description of Competence in Simulation-Based Learning

Categories	Codes	No. of Participants Responding
Program Stages	Seniors	5
	Interns	5
Learning	More challenge	2
	Less challenge	3
Motivation	Increased motivation	6
	Decreased motivation	2

Program stages. The first and most frequently mentioned category used to summarize participants' descriptions of competence was program stages. Participants compared experiences associated with simulation-based learning from their intern year to those of their senior year. Considerations and qualities of the challenges presented to the two groups were justified by participants for different reasons. Two codes, seniors and interns, are described below.

Seniors. Participants indicated that different challenges to senior residents, compared to those of interns, were an important component of their overall development as physicians (Participants 2, 3, 4, 6, & 7). Because the senior residents had already mastered basic knowledge and skills, the challenge came in the form of honing ancillary elements. Residents related real-life experiences back to the safe environment of the simulation setting, where residents "build upon that knowledge that you already have, and then you start making connections that weren't there before" (Participant 2). Participant 3 shared,

> As a senior, I think for me, it is challenging me to be more pristine in my procedures. I can polish what I do. You know how to do things, but there is always that little thing you can polish.

Participant 4 described using simulation training time as a reminder that their competence can be challenged from within: "I've walked into many simulations like 'Oh, I've already done 20 lines; but if I take out one thing from the simulation where it helps me change up a little thing that makes life easier for me.' I'm growing" (Participant 4).

Interns. The way participants described the concept of being challenged as interns primarily focused on the idea of over-challenging (Participants 3, 4, 6, 7, & 8). Because of the immersive and complex environment of simulation-based training and the concepts addressed, participants noted that it was very easy to become overwhelmed and overstimulated. "I think it's easy to over-challenge the interns, even in a procedure that seems like it's not very challenging, will be challenging just by the process that they don't know it" (Participant 8). "I think it's important that the interns get exposed to something that's out of their reach or feel over their head at the beginning, but in a controlled environment, which you're doing with the simulation lab" (Participant 6). Compared to the senior experience, "the challenge is perceived relatively higher" (Participant 3) for interns in simulation-based training.

Learning. The focus of the next category was participants' descriptions regarding how strong and weak challenges impacted their learning. Participants associated the learning that might occur during a simulation-based training experience with how challenging the experience was perceived. Additionally, the association of participants' motivation with learning and competence was explored through their descriptions and quotes.

More challenge. The suggestion that learning would be increased with additional or stronger challenges came from two participants (Participants 8 & 9). "In order to learn, you need to be challenged. You have to be put in situations where you don't know something" (Participant 9). Participant 8 indicated learners need constant challenge:

> I think that there is a sweet spot, potentially, but I think there should always be room to create a more challenging environment, so that the bar is always set high. If you set the bar high, they're going to perform better because they know the bar is higher. I think the challenge is really making sure that simulation is not just in the sweet spot, but it borders on the more challenging approach to things.

Less challenge. The other perspective provided by participants (Participants 8, 9, & 10) focused on the concept of under-challenging experiences. Experiences that participants identified as less challenging or sub-threshold to their competence resulted in opportunities where less learning occurred. "Under-challenging is never a right answer" (Participant 8) to learning or growing as an individual, whether that be in simulation-based training or the real world. Similarly, Participant 9 associated learning and competence, noting, "The only way you're going to learn is if you're challenged" (Participant 9). "You want to be challenged in the simulation, so in real life, it's…less as stressful. But if you're not challenged at all in the simulation, I think that's not appropriate because everything in the real world is more challenging" (Participant 10).

Motivation. The final category summarized participants' descriptions of the relationship between competence and simulation-based training experiences. Two codes were represented how participants described the relationship between their motivation and experiences as related to their competency and challenges.

Increased motivation. Participants described challenges incurred during simulation-based training and their clinical roles as sources to increase their motivation (Participants 2, 6, 7, 10, & 11). "You can't know what you don't know, and then you kind of step up your ability to learn and acquire more advanced knowledge and more advanced skills" (Participant 2). "I think from a challenge standpoint, the more challenging, or the more complicated, or the more difficult it is, the more you're motivated to do it; you want to get better at that specific thing" (Participant 11).

Participant 7 described the evolution from intern to senior status and how they met new challenges with rekindled motivation: "There were few things that were challenging to me that was new. I explored them because I already knew the basic things, and my aim was to learn new things. So those new things were challenging for me." Participant 6 responded,

> I get excited when I see new things. When I have a challenge, like a patient coming with a thing that's something, we don't know the diagnosis, and we don't know what's going on with you. I like the challenge.

Participants 10 and 11 identified experiences in which challenges or situations that were less demanding resulted in an increase in motivation: "If it's something really easy, it probably has a positive impact on motivation; you're more likely to participate if you feel it's easy for you. If you feel like it's hard, you're less likely to be motivated" (Participant 10).

Decreased motivation. Some participants described experiences in which challenges incurred during simulation-based training, and their clinical roles resulted in a decrease in their motivation (Participants 5, 10, & 11). Most often, in the intern stage, as described previously, participants reported that a decrease in motivation accompanied a difficult situation, depending on the individual: "It depends on the person, but I think in general, if you're challenged, it probably has a negative impact on motivation" (Participant 10). In contrast, Participant 5 noted that their experience changed when the task was not challenging enough, and their motivation decreased: "To be honest, probably when it's something that we've already seen, probably that something that I feel more comfortable with. I might be a little more aloof that day."

Presentation of Themes

The preceding subsections presented participants' descriptions and responses to the interview questions as related to the research question and subquestions. Three themes summarize this data:

1. Simulation-based learning is beneficial,
2. Barriers impact further learning in simulation-based learning, and
3. Motivation varies in simulation-based learning.

The purpose of these themes was not to explicitly answer the research questions; rather, the themes were intended to summarize the data regardless of how they may or may not fit into the questions. Themes 1 and 2 approximated responses to the research question, RQ_1, and RQ_2; however, as noted in Table 14, some data from this theme could be considered to answer RQ_3. The third theme is comprised of data that could be used to address the research question, RQ_2, and RQ_3.

Table 14

Relationship Between Data Themes and Research Question and Subquestions

Theme	Research Question/Subquestions
Simulation-based learning is beneficial	Research Question Research Subquestion 1 Research Subquestion 2 Research Subquestion 3
Barriers to further learning in simulation-based learning	Research Question Research Subquestion 1 Research Subquestion 2 Research Subquestion 3
Motivation in simulation-based learning	Research Question Research Subquestion 2 Research Subquestion 3

Theme 1: Simulation-based learning is beneficial. The first theme represented the idea that participants regard their experience, overall, with simulation-based learning as a very positive and beneficial component of their development as physicians. Categories that applied to the first theme appear in Table 15.

Theme 2: Barriers to further learning in simulation-based learning. The second theme was drawn the categories listed in Table 16. The research question/subquestion in which the category was drawn from, as previously presented in Chapter 4, are also shown in Table 16.

Theme 3: Motivation in simulation-based learning. The third theme represented participants' definitions of motivation, as well as the range of descriptions of autonomy, competence, and relatedness. Categories that applied to the third theme included but were not limited to definition of motivation, motivation in simulation, motivation as related to competence, and the application of simulation-based training to real-world practices (Table 17).

Table 15

Categories Contributing to Theme 1

Category	Research Question/Subquestions
Format of current training program	Research Question
Procedure and equipment familiarization	Research Question
Intern experience	Research Subquestion 1, Experience
Role as a senior	Research Subquestion 1, Experience
Codes	Research Subquestion 1, Reflection
Evaluation	Research Subquestion 1, Reflection
Knowledge	Research Subquestion 1, Reflection
Real-world application	Research Subquestion 1, Reflection
New ideas	Research Subquestion 1, Conceptualization
Social learning	Research Subquestion 1, Conceptualization
Types of experiments	Research Subquestion 1, Experimentation
Where to experiment	Research Subquestion 1, Experimentation
Self-assessment	Research Subquestion 2, Benefits
Opportunity for repetition of skills	Research Subquestion 2, Benefits
Non-technical skill review and practice	Research Subquestion 2, Benefits
Closing knowledge gaps, knowledge building	Research Subquestion 2, Benefits
Motivation in simulation	Research Subquestion 3, Motivation
Application	Research Subquestion 3, Relatedness

Table 16

Categories Contributing to Theme 2

Category	Research Question/Subquestions
Format of current training program	Research Question
Previous experience	Research Subquestion 1, Experience
Intern experience	Research Subquestion 1, Experience
Codes	Research Subquestion 1, Reflection
Real-world application	Research Subquestion 1, Reflection
New ideas	Research Subquestion 1, Conceptualization
Where to experiment	Research Subquestion 1, Experimentation
Applicability	Research Subquestion 2, Barriers
Program requirements	Research Subquestion 2, Barriers
Variability of experiences	Research Subquestion 2, Barriers
Repetition	Research Subquestion 2, Barriers
Learning	Research Subquestion 3, Competence
Motivation	Research Subquestion 3, Competence

Table 17

Categories Contributing to Theme 3

Category	Research Question/Subquestions
Definition	Research Subquestion 3, Motivation
Motivation in simulation	Research Subquestion 3, Motivation
Application	Research Subquestion 3, Relatedness
Senior	Research Subquestion 3, Relatedness
Intern	Research Subquestion 3, Relatedness
Program Stages	Research Subquestion 3, Competence
Learning	Research Subquestion 3, Competence
Motivation	Research Subquestion 3, Competence

Summary

The primary objective of Chapter 4 was to present the data analysis to address the research question and subquestions. Chapter 4 also presented a description of the participant sample from which data were collected and a review of how the basic qualitative study methodology applied to the data analysis process. Additionally, a description of the researcher's qualifications and experiences established perspective and expertise.

The main findings of Chapter 4 include three themes related to participants' descriptions of the benefits of simulation-based learning, barriers in simulation-based learning, and motivation as related to simulation-based learning. The meaning and interpretation of these themes will be further explored and discussed in Chapter 5. Chapter 5 will present a summary, discussion, and conclusion of these results based on the data analysis presented in this chapter. Interpretations and implications for these results will be explored, as well as limitations and recommendations for further research. A final conclusion of the study will close the chapter.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

The purpose of this study was to understand the experiences of senior internal medicine residents in simulation-based learning and to explore how they described their motivation in those experiences. The study may provide a rich understanding of the experiential learning framework and its application in the field of medical education. Chapters 1 through 4 introduced the study and background, a literature review from relevant fields, the methodology of the study, and a presentation of the data and data analysis. The focus of Chapter 5 is a summary, discussion, and conclusion of these results based on the data analysis. Interpretations and implications for these results will be explored, as well as limitations and recommendations for further research. A conclusion of the study will close the chapter.

Summary of the Results

A thorough and extensive review of the literature established the need for this study. Investigations in simulation-based learning within the field of medical education indicated that the experiential learning theoretical framework had been used by educators as a guide to focus on and develop necessary skills in the field of medicine (Hamstra & Philibert, 2012; Obi et al., 2015; Ojha et al., 2015). Medical students and junior/intern residents, assumed to be a less experienced group of learners and healthcare professionals, have described benefits such as increased confidence and motivation that resulted from their participation in simulation-based learning (Barsuk et al., 2011; Miloslavsky et al., 2012; Owolabi et al., 2014; Ricciotti et al., 2012; Schroedl et al., 2012). Increased motivation in healthcare professionals, mainly when the three psychological needs identified within self-determination theory are satisfied (Podlog & Brown, 2016), has been associated with better performance in patient care and increased awareness of patient safety practices (Escher et al., 2017; Kusurkar et al., 2013). A summation of the literature review indicated, however, that research was lacking regarding how more experienced learners, such as senior residents in an internal medicine residency program, would describe their experiences with simulation-based learning and how they would describe their motivation as it related to those experiences.

The findings of this study and research topic add to the fields of education, medical education, and professional studies because they add a new perspective and insight into an area that has received limited scholarly attention. Physician training programs face several challenges in the delivery of educational content and need to adapt outdated curriculums (Sawatsky et al., 2015). Simulation-based learning has become an accepted educational technique for medical educators to meet the needs of their learners and the demands of the field of medicine. Senior internal medicine residents represent a group of experienced, professional learners in graduate medical education who can describe their experiences within their training program as they relate to simulation-based learning and their motivation related to those experiences. The broader perspective and potential application of this study could not only reach other types of graduate medical education training programs but also inform the entire field of experienced medical professionals. Educators considering the use of simulation-based learning, or those educators who have already adopted simulation-based learning, may benefit from the findings of this study through a better understanding of their experienced learners' perspectives about participating in simulation-based learning.

Previous Literature

The modern theory that explains how learning occurs from experience derived from D. A. Kolb's (1984) experiential learning theory (Seaman et al., 2017). D. A. Kolb (1984) described his model for learning: "Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it" (p. 41). The process of transforming the experience into knowledge was operationalized into four stages, otherwise known as the learning cycle (D. A. Kolb, 1984). The learning cycle is a holistic interpretation of what learners go through when learning from experiences. Bailey et al. (2017) noted that merely having an experience, such as participating in an internship, is not sufficient for learning to occur; instead, the three remaining steps in the learning cycle (reflection, conceptualization, and experimentation) also need to occur. Experiential learning theory was one of the two theoretical frameworks applied to this study.

The second theory applied to this study was the self-determination theory. Self-determination theory describes inherent human behavior in which intrinsic and extrinsic variables or characteristics influence an individual's motivation and psychological needs (Ryan & Deci, 2000). Three psychological needs define the scope of self-determination: autonomy, competence, and relatedness (Lyness et al., 2013; Ryan & Deci, 2000). Self-determination theory has been used to explain the motivation of undergraduate medical students and explore how curriculums can be designed to optimize learners' motivation (Rosenkranz et al., 2015).

Simulation-based learning in medical education is a method that uses an artificial environment and prompts for participants to experience the context of real clinical situations that require knowledge, skills, and behavior as patients would in real-life (Lopreiato, 2016). Simulation-based learning has been implemented in the medical field for undergraduate training programs (McGarry et al., 2014; Miloslavsky et al., 2012; Nelson, 2016; Raurell-Torredà & Romero-Collado, 2015) and in continuing education programs for healthcare professionals (Garvey et al., 2016; Swick et al., 2012; Zambricki et al., 2015). Post-graduate training programs were slow to integrate simulation-based learning due to the significant costs and resources associated with development and maintenance (Lazzara et al., 2014; Mathai et al., 2014).

This research study derived from the premise that simulation-based learning provides a beneficial learning experience for resident physicians (Dernova, 2015). Sorensen et al. (2015) noted concerns that results from studies focused on undergraduate participants would fail to translate to individuals that have graduated and have more experience. Clear descriptions and rationale that could lead to more effective and appropriately designed simulation programs, particularly for experienced participants such as senior internal medicine residents, are needed (Ojha et al., 2015; Touchie et al., 2013).

Findings From New Literature

The pursuit of a better understanding of how learners in medicine evolve continues to be of great interest (Chacko, 2018). New and different educational formats for physicians-in-training, including near-peer (C. J. Smith et al., 2018) and simulation competition (Ingrassia, Franc, & Carenzo, 2018) continue to be considered and explored. Residents who participate in simulation-based training for clinical procedures commit fewer errors when performing the procedure on real patients (Barsuk et al., 2018) and report higher levels of confidence (Amoako, Pujalte, Kaushik, & Riley, 2018).

Self-determination theory has also received attention by researchers since the original literature research was completed. Researchers and educators in medical education seek to understand better the motivation of individuals entering the medical field so that attrition can be reduced (Messineo, Allegra, & Seta, 2019). Shin et al. (2018) reiterated the importance of autonomy during the educational experience of physicians-in-training while in the clinical setting.

Methodology

The methodology for this study was qualitative with a basic qualitative research design. Merriam and Tisdell (2016) described the fundamental objective of a basic qualitative study was to construct people's experiences and what they mean to them. The process of uncovering the experience of simulation-based learning and descriptions of motivation was conducting semi-structured interviews with 11 senior internal medicine residents. Semi-structured interviews are a common tool used to collect deep and rich descriptions of experiences (Merriam & Tisdell, 2016). Purposeful sampling was implemented for this study; inclusion criteria were that participants in the study had to be senior internal medicine residents who had experience with simulation-based learning in a residency program.

Interviews were conducted face-to-face using a semi-structured format to collect individual responses; audio recording facilitated the transcription of the interviews to text. The qualitative data analysis software ATLAS.ti 8 for Windows (student license) was initially used to code the transcripts; however, descriptive and axial themes were ultimately derived from codes using a manual approach. Member checks were used to confirm and triangulate codes and themes (Merriam & Tisdell, 2016). A research journal contained hard copies of the coded transcripts, and the researcher maintained the journal to track categories that formed and thematic conclusions.

Review of the Findings

The research question for this study was How do senior residents in internal medicine residency programs describe their experience with simulation-based learning? and the subquestions were

RQ_1. How are the components of experiential learning theory (A. Y. Kolb & Kolb, 2005) described, as applied through simulation-based learning, by senior internal medicine residents?

RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners?

RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents in the context of simulation-based learning?

The presentation of the data in Chapter 4 followed the research question and subquestions, as stated above. Codes were initially created through the descriptive and in vivo coding processes, followed by axial coding to then establish the categories. Three themes were identified based on the codes and categories established; however, they did not clearly and explicitly answer the research question and subquestions. The purpose of these themes was not to explicitly answer the research questions; rather, they were intended to summarize the data regardless of how they may or may not fit into the design questions. The three themes follow:

1. Simulation-based learning is beneficial,
2. Barriers impact further learning in simulation-based learning, and
3. Motivation varies in simulation-based learning.

Discussion of the Results

This section presents a discussion of the results and the researcher's interpretations of those results. Each of the three themes will be presented along with the rationale for their selection and what they mean. Aspects of the research question and subquestions will also be discussed as they relate to the themes.

Theme 1: Simulation-Based Learning is beneficial

As previously stated, participants described their experiences with simulation-based training with overall positive regard. As shown in Table 15, at least 18 categories were considered when analyzing the results and creating the themes. Thus, a variety of aspects could be considered in which participants described the benefits of simulation-based learning and training. Participants were prompted in the semi-structured interview questions to compare their experiences as interns with their experiences as senior residents. Often the benefits associated with their intern experiences were different from those described during their time as senior residents. This difference likely occurred because the participants achieved fundamentally different objectives despite participating in the same simulations and procedures.

For example, although interns and senior residents participate in the same simulations and training tasks, such as central line insertion, residents of different knowledge and skill levels train together on the same content to learn and reinforce objectives. The opportunities to become more familiar with procedures and equipment were important earlier in their development as interns. Later in their training program, simulation-based learning became an important opportunity for seniors to refine their knowledge and technique and integrate what they learned through successes and failures in the clinical environment.

Participants also identified the experience of simulation-based learning as the ideal venue for teaching the less experienced members of their training programs, rather than doing so in the clinical environment with real procedures on real patients. Teaching in the clinical environment requires patients to assume a certain amount of risk; despite obviously obtaining approval and consent, participants were still hesitant knowing that the same lessons could be completed in simulation-based training rather than with patients. Separating the teaching from real clinical cases was also associated with the basic notion of repetition in technical and nontechnical skills. Repeating procedures can be unnecessary and uncomfortable for patients; sometimes, repeated procedures can be accompanied by complications for the patient. Participants have recognized this element and for the benefit of the patients, prefer to teach and gain repetitions through simulation-based training. Likewise, routine and repetitive practice for the more experienced senior residents can become monotonous and meaningless; however, participants discussed that they were able to use the simulation training venue for purposes other than skill development.

From an introspective perspective, many of the participants described simulation-based training as an opportunity to self-evaluate and improve their knowledge and abilities. The descriptions of these opportunities featured in all the phases of experiential learning (experience, reflection, conceptualization, and experimentation). Participants mentioned self-assessment more frequently in the reflection phase of experiential learning than any of the other phases. The social learning aspect of observing other residents' performances and reflecting on simulation-based training tasks were also components of participants' descriptions of self-evaluation. Improving knowledge and abilities was commonly described across the four phases of experiential learning; participants included descriptions in each phase about how this type of learning contributed to their learning and growth.

In summary, participants described their simulation-based training experiences to be beneficial and valuable. Participants compared experiences and associated benefits from their time as senior residents from their intern experiences. Participants identified many elements of simulation-based training that benefitted them as senior residents, different elements than those that enhanced their intern experiences. Because of the variability of descriptions and responses, no specific aspect of participants' responses or the data analysis could be used to summarize the benefits further.

Theme 2: Barriers to Further Learning in Simulation-Based Learning

While the participants described the majority of their experiences as positive and beneficial, they were also critical of their experiences so that weaknesses or faults in the experience design could be identified and better understood. RQ_2 was specifically designed to address the weaknesses and potential barriers experienced by participants. Probing and follow-up questions in the interviews were often necessary to encourage participants to be more critical of their experiences so that more specific barriers and challenges could be identified. In total, as shown in Table 9, four categories summarized the nine codes. Although the descriptions were not as rich, and the data were not as substantial as those reported for the first theme, it was important to juxtapose the participants' perspectives about the barriers to those that expressed the benefits.

When a learner has no experience or prior knowledge, educators need to present information in a particular fashion; when learners have knowledge and experience, a different approach is likely needed. The barriers and weaknesses described by participants, regarded as experienced and learned physicians, were intended to emphasize how simulation-based training programs failed to meet their needs and suggest future targets for design improvements. For example, three participants considered the repetition of their experiences problematic; however, the code more specifically referred to insufficient repetition. Participants noted that the frequency of their simulation-based training experiences was a weakness or barrier in the sense that participation in such training once or twice a year was insufficient. Participants expressed the desire to have simulation-based training occur more often throughout the year, especially for critical procedural skills and critical thinking situations. High-frequency clinical events were more ideal topics for simulation-based learning; contrarily, low-frequency clinical events were less ideal training topics because of the change participants would be able to apply what they learned.

The most frequently mentioned barrier emerged in the applicability category. This category described participants' inabilities to translate objectives and lessons from simulation-based training to real-life applications in the clinical environment and medical practice. The relatability code referred to the scope of activities in simulation-based training that were outside the scope of participants' practice or opportunity to experience in real life. For some participants, the determination of whether or not they would be able to use the lessons learned in simulation-based training beyond their residency career determined whether or not they would experience something beneficial. If participants could not use the information later on in their career, it was not beneficial, and they considered it to be burdensome.

As noted in Chapter 2, the effect of program requirements has been an area of interest for researchers and program leaders. Participants in this study agreed with findings that the program requirements, such as duty hours, inhibited their experiences, particularly those in simulation-based training. Although nearly half of the participants provided comments that contributed to the program requirement category, considerable variability was present in their comments;

therefore, it would be difficult to establish any generalizability in the way that program requirements inhibited or compromised the experiences of simulation-based training sessions. The same discussion applies to the variability of experiences category in that only a few participants included descriptions that contributed to the category, and no generalizability is likely to be drawn from this.

Theme 3: Motivation in Simulation-Based Training

The third theme summarized participants' descriptions of motivation, particularly as it related to simulation-based training and the components of self-determination theory. As participants described their motivation to participate in simulation-based learning, three clear codes emerged from the data (perform the best I can, fear/bad outcomes, and social/teaching), and a fourth (patient care) was included in the presentation of data. The former two categories can easily be extrapolated in an intrinsic sense that participants internalized the root of those descriptions of motivations; the fourth could be included with intrinsic motivation; however, additional research is likely needed to establish certainty. The social/teaching element also likely requires further investigation to more completely understand why participants identified this aspect of motivation.

Self-determination theory presents as a three-part framework: autonomy, relatedness, and competence. While all participants in the study addressed all three components of the framework, it was discovered after the study that not all participants were asked which component was most important to them or most important to senior residents (compared to which was most important to intern residents). Therefore, the researcher was unable to draw any conclusion. Based on the quality of the descriptions and responses provided by participants, the codes and categories for autonomy and relatedness seem to produce data that is deeper and more substantive than that of the competence component.

Participants commonly characterized their experiences in simulation-based training as supportive and promotive of their sense of autonomy. The codes presented in Table 11 implied that simulation-based training could be positively regarded as a supportive mechanism of autonomy in the developing physician learner. Confidence, development, and leadership were the codes associated with participants' descriptions of how simulation-based training enhanced the overall sense of autonomy. Each of these codes could be considered important individually in the development of autonomy; in the summative sense, these components could be developed in a way that would otherwise not be possible without simulation-based training.

The categories and codes created to summarize the concept of relatedness were presented in two essential concepts: the role and importance of applicability and the comparison of relatedness from the senior and intern perspectives. The most important and common code reported in the applicability category referred to the idea that content in the simulation-based training needs to relate to real-life activities and experiences. By seeing the same types of cases and content in simulation-based training that they saw in their real-world medical practice, participants also reported that they felt an increased motivation to engage with the simulations. This relationship between what participants saw in real life and their associated sense of motivation, therefore, seems to be related.

Conclusions Based on the Results

This study contributes to the overall understanding of experiential learning and self-determination theories. This section provides conclusions of the study as they relate to the theoretical framework and previous literature, as presented in Chapter 2. The following sections present conclusions drawn from the findings concerning the theoretical frameworks and previous literature.

Comparison of Findings with Theoretical Framework and Previous Literature

The aim of this study was to provide a deeper understanding of the experiences of senior internal medicine residents in simulation-based learning and explore how they describe their motivation in those experiences. Although the themes reported in Chapter 4 did not directly answer the research question and subquestions, the participants' descriptions of simulation-based training and motivation were consistent with previous literature. This section compares the findings reported in Chapter 4 with the theoretical framework and literature findings reported in Chapter 2.

Experiential learning theory. Participants described the components of experiential learning theory and the differences between those experiences as intern residents and senior residents. The undergraduate and inexperienced learner's experience has been investigated and reported by a variety of reserachers (Banerjee et al., 2016; Bronson, 2016; Fawaz & Hamdan-Mansour, 2016; Holland, 2016; Kusurkar & Croiset, 2014; Mehrabi et al., 2016; Yardimci et al., 2017). Participants described each of the components of experiential learning theory, and those will be compared with the literature reviewed in the remainder of this section.

Experience has long been valued in the field of medical education. The method of see one, do one, teach one (Nwomeh, 2012) has been used as an instructional framework within the field of medicine for many years; however, the basic premise of such teaching has become contentious because of the errors and mistakes involving real patients and quality experiences available through simulation-based training. Participant 1 expressed discontent with the see one, do one, teach one teaching approach:

> Medicine has this silly principle called see one, do one, teach one, which I am not a fan of. Going through simulations, and we've gone through the same simulations several times, practicing how you do it; going through the simulations as a first year was just hands-on, how do I open this kit, how do I put these things together? What am I doing here? As a second year, when you have more experience, now you're in a teaching capacity where you're reinforcing all the skills you now know. Now you're teaching, and after doing multiple central lines, for example, you're able to walk someone through a kit with your eyes closed. You're able to instruct them on how to practice good sterile techniques; that's how you know you really know what you're doing is the teaching aspect. It's only through the multiple trial and errors as an intern that you get to that point.

Participant 1 highlighted the difference between observing a procedure and a meaningful experience so that learning can take place and transferable knowledge can be obtained. Though it could be argued that see one, do one, teach one adheres to the experiential learning theoretical framework, participants' descriptions of the experiences they had in simulation-based training implied that not all experiences are equivalent. Although this study was not an effort to understand the differences between see one, do one, teach one and simulation-based training, the data strongly suggested a difference does exist, and participants stand to benefit more from simulation-based training experiences than observing real procedures performed on real patients, at least in the knowledge/skill acquisition and refinement stages.

The other significant stage in experiential learning theory and experience described by participants was reflection/debriefing. Participants expressed high regard and a positive association with their experiences from the debriefing process during simulation-based training. Findings from this study aligned with L. Kim et al.'s (2016) conclusions that debriefing sessions can be used following both simulated events and real-life events. Among the strongest codes presented, debriefing after cardiac arrest events (simulated or real-life) was identified as an important step in participants' continued development as physicians-in-training. Although participants noted that debriefing sessions do not happen with nearly the same consistency or frequency in real-life following cardiac arrest events as they do with simulated cardiac arrest events, the lessons learned from those debriefing sessions were similar to that documented by Schoenborn and Christmas (2013). Likewise, lessons learned in those debriefing sessions resulted in real-world practices and care provided to patients. Perhaps one of the most poignant insights from the data collection came from Participant 8's description of their experiences with cardiac arrest events and debriefing: "If we don't debrief on it, and we don't talk about it, then you don't learn anything from it." Bailey et al. (2017) and Participant 8 agreed that experiences alone are insufficient sources of learning.

Self-determination theory. Participants also described their definition and sense of motivation as it related to simulation-based learning. In describing their motivation to participate in simulation-based learning, many of the responses could be attributed to intrinsic sources. This finding was consistent with Dath et al.'s (2013) assertion that more experienced residents were associated with intrinsically motivated techniques. Overall, participants regarded their experiences with simulation-based learning as positive and beneficial to their motivation. Similar to what Podlog and Brown (2016) suggested, participants indicated (in part) that they sought to engage with simulation-based training to deliver the best care to their patients and avoid bad outcomes.

Participants addressed each of the components of self-determination theory in response to the semi-structured interview questions and probes. While no specific or emerging component of this theoretical perspective was identified through the data analysis, participants did provide descriptions that suggested all the components were pertinent to their motivation as related to simulation-based learning. These findings were consistent with those of other researchers who recommended training programs align with the three components of self-determination theory to improve the motivation of learners (Bjerregaard et al., 2016; Pass & Neu, 2014; Rosenkranz et al., 2015). When probed to identify what motivates senior residents compared to their intern experience, participants largely agreed that motivation was too individualist to generalize. Designing a training program around and enhancing intrinsic motivation is a very difficult task (Cortright, Lujan, Blumberg, Cox, & DiCarlo, 2013). The variability in the data from this study further supports those difficulties.

When describing their experiences with simulation-based learning as related to autonomy, participants most commonly identified increased confidence that led to a sense of increased autonomy. Supporting autonomy and autonomous motivation within the context of medical education has generally been directed at efforts such as empowering learners with control of what they will learn, providing supportive and positive feedback, and presenting challenging situations in which learners can create their success (Kusurkar & Croiset, 2015).

Finally, participants described the factors that negatively affected their motivation as related to their experiences with simulation-based learning. Participants' responses agreed with those in previous literature that identified de-motivating variables. For example, the regulation of the number of duty hours that residents are allowed to spend in training activities remained a barrier in experiences (Shea et al., 2012). Another example was the applicability of the simulation-based training to their real-life medical practices; Shweiki et al. (2015) noted how the perception of the program design, including how components of the program relate, can impact motivation. In total, the results of the data analysis did not produce any significant disagreements with the literature reviewed.

Interpretation of the Findings

The purpose of these themes in this study was not to explicitly answer the research question and subquestions; instead, they were intended to summarize the data regardless of how they may or may not fit into the questions. Participants provided descriptions of their experiences with simulation-based learning as well as descriptions of their motivation related to simulation-based learning. The emerging and applied themes were determined to be the most appropriate method of summarizing those descriptions, as noted in Chapter 4. The three themes can be applied to each of the theoretical framework components so that benefits and weaknesses can be inferred.

Findings from many of the studies identified in previous literature agreed with the findings of this study. Participants recognized and accepted simulation-based training as a valuable experience in their development as physicians. While the participants were assumed to be more experienced and likely to be masters of the basic cognitive and psychomotor skills necessary in their field, the data suggested that repeated exposure to and repetition of basic skills continued to be beneficial. The self-assessment and fine-tuning of these basic skills likely led to a higher level of perceived mastery by the individuals. This notion seemed to be even more prevalent from the perspective of the participants as senior residents, whereas their experiences as interns were more focused on establishing the rudimentary objectives of procedures and skills.

Participants also included the social component in their descriptions of simulation-based training; however, this finding was not strongly reported or associated with previous literature. This social component contributed to the self-assessment process so that other performances could be used for comparison; additionally, participants associated the social component of simulation-based training with teaching other residents. Taylor and Hamdy (2013) recommended such learning environments where peers provide feedback on performance to support adult learning and collaboration between learners. Teaching and feedback can also improve a person's confidence in their ability (C. C. Smith et al., 2014).

Potential barriers were evident in previous literature and confirmed by participants in this study. Perhaps to complement the discussion of relatedness under self-determination theory, participants reported becoming more disengaged and uninterested with any simulation-based training if they could not immediately relate the topic to current or future applications. Barriers related to duty hour regulations and clinical responsibilities were among the most consistent responses provided by participants. Concern for the amount of time in which residents are working has received significant attention for the past two decades (Hoffman, 2015). While many interventions have presumably been initiated, descriptions from participants in this study reinforced the need to assess and adapt curriculum design to maintain engagement and motivation.

Descriptions of motivation by experienced learners, particularly applied to simulation-based learning, were largely absent from previous literature; therefore, this is a new finding. The codes reported in Table 10 support the idea that participants self-identify with intrinsic sources (perform the best I can, fear) for their motivation rather than extrinsic variables. This finding was similar to those from Ballangrud et al. (2014), who interviewed experienced intensive care nurses who wanted to participate in simulation-based training to improve patient outcomes. Cho, Marjadi, Langendyk, and Hu (2017) reported that medical students were less likely to identify with the three components of self-determination theory and more likely to embrace extrinsic sources of motivation.

The data did not explicitly support one component of self-determination theory to be any more important than another, though that distinction was not the purpose of RQ_3. Participants described their experiences with each of the self-determination theory components and how they related to experiences with simulation-based learning; this subjective perspective was likely why the findings did not support differentiation and ranking of the three components. As noted above, the relatedness of simulation-based training emerged as a potential barrier to learning. Connecting responsibilities in the short-term perspective and long-term career goals has been associated with increased motivation in other learner groups (Henry, Vesel, Boscardin, & van Schaik, 2018). While this level of specificity could prove difficult for the internal medicine residency audience because of the variability in post-residency career goals, consideration and integration of more short-term responsibilities are likely to resonate well with residents.

Limitations

The aim of this study was to provide a deeper understanding of the experiences of senior internal medicine residents in simulation-based learning and capture their descriptions of their motivation in those experiences. With the methodology and design as described above, inherent limitations could have improved or clarified the results. The first limitation was the selection process of the sample. As noted in Chapters 1, 3, and 4, the participants were sampled with a purposeful sampling design with inclusion criteria that only senior internal medicine residents who had participated in simulation-based learning during their residency program were eligible for the study. The purposeful strategy also resulted in all the participants enrolled in the study coming from the same program. The homogeny of participants may have restricted the potential for alternative perspectives and a variety of experiences described by participants. Likewise, the single site and program may have resulted in experiences or explanations from participants that might not exist in other sites or programs. Utilizing more than one residency training program and hospital site could add deeper and richer experiences that would clarify the results and answers to the research questions.

Aside from additional programs and sites, another consideration was the notion of designing the study such that only potential participants from internal medicine residency training programs would be included. Other residency training programs, such as emergency medicine (Jeffers & Poling, 2019), obstetrics (Winkle, Niles, Lerner, Zabar, Szlyd, & Squires, 2016), and surgery (Karmila et al., 2018), have featured in studies focused on the experiences and effects of simulation-based training. Generalized findings could be universally applied to all graduate medical education training programs, so the simulation-based training curricula and participants' motivation could be considered and integrated appropriately.

The final limitation pertained to the theoretical framework applied to the study. Experiential learning theory was selected to establish and explore participants' experiences with simulation-based training. Self-determination was also applied to elicit the participants' experiences and to understand their motivation as related to simulation-based training. During the data collection, analysis, and reflection, the researcher began to appreciate that one theory applied to the study would have provided sufficient insight into the participants' experiences: literature review and interview questions needed to be adequately distributed so that both theoretical perspectives could be addressed. If just one theory were applied to the study, perhaps deeper and more descriptive insights could have been obtained from participants.

Delimitations

Two potential delimitations that were discovered during the data collection and analysis were the sex ratio and country of medical school attendance. As noted in Table 1, only one of the 11 participants was female. More equitable distribution of sexes in the study would lend to a more accurate representation of real-world dynamics. In the distribution of medical school attendance, Table 2 shows that only two of the 11 participants self-identified the country of their medical school to be within the United States. Specific knowledge of the country in which a participant attended medical school could be a useful consideration when designing simulation-based training curricula and experiences. Neither of these demographic factors was implicit data to be captured by the study; however, both seemed to be substantive and potentially meaningful aspects that could be used to further understand simulation-based training.

One unintended aspect of the study identified during the data analysis was the social component of simulation-based training. Participants described that the presence of other learners, interns and seniors alike, enhanced their experiences of training while reflecting or debriefing experiences, building new ideas, or describing and grounding their motivation as related to simulation-based learning. Participants' descriptions of simulation-based training certainly seemed to be consistent with social learning theory. Bandura (1971) first described social learning theory "in the social learning system, new patterns of behavior can be acquired through direct experiences or by observing the behavior of others" (p. 3). Potential seems to exist for medical educators to further understand the appropriate balance between social concentration and the quality of the experiences for each individual; likewise, educators could pursue methods to modulate learners' motivation.

Implications for Practice

The theoretical frameworks applied to this study were experiential learning theory and self-determination theory. Insights from this study can be used by other researchers and educators to apply the respective theories to the findings. Experienced learners, such as the participants in this study, clearly identified the benefits of the hands-on nature of stages in simulation-based training experiences and reflective exercises during debriefing sessions. Because these individuals self-identified mastery of foundational knowledge, the concepts of conceptualization and experimentation were not reported to be as important or meaningful. In other words, the simulation and debriefing experience were the components of experiential learning theory that participants valued the most. While it would seem to be reasonable to argue that the repetitious cycling of simulation experiences is the experimentation of previously learned knowledge or skills, participants described simulations more as isolated events in the same way that procedures and treatment for one patient are independent of the next.

The implications of this study for self-determination theory, from the perspective of the experienced learner, were less concrete than those for experiential learning theory. Participants failed to provide any explicit indication of one component in self-determination theory as more important than any other. Therefore, the overriding implication was that among the three elements identified for this study to comprise self-determination theory, individuality was the primary determinant, and no generalized design can be adopted by educators to meet the motivational needs of experienced learners (Henry et al., 2018). Another implication was that educators can find the varied data to infer that at least one of the components in self-determination theory could resonate with their experienced learner audience to improve or increase motivation.

The wider communities of stakeholders for this study are practitioners in the fields of graduate medical education for residency training programs and medical education for healthcare professionals. One implication of this study to these stakeholders was to include or integrate an emphasis on the stages of learning within simulation-based training and the importance of understanding the individuality of motivation. Many aspects of the medical education curriculum have had content that integrated simulation-based training with varying degrees of success. For experienced learners in medical education, drawing upon their previous experiences and building upon them would seem to add the most value to their training experiences. Offering continuous opportunities to fine-tune cognitive/psychomotor/nontechnical aspects of medical practice would seem to appeal to these experienced learners and healthcare professionals

Recommendations for Further Research

The aim of this study was to provide a deeper understanding of the experiences of senior internal medicine residents in simulation-based learning and to capture their descriptions of their motivation in those experiences. One outcome of the study was that further research is needed for additional insight and understanding of the experience and motivation of simulation-based learning with experienced learners. The following sections outline some of the areas that could benefit from further research and examination.

Recommendations Derived from Methodological/Research Design/Other Limitations of the Study

As suggested in the Limitations section above, the application of two theoretical frameworks may have resulted in more superficial findings than if just one framework had been applied. Future researchers could apply just one framework, based on the findings of this study, to further understand the respective aspects of this study. For example, more detailed questions regarding the experiential processes or components of self-determination theory could be used to establish new insights and understandings.

Recommendations Based on Delimitations

The delimitations of this study also suggested potential areas for further research in the sex differences indicated in Table 1 and the locations of medical schools reported in Table 2. Differences in experiences between men and women have been studied and reported in variety of other contexts (Grendar, Beran, & Oddone-Paolucci, 2018). Likewise, international medical graduates have received significant attention for their matriculation and experiences in U.S. residency training programs; the findings of this study could be used to further explore their experiences (Neiterman et al., 2018; Otokiti et al., 2018; F. Patterson, Tiffin, Lopes, & Zibarras, 2018).

Conclusion

This study focused on participants' (senior internal medicine residents who had participated in a simulation-based training curriculum during their residency training program) descriptions of their experiences in simulation-based learning and descriptions of their motivation in those experiences. Previous researchers had demonstrated support for the role and effectiveness of simulation-based learning, as well as increasing motivation, for medical student and PGY-1 residents (Barsuk et al., 2011; Miloslavsky et al., 2012; Owolabi et al., 2014; Ricciotti et al., 2012; Schroedl et al., 2012); no such support was identified in previously reported research for learners with more knowledge and experience, such as PGY-2 or PGY-3 residents.

A basic qualitative research design was implemented with a sample of 11 senior internal medicine residents. These individuals participated in semi-structured interviews based on 13 core questions and additional probing questions, which resulted in a collection of data to address the research question and three subquestions. The research question for this study was How do senior residents in internal medicine residency programs describe their experience with simulation-based learning? and the subquestions were

RQ_1. How are the components of experiential learning theory (A. Y. Kolb & Kolb, 2005) described, as applied through simulation-based learning, by senior internal medicine residents?

RQ_2. What aspects of simulation-based learning have provided the most benefit/hindrance to the senior residents in their development as learners?

RQ_3. How are the elements of self-determination theory and motivation described by senior internal medicine residents in the context of simulation-based learning?

The results, as presented, offer support for future exploration of simulation-based learning as applied to the field of graduate medical education, the various fields within, and other disciplines with the medical profession. Participants identified reliance on previous experience to reinforce simulation-based experiences and providing time to reflect (debrief) experiences as particularly important and beneficial aspects of their experiences. Although no specific element of self-determination theory was established to be more important than any other, consideration and fulfillment of these characteristics are necessary to enrich experiences within simulation-based learning. Additionally, educators and instructional designers can utilize the descriptions and perspectives of simulation-based training and motivation to develop and present simulation-based training programs that reflect the needs of experienced learners, such as senior residents.

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