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Directors' Perceptions of Supplementing Clinical Requirements with Simulation-Based Education in Paramedic Education

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This is to certify that the doctoral study by

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Walden University
2023

Abstract

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by

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M.Ed., Colorado State University, 2015

BS, University of Colorado in Colorado Springs, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

August 2023

Abstract

The problem for this study was limited clinical site access for paramedic students causing delays in completion and exacerbating critical staffing shortages in healthcare. The purpose of the study was to explore perceptions of paramedic program directors (PD) in Colorado regarding use of simulation-based education (SBE) to supplement program-determined clinical requirements. Kolb's experiential learning theory was the conceptual framework that guided this study. Research questions focused on Colorado paramedic PDs' perceptions about advantages, disadvantages, and barriers involved with replacing program-determined clinical education with SBE. A basic qualitative design was used to capture insights of 6 Colorado paramedic PDs through semistructured interviews; a purposeful sampling process was used to select participants. Emergent themes were identified through open coding, and findings were developed and checked for trustworthiness through member checking, rich descriptions, and researcher reflexivity. Findings revealed that Colorado paramedic PDs recognize a combination of simulation and clinical experiences is the best practice, PDs can control the SBE experience, and logistical challenges can occur. This study has implications for positive social change via providing teachers with strategies and approaches for managing students' test anxiety. This research contributes to positive social change by illuminating how paramedic PDs approach SBE and clinical requirements to meet student and employer needs. This study provides insights that can help address critical staffing shortages in Colorado's healthcare system through on-time paramedic education completion in Colorado programs.

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Dedication

This work is dedicated to my beloved husband and daughters. Throughout this journey we endured not only the educational process, but also my fight against cancer. Together we saw the beauty, the light, and the love in the hardships. I love you all beyond words. You will forever be my greatest achievement.

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I would also like to thank the Colorado Paramedic Program Directors for your time and candor. Your dedication to EMS education and your students is reflected in the quality of patient care seen throughout Colorado. Thank you for your service to the community and to the future of EMS.

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Chapter 1: Introduction to the Study

Emergency Medical Services (EMS) is comprised of four levels of providers, Emergency Medical Responder (EMR), Emergency Medical Technician (EMT), Advanced Emergency Medical Technician (AEMT), and Paramedic. Paramedics are the highest level of EMS providers. The Commission on Accreditation of Allied Health Education Programs (CAAHEP, 2021) defined a paramedic as:

> An allied health professional whose primary focus is to provide advanced emergency medical care for critical and emergent patients who access the emergency medical system. This individual possesses the complex knowledge and skills necessary to provide patient care and transportation. Paramedics function as part of a comprehensive EMS response, under medical oversight. Paramedics perform interventions with the basic and advanced equipment typically found on an ambulance. The paramedic is a link from the scene into the health care system. (p. 2)

Paramedic education involves didactic time where students learn theories about paramedicine. Students learn individual skills and critical thinking in lab settings via scenarios and simulated patient care experiences. During clinical patient care experiences, students begin exposure to the spectrum of patient types and implement skills learned in the classroom in clinical settings. Paramedic education culminates in field education, also known as field internships, where students apply information learned in didactic, lab, and clinical experiences to become independent paramedic practitioners (Rosenberger et al., 2021). The CAAHEP must accredit paramedic programs in the U.S.

This accreditation comes at the recommendation of the Commission on Accreditation of Educational Programs for the Emergency Medical Services Profession (CoAEMSP) (Rodriguez et al., 2018). CAAHEP standards involve identifying patient contact requirements that students must meet throughout enrollment in paramedic programs to satisfy accreditation standards. CAAHEP standards specify that paramedic students must have adequate access to patients of all ages, chief complaints, and interventions in the paramedic scope of practice.

Paramedic students track their activities in lab, clinical, and field internship experiences as specified by CoAEMSP interpretation III.A.2 to achieve terminal competencies set forth by the paramedic program. Terminal competencies include lab skills and patient contact demographics such as patient ages, patient complaints, provider impressions, skills, and internship team leads (CoAEMSP, 2020). Capstone field internship team leads require patient contact. All other clinical requirements can be achieved through simulation if deemed appropriate by the program director (PD) and advisory committee (CoAEMSP, 2020, p. 22). Paramedic PDs and the advisory committee determine student lab, clinical, and field internship experiences and document those contacts in the Student Minimum Competency (SMC) matrix to meet accreditation requirements (Miller, 2021).

Clinical site access has grown increasingly challenging for students in Colorado, the US, and worldwide and is compounded by limitations due to the COVID-19 pandemic (CoAEMSP, 2021; Lenson & Mills, 2018; Page et al., 2021). It is necessary to explore effective clinical completion options that do not require students to delay their

education or entry into the workforce. A paucity of research exists regarding simulation-based education (SBE) in place of clinical experiences in paramedic education. The fields of nursing and medicine have an abundance of information on the topic. This research involved focusing on Colorado paramedic PDs and their perceptions of SBE supplementation of clinical-based education during paramedic education. Information gathered from this study is significant for paramedic students because access to clinical sites has become increasingly restrictive, and paramedic students need alternative opportunities to fulfill required patient contacts. Increasing opportunities for paramedic student clinical completion through appropriately structured SBE allows paramedic students to complete their education with fewer scheduling delays in order to help address critical staffing shortages experienced in the field. Paramedic PDs' perceptions regarding supplementation of clinical requirements for SBE in Colorado and perceived advantages and disadvantages of SBE will contribute to understanding how this population approaches SBE and clinical requirements to meet student and employer needs. Furthermore, this research can help paramedic PDs make decisions regarding implementation of SBE for clinical requirements based on experiences and perspectives of other PDs, which may help guide program development in the future.

Background

Lenson and Mills (2018) asserted clinical availability was becoming increasingly limited for paramedic students due to the growing demand for student placement. Page et al. (2021) clarified that special populations, such as pediatrics, were even more challenging for paramedic students to access. The CoAEMSP addressed the limitations of

clinical placement and the opportunity to replace clinical experiences through simulation during a webinar in September 2021 (Miller, 2021).

Clinical education is necessary for paramedic students to integrate theoretical knowledge from the classroom and laboratory into patient interactions (Alrazeeni, 2018). Khan et al. (2020) identified that paramedic student clinical education enables students to provide safe patient care and increase problem-solving abilities while developing affective, cognitive, and psychomotor skills. Lack of clinical opportunities prevents development of communication skills, professional socialization, and expansion of psychomotor skills (Afshari, 2021; Way et at., 2017). Paramedic students being unable to access clinical sites at all or on time results in a theory-practice gap, inability to implement career-necessary skills learned in the classroom, and delayed course completion, resulting in delayed employment.

Furthermore, challenges have been identified within the clinical setting. Paramedic education differs from other medical sciences because many paramedic students complete clinical time with other disciplines in locations like the emergency department and intensive care unit (Credland et al., 2020; Khan et al., 2020). Benefits of clinical settings may be adversely affected by lack of control within these settings such as emergency departments (Khan et al., 2020; Reid et al., 2019). The clinical practicum does not guarantee each student equal exposure to different types of patients because of variability within clinical settings (Hall et al., 2020; Reid et al., 2019).

Credland et al. (2020) explored paramedic student experiences in the clinical environment and noted nursing staff often did not understand the role of paramedics or

why paramedic students were present in the department. Perceptions of paramedic students in clinical settings, including general medical, surgical, respiratory, and orthopedic wards, regarding support from nursing staff was varied (Credland et al., 2020). Some students felt supported, while others felt the atmosphere was dismissive. Khan et al. (2020) noted that the clinical environment includes challenges involving learning to use different medical equipment than what was used in training, dealing with demands from patients' relatives, and learning how to manage changing patient conditions, which can affect their ability to maintain good relationships with clinical staff and instructors. Students may avoid clinical experiences and mistakes out of fear of criticism from mentors and peers as well as negative attitudes and expectations from clinical staff (Credland et al., 2020; Khan et al., 2020). Bourke-Matas et al. (2020) identified paramedic students preferred friendly and nonthreatening learning environments during clinical placement, and a hostile clinical environment adversely affected their learning experiences.

An additional concern during clinical placement of paramedic students is exposure to workplace violence. Boyle and McKenna (2017) identified that 32.6% of paramedic students surveyed had been exposed to at least one act of workplace violence during a clinical experience. These experiences included violence, bullying, physical threats, sexual violence, sexual harassment, verbal abuse and victimization, and physical intimidation. While perpetrators of physical violence against the paramedic students were generally patients, clinical staff were involved in verbal abuse and intimidation of students (Boyle & McKenna, 2017).

Delaying employment affects student earning potential and ambulance services that rely on graduating paramedic students to address the paramedic staffing shortage throughout the U.S. (Cash et al., 2021a). A letter was submitted to Congress on October 1, 2021, regarding the EMS workforce shortage defining turnover ranging from 20 to 30% annually, with the pipeline for new employees adversely affected due to limited clinical access (Baird & Evans, 2021). The EMS provider shortage is ongoing but exacerbated by the COVID-19 pandemic (Cash et al., 2021a; CoAEMSP, 2020). The National Association of EMTs (NAEMT) surveyed the EMS workforce in April 2021 to determine the impact of COVID-19 on agencies and providers (*How covid-19 has impacted our nation's EMS agencies*, 2021). Participant responses identified that throughout the U.S., approximately 27% of the workforce was quarantined at some point during the pandemic, 18% of EMS providers contracted COVID-19, and 8% of agencies experienced a line of duty death (*How covid-19 has impacted our nation's EMS agencies*, 2021). Michigan saw paramedic graduates decrease from 1200 per year to 250 in the previous three years (Snyder, 2019).

In Colorado, 10 accredited paramedic programs compete for placement at available clinical education sites (Cash et al., 2021b.). In addition to paramedic students from Colorado and out-of-state, nursing students, medical students, and other allied health students also attend clinical rotations at Colorado hospitals. The result of this clinical competition means that students may wait several months to complete their clinical requirements. This delayed completion has downstream effects on students, including delayed course completion, increased program costs, and delayed employment

(Page et al., 2020). Competition for clinical placement in paramedic programs makes consideration of alternative clinical completion a priority (Johnston & Batt, 2019; Lenson & Mills, 2018; Page et al., 2020).

According to Cash et al. (2021b), 73% of the U.S. population is within 30 miles of an accredited paramedic program; however, this only accounts for 22% of rural communities. Limited access for rural communities to paramedic education results in disparities in terms of paramedic education for rural America, specifically regarding robust clinical requirements for CAAHEP accreditation and access to clinical sites (Cash et al., 2021b).

On March 26, 2021, paramedic PDs in Colorado met to discuss challenges paramedic programs face with clinical placement, emphasizing this study's timeliness. One paramedic PD identified three clinical sites currently closed to students, including pediatric rotations. This PD also identified a theory-practice gap between skills practiced in the classroom and those available in the clinical setting. A second PD identified limited access to all clinical requirements because of the program's location and proximity to other paramedic programs. Another PD identified that students had limited clinical access to pediatric contacts. These challenges involving clinical education necessitate exploring an alternative to clinical experiences in paramedic education. A gap in practice exists involving SBE in place of clinical education experiences for paramedic education, by CAAHEP accreditation standards (CAAHEP, 2021; CoAEMSP, 2022; CoAEMSP, 2020). Additionally, no published literature explores paramedic PD perceptions regarding SBE.

Problem Statement

The problem is that increased demand for clinical placement for paramedic and other healthcare students is causing clinical site access and educational opportunities to become more limited, which delays completion for these populations. The problem of limited clinical access has been identified across the U.S. However, there is scarce data exploring simulation as an alternative to clinical time in paramedic education (Lenson & Mills, 2018; Miller, 2021; Page et al., 2021). Further, resources have not been invested in determining the use of simulation for clinical education within Colorado's paramedic programs. The use of simulation in place of clinical education has been explored extensively in medical and nursing education (see Bogossian et al., 2018; Cheng et al., 2018; Hall et al., 2020; McCarthy, 2020; Wands et al., 2020; Waseem & Horsley, 2020; Way et al., 2017; Weeks et al., 2019; Weersink et al., 2019; Young et al., 2020; Zapko et al., 2018). This research involved analyzing perceptions of Colorado paramedic PDs regarding supplementation of simulation for clinical experiences in paramedic education.

Purpose of the Study

The purpose of this qualitative study was to investigate PD perceptions of supplementing clinical requirements with SBE in paramedic education programs. CAAHEP permits paramedic programs to substitute SBE for clinical experiences; however, there is no current guidance regarding best practices (CAAHEP, 2021; Page et al., 2021). Paramedic PDs provided valuable insights to help guide identification of SBE in place of clinical education to meet needs of local paramedic programs. This research will contribute to the current body of knowledge by addressing perceptions of Colorado

paramedic PDs regarding simulation experiences in place of program-determined clinical experiences. These perceptions can help paramedic programs make decisions about simulation, clinical placement, and program development moving forward.

Research Questions

Research questions were designed to gain PDs' perspectives regarding replacing program-determined clinical requirements with SBE in Colorado paramedic programs. The following research questions were used:

RQ1: What are perceptions of Colorado paramedic PDs regarding replacement of program-determined clinical education with SBE?

RQ2: What are Colorado paramedic PDs' perceptions of advantages of replacing program-determined clinical education with SBE?

RQ3: What are Colorado paramedic PDs' perceptions of disadvantages of replacing program-determined clinical education with SBE?

RQ4: What are Colorado paramedic PDs' perceptions of barriers to replacing program-determined clinical education with SBE?

Conceptual Framework

The conceptual framework for this research was Kolb's experiential learning theory. This theory is a foundation for SBE as an alternative to clinical experiences in nursing programs (Forstrønen et al., 2020; Secheresse et al., 2020). Kolb (1984) postulated experience forms learning opportunities and outcomes of those opportunities. Learning is "a continuous process grounded in experience," (Kolb, 2015, p. 38) which is foundationally the basis of SBE and clinically-based education. Forstrønen et al. (2020)

said Kolb's experiential learning theory is a foundational tenet of simulation-based learning. With SBE, students work through predetermined patient encounters in fabricated environments similar to what they would experience in clinical settings (Rholdon et al., 2020). The experiential learning theory (ELT) was used as the foundation to answer the research questions. It was necessary to establish commonly accepted definitions of SBE and clinical education in order to explore viability of SBE as a supplement to clinical education and stakeholders' perceptions to ensure a common language and understanding between the two similar yet different educational approaches.

As student access to clinical sites becomes more uncertain and SBE is explored as a practical means to supplement student learning, the ELT is an established framework in clinical education and SBE. Kolb's ELT provided a framework for curriculum development to connect the two educational methods.

Nature of the Study

The current study involved using a basic qualitative research design, which has been linked closely to health disciplines and education, to provide rich perspectives from participants. This design was chosen because I aimed to explore perceptions of Colorado paramedic PDs through interview responses. Interviews with Colorado paramedic PDs served as the data source for this study. Basic qualitative design was chosen because the sample size can be as small and data collection involves interviews.

The value of qualitative research is that lived experiences are investigated, and the subjective nature is fundamental to the research (Tomaszewski et al., 2020). Case study,

ethnography, narrative inquiry, and phenomenology approaches did not appropriately meet the needs of the current study. A case study approach was not chosen because the goal of the research was to investigate perceptions of PDs not evaluate an in-depth analysis of a program, event, activity, process of one or more individuals bound by time or activity (Creswell & Creswell, 2018). Phenomenology was not chosen because I was not investigating the lived experiences of individuals. Ethnography is the shared patterns of behaviors, languages, and actions of an intact cultural group, which was not appropriate for this research. Narrative inquiry was considered a possibility for the current study; however, the goal of the current research was not to observe interviewees as they answered questions during interviews.

This basic qualitative study involved identifying patterns and exploring concepts that emerge through interviews with Colorado paramedic PDs regarding their perceptions of supplementing clinical requirements with SBE in paramedic education programs. Paramedic programs in the U.S. are accredited through the CAAHEP on the recommendation of the CoAEMSP. Current accreditation guidelines permit paramedic programs to substitute SBE for clinical experiences; however, there is no current guidance regarding best practices (Page et al., 2021). Paramedic PDs are experts on their program requirements and needs, and therefore provided valuable insights to help identify values of SBE in place of clinical education. Paramedic PDs in Colorado have been identified as appropriate interviewees through purposive sampling based on their knowledge of paramedic education and CAAHEP accreditation standards. Participants

were emailed to request participation in the study, followed by a phone call if there was no response to the email.

Data were collected through one-on-one qualitative and semistructured interviews which were conducted virtually. Interviews were audio recorded with participant permission. Additionally, notes were kept throughout interviews to request elaboration as necessary.

Data analysis began with coding raw data from interviews with PDs. Creswell and Creswell (2018) discussed grouping information into themes and descriptions that can be interrelated and interpreted. Member checking was conducted with participants to review preliminary findings for feedback and ensure lack of researcher bias.

Definitions

Clinical scenario: A comprehensive outline of a simulated event (Lioce et al., 2020).

Conceptual fidelity: A concept in healthcare simulation that involves considering all aspects of a scenario to ensure reality of the simulation (Lioce et al., 2020).

Debriefing: A bidirectional process that involves encouraging learners' metacognitive reflection (International Nursing Association for Clinical Simulation and Learning [INASCL], 2021a).

Feedback: The process of a facilitator providing information to a learner with the purpose of improving performance or understanding (INASCL, 2021a).

Guided reflection: A method that involves encouraging students to link theory with simulated activities through analyzing crucial learning factors (INASCL, 2021a).

Preceptor: A qualified clinician who enables clinical learning for healthcare students through direct involvement in teaching at clinical sites (Wongtongkam & Brewster, 2017).

Simulation: An environment where learners can interact as in a real-life situation for the purpose of practice, learning, or assessment (Lioce et al., 2020).

Standardized patient: An actor used in simulation activities who has been trained to mimic patients accurately (Lioce et al., 2020).

Assumptions

It was assumed that all paramedic programs in Colorado were using simulation to some degree, but there was no published literature regarding this topic in Colorado. McKenna et al. (2015) is the single publication exploring simulation usage in U.S. paramedic programs. The premise of simulation in paramedic education is fundamental to this research as it explores the perceptions of Paramedic PDs regarding the supplementation of SBE for program-determined clinical experiences. Additional assumptions underscoring this research were that the participants would be forthright and honest throughout the interview process and would have the knowledge needed to answer the interview questions.

Scope and Delimitations

The study involved interviews with paramedic PDs in place at CAAHEP-accredited paramedic programs in Colorado. There was no turnover in the Colorado PDs who participated in the research process. The viewpoints might have been different from the perspectives of the interviewed PDs due to new PDs, however once the interview

process began the identified program representatives were the sole interviewees representing their programs for this study.

Limitations

One limitation of the study was less than expected participation from paramedic PDs in Colorado. Another potential limitation of this study was that PDs may not be subject matter experts on SBE, although this was not a requirement for participant selection. CAAHEP Standard III.B.1.a (2015) requires PDs to be responsible for all aspects of paramedic programs. Even if they are not subject matter experts, PDs are required by accreditation standards to have a working knowledge of SBE occurring within their program.

Significance

This study is significant in that access for paramedic students to clinical sites has become increasingly restrictive, and paramedic students need alternative opportunities to fulfill required patient contacts. Increasing opportunities for paramedic student clinical completion through appropriately structured SBE allows paramedic students to complete their educational experiences with fewer scheduling delays and address the critical staffing shortage in the field. SBE allows paramedic students to achieve specific learning outcomes that cannot be managed explicitly in clinical settings. By ascertaining paramedic PDs' perceptions regarding supplementation of clinical requirements for SBE in Colorado and perceived advantages and disadvantages of SBE, this study will contribute to understanding how this population approaches SBE and clinical requirements to meet student and employer needs. Additionally, this research can help

paramedic PDs make decisions regarding implementation of SBE based on clinical requirements as well as experiences and perspectives of other PDs, to help guide program development in the future.

Summary

Clinical access is challenging for paramedic students in Colorado, the U.S., and worldwide. This study involved exploring viable alternatives to clinical experiences in order to ensure patient and student safety, bridge the theory-practice gap, and guarantee on-time student program completion. I sought to identify themes and descriptions from one-on-one qualitative and semistructured interviews conducted with paramedic PDs in Colorado regarding SBE for clinical experiences. This research will contribute to the current body of knowledge by ascertaining perceptions of this population regarding simulation experiences in place of program-determined clinical experiences. These perceptions can help guide paramedic PDs to make decisions about simulation, clinical placement, and program development.

Chapter 2 includes a review of the literature, starting with an explanation of the ELT. Additionally, I explore paramedic education related to clinical education, SBE in healthcare, and simulation learning theories.

Chapter 2: Literature Review

Clinical site access opportunities have become more limited for paramedic students, resulting in course completion delays and furthering the shortage of paramedics in the field. This research involved exploring perceptions of Colorado paramedic PDs regarding supplementation of simulation for clinical experiences in paramedic education. Chapter 2 includes a review of the literature on the conceptual framework, SBE in healthcare, paramedic student clinical placement, and student experiences during clinical placement.

Literature Search Strategy

An extensive review of literature was conducted using EBSCOHost, Google Scholar, Google, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Walden University Library databases. All sources were published between 2017 and 2022. Furthermore, reference lists of articles used in this research were manually searched for additional sources. I also included seminal articles on SBE, applications of SBE to clinical and paramedic education. Key terms were: *paramedic clinical experiences, paramedic clinical, paramedic education, simulation for clinical paramedic, simulation for clinical, simulation-based education, Kolb, ELT, nursing simulation, nursing simulation for clinical,* and *medical simulation-based education*. One of the most significant challenges facing paramedic research is scarcity of published data that relates explicitly to paramedicine.

Conceptual Framework

Experiential Learning Theory

Kolb proposed the ELT in 1984. Kolb (1984) espoused that learning is a cycle of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Learners experience effective learning when there is an opportunity to complete the cycle (Kolb, 1984). The ELT is traditionally founded on the educational philosophies of Dewey, Lewin, and Piaget. Dewey's philosophy influenced Kolb with the idea that learning is a continuous process based on not exclusively intellectual experiences (Dewey, 1910). According to Dewey (1910), education occurred simply by living, and experiences provided the best learning opportunities. Lewin (1939) said learning is a subjective experience influenced by needs, ambitions, recollections, environmental events, obstacles, and opportunities. The final pillar of the ELT is Piaget's constructivist theory. Piaget (1952) said learning is best facilitated by examining and refining current beliefs.

Theories of knowing by apprehension and comprehension were integral to the ELT (James, 1912). Jung's concept of amalgamating the conscious with the unconscious and the requirement of thinking and feeling to become whole is considered an essential component of Kolb's ELT (Jung, 1959). Rogers' concept that experience is central for a person to learn and subsequently change and that psychological safety is required in a learning environment was adopted into the ELT (Rogers, 1951). From the inception of the ELT, Kolb fused concepts from Erikson's developmental schemes, Maslow's self-actualization psychology, and Perls's gestalt therapy. Vygotsky's zone of proximal

development and scaffolding is recognized as foundational requirements of the learning process. Freire's naming lived experiences and working together respectfully and democratically has developed into a tenet of the ELT (Freire, 1970). According to Follett (1940), experiences lead to self-transformation and are collaborative encounters to evoke learning, and development supports the relationship between students and educators.

INASCL (2016) identified best practice standards for simulation. The INASCL Standards Committee updated the INASCL Standards of Best Practice to the Healthcare Simulation Standards of Best Practice in 2021 to assert that simulation is practiced by all healthcare disciplines. These Standards of Best Practice™ serve as the foundation for SBE in healthcare.

Kolb (2015) postulated that experience allows learning and is "a continuous process grounded in experience" (p. 38). Ross et al. (2018) identified that learning experiences should lead to better knowledge, skills, and abilities (KSA). Opportunities for students to practice essential skills and critical thinking through SBE or clinical education should promote patient safety and good patient outcomes. Experiential learning is modeled throughout SBE. With SBE, students work through predetermined patient encounters in fabricated environments like they would experience in clinical settings (Rholdon et al., 2020).

Mills et al. (2015) investigated benefits of SBE in the context of the ELT before and after clinical education. Students who experienced SBE prior to clinical education experienced the most significant benefits (Mills et al., 2015). Perceptions of SBE as a

supplement to clinical experience are explored among Colorado paramedic PDs. The ELT was used to address research questions.

Literature Review Related to Key Concepts

Simulation-Based Education in Healthcare

SBE is a medium for students to learn skills and gain knowledge in safe spaces that do not compromise patient safety (Walsh et al., 2020). It is used for mastery of skills and procedures to ensure consistent and deliberate practice with insignificant variation among learners (Bogossian et al., 2018; McCarthy et al., 2020; Wiggins et al., 2020). SBE is encouraged as an educational method to ensure safe patient care for pediatric patient populations (Cicero et al., 2021). It can be implemented to decrease practice errors and increase learner confidence across healthcare through various methods, but best practices remain the same for all healthcare education.

Outcomes of SBE in Healthcare Education

SBE improves discomfort in practice, decreases medication errors, and allows identification of errors that may have been missed during clinical practice (Cicero et al., 2021; Hoyle et al., 2020; Padrez et al., 2021). Furthermore, it increases self-confidence and knowledge retention (Costa et al., 2020a; Herron et al., 2019; Mutter et al., 2020).

Padrez et al. (2021) identified SBE as an effective intervention to address provider discomfort in terms of treating critically ill pediatric patients. Hoyle et al. (2020) encouraged SBE to decrease pediatric medication errors through practice, identify errors involving pediatric medication administration during simulation, and improve patient safety. SBE experiences also help in terms of identifying errors that are likely to have

been overlooked by the provider and are therefore not reported (Cicero et al., 2021). Padrez et al. also reported that through SBE, errors that would have likely been overlooked in practice were identified. Opportunities for SBE among pediatric patients are significant because this is a vulnerable patient population requiring significant time and funding when differentiating treatment (Hoyle et al., 2020). The value of SBE also extends to how learners perceive themselves and their abilities in clinical practice.

Researchers have demonstrated increased learner self-confidence through SBE practices. Zapko et al. (2018) evaluated student perceptions in SBE through four years of undergraduate nursing education. A convenience sample of 199 students evaluated the simulation experienced in two consecutive years using serial patient simulations appropriate to the educational level. Zapko et al. noted an increase in students' self-confidence levels through SBE experiences.

In a study that evaluated similar outcomes, Herron et al. (2019) evaluated students' satisfaction, self-confidence, and knowledge using a video-simulated unfolding case study SBE compared to a traditional written case study. A two-group (n=165) quasi-experimental design was used to compare the control and intervention groups, both of which reported high levels of self-confidence and satisfaction (Herron et al., 2019). Herron et al. found that the group receiving SBE (intervention) answered the multiple-choice post-test questions correctly more frequently than the control group. The Herron et al. study compared a traditional teaching modality, an unfolding case study, to the more novel unfolding case study with SBE. It is important to note that student satisfaction and self-confidence are high with both modalities; however, the findings suggest that adding

SBE may increase learner engagement and retention of information as assessed on a post-test.

Like the Herron et al. (2019) study, Costa et al. (2020a) conducted a controlled, randomized clinical trial with voluntary participation from a convenience sample to compare satisfaction and self-confidence between traditional and SBE educational strategies. Thirty-four students, 79.4% female and 61.8% male, ages 21-23 years old, participated. The study determined that there was no statistically significant difference between the traditional and SBE group in learning satisfaction (p>-0.05) or self-confidence (p>-0.05); however, the mean values for SBE were higher in almost all categories. Costa et al. (2020a) drew from a small sample size of only 34 students.

Equally important, SBE has been correlated with higher exam scores (Costa et al., 2020b; Herron et al., 2019). Mutter et al. (2020) conducted a randomized controlled trial that assessed clinical reasoning skills after an internship readiness course for 96 fourth-year medical students. The control group (n=48) completed the course without a manikin, while the intervention group (n=48) completed the course with a manikin. Mutter et al. found that using a manikin resulted in a statistically significant mean difference in the final assessment (t=3.059, df=88, p=.003). Furthermore, students' clinical reasoning skills were improved, and learners reported satisfaction with the experience and increased self-efficacy (Mutter et al., 2020). Once again, learners from both groups reported high engagement levels, but the students who engaged in SBE scored higher on the final assessment, suggesting greater knowledge retention. The limitation of the Mutter et al.

study is that it was conducted using a small sample size in a single institution, so the results may not be generalizable.

In another study evaluating the effects of SBE on post-test results, Costa et al. (2020b) conducted a controlled, randomized trial that included 34 students through convenience and inclusion sampling in a pre-test/post-test evaluation to evaluate the effectiveness of clinical simulation on clinical simulation cognitive performance. The participants were 79.6% female, with a mean age of 22.3 years. The control group utilized active participation and skill, while the intervention group utilized active participation, skills, and SBE as teaching methods. The groups were assessed using a ten-question tool before the educational activity, immediately following the educational activity, 20 days later, and 40 days post educational activity. Consistently, the intervention group demonstrated a statistically significant increase in scores (p=0.031) compared to the control group, suggesting that SBE assists with learning and retention of knowledge.

The outcomes of SBE have shown decreased discomfort in practice and improved self-confidence (Padrez et al., 2021; Zapko et al., 2018). Additionally, researchers have shown that SBE decreased medication errors and identified clinical errors that may have been inadvertently overlooked during practice (Cicero et al., 2021; Hoyle et al., 2020). Finally, SBE is correlated with increased knowledge retention (Herron et al., 2019; Mutter et al., 2020). These outcomes are achieved through the numerous applications of SBE.

Application of SBE in Healthcare Education

SBE allows learners to practice high-risk skills in low-risk environments without patient risk to bridge the theory-practice gap experienced in healthcare education (Thelen, 2021; Waseem & Horsley, 2020). Furthermore, SBE contributes to the development of non-technical skills like decision-making, leadership, communication, situational awareness, and teamwork (Langdalen et al., 2018).

Identifying appropriate SBE in paramedic education is particularly important, considering that medication error is the third leading cause of death in the US, and diagnostic errors contribute to 10% of deaths (Omron et al., 2018; Thelen, 2021). SBE allows providers to practice a range of skills without risk to the patient in a setting that can be constructed for individualized learning and developmental progression (Waseem & Horsley, 2020; McCarthy et al., 2019; Hernandez et al., 2020). Hernandez et al. (2020) identified that SBE leads to practice change, while traditional lecture approaches have been shown to be ineffective in facilitating changes in practice.

Well-designed SBE is developed from the ground up to immerse the learner in the cognitive, behavioral, and emotional dimensions of learning. In a study designed by Hernandez et al. (2020), participants (n=35, mean age 36.8 years, 41% female) completed a pre-simulation survey immediately prior to and a post-simulation survey immediately following the simulation training. 89% of the participants refined or changed their learning objectives after the simulated learning experience, suggesting increased awareness of the student's practice.

Thelen (2021) conducted a synchronous online SBE activity using a pre-test/post-test design to address medication errors identified as a leading cause of patient injury and death. Thelen identified that lecture alone was insufficient to address the theory-practice gap. However, immersive SBE promoted integrating theory into practice while improving self-confidence, motivating students to learn, and promoting aspects of care that required improvement (Mutter et al., 2020; Thelen, 2021). Additionally, students move from novice to graduate providers through the active, experiential learning environment provided by SBE and the development of decision-making capabilities, problem-solving tactics, and clinical reasoning abilities (Herron et al., 2019; Mutter et al., 2020).

Way et al. (2017) utilized simulation to develop paramedic training for airway management because clinical exposure is limited, and skills occurrence is inconsistent during the clinical. The researchers provided a clear explanation of the statistical processes used in developing the airway management proficiency checklist and the limitations of the current process, including a small sample size and a single rater prohibiting the evaluation of interrater reliability.

In a cross-sectional study of inexperienced first- and second-year paramedic students, Can et al. (2021) compared intubation success on a manikin with cervical spine precautions to compare direct laryngoscopy to video laryngoscopy. The study evaluated 32 first-year paramedic students and 51 second-year paramedics students who volunteered to participate. The manikin is critical to use in place of the live patient because of the specific demographic in this study. In the study by Can et al., SBE allows the replication of specific skills in a specific demographic for each student rather than

attempting to find 83 different matching or closely matching patients, which could take years and compromise patient safety.

Additionally, Way et al. (2017) identified the importance of utilizing SBE for high-risk skills in developing and mastering skills. Waseem and Horsley (2020), who suggested use of SBE for low-frequency, high-acuity events. Langdalen et al. (2018) created a comparative study from cross-sectional questionnaires from prehospital EMS crews to evaluate the training and assessment of non-technical skills. Langdalen et al. determined that SBE can enhance non-technical skills, including decision-making, leadership, communication, situational awareness, and teamwork.

Waseem and Horsley (2020) highlighted a critical concept in their novice guide to simulation applications: clinical experience is not a proxy for developing skills. This statement has been overlooked in medical education, where the previous modality for learning has been see one, do one, teach one (Waseem & Horsley, 2020). The authors provide a thorough and practical orientation to the potential applications of SBE in healthcare education. SBE allows for the evaluation of knowledge, clinical reasoning, and teamwork simultaneously while allowing the students to experience the complexity of a clinical environment without risk to the patient or hazards to the students.

Hunter et al. (2021) evaluated the situational awareness of paramedic students during SBE in a mixed-methods study including 12 students. Situational awareness, which requires someone to recognize what information means and successfully anticipate how the information may or may not predict future events, is fundamental to paramedicine because of the unpredictable nature of the environment where paramedics

provide patient care (Hunter et al., 2021). Hunter et al. conducted pre-and post-assessment surveys, performance assessments, debriefing with situational awareness global assessment technique, and full video debriefing for thematic analysis. The researchers found that students recognized only 42% of the items related to the global emergency scene or patient's physiological status. Of the items recognized, only 34% were interpreted correctly, resulting in the proper projection of the patient's clinical progression only 40% of the time. The themes identified during student interviews were tunnel vision, stress, and a lack of an organized approach. The Hunter et al. study is small and warrants replication in additional paramedic educational centers. Furthermore, the current study does not evaluate causation beyond situational awareness. The students are described as being in the final semester of their paramedic education, but it is unclear if they have had previous clinical or field experiences.

Schroter et al. (2021) conducted a cross-sectional study of paramedics from a single EMS agency utilizing SBE in a case-based multimedia questionnaire, including videos and lung sounds of respiratory distress conditions in pediatric patients. In contrast to the Hunter et al. (2021) study, the 420 paramedics that participated (82% of the paramedics in the EMS agency) in the Schroter et al. study correctly assessed the severity of the virtual patient 92% of the time. Like Hunter et al., the paramedics in Schroter et al. correctly diagnosed the patient 50% of the time and provided correct interventions 38% of the time. The difference in the participant demographic is that the participants in the Hunter et al. study are currently students, while the Schroter et al. participants are practicing paramedics. The respondent demographics for the Schroter et al. study are

94% male, with an average age of 36.18 years, an average prehospital experience of 12.44 years, average ALS experience of 7.87 years. Omron et al. (2018) described a calibration gap experienced providers face, whereas feedback regarding missed or incorrect diagnoses is not provided to clinicians, so practice is not altered to improve diagnostic performance. By utilizing the results from Hunter et al. and Schroter et al. studies in an SBE environment, paramedic students and providers can receive prompt feedback about the diagnoses and interventions, thus helping to close the calibration gap.

Many researchers have demonstrated using SBE to practice complex skills while ensuring patient safety. Sevilla-Berrios et al. (2018) utilized SBE to decrease the omission of critical tasks during cardiac arrest resuscitation. The participants were volunteer medical students, medical and surgical residents and fellows, nurse practitioners, and physicians with Advanced Cardiac Life Support (ACLS) certifications. The researchers found that critical task omission decreased to 42% compared to the original 59% ($p<0.01$), and clinician satisfaction was high (Sevilla-Berrios et al., 2018). The researchers used volunteers with ACLS credentials that represented other healthcare disciplines who responded to cardiac arrest resuscitation. If the purpose of the study were to evaluate performance during resuscitation, then the results may be skewed; however, that was not the case in this study.

Similarly, Jong et al. (2018) conducted a prospective study of 34 team leader residents, 34 nurses, an EMS provider, and two faculty to assess Emergency Medicine (EM) resident performance in an SBE environment. The researchers identified the use of SBE to present a variety of case presentations that included rare but critical presentations

and commonly seen complaints in a simulated environment. Weeks et al. (2019) utilized SBE to demonstrate competence development in medication administration using SafeMedicate. The authors presented a thorough literature review and foundation for SBE; however, the results of the SafeMedicate data may be unintendedly biased by authors who have a financial investment in the product (Weeks et al., 2019).

SBE provides a low-stakes environment for learners to master skills through deliberate practice and distinguish patient presentations without risk to patient safety (Bogossian et al., 2018; Hunter et al., 2021; McCarthy et al., 2020; Wiggins et al., 2020). Zapko et al. (2018) and Omron et al. (2018) asserted that SBE with deliberate practice, including well-designed educational interventions, is superior to traditional clinical medical education. Wiggins et al. (2020) identified the need for meaningful training experiences for healthcare Reserve units in the face of recent budget challenges and downsizing. The students participated in SBE military health-care training curriculum skills stations utilizing deliberate practice until achieving mastery as assessed on a developed matrix, adopted from textbooks or online publications, and validated through input from other educators. The program outcome stated that 92% of the registered nurses and 87% of the medical technicians completed the training, with 12 of the 38 medical technicians requiring additional support. The day-to-day jobs of the Reservists are not reported in the study, which would likely influence the program outcomes. The Wiggins et al. study supports another use for SBE, but the document reports on the experience rather than the specific outcomes of the study.

Weersink et al. (2019) evaluated resuscitation competence in the workplace in a single-center study with a limited sample size (n=28). Assessment of the participants using entrustment-based scoring in simulation settings demonstrated a moderate positive correlation ($r=0.630$, $n=17$, $p<0.01$) between the simulated clinical environment and clinical practice in the Emergency Department. SBE has demonstrated efficacy in increasing expert medical knowledge, procedural skills, and improving patient outcomes (Weersink et al., 2019). Learning and evaluation in an SBE clinical environment are structured and comprehensive in contrast to a clinical environment constrained by competing interests beyond the learner, including patient safety (Weersink et al., 2019). Weersink et al. and Hall et al. (2020) identified the importance of prioritizing patient care over students' educational experiences. Hall et al. acknowledged that much of the learning in SBE occurs as a result of the debriefing process to include timely, objective, and constructive feedback to the students, which is superior to clinical education because of the difficulty prioritizing student education.

SBE allows learners to practice high-risk skills in low-risk environments without patient risk to bridge the theory-practice gap experienced in healthcare education (Thelen, 2021; Waseem & Horsley, 2020). Furthermore, SBE contributes to the development of non-technical skills like decision-making, leadership, communication, situational awareness, and teamwork (Langdalen, 2018). SBE can be delivered through a variety of mediums.

Methods to Deliver SBE

SBE can employ various mediums, including standardized patients (SPs), simulator models, role play, AR/VR, and equipment ranging from high-fidelity to low-fidelity (Birtill et al., 2021). The method used to implement the SBE will address the objectives identified by the educator for activities such as SBE employed in place of clinical instruction where access to specific patient demographics is limited or to present a variety of case presentations (Forstrønen et al., 2020; Hunter et al., 2021; Leggio et al., 2020; Rholdon et al., 2020; Walsh et al., 2020; Waseem & Horsley, 2020). Additionally, Walsh et al. (2020) highlighted the use of SBE in risk management, procedural training, and team-based simulation.

In light of the COVID-19 pandemic, McNally et al. (2021) explored delivering a simulated patient encounter through an online video conference platform to a convenience sample of 90 participants in one department. Only 42 participants completed the post-participation survey but provided the researchers with results suggesting the educational intervention had been beneficial. The researchers utilized a scenario and abbreviated debrief structure with a virtual presenter (the Medical Director) and the crews within the station working on a manikin (McNally, 2021). While the exercise did not meet the best practices of SBE, it did meet the needs of education identified during a pandemic. The researchers determined that the respondents transitioned from 24% to 43% feeling extremely comfortable responding to a sick patient with COVID and from 10% to 0% in the category of somewhat uncomfortable responding to a sick patient with COVID (McNally et al., 2021).

Cochrane et al. (2018) presented a conceptual design to develop mixed reality in paramedic education at the International Conference on Teaching, Assessment, and Learning for Engineering. The study included 32 participants ranging from first-year health science undergraduate students to practicing paramedics. However, the participant demographic was not disclosed because the focus of the study was explicitly on the prototype to create a mixed reality device that can be used in pre- and post-graduate paramedic SBE to increase the authentic experience. Cochrane et al. designed the VR encounters for increased procedural training and team-based education during education.

Methods of delivering SBE are also compared, as seen in McKelvin and McKelvin (2020) who compared the impact of immersive SBE on confidence in performing basic life support (BLS) in real-life stressful and life-threatening scenarios. The researchers used a form of SBE called Immersive Simulation Training (IST) that focuses on creating an environment that mimics the sights, sounds, and smells the students would experience in the real world. The objective of this study was to compare IST to SBE, which is not immersive. Seventeen students (seven midwives and ten paramedic students) participated in the study; a mixed-methods approach with an explanatory sequential design consisting of a validated confidence questionnaire and semistructured interviews.

Student confidence in IST demonstrated a statistically significant improvement compared to traditional simulation approaches of 6.71 (95% CI, 3.57 to 9.84, $p < 0.001$). The limitation of this study is that the sample size is small, and the study was conducted at a single institution. The students did provide valuable feedback, including statements

about difficulty suspending disbelief in the IST environment. SBE can be delivered through various methods to accomplish the goals of SBE, including clinical experiences because of limited patient access or because of a pandemic or procedural training and team-based education. Despite the variability in SBE medium deliverability, the best practices of simulation standards remain.

Best Practices of SBE

The Healthcare Simulation Standards of Best Practice (HSSOBP) were identified through the efforts of the INASCL Standards Committee (2021b). These best standards include simulation design, outcomes and objectives, prebriefing, facilitation, debriefing, evaluation, simulation-enhanced interprofessional education, operations, and professional development (INASCL Standards Committee, 2021b). The INASCL Standards Committee integrates the Society for Simulation in Healthcare (SSH) Code of Ethics and the SSH Healthcare Simulation Dictionary into best practices. Waseem and Horsley (2020) and Hunter et al. (2021) supported best practices in SBE, including prebriefing, well-organized and defined learning objectives, and structured debriefing. Although SBE is supported as a best practice, there are recognized challenges.

The limitations Waseem and Horsley (2020) identified regarding the use of SBE included the cost of equipment and environments and the efficacy of application due to limited faculty and faculty training. Moreover, Cook et al. (2018), Johnston & Batt (2019), McKenna et al. (2015), and Wiggins et al. (2020) discussed the limitations of SBE in EMS education, which mirrored the findings of Waseem and Horsley. Furthermore, Gugiu et al. (2021) identified a lack of standardization among simulation

scenarios and inconsistent, ill-defined provider assessment within EMS assessment as a limitation to simulation within EMS education. Gugiu et al. addressed an aspect of this deficit by defining and validating critical domains in paramedic practice as identified through a two-phase study combining focus groups and Delphi methodology. The study found five primary content domains with varying sub-domains for newly trained paramedics' performance assessment that could be used as an evaluation tool in paramedic education SBE (Gugiu et al., 2021).

The first evaluation of simulation resources in paramedic education was conducted by McKenna et al. (2015) through a cross-sectional census survey. The study sought a robust simulation perspective among paramedic educational institutions, including resources, perceptions of simulation, program characteristics, faculty influence on simulation use, and uniformity of simulation resources (McKenna et al., 2015). CAAHEP-accredited and Letter of Review paramedic programs received a survey with 389 programs providing valid responses from 638 surveys.

McKenna et al. (2015) found that paramedic education programs had varying access to SBE resources, and the use of the equipment was influenced by faculty training. 78% of the respondents felt SBE should be used more in their educational programs (McKenna et al., 2015). A follow-up study was conducted by Johnston and Batt (2018) in Canada utilizing a cross-sectional survey distributed to 44 identified paramedic coordinators with 20 responses received and analyzed. Johnston and Batt discovered that 85% of paramedic programs recognized that SBE directly impacted patient care; however, only 60% of the respondents had been trained to design and implement SBE.

15% of the programs that responded used SBE for clinical experiences (Johnston & Batt, 2018). Johnston and Batt cited cost, time, and availability of resources as barriers to SBE. McKenna et al. and Johnston and Batt highlighted the use of SBE in paramedic education in North America, specifically noting the significance of SBE in paramedic education.

An ethical imperative was described by Cook et al. (2018) when comparing the educational outcomes of SBE, including the positive impact on patient outcomes and mitigation of risk, to the financial concerns. Challenges with SBE, such as resource limitations, including appropriately trained educators and support personnel, physical space, learner time, and equipment cost, were identified by researchers (Cook et al., 2018). However, Cook et al. emphasized that the benefits of SBE were improved KSA, which were superior to non-SBE education, the acquisition and maintenance of expertise through deliberate practice and feedback, and improved patient outcomes (Cook et al., 2018). Waseem and Horsley (2020) discussed that SBE education could be designed around patient safety even with limited resources. The most vital components of effective SBE are well-designed simulations by simulationists that understand the pedagogy and theory-based debriefing (Waseem & Horsley, 2020).

SBE is increasing as an educational modality in healthcare education, but healthcare's foundation is patient care. As a result, clinical placement is still necessary for paramedic education.

Paramedic Student Clinical Placement

Clinical placement for paramedic students is increasingly problematic as access to clinical sites becomes more limited and competition for student access increases (Lenson

& Mills, 2018; Page et al., 2021; Way et al., 2017). Page et al. (2021) retrospectively reviewed prospectively collected quality assurance data between 2010 and 2014, including 10,645 paramedic students and 2,239,027 patients. Researchers determined that paramedic students spend an average of 626 hours in the hospital and field throughout their education (Page et al., 2021). Students encountered a median of 206 patients with 56 team leads. The researchers utilized data entered into a computerized tracking system by paramedic students during clinical and field patient encounters. The researchers identified a quantitative description of placement hours, patient types, and age groups.

Page et al. published the first look at patient encounters among paramedic students across the US. Previously, Alrazeeni (2018) had conducted a retrospective descriptive study based on an observational documentary review of internship reports to evaluate the completion of patient contact, clinical, and internship requirements for paramedic students completing the Prince Sultan Bin Abdulaziz College for Emergency Medical Service (PSCEMS) through Creighton University EMS in Omaha, NE. Alrazeeni found that in three cohorts of students (Group A n=13, Group B n=12, Group C n=13), the average number of hours was 344.2, and the average number of patient contacts was 93.67. These numbers are significantly lower than the average hours, as determined by Page et al. (344.2 versus 626).

Furthermore, when comparing the patient contacts from the Alrazeeni study (66 to 122) to Page et al. (142-269), the patient contact numbers are still lower than the lowest reported numbers in the Page et al. study. One explanation for the discrepancy may be the differences in requirements. While the students in the Alrazeeni research completed their

clinical education and internship in the US, and the curriculum was based on US standards, there is a difference in paramedic education requirements and practices between Saudi Arabia and the US. Despite the differences in education requirements, it is important to highlight that the students completed their clinical education and internship requirements through Creighton University EMS (Alrazeeni, 2018). The patient contact differences between Page et al. and Alrazeeni highlight the discrepancy in patient access across the country. Page et al. is an average of encounters between paramedic programs using a specific data collection program, while Alrazeeni looked at access through a single paramedic program, highlighting the challenges in accessing patient contacts.

Paramedic education accreditation requires clinical and field experiences that include diverse patient populations and conditions, which can be challenging for a program to access, specifically the pediatric population (Page et al., 2021). Page et al. noted that clinical access meeting accreditation requirements is difficult for paramedic education worldwide. This concern is reiterated in recent publications by Afshari et al. (2021), Alrazeeni (2018), and Lenson and Mills (2018). High demand for clinical sites in healthcare education, particularly specialty sites such as pediatrics, and scheduling constraints coupled with preceptors unfamiliar with the paramedic scope of practice can make clinical access challenging in education (Afshari et al., 2021; Alrazeeni, 2018; Lenson & Mills, 2018).

Despite difficulty with scheduling, Lenson and Mills (2018) found that continued access to specialized clinical sites, such as pediatrics, was preferred in paramedic education, if possible. Diverse patient populations allow students to develop their KSAs

across patient conditions and ages. The importance of this development cannot be overstated during paramedic education, as this is when paramedic students integrate classroom and clinical knowledge with oversight from clinical preceptors.

Student Experiences During Clinical Placement

Student experiences during clinical placement are multi-faceted. Some considerations during clinical placement include skill development which allows the translation of skills learned in the classroom into the clinical setting. Additionally, preceptor interactions are another consideration of clinical placement, as these interactions significantly influence student outcomes.

Development of Skills

Clinical experiences in paramedic education allow students to translate the information learned in the classroom and the skills learned in the lab into the clinical setting. Khan et al. (2020) associated student clinical experiences with safe patient care during independent practice and enhanced knowledge, skills, and abilities (KSA). Given the dynamic environment where paramedics perform, safe patient care and KSA development are essential for paramedic students. Paramedics often make time-sensitive decisions with limited information and equipment in a non-linear, multifaceted process that relies on experience and feedback from previous encounters (Perona et al., 2019). Clinical experiences are an integral component of paramedic education, allowing students to integrate the information learned in the classroom and lab. This clinical integration is an indispensable opportunity for students to recognize the association between knowledge, skills, and abilities during real-time patient care. However, clinical

experiences vary between students and paramedic programs. The result is that no two students have the same experiences during clinical encounters.

Experiences during paramedic clinical education can vary by program and rely on chance encounters (Cash et al., 2021b; McKenna et al., 2015). During the clinical experiences, students develop clinical decision-making skills and work toward working autonomously, which is necessary for a paramedic (Hanna et al., 2018). The CAAHEP requires robust patient encounters during clinical education in numerous hospital and prehospital settings (Cash et al., 2021b). A significant challenge facing prehospital placement is the workforce shortage of EMS agencies, particularly in rural areas (Cash et al., 2021b). Staffing shortages lead to unavailable preceptors for students or clinical sites that cannot accept students because of the workforce shortage (Cash et al., 2021b). Unavailable preceptors make skill acquisition challenging for students. Furthermore, staffing shortages can lead to strained student-preceptor interactions.

Preceptor Interaction

Clinical education allows paramedic students to interact with preceptors and mentors to enhance KSAs and share conversations about evidence-based practice (Bourke-Matas et al., 2020). In a non-threatening environment, students thrive and have a successful learning experience. However, if the atmosphere is unfriendly or the preceptor is unable or unwilling to engage, a positive experience is improbable, and learning is unlikely to occur (Bourke-Matas et al., 2020; Khan et al., 2020). Bourke-Matas et al. (2020) found that the gender of the supervisor (p=0.029) and the age of the student (p=0.049) significantly affected the likelihood of participation in evidence-based practice

with a preceptor. Students enter the clinical setting with a new environment, unfamiliar equipment, novel patient conditions, and often fear making mistakes (Khan et al., 2020). Khan et al. conducted a study that included student nurses and paramedic students attending a clinical experience on a Nursing ward. The study results demonstrated that male paramedic students were the least satisfied in the clinical environment, while female nursing students consistently demonstrated higher scores. 61.8% of the participants were male, and 49% were student nurses (Khan et al., 2020). It is relevant to note that the learning experience is damaged by negative criticism and staffing shortages, as well as a limited opportunity to practice skills (theory-practice gap) and limited clinical site availability (Cash et al., 2021b; Khan et al., 2020; Thelen, 2021).

Additionally, these experiences included negative relationships with clinical preceptors, unfamiliarity with clinical equipment, a lack of understanding of the paramedic scope of practice from the staff, and an unsafe clinical environment (Bourke-Matas et al., 2020; Credland et al., 2020; Khan et al., 2020). Clinical staff may be managing their stress and burnout through increasing workloads and may not recognize paramedic students as part of the clinical team (Wongtongkam & Brewster, 2017). The environment must be safe for an educational experience to be effective (McKelvin & McKelvin, 2020). Students' perceptions of unsafe or hostile learning environments can impair their learning opportunities, which may inhibit clinical judgment development (Williams et al., 2018).

An issue with in-hospital clinical placement for clinical staff may be an underlying lack of understanding among the preceptors regarding the scope of practice

for the paramedic students (Bourke-Matas et al., 2020; Credland et al., 2020). This missing communication regarding paramedic scope can frustrate preceptors and paramedic students. The result is that the paramedic student bears the responsibility of explaining the role of the paramedic and the purpose of the clinical experience to clinical providers in under-staffed units (Bourke-Matas et al., 2020; Credland et al., 2020).

Credland et al. (2020) conducted a qualitative study using semistructured interviews of 33 first-year paramedic students evaluating a non-ambulance clinical setting. The interviews yielded four themes and found that the students had mixed clinical preceptor/student reviews. Some students in the study felt supported by their preceptor and had a positive experience. In contrast, other students felt their preceptor was dismissive and felt the experience was negative. Clinical staff unfamiliarity with the paramedic scope of practice was identified through the responses of 18 paramedic students, which resulted in a communication barrier between students and staff (Credland et al., 2020). In addition to barriers in communication between students and clinical staff being frustrating, the difficulties can lead to adverse learning experiences for the students. Once again, these negative learning experiences can lead to an unsafe learning environment, inhibiting student learning experiences (Bourke-Matas et al., 2020). Credland et al. suggested supporting clinical mentors, de-siloing medical education, and exploring similarities and strengths between professions as a path to improve clinical experiences for paramedic students in non-ambulance clinical sites. These suggestions will require a culture shift within EMS and Nursing, which is not impossible but needs time to implement and trickle through the practitioners.

Paramedic students complete clinical and field experiences during their initial education. Wongtongkam and Brewster (2017) evaluated the field experiences of paramedic students through a retrospective review of student feedback forms (n=21). 70% of students reported satisfaction with the quality of preceptors and the fieldwork atmosphere as evaluated on questionnaires developed by one of the authors and assessed for content validity by lecturers from the university. The questionnaire was a self-administered 14-item tool with topics evaluated on a 6-point Likert scale. The study is small and completed in one paramedic program, so it is difficult to apply the satisfaction to all paramedic programs; however, paramedic education clinical satisfaction research publications are difficult to find. Wongtongkam and Brewster found that a supportive atmosphere and positive relationships between students and their preceptors are instrumental during clinical placements in developing sound clinical skills and decision-making capabilities in patient care and choosing to stay in healthcare. Compared to previous research demonstrating how negative field and clinical experiences harm self-confidence, Wongtongkam and Brewster found that the students demonstrated increasing confidence and participation in challenging activities as well as a willingness to ask questions and work independently, as evidenced by the feedback provided on the preceptor evaluation forms.

Preceptor interaction within the clinical setting significantly affects student perceptions of clinical experiences. Researchers have found that unfriendly or hostile clinical environments inhibit student learning (Bourke-Matas et al., 2020). The clinical environment can be influenced by staffing shortages, confusion about the scope of

practice, and increasing support for preceptors (Bourke-Matas et al., 2020; Credland et al., 2020).

Summary

The educational institution providing paramedic education is responsible to ensure paramedic students are developing critical thinking skills and practicing skills necessary for independent practice. Educational institutions can ensure the development of clinical judgment through SBE or clinical experiences. Variations in student clinical experiences make achievement of specific clinical objectives difficult, resulting in challenges in terms of completing or satisfying accreditation requirements as well as difficulty developing KSAs required to provide exemplary patient care as independent paramedic practitioners. Paramedic programs must examine alternatives to exclusively using clinical experiences to achieve Student Minimum Competencies during paramedic education.

SBE has demonstrated increases in learner self-confidence and student satisfaction (Costa et al., 2020a; Herron et al., 2019; Mutter et al., 2020; Zapko et al., 2018). Additionally, superior retention and transfer of knowledge have been demonstrated among SBE learners (Herron et al., 2019; Mutter et al., 2020). The INASCL publications ascribe best practices for all healthcare fields in SBE, as supported by Waseem and Horsley (2020) and Hunter et al. (2021). McKenna et al. (2015) explored paramedic education simulation resources and said 78% of programs felt they should use more SBE. During this study, best practices involving SBE were not described. While SBE can be used as a substitute or supplement to clinical education, paramedic

accreditation only recently published guidance literature for SBE in EMS education. Clinical education is recognized as an essential component of paramedic education. Some drawbacks of attending clinical sites include difficulty accessing sites and challenges in standardizing clinical experiences among students (Page et al., 2021). Additionally, student learning is inhibited via poor preceptor interactions and exposure to workplace violence. Chapter 3 includes methods used in this research to address perceptions of Colorado paramedic PDs' supplementation regarding SBE for clinical experiences.

Chapter 3: Research Method

The purpose of this qualitative study was to investigate PD perceptions of supplementing clinical requirements with SBE in paramedic education programs. The CAAHEP permits paramedic programs to substitute SBE for clinical experiences; however, there is no current guidance regarding best practices. Paramedic PDs provided valuable insights to help guide identification of best practices in SBE in place of clinical education to meet needs of local paramedic programs. This chapter includes a review of the role of the researcher, methodology, issues with trustworthiness, and ethical procedures.

These research questions were designed to address PDs' perspectives regarding replacing program-determined clinical requirements with SBE in Colorado paramedic programs.

RQ1: What are perceptions of Colorado paramedic PDs regarding replacement of program-determined clinical education with SBE?

RQ2: What are Colorado paramedic PDs' perceptions of advantages of replacing program-determined clinical education with SBE?

RQ3: What are Colorado paramedic PDs' perceptions of the disadvantages of replacing program-determined clinical education with SBE?

RQ4: What are Colorado Paramedic PDs' perceptions of barriers to replacing program-determined clinical education with SBE?

This study involved using a basic qualitative research design. This design was chosen because my purpose was to explore perceptions of Colorado paramedic PDs

through interview responses. Narrative inquiry was considered as a research design; however, observations during interviews did not meet the purpose of the proposed study. Tomaszewski et al. (2020) described three commonly used qualitative approaches: case study, ethnography, and phenomenology. The qualitative case study design was inappropriate for this research because a single phenomenon was not being researched. Ethnography was inappropriate because no social or cultural group was being investigated. Phenomenology was inappropriate because this research did not involve investigating a particular group's lived experiences.

Role of the Researcher

As the researcher in this environment, I designed the study, identified participants, and created the interview protocol. I conducted interviews and transcribed data. Then I analyzed data by coding, categorizing, and grouping it into themes and descriptions for interpretation.

I am a PD of a paramedic program in Colorado Springs, Colorado. I associate professionally with PDs I requested to participate in interviews. Recognizing the relationship between myself and interviewees and remaining neutral during interviews was paramount to ensure responses were not unduly influenced. To maintain neutrality during interviews, I remained conscious of not interrupting participants and ensured my responses to statements were neutral and not affirming. I was continuously aware that I was conducting research and not trying to relate to participants because my nature is to seek familiarity with people. To accomplish this, I conducted practice interviews with colleagues. Conducting practice interviews helped me to identify any biases I may have

had and how those biases were reflected in my tone. I monitored and adjusted my tone appropriately during data collection as needed. These practice interviews helped me maintain a neutral tone throughout the interviews.

Methodology

This study was conducted via semistructured interviews over Zoom. I had considered questions administered via email; however, information would not provide robust enough responses from PDs. The CAAHEP website identifies 10 paramedic programs in Colorado that are fully accredited or have a letter of review status. A request was sent to paramedic PDs at each program for interviews, excluding Pikes Peak State College in Colorado Springs, where I am the current paramedic PD.

Interviews consisted of one-on-one qualitative and semistructured conversations conducted over Zoom. Interviews were recorded through an audio recording device with participants' permission. I kept notes throughout interviews to request elaboration on certain points.

Data analysis began with transcription, followed by coding raw data from interviews with the PDs. Creswell and Creswell (2018) discussed grouping information into themes and descriptions that can be interrelated and applied to interpretation. Additionally, Creswell and Creswell described the goal number of qualitative interviews to be between six to eight. This was achieved via six interviews conducted with Colorado PDs.

Participant Selection

Participants were selected using purposive sampling and identified through the CAAHEP website. Accredited programs have received program accreditation through the CAAHEP after demonstrating compliance with standards, while programs with a Letter of Review designation are in the process of becoming accredited (Rodriguez et al., 2018).

Ten paramedic PDs have been identified in Colorado, representing 12 paramedic campuses throughout the state as of November 2021. Nine PDs were recruited via email to participate in this research. Creswell and Creswell (2018) discussed anticipated participation of 10% to 20% of participants in qualitative interviews. Saturation was essential in case fewer than six Colorado Paramedic PDs responded to requests to participate in interviews. I am one of the paramedic PDs in Colorado, so I was excluded from interview requests.

Paramedic PDs in Colorado were identified through the CAAHEP Paramedic Program accreditation website. Purposive sampling was used based on knowledge of paramedic education and CAAHEP education standards that are the responsibility of PDs. Requests for participation were sent to email addresses shared on the CAAHEP accreditation website for each PD. Each email request included the purpose of this research and a request for a 45–60-minute virtual interview. If there was no response to emails, phone calls to posted numbers published on the CAAHEP directory were placed with requests for participation. Phone calls contained the same information as emails.

Instrumentation

Interviews with the Colorado Paramedic PDs were the data source for this study. The interview protocol (see Appendix A) served as the data collection instrument for interviews. I developed the interview protocol to answer research questions and investigate the purpose of the study using the ELT as the foundation that links SBE and clinical education. I developed open-ended questions with associated follow-up questions in order to answer RQ1. Questions seven, eight, and nine are open-ended questions designed to answer RQ2, RQ3, and RQ4. Questions 10 and 11 are open-ended questions designed to guide PDs in order to discuss further thoughts related to previous interview questions. The semistructured format of interviews permitted follow-up to statements made by participants.

Interviews were recorded, with permission, using a handheld recording device. I also took notes throughout the interview. Additional interviews were not requested to clarify questions identified through transcript coding and the development of themes; however, two further questions were asked in the member check email.

Data Collection

Interviews were performed over Zoom and recorded using a handheld recording device with the participants' permission for accuracy and transcription. See Appendix A for the interview protocol. Follow-up interviews were not requested. I transcribed the interviews immediately after the interviews into a Word document. To transcribe the interviews, I listened to the recordings at a slower speed and then typed the conversation into a Word document. Once the interview was transcribed, I relistened to the interview

to ensure the transcription was accurate. If the transcription was incorrect, I corrected any errors. The transcripts include the participant's authentic thoughts, so verbatim slang and coarse language are included. Interviewee responses were bolded to differentiate from my questions. Second, I printed the transcribed interviews with 1.5 inches on each side of the text for notations. The left-hand margin of the transcripts was used for broad topics and interpretative notations, while the right-hand margin used was for tentative codes.

Data Analysis Plan

I utilized a methodical and strategic plan to analyze the transcripts and notes created throughout the interviews. Saldaña (2021) described the coding process as an analytic tactic that begins with looking for patterns in the language to ascribe meaning. First, I transcribed the interviews into a Word document. Second, I printed the transcribed interviews in the format recommended by Saldaña, with the left-hand margin of the transcripts used for broad topics and interpretative notations, while the right-hand margin was used for tentative codes. The coding process was cyclical and required an iterative approach to capture the qualitative story completely.

Third, the transcripts were manually coded using evaluation coding to categorize the data into smaller parts for more in-depth analysis. The evaluation coding process is appropriate for assigning judgments of merit or significance of programs (Saldaña, 2021). Saldaña described evaluation coding as a focus on describing participants' observations or attributions, comparing program measures to a standard or ideal, and predicting recommendations for change and suggestions for change implementation. I evaluated the interviewee's responses to words or phrases relevant to the research questions. Fourth, I

reread the transcripts to ensure I had not missed significant data during the evaluation coding process. Fifth, I began the axial coding to identify the most frequent and significant concepts and categories from the descriptive coding process and condense the data into categories. Axial coding was used because the process explores how categories and subcategories are related, specifically determining the more dominant to less important codes in a visual model (Saldaña, 2021). Atlas.ti Qualitative Data Analysis Software version 22 was used throughout the data analysis process to help keep the codes, categories, and themes organized and avoid overlooking connections.

Finally, An Excel document was created with each research question indicated as a tab along the bottom of the spreadsheets. The PDs' de-identified designations were noted down the rows, and the columns were labeled transcription, evaluation coding concepts, and axial coding categories on the top of the spreadsheet. The codes and categories were color-coded on the spreadsheets for easier pattern recognition. The codes were grouped into categories, and the categories were evaluated for relationships to identify a theme. The theme developed from methodical coding, categorization, and analytic reflection to develop a narrative description of the findings (Saldaña, 2021). Qualitative rigor was established in maintaining a systematic approach to data analysis and step-by-step coding.

Trustworthiness

The participants were provided with a transcribed copy of their interview that included preliminary codes to ensure trustworthiness and establish credibility through a member check. The member check allowed the participants to review preliminary

findings for feedback and avoided researcher bias. Credibility was further established through saturation and maintaining reflexivity. Qualitative interview saturation is achieved when data collection does not lead to further insight (Creswell & Creswell, 2018). The sample size for this research was six PDs. The study population is homogenous, so saturation was assessed based on a stopping criterion of 66% of population participation followed by an evaluation of code frequency counts (Hennink & Kaiser, 2021). To maintain reflexivity throughout the interviews and data analysis process, I continually monitored my bias and kept a journal during the interview and data analysis process. Transferability was established through an accurate description of participant selection and a clear interview protocol (Appendix A). Dependability was established through a clear audit trail that tracked the step-by-step process of each step of the research and data analysis.

Ethical Procedures

Participants were recruited for participation through an email request initially and then through a phone request if there was no response to the email request. The participants in this research were Colorado Paramedic PDs, which is also my job. There is no power differential or oversight between the other Directors and myself. The interview transcripts are kept confidential and viewed only by myself by keeping the transcripts in a password-protected file on my personal PC. The research notes and associated recordings and documents will be kept for five years after approval of the final study. The digital files will be permanently deleted at that time, and any paper files will

be shredded. The Directors are deidentified throughout this research as Director A, Director B, and so forth.

Participants provided informed consent verbally at the start of the interview. The participants were also sent an informed consent document electronically prior to the scheduled interview. Participants were asked to return the document prior to the initial scheduled interview.

Summary

This qualitative study involved investigating perceptions of Colorado paramedic PDs regarding supplementation of program-determined clinical education with SBE using semistructured virtual interviews. Interviews were conducted with participants who were identified through virtual purposive sampling, then analyzed while maintaining qualitative rigor.

Chapter 4: Results

This basic qualitative study involved investigating Colorado paramedic PDs' perceptions of supplementing clinical requirements for SBE in paramedic education programs. I investigated and determined that SBE is integral to paramedic education. Director E described simulation as "absolutely a part of the fabric of what we do, especially from an education standpoint." Perceptions of PDs varied regarding using SBE as a supplement for clinical experiences.

These research questions were designed to gain PDs' perspectives regarding supplementing program-determined clinical requirements for SBE in Colorado paramedic programs.

RQ1: What are perceptions of Colorado paramedic PDs regarding replacement of program-determined clinical education with SBE?

RQ2: What are Colorado paramedic PDs' perceptions of advantages of replacing program-determined clinical education with SBE?

RQ3: What are Colorado paramedic PDs' perceptions of disadvantages of replacing program-determined clinical education with SBE?

RQ4: What are Colorado paramedic PDs' perceptions of barriers to replacing program-determined clinical education with SBE?

This chapter includes a review of the setting for this research, data collection procedures, data analysis, research results, and issues with study trustworthiness.

Setting

PDs in Colorado represent urban and rural paramedic programs throughout the state. They are responsible for all aspects of program operation, including administration, organization, supervision, long-range planning and ongoing development, continuous quality review and improvement, program effectiveness, cooperative involvement with medical directors, and orientation and oversight of clinical and field preceptors (CoAEMSP, 2020, p. 13). Further included in these responsibilities are assurance of completion of terminal competencies, such as patient demographics and skills, found in the SMC matrix (CoAEMSP, 2020, p. 13).

Additionally, participants were still affected by the COVID-19 pandemic. This effect is seen in their responses when discussing access to clinical sites and current considerations involving SBE as a supplement for clinical experiences for their programs. Director A explained, "COVID shut down the Children's Hospital, and [it] has not opened back up." Similarly, Director E described clinical challenges within their program: "Since COVID, just like across the country. Children's Hospital, as far as our pediatric placement… shut down as far as clinicals goes." Director C recalled, "During COVID… we were restricted from participating in the ICU [Intensive Care Unit], RT [respiratory therapy], a number of units." Director F said, "COVID completely leg swept [destabilized] our program. We made the decision to supplement simulation… because we had literally no other option." Director D shared the reasoning for implementing SBE as a supplement to clinical education: "part of it is COVID and … the other part has to do with research." Finally, Director B had a unique experience compared to their peers, and

said, “Even during COVID, we could place students. I know some people basically had to go to full simulation. They couldn’t get in anywhere. It took a few months for things to open up again.” Five of six respondents integrated SBE for clinicals during the COVID-forced shutdown, but only three of the programs had chosen to continue to use SBE for clinicals at the time of interviews.

Data Collection

Participants were selected using purposive sampling and identified through the CAAHEP website. Accredited programs have received program accreditation through the CAAHEP after demonstrating compliance with standards, while programs with a Letter of Review designation are in the process of becoming accredited (Rodriguez et al., 2018).

Ten paramedic PDs were identified in Colorado, representing 12 paramedic campuses throughout the state as of November 2021 (CAAHEP, n.d.). Nine PDs were recruited via email to participate in this research. Six of nine identified PDs responded to email requests and participated in semistructured interviews over Zoom that were recorded using a handheld audio device (see Table 1). The remaining three PDs did not respond to emails or phone calls. In addition to audio recording interviews, I kept notes to request elaboration of points as necessary.

Table 1

Participants and Interview Information

Pseudonym	Interview Time	Interview Day	Total Word Count
Director A	51 minutes	10/4/2022	2,794
Director B	34 minutes	10/25/2022	1,729
Director C	42 minutes	11/1/2022	2,336
Director D	66 minutes	9/27/2022	3,214
Director E	86 minutes	11/28/2022	6,588
Director F	46 minutes	12/12/2022	3,588

Upon completion of interviews, I immediately transcribed recorded conversations into a Word document, and I then printed the transcribed interviews.

Data Analysis

The coding process was cyclical, and an iterative approach was used to capture interview information. First, interviews were transcribed and printed. Then, transcripts were manually coded using evaluation coding to categorize data into smaller parts for more in-depth analysis. I evaluated interviewee responses in terms of words or phrases that were relevant to the research questions. Using evaluation coding, I reviewed transcripts manually to identify broad topics and tentative codes that appeared independently within interviews.

Evaluation coding was used for the first round of coding. I focused on describing participants' observations or attributions, comparing program measures to standards or

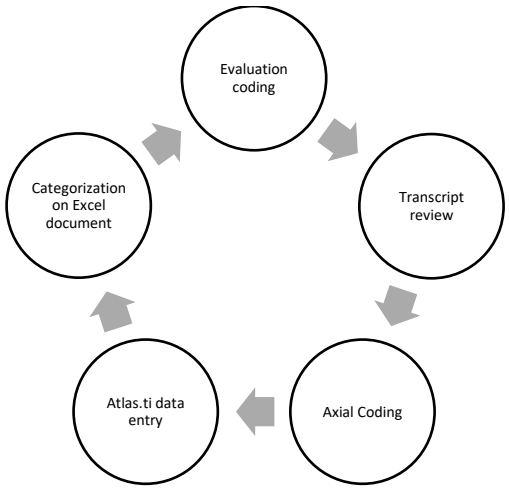
ideals, and recommendations for change and suggestions for change implementation. From evaluation coding, codes were divided into two categories: clinical sites and SBE. I transcribed identified evaluation codes into a Word document and sorted them alphabetically to look for similarities I may have missed.

Next, I reread transcripts to ensure that I had not missed important data during the evaluation coding process. After this review, I began axial coding to identify the most frequent and significant concepts and categories from the descriptive coding process and condensed data into categories. For axial coding, I created a document that allowed me to visually demonstrate hierarchical structures of codes and categories to analyze relationships further.

To specifically answer research questions, I evaluated perceptions, advantages, disadvantages, and barriers of SBE as a supplement to clinical education in initial paramedic education. These remained as categories in the research. Clinical sites also emerged as a category. I used a methodical and strategic plan to analyze transcripts and notes created throughout interviews (see Figure 1).

Figure 1

Iterative Process of Developing Codes, Categories, and Themes



Atlas.ti version 22 for Windows was used throughout the data analysis process to help keep codes, categories, and themes organized and avoid overlooking connections. Finally, an Excel document was created with each research question indicated as a tab along the bottom of the spreadsheets. On each tab, the PDs' deidentified designation was noted down the rows. The columns were labeled transcription, evaluation coding concepts, with axial coding categories on top of the spreadsheet. The codes and categories were color-coded on the spreadsheets for easier pattern recognition. The codes were grouped into categories, and the categories were evaluated for relationships to identify themes. The themes emerged through methodical coding, categorization, and analytic reflection to develop a narrative description of the findings (Saldaña, 2021). Qualitative rigor was established in maintaining a systematic approach to data analysis and step-by-step coding. The coding process distilled 22 codes after evaluation coding and axial coding was completed (Table 2). Those 22 codes aligned with the four

categories of perceptions, advantages, disadvantages, and barriers. From the four categories, ten themes developed.

Table 2

Summary of Codes, Categories, Themes

Codes	Categories	Themes
1. Simulation as an adult learning methodology; 2. Processes to integrate simulation for clinical; 3. CoA Standards; 4. Oversight; 5. Utilization of SPs; 6. Simulation is integral to initial paramedic education; 7. Advice 8. Clinical challenges; 9. Clinical sites; 10. COVID; 11. Random clinical experiences- variations and limitations of paramedic clinical experiences	Perceptions	1. Simulation and clinical needs to be a combination; 2. Simulation cannot replace some clinical experiences; 3. Common ideas for SBE for clinical
1. CoA Requirements; 2. Oversight; 3. Logistics; 4. Feedback; 5. Patient safety	Advantages	1. Specificity of simulated patient encounters; 2. Control; 3. Flexibility
1. Realism; 2. Logistics	Disadvantages	1. Logistical challenges; 2. Artificiality
1. Logistics; 2. No common language; 3. Human resources; 4. Reluctance	Barriers	1. Administrative challenges 6. Acceptance from the profession

Results

This study involved four research questions designed to gain Colorado paramedic PDs' perspectives regarding supplementing program-determined clinical requirements with SBE. I will individually present the results of these questions using the themes that emerged during the coding process, with specific discrepancies discussed as relevant in each section.

RQ1

What are the perceptions of Colorado Paramedic PDs regarding the replacement of program-determined clinical education with SBE? Three themes developed through the coding and categorization process while answering this question.

Theme 1: Simulation and Clinical Need to be Used in Combination

All interviewees used simulation education as an integral part of initial paramedic education in their programs; however, not all PDs utilized SBE to supplement clinical experiences. A consensus discovered between the directors is that, even with the programs that choose not to utilize at the time of the interview, SBE for clinical, simulation and clinical need to be used in combination. PD A used SBE as a supplement to clinical experiences recommended the model of simulation-clinical-simulation-field:

> [Simulation and clinical] needs to be a combination. At some point, students need to go to the hospital. They need to interact and see what it is like to be in a hospital. But I think that the learning opportunity that is afforded is the immersion in the environment, and then the icing on the cake is maybe you see a cardiac patient, maybe you see a stroke patient, maybe you see a baby patient. The big

> learning opportunity is what we can craft and create in simulation, which is going to make the student better once they actually get to the hospital and the ER if we do it right.

PD B and PD E do not supplement clinical with SBE at this time, yet neither discounted the potential value of utilizing SBE as a supplement for clinical in conjunction with clinical experiences. According to PD B:

> there to learn the process of patient assessment [by] listening to other professionals. And watching how other professionals manage a patient. And just seeing how a COPD patient presents and how does that differ from CHF. But for the actual critical thinking through patient care, I think simulation… may be an opportunity for them to think through something rather than having it just there in front of them.

In some programs, SBE for clinical experiences is integrated into the curriculum. These directors have utilized the Standards set forth by the CoAEMSP and CAAHEP to determine which clinical experiences are best suited to supplement with simulation. Director D stated, "If you had to ask do I think it's a good idea for programs to use simulation to replace or supplement patient contacts they don't get from real people, from live people, the answer is 100%." There were no discrepant cases noted in this data.

Theme 2: Simulation Cannot Replace Some Clinical Experiences

Another theme that developed is that simulation cannot replace some clinical experiences. Director C stated, "I don't think there is a replacement for some [clinical] experiences." Director B does not currently utilize simulation for clinical and did not

implement SBE for clinical during COVID. The Director does not foresee implementing SBE for clinical experiences soon because the program has successfully obtained patient contacts without the need to supplement.

Director E was amenable to utilizing SBE as a supplement to clinical experiences but not as a replacement because of the degradation the director has experienced in the interpersonal interactions with other healthcare professionals that use SBE for clinicals. Director E said, “Simulation is ok. It is not the same as having a true patient sitting in front of you. It never will be. It never has been.” There were no discrepant cases noted in the data.

Theme 3: Common Opportunities for SBE Clinicals

The second theme, simulation cannot replace some clinical experiences, naturally led into the third theme, which is the common ground where PDs see possibilities for SBE as a supplement to clinical experiences. There were no discrepant cases noted in this theme. The most common areas of SBE for clinical experiences identified by PDs are high-acuity, low-frequency patients that can be replicated in a simulation environment. Director C described, “High-acuity, low-frequency [simulations] with patient safety and patient comfort still being protected.” Directors B and D discussed the challenges students face in the clinical setting regarding clinical decision-making. Director B said, “In a really specific situation, that might be something students won’t see in clinical and that critical thinking piece. When students go to clinical, they aren’t in charge of the patient.” PD D elaborated:

> A paramedic student in a hospital, they're not the team leader, they're not the primary one in charge, even if there's a doctor who is really accommodating and brings [the student] over and is letting [the student] do procedures and contributing. [The student is] never the main one in charge.

Directors C, E, and F more specifically described types of clinical scenarios that could be addressed through SBE. One consideration is the Labor and Delivery (L&D) rotation that paramedic students complete. One frequent concern from Directors is that students cannot participate in patient care, specifically on the L&D floor. In these situations, SBE would exceed the experience the students have in the clinical setting. Director C explained:

> What happens in L&D, at least to my male students, is they get put in a corner, and basically, they sit there and study their book. I can do a lot more with [our high-fidelity birthing manikin] and have [the students] be present and set up all kinds of birthing complications.

Further considerations of SBE for clinical experiences include patient encounters that may be less frequent in the clinical setting, including a patient in cardiac arrest, a multi-systems trauma, a heart attack, a stroke, complex airway management, pediatric airway management, pediatric respiratory arrest, and neonatal resuscitation. As PD F summarized:

> These are all very high-risk and low-frequency interventions, even in clinical settings… I can send my students to a NICU. That doesn't mean they are going to be allowed to intubate a neonate. Should they? Absolutely. Do I understand why

> the facility doesn't let them? Without question. That doesn't help me in mitigating the knowledge gap.

RQ2

What are the Colorado Paramedic PDs' perceptions of the advantages of replacing program-determined clinical education with SBE? Three themes emerged to answer the second research question.

Theme 1: Specificity of Simulated Patient Encounters

The first theme identified regarding the advantages of SBE for clinical experiences is specificity, specifically the ability to recreate high-acuity, low-frequency patient encounters. Director F explained:

> [simulation for clinical] is targeted. It's adapted to the individual's needs. We can take something we are not going to see, or you have a very low chance of seeing out in the wild and recreate it. And control it. And we can do so repeatedly.

One of the challenges highlighted frequently in the interviews was that there was no way to standardize the patient encounters in the clinical setting. A key advantage to SBE for clinical encounters is reported by Director A, "the patients that I know the students are not going to see and I know that I can create." Director C confirmed, "You completely control what [the students] encounter." Director E acknowledged, "You want to make sure [the students] have got depth and breadth of patient contacts, age groups, pathologies, diagnoses… You still can't orchestrate that. Not in the clinical setting."

PDs valued the ability to direct and specify the simulated encounters to meet student needs when considering the advantages of SBE as a supplement to clinical education. There were no discrepant cases noted in this theme.

Theme 2: Program Director can Control the SBE Experience

Control for the PD is also identified as an advantage. Director A explained using simulation experiences for clinical encounters, "It's very controlled. I know what patients the students are going to see today. It is regulated." Director A said:

> Well-crafted scenario simulation events are actually preferable to what the students might receive in the clinical setting based on their ability to interact with feedback while not dealing with a real-life sick, dying patient, so they get more opportunity to give the students feedback directly.

Director D further elaborated:

> I can't really do that when they're on their clinical rotations. When I'm not there, I'm not seeing what's going on, so the simulations give me an opportunity to… see exactly where the students are, and then I can feel more comfortable signing off on their abilities.

Additional consideration of the ability to craft SBE experiences for clinical education included the opportunity for students to learn from failure in the simulated environment. Director D stated, "Regardless of how realistic you make it, that student has the opportunity to fail. If they're in a rotation in a hospital, someone's going to step in, and they might not ever even get the chance from the very beginning." When building those simulated events, PD A recommended, "It is good to have an interdisciplinary

relationship with the nursing staff and facilitate that and know what that looks like." To create a more realistic environment, PD F said:

> We have actually found as affective interaction to have a role-player in the room playing another provider or a family member not only acts as a resource of information, but we can relay prompts to but acts as a situational stressor. You get someone acts as a method actor that comes in and immerses themselves in that role. It is incredibly beneficial to deal with someone that is angry and aggressive, scared for their family member.

Further, SBE allows directors to be specific with matching CoAEMSP Standards. Director C said, "you have complete control, and you can match it to need, and you can match it to standards." Several directors discussed the importance of recognizing patient safety and comfort in the clinical setting while students work to achieve clinical competencies. Director C described:

> If you are looking at the [Student Minimum Competency] Matrix and you see that they need three neonates with neonatal resuscitation, no one is ever going to get that [in the clinical setting]... And that has a lot to do with patient safety. One of the reasons no paramedic will ever run three distressed neonates in a clinical setting is because a doctor will be doing that, and that is good because that is what is best for the patient.

There were no discrepant cases noted in this theme.

Theme 3: Program Director has Flexibility

The final identified advantage theme is flexibility. PDs acknowledged numerous challenges to placing students within a clinical site, including background checks, drug screens, accessing student health records, records tracking, and coordination scheduling with the clinical sites. A significant advantage to utilizing SBE as a supplement to clinical experiences is the ability for directors to forego those requirements in the simulation space. Director A stated, “Scheduling is easier because I could just pick the date, time, and room, and I don’t need to clear that with anyone… Logistics, getting all the records, background checks, and the documents, and getting the students approved. I don’t have to go through any of that; I can just schedule them.” Director E voiced a concern regarding the loss of flexibility to use SBE for clinical experiences and said, “If you don’t need [simulation for clinicals], then don’t do it. But I don’t think that CoA and CAAHEP should take that option away from us. Because they gave [simulation to clinicals] to [initial paramedic education programs], and it was effective.”

There were no discrepant cases noted in this theme.

RQ3

What are the Colorado Paramedic PDs’ perceptions of the disadvantages of replacing program-determined clinical education with SBE? Two themes emerged while answering this question.

Theme 1: Logistical Challenges

Logistical challenges of operating SBE experiences were the predominant disadvantages identified in using SBE to supplement clinical experiences. The directors agree that these challenges include time to conduct simulation, space, and cost barriers to purchasing equipment. There were no discrepant cases noted in this theme. Director B described:

> When I send [students] to the hospital, I need to do the hospital orientation and those kinds of things, but it is not so much of a staffing issue on my side. Simulation takes much more time and effort on the school's side.

Director A elaborated that scheduling is less challenging because the director controls the classroom schedule but described the logistical challenges of coordinating SBE. Director A said:

> The logistics part, the space. What do we need to do? What room is going to be big enough, and who is using the equipment? Can you get staff on campus? Which increases the cost to the program. If I have to bring in more hourly instructors to help with these simulations, that increases the programmatic costs. So, there is cost prohibitiveness.

Theme 2: Artificiality of SBE Experiences

The second theme that emerged while answering the question regarding the disadvantages of SBE for clinical experiences was artificiality. Even the directors currently using SBE as a supplement to clinical education identified artificiality as a challenge in simulation. There were no discrepant cases noted in this theme. Director F

said, “There is always a lag,” and PD A stated, “In simulation, there is always a disconnect,” using similar language when discussing the disadvantages. Director F did offer a solution with a challenge, “Elements of artificiality that are difficult to overcome. Obviously, this can be mitigated with live role-playing patients, but then [you are] limited on what procedures you can actually do.” Director C also discussed the environment in which the SBE event occurs, “As much as you might try to replicate the atmosphere, I don’t think you can ever replicate completely the emotional aspect and the stress aspect and the psychosocial aspect.” Director E agreed with the inability to replicate the stress of real-life events, “It is very hard to be able to simulate that urgency and that criticality. The pucker factor. Unless you have that true experience, it doesn’t touch you.” In PD E’s program, students participate in simulated events for education, but those events do not count toward clinical experiences. Director E described some of the ways that the program works to mitigate the artificiality of simulation:

> We simulate having to break the news to the family that resuscitation was unsuccessful, or that we are not going to start [resuscitative efforts], and we use SPs. So, they are breaking the news to another human being. It is not the same because there is not a dead body there. There is not a human being that was alive several minutes ago who is now not, and you have to turn to that family member and tell them that their family member has died. That is a salient experience in someone’s life or career. You have to be able to think outside the box. You have to be able to think of ways to create the environment that goes with some of those

salient experiences. Whether it is the sights and the sounds and the smells, it is a huge undertaking.

RQ4

What are the Colorado Paramedic PDs' perceptions of the barriers to replacing program-determined clinical education with SBE? Two themes emerged while answering this question.

Theme 1: Administrative Challenges

Administrative challenges are the first theme identified as a barrier to SBE for clinical experiences. There were no discrepant cases noted in this theme. Simulation-based education is time and resources-intensive, which requires specialized training in the proper way to facilitate and debrief simulation activities. Director A described challenges with staff: "The biggest obstacle is coaching and teaching the instructors. Faculty members don't know what to do, and they don't know how to do it." Furthermore, increased training requires increased opportunities for funding and financial support. Director D said, "The more accurate, the more realistic the simulation is, the more time it is going to take, so there is a little bit of trade-off with increased work and time with set up." Finally, the system's building design may not be designed for SBE.

Theme 2: Acceptance from the Profession

Concerns were raised during the interviews about acceptance from the EMS community and medical directors if there was a shift to using SBE for clinical experiences. Director E said:

> I think if we went more simulation as opposed to real life for clinical, and especially for a field standpoint, I think you might have some pushback from agencies. I do think that you do have a fair amount of us that have worked in the field that are pretty adamant that they need the real-life experiences.

Others, such as Director C, voiced concerned regarding the ability to validate and standardize the educational approach of SBE to ensure the quality of the education. Director C said:

> My conversations with my Advisory Board during the pandemic about simulation and about supplementing were super illuminating, from outright resistance to there is nothing like the real thing. I'm not comfortable letting people out in the field who have never done XY and Z on a really patient to now, almost three years in, they are saying things will never go back to the way things were, so let's see what we can do.

Directors could not speculate whether they thought SBE for clinical experiences would gain traction within the field of EMS, but those currently utilizing SBE as a supplement to clinical experiences felt strongly about continuing to use and grow the model. There were no discrepant cases noted in this theme.

Common Definition

SBE was not clearly defined during the interviews. Each PD uses a slightly different definition of simulation, as is evidenced by the responses to the question, "How would you define simulation and its use in your program?" Three of the six directors responded. Director A submitted, "Simulation is a teaching modality. It is used to help

students learn skills, assimilate information, learn to manage patients of different types, and as an evaluation tool." Director C described simulation as:

> Anything with a psychomotor component (I don't really think tabletops or white board exercises are simulation, and I think it's problematic to say they are), that prepares students to perform assessment and management of live patients, or that reinforces experiences with patients and patient safety. [Simulation is] to prepare [students] to be safe to operate in their internships by giving them a low or no risk environment to apply cognitive knowledge.

PD D used the following definition:

> Regarding training or education in emergency medicine, I would define simulation as any attempt to mimic or replicate reality. For example, a manikin arm is used to educate students about starting IVs and administering medication. Said arm is a way to isolate some of the tasks that occur while managing an emergency. However, if the arm is part of a full-sized, high-fidelity manikin, future training can more closely mimic the treatment of an actual person. The more advanced or high-fidelity the equipment, the more realistic the training.

Evidence of Trustworthiness

The basic qualitative research design was chosen because the study aimed to explore the perceptions of the Colorado Paramedic PDs through interview responses. I established credibility through a member check, saturation, and maintaining reflexivity. Saturation was achieved based on the stopping criteria of 66% of the population and the interviews revealing repeating patterns (Creswell & Creswell, 2018; Hennink & Kaiser,

2021). To maintain reflexivity throughout the interviews and data analysis process, I continually monitored my own bias and kept a journal during the interview and data analysis process. Transferability was established through an accurate description of participant selection and a clear interview protocol (see Appendix A). Dependability was established through a clear audit trail that tracked the step-by-step process of each step of the research and data analysis. Further, maintaining a journal and audit trail allowed me to establish confirmability in the research process. There was no variability in the processes described in Chapter 3 for credibility, transferability, and dependability.

Summary

This basic qualitative study involved answering four research questions examining perceptions of six Colorado paramedic PDs regarding supplementing program-determined clinical education with SBE. Through transcript and coding analysis, 22 codes, five categories, and 10 themes emerged.

Chapter 4 included the setting for research, data collection, data analysis, research results, and issues regarding trustworthiness. In Chapter 5, I address interpretations, limitations, recommendations, and implications of the study.

Chapter 5: Discussion, Conclusions, and Recommendations

In this basic qualitative study, I investigated perceptions of six Colorado paramedic PDs regarding supplementing clinical requirements with SBE in initial paramedic education programs. I interviewed directors over Zoom using the self-developed interview protocol (see Appendix A) and semistructured interviews. This research involved examining and determining whether SBE is integral to paramedic education. Several themes emerged through data analysis regarding these research questions:

RQ1: What are perceptions of Colorado paramedic PDs regarding replacement of program-determined clinical education with SBE?

The three themes for RQ1 were: Simulation and clinical need to be used in combination, simulation cannot replace some clinical experiences, and common opportunities for SBE clinicals.

RQ2: What are Colorado paramedic PDs' perceptions of advantages of replacing program-determined clinical education with SBE?

The three themes for RQ2 were specificity of simulated patient encounters, PD control, and flexibility.

RQ3: What are Colorado paramedic PDs' perceptions of disadvantages of replacing program-determined clinical education with SBE?

The two themes for RQ3 were logistical challenges and artificiality of SBE experiences.

RQ4: What are Colorado paramedic PDs' perceptions of barriers to replacing program-determined clinical education with SBE?

The two themes for RQ4 were administrative challenges and acceptance from the profession.

Interpretation of the Findings

This study has contributed to the study of paramedic education and simulation education by focusing on perspectives of Colorado paramedic PDs. The ELT was used to address SBE and clinical education in order to emphasize the importance of experiences throughout the learning process. Students engaging in clinical educational experiences participate in concrete encounters with actual patients. By contrast, students participating in SBE have realistic experiences that are created to reinforce concepts. Both clinical experiences and SBE allow for experiential learning to occur, thus reinforcing learning (Watts et al., 2021). Additionally, students move from novice to graduate providers through active and experiential learning environments via SBE as well as development of decision-making capabilities, problem-solving tactics, and clinical reasoning abilities (Herron et al., 2019; Mutter et al., 2020).

This study involved exploring perceptions of PDs involving four research questions. I investigated their perceptions regarding supplementation of SBE in terms of clinical experiences during paramedic education. Three themes emerged. First, SBE and clinical education need to be used in conjunction. Hunter et al. (2021) recognized SBE as a supplement to clinical education. Further, years of experience do not confer greater

diagnostic accuracy; feedback is essential for improved diagnostic performance, but is often lacking (Omron et al., 2018).

Participants further agreed that simulation could not replace some clinical experiences. Because paramedicine is a field involving human interaction and patient care, students must spend time caring for actual patients. Further, clinical experiences involve encouraging students to develop independence in their professional paramedic roles (Wongtonkam & Brewster, 2017).

Finally, PDs independently identified common opportunities for clinical experiences that SBE could replace. These opportunities included high-acuity and low-frequency patients that allowed for clinical decision-making and supported students during clinical judgment opportunities, such as a neonatal resuscitation or high-risk obstetric case that paramedics will manage independently in the field. SBE is applicable for clinical experiences in order to increase student opportunities in terms of practicing skills, ensuring patient safety, and applying knowledge while developing clinical reasoning (Bogossian et al., 2018; Can et al., 2021; Jong et al., 2018; Sevilla-Berrios et al., 2018; Waseem & Horsley, 2020; Way et al., 2017; Wheeler & Dippenaar, 2020). SBE is not a replacement for clinical experiences but a viable supplement for skills and experiences that are not always possible to achieve in clinical settings.

Advantages of SBE in terms of clinical experiences include the ability of PDs to specify objectives and outcomes of simulated patient encounters. In hospital or field settings, PDs do not have control over which patients are seen by students, but during simulated events, PDs can be deliberate in terms of learning opportunities for the

students. These opportunities included specific patient demographics, such as pediatric patients, that are difficult to see in the numbers required by accreditation standards (Cash et al., 2021b; Page et al., 2021). PDs have control over SBE, resulting in the ability to closely monitor student progress and ensure feedback is provided to students (Williams et al., 2018). Additionally, students can learn from failure (Bourke-Matas et al., 2020; Khan et al., 2020). Finally, flexibility is cited as an advantage to SBE for clinical education, which is seen as a benefit (Afshari et al., 2021; Alrazeeni, 2018; Lenson & Mills, 2018). PDs view SBE as an effective and beneficial supplement to clinical education, providing specificity, control, and flexibility.

Two themes were identified for RQ3: logistical challenges and artificiality of simulation experiences. First, logistical challenges were specific to organizing and conducting SBE, including finding time, space, and equipment needed to run SBE. PDs also noted that costs associated with equipment and additional instructors could be prohibitive (see Cook et al., 2018; Johnston & Batt, 2019; McKenna et al., 2015; Waseem and Horsley, 2020; Wiggins et al., 2020).

Second, SBE, no matter how realistic the simulation environment may be, is not a real-life situation. PDs expressed concerns that students do not experience real-life's emotional, stress, and psychological aspects in SBE. James (2021) identified critical elements of SBE necessary to overcome the environment's artificiality, including the participants' willingness to suspend disbelief, trained facilitators, well-designed SBE, and debriefing.

Finally, RQ4 involved considering the perceived barriers to replacing program-determined clinical education with SBE. First, administrative challenges, such as a lack of appropriately trained personnel, were identified by the PDs. These administrative challenges were identified in previous studies (Cook et al., 2018; McKenna et al., 2015). Second, PDs voiced concern regarding acceptance from the EMS profession about supplementing SBE for clinical experiences. This concern was not found in the literature specific to EMS; however, the research references to EMS SBE for clinical education are sparse.

Limitations of the Study

The proposed study did not require access to sensitive data or ethical IRB considerations. The only anticipated limitations to the study were inadequate participation from paramedic PDs in Colorado or that PDs may not be the subject-matter experts on SBE, which were not realized. Trustworthiness was established and described in the Results section. One limitation of the current study is that these viewpoints may not apply to paramedic PDs throughout the U.S., so a broader investigation of the topic is encouraged.

Recommendations

The Healthcare Simulation Standards of Best Practice include simulation design, outcomes and objectives, prebriefing, facilitation, debriefing, evaluation, simulation-enhanced interprofessional education, operations, and professional development that guide the development and running of well-structured simulation (INASCL Standards Committee, 2021b). Best practices in SBE, including pre-briefing, well-organized and

defined learning objectives, structured debriefing, and the development of SBE scenarios following a standardized model, are supported by Waseem and Horsley (2020), Hunter et al. (2021), and Gugiu et al. (2021). Initial paramedic education research in SBE for clinical education needs to determine which clinical experiences best suit SBE and the appropriate simulation-to-clinical education ratio. A single paramedic program cannot adequately determine these experiences and ratio, so this research is recommended to include all the paramedic programs across Colorado, if possible. The results of such a study could help develop specific recommendations, including a specific definition and standard regarding simulation for clinical education for initial paramedic education. While some guidance is provided in the Standards, more specific language from CAAHEP would benefit PDs (CoAEMSP, 2020, p. 22).

Further, it is essential to note that the lack of a clear and consistent definition of SBE among PDs could lead to misunderstandings and discrepancies in the interpretation and implementation of SBE. The lack of a clear definition could also affect the ability to compare and generalize findings across programs. Thus, future research may benefit from providing a clear and specific definition of SBE to ensure a common understanding among educators and participants. Again, this study should seek to include the perspectives of PDs across Colorado to incorporate the diversity of paramedic programs, large and small. In contrast to the previously recommended further research, this definition should be guided by the formally accepted definition of SBE by the Society of Simulation in Healthcare (Lioce et al., 2020).

Implications

This study is significant because access for paramedic students to clinical sites has become increasingly restrictive, and paramedic students need alternative opportunities to complete required patient contacts. The NCSBN longitudinal study determined that a well-designed simulation was equivalent to clinical education in a 1:2 ratio (Hayden et al., 2014). The current research contributes to positive social change because increasing opportunities for paramedic student clinical completion through appropriately structured SBE allows paramedic students to complete their educational experiences with fewer scheduling delays to help address the critical staffing shortage experienced in Colorado. SBE allows paramedic students to achieve specific learning outcomes that cannot be managed explicitly in the clinical setting (Hernandez et al., 2020). Further, well-designed SBE may be superior to traditional clinical education (Omron et al., 2018; Zapko et al., 2018). Through ascertaining Paramedic PDs' perceptions regarding the supplementation of clinical requirements with SBE in Colorado and the perceived advantages and disadvantages of SBE, this study further contributed to positive social change by understanding how Paramedic PDs approached SBE and clinical requirements to meet student and employer needs.

Conclusion

This study provided insight into the perceptions of paramedic PDs regarding using SBE as a supplement to program-determined clinical requirements in Colorado during initial paramedic education. The research found that PDs view SBE and clinical education as equally essential and complementary. The PDs found common ground

during independent interviews for SBE to replace clinical experiences during high-acuity, low-frequency patient cases where clinical decision-making and opportunities for clinical judgment are limited. SBE is not intended to replace clinical experiences but rather to be a valuable supplement for skills and experiences that may not always be available in the clinical setting. The research found that PDs viewed SBE as a valuable supplement to clinical education by providing specificity, control, and flexibility. However, logistical challenges and the artificiality of the simulation experiences were identified as potential disadvantages. The study highlights the need for clear definitions and standards for SBE and recommends that CAAHEP provide more specific language regarding simulation for clinical education in initial paramedic education. Finally, the HSSOBP should guide the development of well-designed SBE experiences for initial paramedic education to avoid misunderstanding and discrepancies. The efforts from this research have been far-ranging including a request to assist in the development in paramedic simulation-based education for Vietnam.

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Appendix A: Interview Protocol

Thank you for agreeing to participate in my dissertation research. I would like to record our conversation today. I will be the only one who has access to the recordings, which will be destroyed after transcription. All information will be held confidential, your participation is voluntary, and you may stop at any time if you feel uncomfortable. If you agree, please verbalize your consent now.

If yes, thank you for agreeing to participate and consenting to recording.

If no, do you agree to participate in this research?

If yes, thank you for agreeing to participate. I will document our encounter by taking notes of our discussion.

If no, thank you for your time. I have no further questions.

I anticipate this interview will last 45 to 60 minutes. I have several questions that I would like to cover during this time. It may be necessary to contact you again for clarification on your answers once this interview has been transcribed.

Introduction

I have identified you as the individual within your institution that would make the decisions about clinical experiences for initial paramedic education from the CAAHEP website. My dissertation focuses on the perceptions of Paramedic Program Directors of supplementing simulation for program-determined clinical experiences.

Demographic information of participants

Name

Title

Can you describe your role in the determination of clinicals and clinical placement within your program?

Follow-up: Clarify the participant's role in the determination of clinicals or clinical placement if necessary.

Do you experience any challenges with placement? If yes, can you describe these challenges?

Do you offer alternatives to clinical placement?

If yes, what are your alternatives to clinical placement?

If no, have you considered alternatives to clinical placement? Why or why not?

How does your paramedic program utilize simulation at this time?

If the program is not utilizing simulation for clinical experiences, have you considered using simulation in place of clinical experiences? Why or why not?

If the program is utilizing simulation for clinical experiences, what factors influence the decision to use simulation for clinical experiences?

How do you/would you determine which clinical experiences to replace with simulation?

What advantages did you find/ would you anticipate for simulation-based education in place of clinical experiences?

What disadvantages did you find/ would you anticipate for simulation-based education in place of clinical experiences?

What barriers did you experience/ would you anticipate for simulation-based-education in place of clinical experiences?

If you could give advice to another program director regarding clinical access or simulation for clinicals, what would that be?

Is there anything that you feel is important about the topic that we have not had the opportunity to discuss before ending the interview?

Thank you for your time and participation in this interview. I may need to contact you in the future to clarify your answers to these questions. Will that be ok, if necessary? Thank you again and have a good day.

Post Interview Comments and/or Observations: