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Featured Article

Simulation as a Disruptive Innovation in Advanced Practice Nursing Programs: A Report from a Qualitative Examination ☆

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Abstract Simulation as a pedagogy is used extensively to educate healthcare professionals in both academic and clinical arenas with the intent to improve the delivery of care and patient outcomes. Advanced practice nursing (APN) programs use simulation as a pedagogy even though APN accreditation and certification organizations prohibit substituting simulation hours for the minimum 500 clinical hours. The purpose of this qualitative study was to explore faculty perceptions of educating APN students using simulation. Focus groups were conducted with a convenience sample of APN simulation faculty. Disruptive innovation theory was used by the researchers to guide the data analysis. Themes emerging during analysis included: 1) extrinsic tension and pressure in the midst of chaos, 2) internal vulnerability, and 3) passion and tenacity to remain resilient. The study results provide clarity to understand integration of APN simulation in the current environment, and introduce the impact of simulation as a disruptive innovation.

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Introduction

The apprentice model for nursing clinical education and nurse practitioner (NP) education is well-established and believed to be the 'gold standard' of clinical learning. However, there is a lack of empirical data to support this model (Haerling & Prion, 2021; Harder, 2018; Leighton, Kardong-Edgren, McNelis, Foisy-Doll, & Sullo, 2021; Waxman, Bowler, Forneris, Kardong-Edgren, & Rizzolo, 2019). The use of simulation allows educators to provide contextually based learning experiences for NP education. Currently, advanced practice nurse (APN) accreditation and certification organizations allow programs to substitute simulation hours for clinical hours that are beyond the required 500 clinical hours (NONPF, 2010; NONPF, 2020; NTF, 2016). The rationale for this decision includes the need for more rigorous evidence to validate simulation in replacement of clinical time. Researchers examining the use of simulation in APN education found increases in student satisfaction, confidence, and knowledge (Nye, 2021; Pittman, 2012; Rutherford-Hemming, Nye, & Coram, 2016; Warren, Luctkar-Flude, Godfrey, & Lukewich, 2016). In addition, simulation enhanced communication skills (Bays et al., 2014; Curtis et al., 2013; Koo et al., 2014; Phillips, Lie, Encinas, Ahearn, & Tiso, 2011; Yuasa et al., 2013), and clinical performance (Bays et al., 2014; Curtis et al., 2013; Fleming et al., 2009; Gasko et al., 2012; Paige et al., 2014; Rutherford-Hemming, 2012).

APN faculty, nevertheless, have incorporated simulation into their curriculum and use it extensively. In a survey of pediatric acute and primary care NP programs, 85% of respondents (N-75) reported using simulation (Hawkins-Walsh et al., 2011). At a 2013 NONPF conference, 54% of APN faculty participants said they used high-fidelity simulation, and 69% integrated simulation as a component of their clinical experiences (National Organization of Nurse Practitioner Faculty NONPF, 2013). Additionally, in a recent descriptive survey of APN educators, 98% of APN programs (n = 133) integrated simulation in their curriculum (Nye, Campbell, Fancher, Short, & Thomas, 2019). Loss or decreased availability of clinical placement due to COVID has heightened the use of simulation to provide consistent clinical experiences (Carolan, Davies, Crookes, McGhee, & Roxburgh, 2020). The accreditation agencies did not alter mandatory requirements for 500 minimum hours of direct patient care during COVID (AACN, 2020;

NONPF, 2020). However, NONPF did provide guidance and support for APN faculty providing simulation through the publication of *Simulation Guidelines and Best Practices for Nurse Practitioner Programs* (Lioce et al., 2020).

There is clear evidence that simulation is incorporated into APN education; however, the faculty experience when using simulation to teach APN students is unknown. During analysis of qualitative data from a previous study (Nye et al., 2019), it became apparent contextual issues required further exploration related to faculty training, resource availability, and administrative support for APN simulation. The purpose of this qualitative study is to explore the faculty experience of providing simulation in APN programs.

Research Aims

The identified aims of this qualitative research project included:

1) What is the experience of planning, delivering and implementing simulations in advanced practice nursing programs?
2) What are the best practices for simulation integration, meeting resource needs, and faculty preparation in advanced practice nursing programs?

Theoretical Basis for Study

According to Daley & Campbell, 2018 in the *Framework for Simulation Learning in Nursing Education,* learners in simulated environments arrive with a unique view of the world based on interpretations of past experiences. Advanced practice nursing learners have concrete contextually placed patient experiences that allow for thinking critically, communicating effectively, and intervening therapeutically, yet they are novice APNs. In debriefing, learners reflect on and conceptualize how simulation scenarios, and learning new behaviors are situated within their frame of knowledge. In the final stage, learners transfer the new knowledge and understanding gained and apply it in patient care (Kolb & Kolb, 2005). Simulations that are carefully planned, tied to professional competencies, and orchestrated following the guidelines for best practice (INACSL, 2016; Lioce *et al.*, 2021) provide a standardized and consistent learning experience not guaranteed in the chaotic clinical environment. This consistent learning experience ensures all students receive a baseline of key

learning opportunities and demonstrate leveled program competencies. The Daley & Campbell, 2018 Framework was used to develop the questions for the focus groups.

The theory of disruptive innovation (DI) informed the interpretation of the data. The DI theory was initially developed in business to examine innovation leading to new products and services. However, at the heart of the theory lies the 'process' of incorporating innovative products, services, and methodologies into the way things were previously done (Christensen, Waldeck, & Hogg, 2017). The process includes development, refinement, and advancement of the DI. Considering simulation as a DI in APN programs, then 1) the use of simulation for clinical experiences is disruptive, 2) faculty's experiences integrating and implementing simulation is disruptive, and 3) additional research must occur to support the credibility of simulation as a DI to ensure it aligns with program accreditation regulations and usefulness.

Methodology

Research Design

This study was a qualitative design using an iterative interpretive approach to address the research aims and analyze the data. Data was gathered through four semi-structured focus groups conducted with Zoom video conferencing technology (Archibald, et al., 2019) and Doody, Slevin, and Taggart (2013a) & 2013b) process for preparing for and conducting focus groups.

Focus Group Question Development

Focus group questions were initially developed during data analysis of a previous study (Nye et al., 2019). The drafted interview questions were reviewed by qualitative research experts, and pilot tested with simulation experts and APN faculty to refine the questions for clarity and specificity. The final revision included seven questions with corresponding probes to assist deeper understanding. See Table 1 for questions with probes.

Sample

Fifteen APN simulation faculty participated in one of four focus groups. Invitees were solicited from four sources: 1) respondents from a previous study by the research team, 2) APN simulation faculty involved with an APN simulation consortium, 3) individuals who were recruited at APN or simulation conferences, and 4) National Organization of Nurse Practitioner Faculties Simulation Committee members. See Table 2 for demographic data. Inclusion criteria were the ability to speak and understand English, and currently teaching using simulation in an APN program.

Exclusion criteria included those who did not meet the inclusion criteria and/or who were not willing to be audio and video-taped for the interview.

Protection of Human Subjects

Approval from the Institutional Review Board (IRB) at the Virginia Commonwealth University was obtained prior to initiating the focus group interviews, exempt status was granted. By accepting the invitation to participate in the focus group, participants acknowledged electronically that their participation was voluntary, that they would be video and audio recorded, that their data would be de-identified and presented in the aggregate, and that they understood that they were free to withdraw from the study at any time.

Focus Group Management

Four focus groups were held using Zoom teleconferencing software. Each focus group took approximately 60 minutes. Preparations for and conducting of the focus groups followed Doody et al. (2013a) guidelines, although modifications were made to accommodate a virtual environment. Participants were informed that they would be filmed and all cameras should be enabled to allow for audio and video-recording. The focus groups were led by one team member. A second team member observed and recorded non-verbal behavior of participants. The third team member recorded notes about the content discussed. At the close of each session, the research team debriefed the session. The recordings were transcribed by a research assistant and the transcribed content was de-identified.

Data Analysis

Data analysis included descriptive demographic statistics about the participants and a qualitative analysis of the transcriptions of the focus groups. A Five Steps Process (Doody, 2013b, p. 268) was used for data analysis. Team members:

  Step 1 - read through the transcripts and notes to become familiar with the data;
  Step 2 - completed a second read, jotting notes in the margins of the documents;
  Step 3 - jointly coded the data from their individual notes into a framework of broad ideas or concepts using a collaborative online format;
  Step 4 - jointly identify patterns and connections between coded data in order to develop the final themes; and
  Step 5 - developed a descriptive summary that best fit the data.

Table 1 Focus Group Questions and Probes.

DI Focus	Questions	Probes
Disruption	Tell us how simulation is integrated into your curriculum.	What courses are easier to integrate simulation? What are the challenges in adding simulation into these courses? Do your simulation hours count for didactic, clinical, or lab hours?
Refinement	What resources need to be in place for simulation to be successful?	What is missing- Finances, training, equipment? Do you have resources that you find key to your organization success? Do you have a missing resource that you think would help your organization?
Disruption	If you also teach in the Undergraduate program, how is your approach with simulation different from the APN program?	Is there a difference with how advanced practice nursing simulation is supported in your organization compared to undergraduate simulation?
Refinement	What about your techniques to evaluate faculty simulation facilitation or debriefing skills?	Do you use a specific tool to evaluate faculty? What challenges do you face in evaluating faculty?
Refinement	Tell us about how you evaluate the simulations themselves.	Do you use formative sims, summative sims, high-stakes sims, or a combination? What tools do you use to evaluate the simulations? What is your biggest challenge in your evaluations of simulations?
Refinement	How are faculty currently prepared to participate in simulations?	What would be the ideal way to train faculty? How is training best delivered-online, face-to-face, off-site? What are the biggest challenges? What is a solution?
Advancement	Is there anything we have not talked about that you would like to add regarding your aspirations about the use of simulation with advanced practice nursing students?	

Themes

Simulation was integrated in APN education throughout the participants' schools of nursing. Both formative and summative simulations were used to varying degrees in the different programs. There was wide variation of how simulation programs were organized and in the level of support from faculty and administration. Themes that emerged during analysis included extrinsic tension and pressure in the midst of chaos; internal vulnerability; and passion and tenacity to maintain resilience. The disruptive innovation facet that pertains to the theme is included.

Extrinsic Tension and Pressure in the Midst of Chaos [Disruption]

The participants shared perceptions of external tension or pressure that impacted their ability to provide quality simulations. The tension or pressure arose from a variety of external sources. A common tension related to the variation of faculty understanding and support for simulation. One participant shared, "I think there's a big hurdle because often times faculty are subject matter experts or they feel they're experts in their field, yet they don't necessarily value that additional training and education in relation to sim." "... I've had to cancel full sessions of days of maybe 20 or 30 students just because that secondary person [canceled]. Now I don't have a station that I was supposed to have and then you just physically don't have the capacity to do it by yourself ..."

Uneven faculty training caused tension. "... you sometimes are going to have people that have been trained with different levels of simulation experience before they get into the level that we're at. So we have to sort of bring everybody on to the same level." One participant stated "... I think that education for your faculty to understand simulation and how to make it happen is essential."

Many participants worked at online programs. Bringing students to campus intermittently for immersive simulation experiences created another tension. "So when the students ...are here for about three days, and... getting 100 students through ... is exhausting for everybody, the students, and the faculty, and the staff. So we usually start at six o'clock in the morning,... And so while the students get breaks, we don't necessarily get breaks." "Our simulations are done ... during a summer intensive week when all its students are

Table 2 Participant Demographics.		
Characteristics	*n*	*%*
Role		
APN Faculty	6	40
Simulation Director	3	20
Program Director	5	33
Associate Dean	1	7
APN Concentration/Track		
Adult-Gero Acute Care	2	13
Family	10	66
Pediatric Primary Care	1	7
Women's Health	1	7
CRNA	1	7
CHSE Certified	5	33
	Range	Mean
Years teaching APN students	1-20 years	9.5
Years teaching APN simulations	1-15 years	7.4

on campus. It's exhausting. And anyone who has some experience in simulation, faculty wise, ends up being put in there. So some of the faculty have had some formal education and simulation. Some of them ... are employees that we pull out of practice and have them teach for us. So there's a whole varying degree of competency."

A frequently mentioned tension was the lack of approval from accreditors regarding using simulation to replace clinical hours. "... because of the regulations associated with the use of simulation on the undergraduate level; it's easier ... to integrate simulation into that curriculum." "It's hard to do a formative [simulation] when you don't have buy-in from the credentialing body (for APNs)." "So if we look at ourselves in comparison to ... medical specialties, dentistry, all of these other(s)....have milestones that are already built-in ... In advance practice in nursing ... we don't necessarily have milestones that we need to demonstrate competency sequentially through their development and we haven't incorporated or moved towards clinical competency evaluation ...". Another participant stated, "we think that we would begin to see on the advanced practice level the use of simulation for clinical hours...we have a really hard time getting pediatric and OB hours because we have to compete with the med students and...11 other programs."

An additional pressure was the lack of administrative support for funding the number of personnel needed to effectively run a simulation center. "You really do have to have that support staff in the simulation center to help you make those events go– there's just no way we could coordinate and schedule and gather everything together in addition to writing the scenarios and organizing the students." Several participants mention the positive effect of having administrative support for simulation. One participant shared ". . . the dean was ... very positively promoting graduate simulation. And so I think having the stakehold-

ers with the commitment is really a positive way to get started."

Internal Vulnerability [Disruption-Refinement]

The second theme that arose from the data was a sense of internal vulnerability. This vulnerability was exhibited by the participants' perceptions of being exposed, or potentially harmed emotionally through their continued efforts to use simulation. "In order for us to even start doing summative [simulations]; the scenarios that we choose need to be valid and reliable which we haven't been able to find. 2) We have so many people that are going to be evaluating that. It really would take a lot of time ...to make sure that we're all grading the same way...because there's so many different factors...we know that we cannot implement the summative evaluations the proper and correct way...also I've experienced...grievances which people have lost because we haven't tested this area." Many participants spoke about the need for support for APN simulations. "I think that we need, obviously, the financial resources to expand this simulation. We have an extensive simulation program for the undergraduate[s], highly utilized for at least 25% of their clinical coursework, but when I came to the University there really was not any graduate-level simulation, and it's now five years. … at a grassroots level, most of the specialties have been able to build some sort of simulation."

Passion and Tenacity to Maintain Resilience [Disruption - Advancement]

The participants revealed a sense of passion and tenacity as a way to maintain resilience. This passion included many ideas of how to improve their current situation. One participant stated "I think one major positive is having faculty that have a passion for it because they go above and beyond what's expected." "I have on the graduate side three faculty champions... they have actually been the champions of initiating it, developing when we didn't even have a budget." Another participant shared the common problem of variations in enthusiasm "I was just thinking about one other challenge that I've had is with faculty and when if you come up with a really good, you think it's a great idea, let's do this simulation, and it's like, well, 'I don't think we need to change anything. We've got great pass rates.'". Discussion of faculty preparation generated ideas. "I would really love to have a more formulated way of preparing our faculty for simulation."

Discussion

This study examined the perceptions of APN educators on the experience of providing simulations in their programs.

The themes that arose from the focus group data were analyzed through the lens of APN simulation as a disruptive innovation. Simulation is widely used in APN education, but many APN educators struggle with being able to use simulation due to a variety of barriers (Nye et al., 2019). Simulation has been accepted as a valid method of teaching and evaluating undergraduate nursing clinical performance (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Efforts to move APN simulation forward as an educational pedagogy, with the future potential as a clinical replacement have caused disruption in many academic institutions. While the APN accreditation agencies support the use of simulation, many participants spoke of the inability to use simulation for the core 500 hour clinical requirement as a barrier to their ability to gain a strong endorsement from their institution for the full integration of simulation. The continued use of simulation, in an environment that is not fully conducive or supportive to the use of simulation, speaks to the APN educators' passion for the process and outcomes of student learning through simulation.

Participants of the focus groups spoke to the perception that their requests for APN simulation resulted in a disruption to the institution status quo. While some educators worked in institutions that were supportive of APN simulation, many educators described the extrinsic tension that arose from their attempts to integrate simulation into their courses and programs. Many educators perceived the lack of administrative support, lack of resources, and lack of faculty support or training as external barriers that impacted their ability to provide quality simulation.

When participants felt they did not have the resources or support to create 'great simulation environments' there was a sense of 'failure' or personal vulnerability that stemmed from their difficulty in reaching a goal. Findings from this study support the construct that simulation is a disruption (Waxman et al., 2019). This growth phase has caused tension between people who are passionate about the use of simulation and have created a picture of the 'ideal' environment for it to occur, and the administrators, novices, and nay-sayers who ask for continued 'proof' of its usefulness. Participants in this study compared ideal environments versus real world-barriers and described the tension that kept them from achieving their goals.

Limitations

There are several potential limitations to this study. Content validity is a common threat to interview questions. The interview questions were reviewed by qualitative research experts, and were piloted with simulation experts to strengthen the face validity. The sample was a convenience sample of individuals interested in APN simulation, thus some response bias is possible. Although only United States APN programs were represented by the participants

in the focus groups, the international survey and representation of Canada by the researchers allowed for a broader perspective to situate results within North America.

Conclusion

This research study aimed to describe the experience of APN faculty delivering and implementing simulation in their programs. Incorporating innovative teaching methods, such as simulation, leads to disruption of the status quo. The evidence gathered was heavily focused on the first two parts of the disruptive innovation theory: the disruption itself and refinement of it. Broader visioning of the third part of DI theory, "advancement" was seen in the final theme, Passion and Tenacity to Maintain Resilience. A key to reducing the barriers to simulation is further research that demonstrates changes in learner critical thinking and performance. In addition, a clarification of the level of support for simulation by accrediting agencies could decrease the institutional barriers to simulation. Continued work in the advancement component of DI requires a paradigm shift within nursing education to embrace new processes for nurse practitioner education that relies on administrative support, faculty capacity building, and networking within the program. This paradigm shift may occur in the near future if the new, competency based AACN Essentials are approved and integrated into nursing curricula. Better envisioning to advance disruptive innovation could diminish some of the tension, pressure, and vulnerability experienced by many nursing faculty, including the participants in this study.

Declaration of Competing Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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