The Impact of Simulation Based Experiences on Clinical Education: Physical Therapist Student Perspective

Sheri Kiami
Northeastern University

Pamela Donlan
Northeastern University

Purpose: Simulation based experiences (SBE) have been described as a means of preparing physical therapist students for clinical practice. The literature, however, largely represents student perceptions while still in the academic setting. The aim of this study was to explore student perceptions of how SBE threaded throughout the Doctor of Physical Therapy (DPT) program impacted subsequent clinical education experiences.

Method: Purposeful sampling was used to recruit eleven participants who had completed coursework, three clinical education affiliations, and earned DPT degrees. Two semi-structured focus group interviews were conducted and transcribed by the authors. Data analysis was performed using inductive conventional content analysis.

Results: Participants reported that roles, procedures, interactions, and predictability in SBE impacted preparedness for clinical education. Findings support previous literature that debriefing fosters development of communication and self-reflection, and that self-efficacy for patient care is promoted through SBE.

Conclusions: SBE requires variability and complexity to adequately prepare DPT students for clinical education experiences. Further research on the impact of learner roles within the simulation on preparedness is recommended.

Keywords: simulation-based experiences, physical therapist education, clinical education

INTRODUCTION

Simulation-based experiences (SBE) have been integrated into health professions education, including Doctor of Physical Therapy (DPT) curriculum, amidst evidence that they enhance clinical performance, challenge critical thinking, and allow students to acquire practical skills in a safe and supported environment. As a teaching pedagogy, simulation provides opportunities for students to apply cognitive knowledge, develop psychomotor skills, cultivate reflective thinking, and shape communication skills. Research has generated meaningful data about the contributions of simulation to learning across cognitive,

psychomotor, and affective domains. Physical therapist students have reported enhanced critical thinking and clinical reasoning skills, as well as an increased ability to synthesize and apply prior academic knowledge after participating in SBE. SBE has also been described as a tool for transfer of knowledge from classroom to clinical practice, thereby preparing students for required clinical education affiliations that assess their ability to demonstrate the practical skills, attitudes, and behaviors necessary for entry level professional practice.

Student feedback on the andragogical value of simulation has been instrumental in helping instructors and clinicians craft substantive learning experiences. This feedback, however, is largely representative of student perceptions that have been gathered during the academic portion of the DPT curriculum when they have not yet had an opportunity to use their skills and knowledge during patient care. There is limited research examining student perspectives on the impact of academic SBE on subsequent clinical education experiences. Johnston et al. aimed to explore student attitudes towards a simulation upon completion, and again after clinical education. They found fewer positive perspectives about the benefits of simulation following clinical encounters, prompting a recommendation of further inquiry on this topic and suggesting that reflective feedback about SBE may provide new insights. Silberman et al. found that SBE prior to acute care clinical education improved student safety, communication and overall preparedness compared to students who did not participate in SBE, however there were no quantitative differences among student groups on the Clinical Performance Instrument scores. While this study shows a positive impact of SBE on preparedness for clinical education, results are only generalizable to the acute care setting.

Research on SBE in physical therapist education to date has focused on student feedback either shortly after participating in the simulation or has examined impact of SBE on performance in one practice setting, limiting understanding of how SBE threaded throughout the academic portion of the curriculum influences clinical education performance in a variety of settings with diverse patient populations. Therefore, the aim of this study was to broadly explore student perceptions of how multiple SBE within the academic portion of the DPT curriculum impacted their preparedness for three subsequent clinical education experiences.

The experiential learning theory (ELT) serves as the underpinning for this study. This theory provides a structural model for learning through simulation and asserts that learning is a four-part cycle which encompasses concrete experience, reflection observation, abstract conceptualization, and active experimentation. It further purports that concrete experiences, such as participation in a simulation, provides a context for reflection and debriefing, conceptualization of new knowledge, and an opportunity to experiment with new behaviors applied to future experiences. ELT is an appropriate lens for inquiry, as SBE during the academic portion of the DPT curriculum are built upon the stages of ELT and can shed light on how the experiential learning process that occurred prior to clinical education impacted students' experience in real life clinical situations.

METHODS

A qualitative inductive approach was employed. Following IRB approval, purposeful convenience sampling was used to recruit 11 participants who had successfully completed all courses and three clinical education experiences as part of their entry level DPT curriculum. All participants were part of the same academic cohort from the Doctor of Physical Therapy Class of 2020 at a large, private university in the US, and 10 were female and 1 was male. Each participant had engaged in 7 simulations during the 3 years of their academic DPT curriculum prior to clinical education experiences (Table 1). The SBE are threaded throughout the curriculum and designed with intentional scaffolding of skills, knowledge and degree of clinical decision making as they progress through their coursework.

TABLE 1
SIMULATION TOUCHPOINTS IN THE DPT CURRICULUM

	Course	Learning Objectives
Year 1	**Foundations of Physical Therapy Practice**	**Patient communication and education; safe transfers and gait training with assistive device**
	Cardiopulmonary Management	**Clinical reasoning with choosing standardized tests and measures, monitoring patient vital signs with ambulation**
Year 2	**Clinical Integration I**	**Safe patient handling with mobility while monitoring vital signs and managing medical equipment**
Year 3	**Musculoskeletal Management**	**Oral health/TMJ screening and referrals to other practitioners**
	Neurological Rehabilitation	**Manage an emerging medical condition and interprofessional communication**
	Neurological Rehabilitation	**Promote transcultural health care practices**
	Interprofessional Simulation	**Communication, roles and responsibilities of various team members**

Simulation activities in which students participated were all developed and facilitated by faculty who are either formally trained in medical simulation or mentored by trained faculty. Efforts to maintain best practices in simulation according to International Nursing Association for Clinical Simulation Learning (INACSL) are taken; all SBE are designed by content experts and simulationists based on learning objectives, and each experience included prebriefing and debriefing components, a plan to maintain psychological safety and ensure confidentiality, and provision of a fiction contract. Operations at the simulation lab are managed by two full-time staff who are trained simulationists, and all SBE in which students participate are required to have an interprofessional component at the authors' institution.

Evidence based debriefing methods, Delta/Plus and/or the Advocacy-Inquiry Model, are utilized during the debriefing which immediately follow all SBE. Participants in this study were exposed to various standardized patients (SP); professional SP were used for nearly half of the SBE, while patients were portrayed by students and faculty in the college for most others. A high fidelity mannikin was used as the patient in the neurological intensive care simulation. Simulation lab policy requires a pilot of any new SBE before scheduling the activity for the class. All participants in the focus groups actively participated in each SBE in either a hands-on or active observer role and debriefed with an experienced debriefer immediately after the activity.

Data was collected through two semi-structured focus group interviews, consisting of 6 and 5 participants respectively. Both authors conducted the interviews together. The focus groups took place after all participants had graduated from the program to eliminate bias as the authors also designed and facilitated some of the participants' SBE. Both focus group interviews were 60 minutes in length. Secondary to COVID-19 pandemic restrictions, interviews took place in a secure, virtual environment equipped with audio and video. A focus group approach was considered appropriate for this study, as focus groups can help foster an exploration of individual and shared perspectives and are advantageous in situations where interviewees are similar to and cooperative with each other. All participants received informed consent forms via e-mail. Interview questions sought to elicit perspectives on how experiential learning provided a

foundation for the behaviors and practices that were exhibited in the clinical setting (Appendix 1). Interviews were recorded, and all text was transcribed by the researchers.

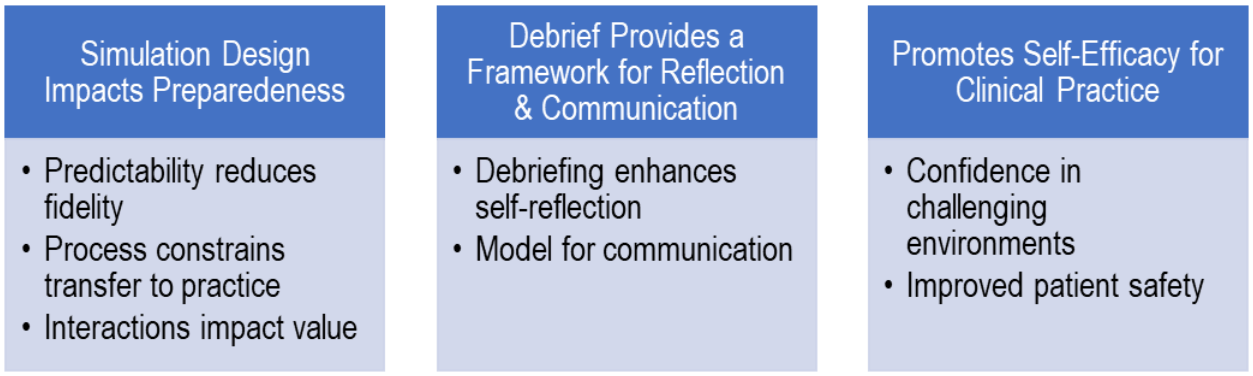
Data was analyzed individually by both researchers who are experienced in qualitative methods. An inductive conventional content analysis approach was employed. A content analysis approach is appropriate for focus groups as it provides knowledge and understanding of the phenomenon under study and is appropriate when existing knowledge on a phenomenon is limited. Initial codes, which included key concepts derived from in text passages, were formed. Codes were then sorted into emergent categories based upon linkages noted. Using a hierarchal approach, emergent categories were linked to form subcategories, and finally, larger categories or themes that captured the overarching relationships between subcategories.

Intercoder analysis was performed to promote trustworthiness. Following individual analysis, the researchers then worked collaboratively to ensure that agreement was reached on the representation of data and that all insights and interpretations contributed to final themes. Additionally, an external audit was conducted by a consultant with no connection to the study. This consultant reviewed all aspects of the study and provided feedback to the researchers. An external audit was valuable and helped to ensure that the findings, interpretations, and conclusions were supported by the data. Furthermore, a statement of reflexivity, which reveals personal perceptions and biases of the researchers, guided analysis (Appendix 2). This statement adds a level of validity and credibility to the study.

RESULTS

Analysis of transcripts resulted in identification of three major themes and seven subthemes (Figure 1). Major themes were (1) simulation design impacts preparedness; (2) debriefing provides a framework for reflection and communication; and (3) SBE promotes self-efficacy for clinical care.

FIGURE 1
THEMES AND SUBTHEMES



Simulation Design Impacts Preparedness

The most predominant theme yielded from our data analysis was that the construct and design of the simulation has tremendous impact on perceived clinical utility and educational value in preparing learners for clinical education experiences. In the first subtheme, *predictability reduces fidelity*, participants reported that the more variable and unpredictable the scenarios were, the greater the psychological fidelity. Thus, when faced with similar clinical patient care situations, they had greater transfer of knowledge and skills and reported improved ability to reflect in action and make rapid clinical decisions. The participants also endorsed that SBE with greater variability prepared them for unexpected clinical situations and led to better patient care. Participants endorsed the educational value of being "thrown to the wolves," (Participant 5, FG B) and not knowing exactly what to expect, as that more closely mimicked actual patient encounters.

"Going in (to the SBE)," stated one participant, "I knew I was going to have 1 of 5 things. As much as I really liked that comfort, I wished it could have been one out of 50 things, because on clinical, that's what it was like." (Participant 5, FG B)

Additionally, there was a sense that environmental or physical fidelity and subsequent transfer of learning to clinical care was diminished by having equipment needed for examination and/or treatment available in the simulation space. As shared by one participant:

> "I think one thing that might be helpful is mimicking the acute care side more by having an area that's your equipment closet that has rolling walkers, crutches, oxygen tanks…so that if it's a type of scenario that you have 1-2 students co-treating in a simulation they have to go pick out all that out based on the information they have and make that decision then. When they go into the room, they have to work with what they have." (Participant 4, FG A)

Process constrains transfer to practice was the second subtheme identified. There was a sense that faculty over-prepared students for SBE by providing extensive case information and too much preparation time. As stated by one participant: "When I was in the clinic or before going to a patient's house, sometimes I had time to look at the chart, and sometimes a few minutes with a warm hand off, so I just had to go for it." (Participant 1, FG A) This was further echoed by a participant who added: "You show up in the morning and get a schedule, and then you have an hour to review all the charts." (Participant 5, FG B) Similarly, a third participant added: "It would be helpful to get used to thinking on your feet instead of having all day to prepare." (Participant 2, FG A)

The third subtheme in this category was *interactions impact value*. Participants stated that group-based simulations diluted the learning experience, as they resulted in constrained decision making, limited hands-on experience, decreased individual accountability, and prolonged observation time. One participant commented: "I think the amount (that SBE) helped your decision making depended on your position in that specific simulation. For some of the simulations, one person was specifically supposed to be the one doing the decision making, like to terminate exercise, and the other ones were just guarding the patient." (Participant 2, FG B) Another added: "There was one sim lab where as a group we were all like one piece of a PT." (Participant 5, FG A) This sentiment extended to the acquisition of communication skills, with participants reporting that observation alone did not serve to improve communication skills, and remarking: "I think a more individual experience would have been more beneficial." (Participant 4, FG B)

Participants additionally believed that having professional standardized patients (SP) to interact with, rather than faculty, students or high-fidelity manikins as patients, would have increased authenticity and educational value. One participant stated: "I know who (the professor) is in my mind…. I personally struggle with getting that particular learning opportunity of communicating with other healthcare professionals in the sim lab because of the relationship I had with the professors." (Participant 1, FG A), while another remarked, "there was (one line) that didn't make sense to me, so I yanked it, and then the (manikin) didn't work. I think someone having an IV taped to their arm might have been better." (Participant 5, FG A)

Debrief Provides a Framework for Reflection & Communication

The second theme which emerged was that debriefing allows students to develop a framework for self-reflection and communicating with their clinical instructors. Participants reported integrating debriefing practices into clinical education experiences, which resulted in increased ability to reflect in action and reflect on action. This gave rise to the first subtheme in this category: *debriefing enhances self-reflection.* Participants acknowledged that while it was uncomfortable to reflect with faculty immediately after SBE, the debriefing sessions led them to engage in a similar, self-reflective process during and after patient encounters during clinical education. One participant stated: "It planted the seed for the system I would use and hone in on once I was on clinical." (Participant 3, FG A). Another noted:

> "I found myself, especially as I got to my third clinical…thinking in the room…Oh, I could have set that up better. I could have introduced this piece of information better. I could have demonstrated that better. Almost in the moment, and as soon as I walked out of a room, especially if my CI was observing." (Participant 4, FGA)

The second subtheme which emerged was that debriefing provided a *model for communication* with their clinical instructors. "The experience of having to debrief afterward- it made me more comfortable with that as a process because I needed to do it every day (on clinical)." (Participant 6, FG A) Participants reported that the SBE debriefing experience, including discussion about strengths and areas for improvement as they did with the Delta/Plus model for debriefing, improved their ability to communicate on clinical education. Participant 2 (FG A) stated:

> "Sim was the one place in school where it was like, what did you do right? We talked about the good part and that set us up for clinical to talk about things that went well, and the things that didn't go well."

Similarly, Participant 3 (FG B) said "After an evaluation, we (spoke about) what went well and what didn't. They had their own sheet about what went well and what didn't. It was very similar to the sim lab debriefing structure."

Promotes Self-Efficacy for Clinical Practice

The third theme found in this study was that SBE during the academic portion of the DPT curriculum enhanced students' self-efficacy to provide safe and appropriate patient care during clinical education affiliations. Participants described how their involvement in multiple simulations allowed them to learn from mistakes in a safe environment and enhanced their autonomy. Improved *confidence in challenging environments* was the first subtheme identified under this larger theme. Participants recalled how the stress of having faculty observe their performance prepared them for the watchful eye of their clinical instructor. A participant commented:

> "Knowing that the professors are watching and critiquing you, even if behind a wall, is actually really helpful for clinical because basically that is what clinical is! You are supposed to be focused on the patient but there's that added pressure knowing that someone is watching over you." (Participant 3. FG B)

Additionally, participants described how exposure to authentic hospital rooms, complete with medical monitoring and treatment devices, prepared them for critical care experiences. "I was in the NICU and the lines and tubes…are really intimidating. Having been in a room with the lines and tubes and moving things to treat a patient, I think that helped me more than the actual interaction with the patient." (Participant 3, FG B) Participants agreed that the experience of physically guarding a patient while monitoring vital signs and managing medical and assistive devices in SBE prepared them for clinical practice. Further, participants articulated how repeated exposure to challenging scenarios fostered development of their professional demeanor and enhanced confidence. Participant 4 (FG B) stated "…learning how to keep a calm presence even when the situation may go crazy…that was really helpful for me especially for my home care clinical. Being able to be calm was very helpful."

Improved patient safety emerged as the second subtheme. Exposing students to changes in medical status during SBE afforded them opportunities to learn appropriate psychomotor responses that enhanced safety and could be translated into clinical practice. One participant discussed an experience in acute care in which their patient experienced severe orthostatic hypotension. "I was a basket case, but I had done it before in a sim lab and I knew I had to get the person back down. So, as horrible as it was, I had the motor memory of having done it before." (Participant 6, FG A) Yet another described how they were more cognizant of medical complications and added, "I ended up catching a few DVT's, which was reassuring

and validating because I didn't catch the one in sim lab!" (Participant 3, FGA) Several participants also stated that routinely taking and monitoring vital signs during SBE fostered safe practice during clinical experiences. As one participant said: "The physical practice in simulation of having to take a manual BP on someone who might be moving around or talking was super helpful, because once I got on clinical, I had to do all of that." (Participant 5, FG A)

DISCUSSION

The purpose of this study was to explore student perceptions of how SBE within the academic portion of their curriculum impacted their preparedness and experiences during clinical education. This was a unique study in physical therapist education literature, as it qualitatively explored the ways in which participants broadly perceived the impact of SBE during coursework on three clinical education affiliations at the end of the program. Inductive analysis revealed that the development of meaningful SBE to optimally prepare students for patient care requires strict adherence to best practices in simulation as described by the newly revised INACSL standards. Data revealed that SBE advanced the theory of experiential learning with respect to skills and competencies. Participant responses indicated that the reflection and conceptualization of knowledge that occurred during debriefing sessions gave rise to new methods of self-assessment, reflection and communication during clinical education. It was additionally clear that the attainment of certain competencies, such as screening for disease, managing ICU bedside care, or stabilizing emotions enhanced perceived performance in the clinical settings. However, in terms of comprehensive patient management and clinical decision making, participants were less enthusiastic about the way that the concrete experience led to active experimentation.

Data analysis revealed that learners benefit from less structure and predictability in SBE. Participants agreed that more variability in the scenarios would better prepare them for the unpredictability they encountered during clinical experiences. Accordingly, the authors suggest educators scaffold the SBE demands and unpredictability as learners advance through the curriculum. Findings also suggest that the prebrief should closely mirror clinical practice and that learners should not be given significantly longer periods of time than that provided in the clinic, nor should they receive copious amounts of documentation and planning forms, to prepare for the SBE.

Emphasis upon the importance of complexity in simulation design is congruent with literature that advocates for scenario versus skill-based simulation, as well as scaffolding of learning. Battista highlighted the importance of moving beyond skill based, or procedure-oriented simulation, to scenario-based simulation that presents learners with holistic problems and calls for the sequencing and integration of clinically relevant activities. The author identified 3 activity-based categories that are integral to scenario complexity: the use of physical clinical tools and artifacts, social interactions, and structured interventions. Their finding captures the perspective of participants in this current study who underscored the need to engage in proactive clinical decision making with respect to equipment retrieval and use, and additionally, suggests a useful template for the design of advanced simulation scenarios. It also advances the educational principle of scaffolding, during which a transition from a fixed mental model to a co-construction of new context specific knowledge and skills takes place. Scaffolding is consistent with best practice guidelines in healthcare and could facilitate the unpredictability deemed important by participants in this study.

Robust simulation scenarios that challenge learners to respond to emergent clinical events have been described in the literature. While many SBE have strived to portray advanced clinical scenarios, they have done so under the umbrella of a prescribed protocol. That element of control and predictability over the simulation environment was perceived by participants as less authentic and a hinderance to transference of knowledge to clinical practice. These perspectives are contrary to literature suggesting that structured time frames for simulation activities are essential to participant success. Participant beliefs regarding potential benefits of less structure during SBE is a topic worthy of further investigation in simulation education.

Research centered on roles and responsibilities during simulation has generated findings that differ somewhat from those in this current study. Rogers et al. found no difference in learning between participants with active roles in simulation versus observers. This mirrors findings by O'Regan et al. which assert that

learning is as effective for students in observer roles, with reports that observation allows participants to better see the big picture and examine details. O'Regan et al. emphasized the importance of observer tools, for example checklists, that can effectively engage participants who do not have a hands-on role. Such tools can be instrumental in facilitating a richer learning process; nonetheless, our findings suggest that observer roles may not prepare students for clinical care as well as hands-on experiences that require active decision making, psychomotor skill performance and communication. Hence, further research on the impact of observer roles during SBE in physical therapist education is recommended.

Debriefing has been described in the simulation literature as the most important component of the experience as it provides an opportunity for learners to reflect on the experience, identify knowledge gaps, and explore any discordance between intended actions and actual performance. Debriefing has been shown to be effective in enhancing communication and reflective practice. Our findings align with previous studies and highlight the value of debriefing in preparing students for clinical practice. Participant responses indicated that the reflection and conceptualization of knowledge that occurred during multiple debriefing sessions over the years in the academic portion of their training enhanced their ability to self-reflect in action and on-action during actual patient care encounters. Moreover, repeated practice in engaging in the Delta/Plus and Advocacy-Inquiry models for debriefing provided a blueprint for students to use while communicating with their clinical instructors about their actions, behaviors and care decisions, thereby increasing comfort with these conversations. These findings suggest that it may be beneficial to embed debriefing practices into a wider array of learning activities throughout the academic portion of DPT curriculum.

Findings that SBE enhance self-efficacy aligns well with, and adds dimension to, previous research in physical therapist education which has primarily focused on acute care settings. Participants described how confidence emerged in an array of challenging environments, with the need to execute multiple tasks simultaneously, manage critical changes in patient status, identify medical emergencies, prioritize safety, and maintain a professional affect. Qualitative data advanced understanding about the events and circumstances that build confidence during SBE and can be of value to educators as they work to design simulation scenarios. The authors also suggest that DPT programs consider expanding use of SBE, and thread increasingly complex experiences throughout the curriculum to enhance self-efficacy for clinical practice in a variety of settings rather than just for acute care. Further, educators who use SBE should receive formal training and mentoring in this teaching modality as results show how essential design, facilitation, prebrief and debrief components are to transfer of knowledge to clinical practice. The Strategic Initiative Panel on Simulation in Physical Therapy Education (SIPS) recently reported that 86% of entry-level PT education programs in the US delivered three or more simulation experiences, but 21% of the faculty leading SBE reported no training in simulation design and implementation. Further, 37% of faculty reported they were self-taught, while 48% said they received institution training in simulation however details of the training were not provided and were likely to vary. They concluded there is a lack of consistent training among PT faculty around best practice standards for the design, implementation and use of simulation as an educational strategy and emphasized the need for more formal training in SBE which is also supported by findings of this study.

Despite the provision of fiction contracts during the prebrief, which instruct learners to treat all aspects of the scenario as if they were authentic, participants stated they were incapable of believing that familiar faculty or students were actual patients during the SBE. This greatly limited the physical or environmental fidelity and lessened the perceived value of the experience. Therefore, findings support the use of professional SP in SBE, or at minimum persons unfamiliar to the learner who have been adequately coached. Research has shown that SP can create realistic and challenging learning environments, improve problem solving, and advance clinical judgement. The integration of highly trained SP may also allow for greater variability during the simulation experience. To that end, it may be advantageous to investigate whether SP can be given greater autonomy to change the expected course of a simulation scenario, shorten or lengthen interactions, or introduce an unexpected variable. The authors further encourage simulationists to adhere to best practices in the use of SP as described by the Association for Standardized Patient Educators (ASPE).

CONCLUSION

Findings of this study reinforce several previously reported results on the impact of SBE and highlights some areas where further research is warranted. Data supports the need for variability and complexity in pedagogical design and underscores the importance of environmental and psychological fidelity. It additionally emphasizes the value of debriefing both in academic and clinical settings and supports previous findings in the literature that SBE is an effective teaching method to enhance self-efficacy for clinical practice. This qualitative inquiry adds depth to previous research by describing the ways in which confidence and skill acquisition influence self-efficacy. Current research suggests that there is value in reflective exploration of SBE following immersion in the clinical setting. Future research should focus on the degree of structure and student roles in SBE necessary to optimally prepare students for clinical care.

REFERENCES

ACAPT Strategic Initiative Panel on Simulation Preliminary Report. (2020, October 1). Academic Council of Academic Physical Therapy website. Retrieved November 6, 2021, from https://acapt.org/docs/default-source/default-document-library/acapt-sips-report---final3.pdf?sfvrsn=5f8982d8_2

Battista, A. (2017, November 21). An activity theory perspective of how scenario-based simulations support learning: A descriptive analysis. *Adv Simul (Lond).*, *2*, 23. doi:10.1186/s41077-017-0055-0

Blackstock, F.C., Watson, K.M., Morris, N.R., Jones, A., Wright, A., McMeeken, J.M., . . . Jull, G.A. (2013). *Simul Healthc*., *8*(1), 32–42. doi: 10.1097/SIH.0b013e318273101a

Campbell, D., Trojanowski, S., & Smith, L.M. (2020, January 1). An interprofessional end-of-life simulation to improve knowledge and attitudes of end-of-life care among nursing and physical therapy students. *Rehab Onc*., *38*(1), 45–51.

Cavanaugh, J.T., & U Konrad, S.C. (2012). Fostering the development of effective person-centered healthcare communication skills: An interprofessional shared learning model. *Work*, *41*(3), 293–301. doi: 10.3233/WOR-2012-1292

Coppola, A.C., Coppard, B.M., & Qi, Y. (2019). Impact of Participation in an Interprofessional Acute Care High-Fidelity Simulation for Occupational and Physical Therapy Graduate Students. *J Allied Health*, *48*(4), 248–256.

Creswell, J.W. (2012). *Research Design, Qualitative, Quantitative, and Mixed Methods*. Thousand Oaks, CA: Sage Publications Ltd.

Creswell, J.W. (2013). *Qualitative Inquiry and Research Design*. Los Angeles, CA: Sage Publications Ltd.

Decker, S., Alinier, G., Crawford, S.B., Gordon, R.M., Jenkins, D., & Wilson, C. (2021, September 1). Healthcare Simulation Standards of Best PracticeTM The Debriefing Process. *Clin Sim Nurs*., *58*, 27–32.

Donlan, P., Greenwood, K., & Kiami, S. (2020, April). A Qualitative Exploration of Simulation as a Tool for Learning in Physical Therapist Education. *J Acute Care Phys Ther*., *11*(2), 84–92.

Dreifuerst, K.T. (2015, May 1). Getting started with debriefing for meaningful learning. *Clin Sim Nurs*., *11*(5), 268–75.

Edwards Collins, M.E., Bell, C.S., Migliarese, S.J., Smith, N., Allison, L.K., Bethea, D.P., . . . Conner, T.A. (2020). Student Perceptions of a Live Standardized Patient Interprofessional Education Scenario: A Multi-Year Study. *J Allied Health*, *49*(1), 8–13.

Fewster-Thuente, L., & Batteson, T.J. (2018). Kolb's Experiential Learning Theory as a Theoretical Underpinning for Interprofessional Education. *J Allied Health*, *47*(1), 3–8.

Gaylle, D. (2019). In-simulation Debriefing Increases Therapeutic Communication Skills. *Nurse Educ*., *44*(6), 295–299. doi: 10.1097/NNE.0000000000000643

Ha, E.H. (2018). Experience of nursing students with standardized patients in simulation-based learning: Q-methodology study. *Nurse Educ Today*, *66*, 123–129. doi: 10.1016/j.nedt.2018.04.023

Hsieh, H.F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qual Health Res.*, *15*(9), 1277–1288. doi: 10.1177/1049732305276687

Johnston, S., Coyer, F.M., & Nash, R. (2018). Kirkpatrick's Evaluation of Simulation and Debriefing in Health Care Education: A Systematic Review. *J Nurs Educ*., *57*(7), 393–398. doi:10.3928/01484834-20180618-03

Lewis, K.L., Bohnert, C.A., Gammon, W.L., Hölzer, H., Lyman, L., Smith, C., . . . Gliva-McConvey, G. (2017, June 27). The Association of Standardized Patient Educators (ASPE) Standards of Best Practice (SOBP). *Adv Simul (Lond)*., *2*, 10. doi: 10.1186/s41077-017-0043-4

Miles, M.B., Huberman, A.M., & Saldana, J. (2014). *Qualitative Data Analysis.* Thousand Oaks, CA: Sage Publications Ltd.

O'Regan, S., Molloy, E., Watterson, L., & Nestel, D. (2016, January 11). Observer roles that optimise learning in healthcare simulation education: a systematic review. *Adv Simul (Lond)*., *1*, 4. doi:10.1186/s41077-015-0004-8

Pritchard, S.A., Blackstock, F.C., Nestel, D., & Keating, J.L. (2016). Simulated Patients in Physical Therapy Education: Systematic Review and Meta-Analysis. *Phys Ther*., *96*(9), 1342–1353. doi:10.2522/ptj.20150500

Rogers, T., Andler, C., O'Brien, B., & van Schaik, S. (2019). Self-Reported Emotions in Simulation-Based Learning: Active Participants vs. Observers. *Simul Healthc*., *14*(3), 140–145. doi:10.1097/SIH.0000000000000354

Sabus, C., & Macauley, K. (2016, January 1). Simulation in physical therapy education and practice: Opportunities and evidence-based instruction to achieve meaningful learning outcomes. *J Phys Ther Educ*., *30*(1), 3–13.

Silberman, N.J., Litwin, B., Panzarella, K.J, & Fernandez-Fernandez, A. (2016, January 1). High Fidelity human simulation improves physical therapist student self-efficacy for acute care clinical practice. *J Phys Ther Educ*., *30*(1), 14–24.

Silberman, N.J., Litwin, B., Panzarella, K.J., & Fernandez-Fernandez, A. (2016, January 1). Student clinical performance in acute care enhanced through simulation training. *J Acute Care Phys Ther*., *7*(1), 25–36.

Spies, C., & Botma, Y. (2020). Optimising simulation learning experiences for mature, postgraduate nursing students. *Nurse Educ Pract*., *47*, 102834. doi: 10.1016/j.nepr.2020.102834

Thomas, E.M., Rybski, M.F., Apke, T.L., Kegelmeyer, D.A., & Kloos, A.D. (2017). An acute interprofessional simulation experience for occupational and physical therapy students: Key findings from a survey study. *J Interprof Care*., *31*(3), 317–324. doi:10.1080/13561820.2017.1280006

Tong, A., Sainsbury, P., & Craig, J. (2017). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*, *19*(6), 349–357. doi:10.1093/intqhc/mzm042

Wallace, D.R., & Gill, J.M. (2018). Attracting the interprofessional collaboration between physical therapy, speech therapy and ABSN nursing students working with patients diagnosed with stroke during simulation. *J Nurs Educ Prac*., *8*(3), 56–43.

Watts, P.I., McDermott, D.S., Alinier, G., Charnetski, M., Ludlow, J., Horsley, E., . . . Nawathe, P.A. (2021, September 1). Healthcare simulation standards of best practiceTM simulation design. *Clin Sim Nurs*., *58*, 14–21.

APPENDIX 1: FOCUS FROUP INTERVIEW QUESTIONS

1. With respect to preparation for a patient encounter, how do you perceive that your simulation experiences played a role?
2. Can you describe how your simulation experiences impacted communication with the healthcare team members?
3. How did your simulation experiences contribute to your ability to perform PT assessments and interventions?
4. How did your simulation experiences influence your "on the spot" decision making?
5. How did you engage in reflective practice during your clinical education?
6. Describe any parallels that occurred between simulation based reflection and reflection during clinical practice?
7. How did simulation help shape your behavior during clinical education?
8. What did you do as a clinical education student that you could directly attribute to your simulation experience?
9. Think about how you applied your simulation experiences to clinical practice. Based on this, how should simulation experiences be changed or restructured? What could be done differently?
10. When thinking back on your simulation activities during coursework, were there any experiences which you feel did not contribute to your clinical practice during clinical education?

APPENDIX 2: STATEMENT OF REFLEXIVITY

It is important to recognize the ways in which the experience of the researchers in this study had the potential to affect data analysis. The principal investigator in this study has expertise in designing simulation scenarios, and both researchers have years of experience as clinical practitioners. This level of skill contributed to a perception that the simulation activities embedded into the curriculum offered sound preparation for clinical practice. Additionally, both researchers have had previous experience as participants and instructors for simulation activities, which could have influenced their personal views about the experience. Following recognition and acknowledgment of individual beliefs, researchers worked to approach inquiry and analysis with objectivity, thereby allowing student perceptions to emerge.