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An exploration of simulation-based education from the perspective of
nursing students

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Submitted in accordance with the requirements for the degree of Doctor of
Education

York St John University

School of Education, Language and Psychology

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Abstract

The research investigates simulation-based education (SBE) through undergraduate nursing students' experiences to understand how emotional engagement and peer dynamics and facilitator influence and environmental realism affect learning outcomes. The research investigated the complete range of simulation factors that affect behaviour because professional observations showed that contextual elements such as uniform use produced behavioural changes.

The research applied constructivist epistemology through qualitative multi-method case study methods to collect data from observations and photographs together with open-ended questionnaires and focus groups and individual interviews. The reflexive thematic analysis revealed three main themes which included student learning experiences and processes and educator roles in shaping experience and simulation environment effects on realism and student engagement. The research results showed that simulation-based education effectiveness requires both scenario fidelity and emotional safety alongside relational authenticity and facilitator presence and structured debriefing practices.

Students described simulation as a cognitively demanding and emotionally charged environment where peer support, emotional realism, and meaningful facilitator guidance were critical to engagement and professional identity development. Learning experiences became undermined when structure and emotional safety and operational quality showed inconsistency which led to student disengagement and alienation. The CARE-ful Simulation Framework serves as a design and evaluation model for SBE by focusing on Connection, Authenticity, Reflection, Emotional safety.

The research timing coincides with the Nursing and Midwifery Council's (2024) new provision that allows up to 600 clinical hours to be replaced by simulation. The study demonstrates that simulation-based education can only replace clinical placement when its design incorporates student experiences rather than following institutional or regulatory standards. Through its focus on student perspectives this research adds essential student-centred insights to the ongoing discussion about simulation teaching methods in nursing education.

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Chapter 1: Introduction

1.1 Introduction to the Study

Simulation-based education (SBE) serves as a fundamental educational method for nursing students today because it provides controlled environments for practising clinical skills and decision-making without endangering patient safety. Students use simulation to bridge academic learning with clinical practice through realistic, immersive scenarios which test their technical abilities and emotional responses (Gaba, 2007). Students use simulation to handle complex clinical challenges while thinking about their decisions and developing their professional identity in a secure environment.

The growth of SBE has accelerated because of changes in healthcare complexity, along with educational policy developments and resource availability. The Nursing and Midwifery Council (NMC, 2024) has established new regulations that allow students to fulfil 600 hours of their 2,300 clinical practice requirements through simulation-based education. Because of recent regulatory requirements, simulation design and delivery now stand as the essential foundation for professional preparation. This research investigates simulation beyond its function as a skill-building technique because it creates direct experiences that shape students' perceptions of their future nursing profession.

1.2 Problematisation and Pathway to the Research Focus

The decision to focus this research on simulation-based education (SBE) emerged directly from my experience as a nurse educator. In a safeguarding simulation session I delivered as part of routine teaching, an incidental event triggered deeper professional questioning. Students were asked to wear clinical uniforms for the purpose of marketing photographs. This was not a pedagogical decision at the time, simply a practical one. However, the impact of this choice on student behaviour and session engagement was immediate and noticeable. Students in uniform behaved more professionally, immersed themselves in the simulation, and demonstrated more appropriate clinical conduct. In contrast, the few who arrived without uniform were notably less engaged and less reflective of expected standards.

This prompted a short, reflective evaluation involving follow-up questionnaires, observational review, and photographic analysis. While the data were informal and retrospective, the behaviour change was apparent. Uniforms appeared to trigger a shift in mindset, from student to nurse-in-role, which, in turn, increased the effectiveness of the learning experience. This raised a broader and more compelling question: What other factors influence how effective simulation feels and functions for students?

From this point, the research focus expanded. The uniform was the first thread, but it became clear that it was part of a larger tapestry. I began considering the range of variables that could shape how students experience simulation, from facilitator style and emotional safety to fidelity, peer dynamics, and even how sessions are structured or debriefed. This led to early mapping and mind-mapping exercises to explore the complex ecosystem of simulation-based education, drawing on both personal practice and existing literature (Appendix 1). These reflections are what laid the groundwork for this research.

This focus also developed in the broader context of nurse education's shifting landscape. Nursing has undergone a process of professionalisation over several decades, moving from

hospital-based apprenticeship models to university-delivered degree programmes. While this transition has elevated the academic standing of the profession, it has also positioned nurse education within a corporate, outcomes-driven higher education system. Simulation has become central to navigating this complexity, a pedagogical strategy that satisfies clinical learning requirements, accommodates growing student numbers, and addresses placement shortages. But with this prominence has come pressure. SBE, through the researcher's own educational experience and as evidenced in literature (Nestel & Tierney, 2021), is increasingly used to fulfil competency requirements under time constraints, often without full regard to the underlying pedagogy or student perspective.

The issue intensified during the COVID-19 pandemic. Emergency NMC guidance allowed simulation to replace clinical practice hours, and many institutions rapidly scaled up its use. While this innovation was necessary, it further exposed weaknesses in simulation delivery, particularly around consistency, psychological safety, and learning outcomes. The recent formalisation of simulation in the NMC's updated 2024 standards, which now permit up to 600 hours of practice learning through SBE, has raised the stakes even further. Simulation is no longer an adjunct, it is a gateway to registration and patient care. This reinforces the urgency of understanding what makes simulation effective from the learner's point of view.

What began as a moment of reflection in practice, sparked by the simple decision to wear uniforms, has led to this doctoral exploration. At its heart, this research seeks to understand how simulation feels, functions, and affects students. It centres their experience not only as learners but as future professionals engaging with complex, emotionally charged learning environments. This research asks what students need to engage with simulation meaningfully and how we can design those experiences with greater intent, care, and pedagogical integrity.

1.3 Context: Nursing Education and the Role of Simulation

During the last thirty years, nursing education within the United Kingdom has undergone substantial modifications. Nursing education started in hospitals through apprenticeships but has transformed into a degree program based at universities. Professional readiness demands increased as the higher education system became more marketised, while pedagogical models transformed, and university standards became more aligned. The healthcare environment adopted simulation as a flexible tool that provided realistic clinical training through controlled, safe settings.

SBE allows complex scenario rehearsals, which traditional placements typically cannot achieve. The educational system helps students build both their technical abilities and their nontechnical competencies, including communication skills and prioritisation techniques, as well as teamwork development. According to Kardong-Edgren et al. (2010), advanced manikins, digital technologies, and immersive environments provide students with better abilities to manage actual clinical situations. The effectiveness of student learning through simulation depends on both the technical quality of the system and the emotional authenticity of the experience.

The COVID-19 pandemic elevated simulation-based education (SBE) to become an essential learning method. The severe disruption of clinical placements forced educators to quickly expand simulation education to maintain student advancement and program stability. Simulation was shown to be adaptable and capable, yet the inconsistent delivery systems and design elements and support mechanisms became apparent. The pandemic revealed multiple

problems in simulation-based education through reduced debriefing time, task-oriented scenarios, and inconsistent emotional safety measures. Such issues were present before the pandemic yet became visible when simulation became the main educational focus.

Since the NMC introduced simulation as a core element for 2024 regulated practice hours, institutions must now develop simulation programs while maintaining their educational quality. Despite its essential position in curricula, the student perspective has not received enough investigation. Most studies continue to concentrate on learning results together with skill development and fidelity measurement while using educator and institutional perspectives. Research lacks understanding of student experiences with simulation and their professional development, their feelings and professional identity formation.

1.4 Research Gap and Justification

This study responds to that gap. Simulation emerges in this study as a multifaceted educational experience which requires independent analysis because it provides more than competency delivery and serves as a space where nursing students face challenges and receive feedback and experience emotions and build their professional identities.

Simulation-based education (SBE) is under-explored from the learner's perspective in terms of research and conceptualisation. Much of the current literature has concentrated on the effectiveness of simulation in teaching technical skills, enhancing clinical decision-making or attaining specified competencies (Issenberg et al., 2005; Lapkin et al., 2010). Although valuable, these outcome-based studies have limitations because they often focus on performance measures and neglect the emotional, relational and psychological aspects of learning in simulation from the students' point of view.

Jeffries' Simulation Framework (Jeffries, 2005, 2012) and the National League for Nursing models have provided direction for scenario development and outcome assessment. However, they are mainly educator or institution centred. This research has explored the simulation space from inside, how students emotionally connect with it, what meaning they give to it, and how it contributes to their nursing identity.

Although simulation is recognised as a tool for developing clinical competence, confidence and professional readiness, the factors that make simulation effective for students are not always considered in research. Areas such as emotional safety, realism, peer observation, and structured debriefing are well theorised in educator discourse, but there are few studies that ask students directly what helps or hinders their learning during these experiences or how simulation prepares them for the emotional work and identity demands of actual practice.

The calls for more constructivist and interpretive approaches in simulation research by Parker and Myrick (2009) and Berragan (2011) stress the need to look beyond the technical aspects. This is particularly significant since the NMC (2024) introduced changes to the regulations, which now permit simulation to replace up to 600 clinical practice hours. These hours are not neutral. They are now part of what qualifies students to practise — and therefore, their impact must be understood not only in terms of skill acquisition but also in relation to engagement, confidence, and student-perceived value.

This study responds to that gap by centring the student voice. It explores how students experience, internalise, and emotionally make sense of simulation, and how these experiences affect their confidence, learning, and developing professional identity. It considers simulation

not only as a teaching method but as a lived and layered learning environment in which students experience pressure, performance, vulnerability, and growth. These student perspectives are crucial to understanding how simulation succeeds or fails in preparing nurses for practice.

1.5 Research Aim, Objectives and Question

In response to the identified gaps in the literature and the evolving role of simulation in nurse education, this study aimed to explore simulation-based education through the lens of the student nurse. It focused not only on what students are expected to learn during simulation but also on how they interpret, internalise, and experience it emotionally, cognitively, and professionally.

This focus is grounded in the belief that students are not passive recipients of simulated scenarios but active participants in shaping meaning, identity, and confidence through these experiences. As simulation increasingly replaces clinical placement hours, understanding how students experience it becomes central to its credibility, consistency, and value as a teaching method. An intention to research and respond to these concerns and issues led to the development of the following question, aim and objectives.

Research question

What makes a simulated teaching episode a more effective learning experience for nursing students in a higher education setting?

Aim

To explore the experiences and perceptions of what ensures effective simulated practice in nursing education from the perspective of student nurses and identify educational implications for simulation delivery.

Objectives

1. Create detailed field notes through observation of the simulated clinical education experience.
2. Obtain rich lived experience descriptions of the simulated clinical education experience for student nurses.
3. Analyse, interpret, and present these descriptions using a phenomenologically informed approach within a qualitative case study design.
4. Identify students' perceived understanding of what creates an effective clinical simulated learning experience.
5. Make recommendations for educational practice.

1.6 Researcher Positionality and Reflexive Considerations

As both a nurse educator and the researcher in this study, my position has inevitably shaped the research process. My experience delivering simulation sessions and observing student engagement overtime gave me insight into the complexities and inconsistencies in how simulation is delivered and received. It also raised questions that may not have been visible to

an outside observer, particularly around emotional dynamics, facilitator influence, and identity formation.

At the same time, this insider role carried the risk of interpretive bias. My assumptions about what ‘should’ happen in simulation had to be consciously examined and bracketed during data collection and analysis. Reflexivity was used throughout the study — including journaling, reflecting, and peer debriefing — to ensure that findings were grounded in participant experience rather than educator expectation.

While this study is shaped by my professional context, it is not an evaluation of my own teaching. Rather, it represents an exploration of how students engage with simulation as a learning experience across multiple institutions and formats, informed by but not confined to my own practice. Further reflection on positionality and reflexivity is located in chapter 5.

Context of Candidature

The journey of this research has been shaped not only by academic and methodological factors but also by personal circumstances. During the course of the project, I encountered significant personal challenges and health issues that impacted my progress at various stages. A new diagnosis of epilepsy was made following a direct impact on data collection when I was taken to the hospital during one of my observations. Recruitment difficulties, particularly in the context of the ongoing pressures on nursing education following the COVID-19 pandemic, also contributed to delays and necessitated adaptations to the original research plan. These challenges, while difficult, have strengthened my commitment to the research process and deepened my understanding of resilience in academic work. I acknowledge these experiences here to provide transparency about the context in which the study was completed.

1.7 Significance of the Study

The research provides important insights into nursing education by studying simulation learning from student nurse viewpoints. The widespread adoption of simulation in nursing education continues to generate minimal research about student experiences and emotional responses during these training activities due to much focus being given to the outcomes and strategic implementation of simulation to be in line with the NMC's new practice standards (NMC, 2024). The study fills a knowledge gap through its focus on student voices during both analysis and interpretation.

Advancing Understanding in Nursing Education

The existing body of research mainly investigates the technical and pedagogical aspects of simulation education through educator and institutional perspectives. This study reorients the examination point to students' experiences with simulation as places where they develop their identities, practice emotions, and face intellectual challenges; it reveals that simulation serves as a transformational learning environment beyond skill development because it functions as a professional development space.

Enhancing Simulation Based Education Practice

This study provides actionable recommendations for simulation design and delivery by analysing which student perceptions affect simulation effectiveness and ineffectiveness. The study reveals that emotional safety, facilitator influence, and structured debriefing are vital aspects which receive insufficient attention during performance- or task-oriented assessments

of SBE. The CARE-ful Framework serves as a practical framework to match simulation instruction with student requirements and achieve uniformity between educational facilities.

Improving Student Outcomes

The use of simulation has become directly associated with developing clinical competence and building student confidence before entering practice. The research provides insights into student simulation behaviour to enhance the development of training methods that effectively prepare nursing students for actual clinical practice. The integration of emotional fidelity with relational support and reflective space creates optimal conditions for simulation to enhance learner confidence, especially during practice transition.

Supporting Policy and Curriculum Development

Simulation has entered the regulatory structure of UK nursing education, thus requiring policy-driven excellence in its delivery. The research findings will guide curriculum development and simulation policymaking and staff training initiatives during the implementation of large-scale SBE programs as institutions follow national guidelines. The research addresses educational challenges related to placement capacity and the professionalisation of nursing practice while promoting fair experiences for students in a transforming healthcare environment.

1.8 Structure of the Thesis

This thesis is structured across six chapters, each building on the previous to develop a coherent exploration of simulation-based education from the perspective of student nurses.

- **Chapter 1: Introduction**
Establishes the background and rationale for the study, including its professional context, problematisation, and relevance to current policy. It outlines the research aim, objectives, question, and significance, and provides a brief note on researcher positionality.
- **Chapter 2: Literature Review**
Review existing literature related to simulation in nurse education, including theories of fidelity, professional identity, learner engagement, and emotional and cognitive learning. It identifies gaps in the current evidence base and establishes the conceptual framework for the study.
- **Chapter 3: Methodology**
Describes the philosophical and methodological approach underpinning the study. It details the research design, data collection methods (including interviews, focus groups, field observations, and visual data), participant recruitment, ethical considerations, and analytical strategy.
- **Chapter 4: Findings**
Presents the thematic findings of the study. It explores student experiences of simulation, organised around three major themes, with additional consideration given to divergent student voices. It ends with a synthesis of the findings leading towards the process of 'becoming a nurse.'
- **Chapter 5: Discussion**
Interprets the findings in relation to existing literature and theoretical frameworks. It introduces the CARE-ful Simulation Framework, developed from the study's findings, and discusses the broader educational and policy implications. The chapter also reflects critically on methodological strengths, researcher learning, and limitations.

- **Chapter 6: Conclusion**

Summarises the key insights from the study, revisits the research question and objectives to demonstrate how they were achieved, reflects on the study's contributions and limitations, and offers recommendations for future practice, research, and simulation policy development.

The following chapters progressively build the study's argument, starting with the professional and policy context for simulation-based education, moving through a critical review of existing literature, and then detailing the methodology employed. The findings chapter presents the voices and experiences of student nurses, while the interpretation chapter connects these insights to theoretical frameworks and practical applications. The thesis concludes by highlighting the study's contribution to knowledge and practice, and offering recommendations for future research and simulation design.

1.9 Chapter Summary

The research began with a practice-based observation, which evolved into a comprehensive study of simulation education and learning experiences for nursing students. The research exists within the framework of historical and pedagogical progress and regulatory requirements, especially since simulation has become essential under new NMC standards. The research study was shaped and developed to tackle an identified deficiency in current literature base in regards to simulation-based learning. The research aims to guide future simulation development, policy-making, and educational practice. The following chapter reviews the existing literature, exploring how simulation has been theorised, evaluated, and critiqued, and identifying the conceptual tools used to analyse the student experience of simulation-based education.

Chapter 2: Literature Review

2.1 Introduction

Simulation-Based Education (SBE) now plays a significant role in contemporary nursing education because it changes how pre-registration programmes teach clinical skills with professional judgment. The practical application of static mannequins and task trainers as a skill acquisition solution evolved into a sophisticated teaching approach which now includes high-fidelity manikins' virtual reality (VR) augmented reality (AR) and hybrid modalities. Healthcare facilities with rising patient complexities and time-sensitive situations alongside increasing patient care demands have driven fundamental changes to clinical readiness expectations and learning environments. The Nursing and Midwifery Council (NMC) together with other regulatory bodies continue to support simulation-based education as a legitimate replacement for clinical hours but questions persist about simulation quality and consistency and accessibility across institutions. The effectiveness of simulation education in teaching nursing students' technical competencies and critical thinking together with teamwork skills receives growing support from research yet its implementation methods and outcome assessment and student learning outcomes show considerable differences.

This review adopts a thematic method to assess the present state of simulation-based education in nursing. The chapter first outlines simulation history and its educational principles before discussing its function in teaching technical competencies and non-technical competencies. The subsequent analysis examines how different stakeholders including students, educators, service users, clinical partners and regulators express similar concerns and conflicting views about simulation design and delivery. Simulation education faces a detailed analysis of its issues regarding equity, access, and representation followed by an analysis of future challenges and possibilities in health education. The review discusses simulation effectiveness as well as its specific boundaries especially regarding emotional safety, facilitator readiness and scenario similarity to actual clinical environments. This review identifies crucial gaps in current research that justify further investigation about student nurse personal and professional development. The current study builds on the review's assessment of simulation strengths and weaknesses in the literature base to understand how simulation affects and is understood by its target participants.

2.2 History and Development of Simulation in Nursing Education

Simulation-Based Education (SBE) has been part of nursing education since the early days and today it is a very sophisticated educational tool that helps students learn a wide range of clinical competencies. The growth of this concept has been influenced by the progress of the healthcare system, changes in educational theory and the need to create safe learning environments in the context of the high-pressure clinical world. The first known simulation tool was “Mrs. Chase” a life size articulated mannequin made by Martha Jenks Chase in 1911. The device Mrs. Chase was created to help students practice patient care procedures like placement, bathing, dressing and basic assessments in a controlled environment that would not endanger patients (Nehring & Lashley, 2009; Burns, 2017; Weir, 2023). As time passed, injection sites and catheterisation features were included which enabled students to practice more complex skills. Mrs. Chase was not advanced by current standards, yet it served as a significant milestone for experiential learning by giving students safe yet realistic space to gain

skill and self-assurance. However, early mannequins like Mrs. Chase were limited to procedural replication and lacked the emotional and decision-making components now recognised as vital in holistic nursing education (Lewis, Strachan & Smith, 2012).

During the mid-twentieth century role playing and basic anatomical models became widely used in nursing education. The simulations provided an opportunity for students to practice these skills such as wound care and medication administration repeatedly until they were ready to move to actual patient care (Leighton, 2013; Hilleren, Christiansen & Bjørk, 2022). Simulation became essential because in most specialty areas including nursing, access to actual patients was restricted thus simulation remained underdeveloped. Resusci Anne, the CPR training mannequin invented by Åsmund Laerdal in the 1960s, represented a major advancement. It provided training in standardised and resuscitation skills and transformed life support education while introducing simulation into emergency care (Gaba, 2004). It was soon followed by SimOne, a computerised simulator which was able to simulate breathing, blinking and other simple physiological responses. At the same time, Harvey, a cardiology simulator was developed to teach students how to listen to hearts and diagnose rhythms with the aid of a hybrid mannequin (Harvey, 2003). These tools introduced high-fidelity simulation which brought more realism and responsiveness into the training. Nonetheless, early high-fidelity systems were expensive, technologically limited, and often inaccessible to smaller institutions, raising ongoing equity concerns in simulation adoption (Cooper & Taqueti, 2008). The development of simulation technologies achieved advanced levels during the 1980s and 1990s. The Gainesville Anaesthesia Simulator (GAS) and Comprehensive Anaesthesia Simulation Environment (CASE) provided scenario-based learning in anaesthesia and critical care fields which involved high risk (Gaba et al., 2003; Owen, 2012). The first simulators were designed for medical use, but nursing education also received these advanced high-fidelity simulators. This allowed them to replicate patients who are getting worse and give instant feedback and conduct crisis management which helped in preparing the nurses for uncertain and dynamic situations.

During this period, the pedagogical objectives of simulation also developed. Current practice has moved from basic technical skills development to encompassing other aspects of competencies including communication, decision making, teamwork, and clinical judgment (Lewis, Strachan & Smith, 2012; Aebbersold & Tschannen, 2013). The integration of Crew Resource Management (CRM) principles that are like those used in aviation have helped to show the importance of teamwork, awareness of mistakes, and the perception of a situation in healthcare training (Salas et al., 2001). Simulation training was adopted in nursing education systems in different countries of the world in the 21st century. Full body manikins, developed by Laerdal and Gaumard, are now high-fidelity simulators that can mimic physiological and verbal responses and can mimic cardiac arrest, sepsis, trauma, and other clinical emergencies (Medley & Horne, 2005; Herrera-Aliaga & Estrada, 2022). These tools enable the student to learn in stages of increasing difficulty as they go through the program.

Technology has also made simulation more accessible. Virtual Reality (VR) creates a completely realistic clinical setting where students can practice for low frequency or dangerous situations without the use of real equipment (Chen et al., 2020; Amod & Brysiewicz, 2019). Augmented Reality (AR) superimposes computer generated information on real life situations to help in the performance of procedures and navigation (Vigliani et al., 2021). These tools are particularly useful for instance, when students are required to view anatomical features or when they must operate on unfamiliar equipment. However, although VR and AR hold much promise they also pose new difficulties concerning learner disorientation, less peer interaction and

technical accessibility, especially for the students from low-income institutions. Further, current VR-based simulations often struggle to replicate the emotional and relational complexity of real patient encounters, a limitation that risks producing technically skilled but relationally underprepared graduates (, 2020).

The COVID-19 pandemic was another critical incident. Due to the suspension of in-person placements, simulation proved to be an effective substitute. The Nursing and Midwifery Council (NMC) and other similar bodies allowed simulation to replace a certain number of clinical hours (NMC, 2024; Alshutwi et al., 2022). This change was both efficient and meaningful, indicating that simulation is a valuable tool for the preparation of students for the practice. Nevertheless, the development of simulation has not been the same across all disciplines. Nursing has been one of the last disciplines to develop its own simulation scenarios. Most paediatric simulations were based on adult simulations without considering the special aspects of the developmental, emotional, and safety concerns in child health (Orique & Phillips, 2017). However, there are now more specific paediatric simulations available, including child manikins and family focused care simulations that are like those used on paediatric wards or during home visits. The field continues to evolve. Simulation is now applied to the full range of learning, incorporating the psychomotor, cognitive, and affective domains. With the use of high fidelity and digital simulations, the learning process can be made more engaging, interactive, and evidence based through real time adjustment, teamwork, and debriefing (Cooper & Taqueti, 2008; Kiernan & Olsen, 2020). As nursing education becomes more complex in the health care systems, simulation will continue to provide a flexible and scalable means of developing not only competence but also clinical reasoning, emotional intelligence, and ethical sensitivity.

In conclusion, the historical growth of SBE shows a gradual shift from simple, task-oriented training to complex, student-oriented learning environments. Simulation has been used for a long time to improve patient safety and technical skills, but current simulation is more educational in nature, aimed at the preparation of nurses for communication, emotional, and technical work in modern healthcare.

2.3 Levels of Technological Complexity in Simulation

Simulation-Based Education (SBE) is now a key part of nursing education, providing students with safe spaces to practice clinical and decision-making skills without putting real patients at risk. At its heart is fidelity, the extent to which the simulation reflects real-life clinical conditions. Fidelity is not one-dimensional but instead comprises physical, psychological, and conceptual elements and is classified as low, medium, or high. In this thesis, 'fidelity' is used to denote technical fidelity unless otherwise specified. This does not discount the importance of other forms of fidelity, such as psychological or emotional fidelity, which are acknowledged in the literature and are explicitly referenced in later sections where relevant. Each fidelity level serves different educational purposes at various stages of learning, across different contexts, and for different intended learning outcomes.

Low-fidelity tools, such as static models and part-task trainers, are useful for skill repetition and procedural confidence. These tools are particularly useful for early learners and institutions with limited resources (Cant & Cooper, 2010; Hill et al., 2023). The studies based on the Deliberate Practice Theory (Ericsson et al., 1993) show that they are useful for developing motor skills and basic proficiency. Nevertheless, they are not interactive and lack emotional fidelity, which means they are not well suited to more complex or interpersonal training (Gaba et al., 2007).

Medium fidelity level simulation incorporates vital signs like breathing patterns and heart rate alongside basic decision-making challenges. These modalities serve scenario-based learning to develop clinical reasoning and patient monitoring skills effectively (Gaba, 2004; Dieckmann et al., 2007). These modalities provide an optimal mix between cost effectiveness and realism and usability making them suitable for implementation within structured curricula. High emotional intensity and complex teamwork training present limitations for these simulation methods according to Salas et al. (2012). The literature indicates that medium fidelity lacks sufficient support for complex learning outcomes unless scenarios and facilitator guidance are properly developed.

High-fidelity environments provide manikins or software systems that create realistic patient responses through verbal interactions as well as vital sign variations and medical crisis situations. Such environments prove essential for developing communication and leadership abilities and teamwork skills when learners experience high pressure situations (Cant & Cooper, 2010; Kim, Park, & Shin, 2016). High-fidelity simulation provides instant feedback alongside built-in debriefing features (Fanning & Gaba, 2007). Research now questions the established belief that more realistic simulation settings produce better learning outcomes. Research findings demonstrate that enhanced realism in simulation does not directly result in better educational performance (Munroe et al., 2016). The effectiveness of high-fidelity simulation depends on factors such as cognitive load management and learner preparedness otherwise it may create student overwhelm and reduce learning efficiency (Sweller, 1994).

New simulation modalities such as Virtual Reality (VR) and Augmented Reality (AR) let students engage with interactive and customisable simulation experiences. Virtual Reality technology enables users to duplicate challenging scenarios such as paediatric resuscitations while Augmented Reality enhances real-world situations with digital interface elements (Padilha et al., 2019; Aebbersold et al., 2017). The tools provide adaptable features which support large-scale educational programs across different geographic locations (Kiegaldie & Shaw, 2023). The adoption of technological innovations presents several challenges because it increases costs and technical problems during training and reduces human interaction and causes learner confusion especially among those who lack experience with the technology (Brydges et al., 2020). According to Weldon (2020) fully immersive technologies face a challenge because they focus on visual impact rather than relational or cognitive aspects so effective instructional planning remains vital. Multiple simulation fidelity levels exist with no universally superior level. The optimal design choice depends on learner development along with specific learning targets and competency needs (Norman et al., 2012; Carey & Rossler, 2021). The best practice for first-year nursing students to practice injections is with part-task trainers yet final-year students need high-fidelity team-based scenarios to learn patient deterioration management.

The evidence from research shows that learning outcomes benefit more from qualified facilitators and organised debriefing strategies than from the simulation fidelity level (Cheng et al., 2016; Bland, 2023). The finding supports a simulation design approach that puts students first while following sound pedagogical principles and avoiding technology-oriented design.

The design of simulations should avoid the tendency to create unnecessary complexity. Layered design, combining different **technical** fidelity types within a coherent learning sequence, offers a more efficient, pedagogically sound approach. This strategy supports competence development while also addressing cost, accessibility, and logistical hurdles.

Fidelity Level	Definition	Benefits	Challenges
Low-fidelity	Simple tools like task trainers; basic or no physiological feedback	Cost effective Focused skill practice Easy to use	Limited realism Low immersion Not ideal for team training
Medium-fidelity	Simulators with basic interactive features; limited physiological responses	More realistic responses Cost-realism balance Improved engagement	Limited for complex scenarios Needs technical support
High-fidelity	Advanced mannequins or virtual patient with complex, realistic feedback	Highly realistic responses Supports teamwork and decision making Real-time feedback	Expensive Requires expert setup Resource intensive

Table 1 Definition of fidelity levels

2.4 Role of SBE in Contemporary Nursing Education

Simulation-based education (SBE) stands as a fundamental component in current nursing education standards. Simulation gained popularity before the Nursing and Midwifery Council (NMC) officially endorsed its substitution for clinical placement hours in 2024 because of the COVID-19 pandemic's impact on in-person training. The strategic implementation of simulation throughout educational programs facilitates students' progression from theoretical knowledge acquisition to practical clinical decision-making. The simulation method supports students in developing foundational competencies during early education then advances them to more challenging situations based on learning objectives (Coffman, Iommi & Morrow, 2022). The educational framework demonstrates the progression path of nursing students from novice to advanced practice. Research evidence demonstrates that simulation training leads to better clinical decision making and increased practitioner confidence. Students demonstrated better diagnostic reasoning abilities after undergoing structured simulation according to Elendu et al. (2024) and Crowe et al. (2018) discovered that frequent simulation practice led to better student confidence and improved patient care quality. However, much of the current literature still focuses on short-term improvements, and there remains a lack of longitudinal evidence on whether these gains are sustained into early professional practice (Weldon et al., 2022). According to Zendejas et al. (2013) and Lewis et al. (2019) simulation produces better patient outcomes in acute emergency situations. SBE develops professional competencies and enhances students' abilities to communicate and work together while fostering teamwork and interprofessional collaboration. The study results presented by Blackmore et al. (2018) and Rajaguru and Park (2021) confirm that simulation-based education develops students' group dynamics skills while preparing them for multidisciplinary practice. Yet, as Weldon (2020) notes, simulation alone cannot fully replicate the relational complexity of real-world

interdisciplinary teams without deliberate facilitation strategies. The study by Aebersold and Tschannen (2013) reveals that simulation produces better patient communication together with enhanced treatment satisfaction results.

The inclusion of simulation throughout a program results in students who are more engaged and satisfied with their education. Students who follow integrated simulation curricula as described by Warren et al. (2016) show increased motivation and demonstrate improved conceptual understanding compared to students who undergo isolated simulation activities. Higher fidelity in simulation training which includes realistic equipment and scenarios along with authentic settings leads to improved learning results. The meta-analysis by Kim, Park, and Shin (2016) demonstrates robust evidence supporting simulation-based nursing education across different fidelity levels and indicates that clinical reasoning improves more effectively through high-fidelity simulations than through lower-fidelity simulations. The systematic review with quantitative synthesis provides a strong aggregation of results. The main weakness of this study is the high heterogeneity of included studies that used different simulation designs and definitions of fidelity and outcome measurements. The results become less precise because of this variability. The meta-analysis mainly examines technical fidelity (e.g., mannequin realism) instead of functional or emotional fidelity which the present study shows are essential for student engagement and identity development. The findings of Kim et al. are useful but require careful interpretation when using them for complex holistic simulation practices. Mulyadi et al. (2021) established that immersive simulation approaches enable better memory retention. The advantages work only when teaching methods match properly. High fidelity presents barriers to learning when it is not designed according to student development levels as explained by Munroe et al. (2016).

The delivery of the program requires successful execution. Students learn to apply their lessons through the PEARLS debriefing models along with the facilitation and feedback skills of their educators (Fanning & Gaba, 2007; Eppich & Cheng, 2015). The success of Simulation-Based Education depends heavily on how well educators demonstrate both confidence and competence particularly through facilitation and feedback methods (Gantt, 2014; Aebersold, 2016). However, access to simulation remains uneven. The unequal distribution of educational resources including funding and personnel and infrastructure between institutions generates disparities in students' access to high-quality simulation-based education which creates equity problems (O'Regan et al., 2016; Kiegaldie & Shaw, 2023). The simulation resources in institutions with plenty of funding enable students to participate in weekly immersive simulation activities but other institutions must settle for paper-based simulations and observation. As Weldon and Kiegaldie (2021) emphasise, without strategic investment in facilitator training and resource equity, simulation risks deepening existing inequalities in clinical education.

The future of clinical education now relies heavily on simulation which has evolved into a pedagogically rich essential tool that also demonstrates scalability. Simulation networks continue to support facilitator development and best practice sharing through their expansion of VR, AR and standardised patient capabilities which have increased simulation realism. The future development of nursing education will depend on SBE as it remains the essential platform for building confident competent compassionate nurses. The upcoming section will present theoretical perspectives which explain simulation effectiveness along with practical guidelines for its optimal implementation.

2.5 Theoretical Underpinnings of Simulation-Based Education (SBE)

Theoretical frameworks which describe learning processes serve as foundation for Simulation-Based Education (SBE) since they explain student skill development along with knowledge acquisition and reasoning application in practical learning settings. The pedagogical principles behind simulation development rest on these educational concepts which explain student progression toward clinical proficiency and independence together with enhanced reasoning abilities. The theoretical frameworks demonstrate strong relevance yet professionals struggle to apply them consistently, especially when working with nursing and new virtual reality technology. This section examines essential theoretical models for SBE and evaluates their effectiveness in simulation practice.

Experiential and Constructivist Foundations

Kolb's (1984) Experiential Learning Theory stands as a fundamental concept that appears frequently in studies about simulation. However, Kolb's model has been critiqued for oversimplifying the cyclical nature of learning and failing to account for the emotional turbulence experienced by learners in high-stress simulations (Beard & Wilson, 2013). Learning occurs through four distinct phases: concrete experience followed by reflective observation and then abstract conceptualisation leading to active experimentation. Students can experience this learning cycle directly through simulation because it lets them participate in practice scenarios and reflect on the experiences and understand the reasons behind them before attempting again with better strategies. The nature of paediatric practice demands this approach because scenarios need both technical and emotional responses from practitioners like communicating with distressed parents or handling developmental aspects of patient care. Simulation implements constructivist learning approaches (Piaget, 1954; Vygotsky, 1978; Bruner, 1961) because they empower learners to build their own knowledge by taking part in decision-making activities. Students in SBE programmes encounter dynamic clinical problems which require them to navigate uncertainty while applying critical thinking skills in real-world scenarios. The field of child nursing extends past physiological practices because it encompasses safeguarding alongside family-centred care and ethical challenges that need more than standard procedures. The reflective practice model developed by Schön in 1983 continues to be essential for understanding simulation learning. The two reflection processes identified by Schön as "reflection-in-action" and "reflection-on-action" match the learning experiences students encounter through simulation activities and debriefing sessions. The reflective practice model developed by Schön has received criticism because it does not clearly explain reflection mechanisms (Cowan, 1998) and because it fails to recognise the social and relational factors that affect reflection in group settings and emotionally intense situations (Eraut, 1995). The essential role of peer dynamics and facilitator support in simulation makes these limitations especially significant. The ability to reflect at two different levels stands essential for nursing practice because its professionals deal with emotionally complex ethical situations on a regular basis. A structured debriefing process helps students properly analyse their learning experiences while maintaining safety.

Cognitive Load and Deliberate Practice

According to cognitive load theory (Sweller, 1988) students experience mental overload from complex or unfamiliar content. Effective simulation must consider students' prior knowledge and avoid overloading working memory. Simulation development requires precise planning of

learning objectives and step-by-step progression alongside suitable content difficulty levels based on the student's developmental level (Fraser & McLaughlin, 2019). For instance, entry-level students would start with basic paediatric assessment while advanced students would handle complex deterioration cases with ethical choices. Deliberate practice (Ericsson et al., 1993) supports this structure. The theory requires learners to practice specific skills multiple times while receiving prompt feedback. Simulation delivers this precise format because it exposes learners to repeated simulations of critical paediatric scenarios such as sepsis management and safeguarding incidents until they reach proficiency levels. The effectiveness of feedback and structured debriefing stands essential for converting practice experience into actual learning (Dreifuerst, 2009).

Situated, Social, and Self-Determined Learning

Situated Learning Theory (Lave & Wenger, 1991) demonstrates the significance of learning when students experience it within genuine settings. SBE requires environments which replicate actual clinical settings such as paediatric wards and schools and community locations. Using child mannequins, age-appropriate cues, and realistic family interaction increases the likelihood of knowledge transfer into real practice. Social Learning Theory (Bandura, 2001) reveals that students learn by observing others and through the process of modelling and receiving feedback. This approach supports the learning process because students can participate in group simulations to develop peer-to-peer learning while making decisions collectively. However, the shift toward VR and individualised learning introduces a tension. A completely virtual environment tends to reduce peer interaction together with social modelling which reduces some of the essential components identified by Bandura (2001). Recent studies show that virtual reality enhances experiential learning yet diminishes interpersonal feedback mechanisms unless educators implement counteracting measures (Kavanagh et al., 2021; Padilha et al., 2019). Self-Determination Theory (Deci & Ryan, 2000) is also relevant. Learners demonstrate stronger motivation when their basic needs of autonomy and competence alongside relatedness find satisfaction. Simulations designed well, especially those with realistic decision points and peer collaboration and success opportunities, encourage intrinsic motivation. A punitive or overly prescriptive scenario can cause motivational problems because students may feel judged or unsupported during these situations (Carvalho-Filho et al., 2018).

Psychological Safety and Reflective Feedback

Learning demands psychological safety which means students can risk failure without fear of repercussions (Edmondson, 1999). Students have the freedom to learn from mistakes through simulation, but emotional safety needs to be constructed. The field of nursing includes critical simulation elements like child protection and end-of-life care, so staff need to watch for emotional distress in students while providing support throughout the simulation experience and its aftermath. Simulation implements principles of Crew Resource Management (CRM) which originated in aviation to boost team execution in critical environments (Salas et al., 2001). Students learn through CRM-based simulations to provide clear communication and task delegation and escalation response abilities for paediatric cardiac arrest situations and safeguarding concerns. The training scenarios develop competencies both technical and non-technical. Self-regulated learning together with feedback strengthens the educational impact of simulation-based instruction. Research evidence demonstrates that timely and actionable feedback leads to better skill acquisition and supports students' metacognitive development (Brydges et al., 2015; Zendejas et al., 2013). Students use PEARLS and Debrief Diamond

structured debriefing models alongside feedback to develop knowledge retention and decision-making analysis while preparing for upcoming performances (Eppich & Cheng, 2015).

The rapid growth of VR, AR and AI-based simulation raises theoretical tensions in technologically mediated simulation. The fast-paced development of VR, AR and AI-based simulation systems tests fundamental principles of traditional learning theories. Students who learn in fully virtual settings have historically faced a reduction in situated and social learning experiences because of limited interaction with peers and facilitators. However, recent developments in VR platforms are increasingly integrating collaborative and instructor-guided components to address this limitation (Padilha et al., 2019; Kavanagh et al., 2021). The experiential and deliberate practice models remain applicable yet learning depth decreases because of the absence of social dialogue along with physical context and real-time feedback (Kavanagh et al., 2021). The implementation of AI-driven child avatars in nursing practice creates several unresolved issues regarding empathy, rapport, and communication. Learners face challenges in developing therapeutic play and demonstrating empathy when training takes place in virtual environments. Current research is scarce, so further analysis is necessary to determine how new simulation formats match up with or conflict with established theoretical frameworks.

Applying Theory in Nursing Simulation

The foundation of SBE relies on strong educational theory but practitioners need to adapt these theories according to specific situations. Nursing presents scenarios which unite technical requirements with emotional and ethical elements so theories should guide both simulation development and facilitation techniques and feedback processes and student support systems. Simulation transformation into personalised digital solutions requires educators to assess the remaining validity of learning theories while determining necessary adjustments. The implementation requires enhanced focus on discipline-specific application combined with attention to paediatric emotional care and theoretical aspects of simulation technologies. Without this, SBE risks becoming decontextualised or disconnected from real-world practice. Simulation will maintain its value as a learning method for future child health nurses through continuous alignment of theory with practice.

2.6 Simulation and Skill Development in Nursing Education

Simulation-Based Education (SBE) functions as a core educational technique to build both the technical competencies and non-technical skills needed in nursing professionals. Students benefit from SBE because it provides them with a controlled environment to practice clinical procedures and develop clinical reasoning and interact in scenarios while keeping patient safety unaffected. SBE emerges as a crucial instrument for both individual competency development and structured real-world practice transition as healthcare environments grow more complex.

Research evidence shows that simulated learning activities result in superior clinical competency development together with better knowledge retention. The literature shows that simulation allows healthcare professionals to practice clinical procedures multiple times (Alharbi et al., 2024; Guerrero, Rosales & Castro, 2022). The studies depend on small participant numbers and short evaluation periods and self-assessment tools which could result in exaggerated results according to Alharbi et al. (2024). The combination of realistic physiological elements with interactive feedback in high-fidelity simulation (HFS) produces enhanced engagement and skill development according to Kim et al. (2016). The meta-analysis

conducted by Kim et al. (2016) faces criticism because it includes research studies with different experimental approaches and simulation approaches and outcome assessment methods which makes it difficult to understand the results across different educational settings. The research conducted by Kiernan and Olsen (2020) demonstrates that multisensory HFS enhances cognitive processing but their results only show immediate effects after simulation and do not extend to long-term clinical practice which is essential for real-world educational outcomes. The simulation research frequently uses Ericsson et al.'s (1993) deliberate practice framework but most studies fail to verify whether simulation training meets the necessary conditions of deliberate practice. Aul et al. (2021) discovered that students who participated in multiple simulation sessions improved their clinical judgment and procedural confidence yet their study used quasi-experimental methods without random assignment and without tracking students over time which restricted the ability to establish cause-and-effect relationships between simulation and traditional learning. The research evidence supports simulation as an effective educational method but researchers need to examine how different study methods and outcome measurements and short-term versus long-term learning effects influence the results.

SBE teaches both clinical abilities and essential non-technical competencies which consist of communication skills together with teamwork and leadership abilities and ethical judgment. Traditional teaching methods face challenges when trying to instruct these important skills which form the basis for delivering safe effective patient care. Students learn to coordinate their roles and practice active listening while learning under pressure by completing simulation scenarios which include managing child deterioration and dealing with distressed family members. The research of Cant and Cooper (2017) and Lewis, Strachan and Smith (2012) demonstrates that team-based simulation produces better situational awareness and clearer communication in urgent circumstances. Studies also support simulation's role in interprofessional skill development. The research conducted by Bucknall et al. (2016) showed that team-based simulation leads to better coordination and understanding between different disciplines while Southall and MacDonald (2021) found evidence that students became more confident in their ability to collaborate. The analysis of patient interactions and decision-making steps becomes more precise through organised debriefing sessions. The facilitation process helps members recognise both verbal and non-verbal communication elements as well as roles and stress reactions which improves their clinical thinking abilities and emotional intelligence (Fanning & Gaba, 2007; Yotsombut et al., 2021).

Student development of empathy and patient-centred care benefits from simulation when they perform patient or carer role-playing activities. Students who participated in Cho and Kim's (2024) perspective-taking simulations achieved enhanced empathy scores along with better comprehension of emotional aspects in healthcare delivery. The Social Learning Theory developed by Bandura (2001) explains this phenomenon by showing how role-playing combined with peer observation produces effective learning especially when students engage in reflective discussions. Nursing requires this approach because its practice involves working with patients and their families through emotionally demanding situations. Students learn to deliver compassionate ethically sensitive care by participating in organised debriefing sessions that help them evaluate emotional responses.

Through simulation students acquire protected opportunities to build leadership skills together with assertiveness abilities. Students gain the opportunity to direct handovers and assign responsibilities and make crisis decisions in simulation-based training which remains safe from

causing actual patient harm. Evidence supports this impact on confidence. Regular simulation participation led students to develop higher self-efficacy levels and made them process information faster while preparing them for leadership responsibilities according to Carver et al. (2024) in their longitudinal research. Research results indicate simulation education serves double duty for elementary learning development as well as advanced professional growth during educational programs.

Standardisation in training is possible through the implementation of simulation programs. Students experience different clinical environments during placements because their learning environments change according to their location and hospital staff and patient population. Simulation provides all learners with the essential clinical experiences and necessary skills. The research by Steven et al. (2024) demonstrates that simulation training, grounded in real student experiences, helps improve patient safety through standardised educational approaches that align with national nursing standards. The implementation of simulation as a curriculum component offers learners structured practice sessions to develop competencies while strengthening their knowledge acquisition. The curriculum priorities of modern education which emphasise interprofessional collaboration and patient-centred communication as well as cultural competence find support through simulation training. The technical aspects of practice receive training in simulation, but Nestel and Bearman (2015) emphasise its specific ability to teach relational and ethical competencies of present-day practice.

The advancement of healthcare practices drives parallel developments in simulation methods. The introduction of Artificial Intelligence (AI) and Virtual Reality (VR) combined with adaptive simulation systems transforms the way educational content is personalised and delivered to students. These tools enable the simulation of infrequent or dangerous situations while providing customised feedback mechanisms and monitoring student development (Kneebone, 2020). Such technologies increase accessibility and flexibility. The system allows students to advance through simulation levels that grow progressively complex and dangerous. The implementation of technology should support human facilitation, but it offers improved reach and creates more comprehensive experiential learning in various educational settings.

The teaching method of simulation continues to evolve into a comprehensive evidence-based educational approach which develops both technical skills and non-technical competencies alongside empathy and clinical judgment. Student nurses benefit from simulation-based education because it creates real-world scenarios for practice while encouraging reflective learning and building confidence and competence. SBE effectively closes the knowledge-practice gap when properly designed and delivered which leads to the development of competent and compassionate healthcare professionals who meet modern healthcare requirements.

2.7 The Role of Debriefing in Simulation-Based Education

Simulation-based education (SBE) identifies debriefing as its most essential component. The simulation scenario provides students with practice experience, but debriefing serves to make learning permanent. Through debriefing students gain a structured environment to reflect on their actions and process emotions while receiving feedback which transforms their experience into meaningful insight (Fanning & Gaba, 2007).

The practice of debriefing draws its foundation from multiple established learning theories. According to Kolb's experiential learning model (1984) reflection serves as a necessary step to

convert experiences into learned knowledge. Schön (1983) identifies two reflection types: reflection-in-action which happens during the task and reflection-on-action which happens after the task and both types benefit from simulation and debriefing. The theories demonstrate the importance of stopping to examine and transform experiences for better comprehension. Nursing students need reflection after emotionally intense or dangerous simulations because it helps them develop cognitively and manage their emotions.

The purpose of structured debriefing models is to achieve consistent results while maintaining deep engagement from learners. Multiple debriefing approaches exist which provide distinct frameworks to direct post-simulation discussions.

Multiple debriefing models exist for simulation-based education which target specific student abilities and scenario difficulty levels. The Plus/Delta model provides an easy framework that helps participants recognise their simulation successes (Plus) and areas for improvement (Delta). The model provides easy comprehension and brief execution which makes it suitable for novice learners or brief simulation exercises.

Debriefing with Good Judgment differs from other methods because it evaluates both results and student decision-making thought processes. The approach enables students to engage in reflective dialogue through combined honest feedback and respectful curiosity which helps them examine their cognitive frames that influenced their decisions (Rudolph et al., 2006).

The PEARLS framework (Promoting Excellence and Reflective Learning in Simulation) combines different debriefing approaches like directive feedback with learner self-assessment and focused facilitation according to session goals and learner experience levels. The flexible model enables deep learning through structured reflection which is tailored to specific needs (Eppich & Cheng, 2015).

The 3D Model (Defusing, Discovering, Deepening) starts with emotional defusing to assist learners in managing their first reactions. The process leads participants to examine their thought processes and actions before they can apply learned lessons to upcoming practice situations (Zigmont et al., 2011). The method works best when dealing with emotionally intense or complicated situations.

The different models present distinct yet compatible strategies for post-simulation reflection which allow facilitators to choose methods according to specific contexts and student requirements. Each model offers flexibility, but none are universally appropriate. The selection of debriefing methods depends on multiple conditions including student experience and simulation objectives together with group interaction patterns and facilitator qualifications. While all models provide useful structure, their effectiveness depends on alignment with educational aims: formative learning benefits from open, exploratory models like Plus/Delta or 3D Debriefing, whereas summative assessment scenarios require more structured, judgment-focused approaches like PEARLS or Debriefing with Good Judgment (Eppich & Cheng, 2015; Rudolph et al., 2006).

Model	Overview	Structure / Key Features	References
Plus/Delta	Simple, learner-focused method encouraging self-assessment.	- Plus: What went well - Delta: What could be improved	Fanning & Gaba, 2007
Debriefing with Good Judgment	Balances critical reflection with psychological safety. Promotes honest feedback through shared understanding.	- Uses advocacy-inquiry - Facilitator shares observations and asks open-ended questions to explore learners' reasoning	Rudolph et al., 2006; Cheng et al., 2016
PEARLS (Promoting Excellence and Reflective Learning in Simulation)	Hybrid model integrating multiple strategies depending on learner needs and objectives.	- Combines learner self-assessment, focused facilitation, and directive feedback - Adaptable to different situations	Eppich & Cheng, 2015
3D Model of Debriefing	Emphasises a structured flow that links experience to future actions.	- Defusing: Emotional processing - Discovering: Analyzing actions and learning - Deepening: Applying lessons	Zigmont et al., 2011

Table 2 Debrief models

Numerous studies demonstrate that proper debriefing techniques lead to improved clinical reasoning abilities and knowledge retention alongside better team execution (Levett-Jones & Lapkin, 2014). Psychological safety finds support through open discussions of mistakes and uncertainties which are critical for learning and emotional resilience according to Edmondson (1999). After challenging simulations debriefing enables emotional processing. Debriefing aids students in nursing by allowing them to process their responses to safeguarding situations along with family crisis situations and paediatric emergency cases. Learners who receive sensitive guidance during these discussions develop better clinical reasoning abilities and increased empathy and maturity.

The practice of debriefing remains poorly implemented despite its essential nature. Many nurse educators demonstrate insufficient capability to conduct systematic reflection especially during emotionally intense or interprofessional learning scenarios according to Boese et al. (2013) and Forneris et al. (2015). The lack of proper training creates conditions where facilitators tend to provide didactic feedback instead of generating deeper learning opportunities. Time constraints also affect debriefing quality. The combination of large group sizes and short session durations along with competing curriculum demands often leads to basic discussion topics. The improper handling of debriefing through ambiguous questions and insufficient safety and undefined goals leads to uncomfortable learning environments which cause students to disengage and maintain potentially harmful practices. The ability of facilitators to perform their duties effectively becomes the main priority. Debriefing effectiveness demands the ability to merge encouraging dialogue with challenging feedback while modifying methods based on participant requirements and managing emotional aspects of the process. These skills are not intuitive and require dedicated development. Simulation programs should place facilitator training as their top priority by teaching debriefing theory alongside model selection and active listening and group facilitation competencies (Cheng et al., 2016; Rudolph et al., 2006).

Simulation teaching adds educational worth yet creates complex implementation challenges. The debriefing process must effectively handle various communication practices while addressing distinct areas of professional expertise and role-based power structures. The presence of skilled facilitation guarantees that everyone gets heard and learning is distributed among different roles (Eppich & Cheng, 2015). Hierarchy dominance would occur if this process

were absent, thus causing reflection to become fragmented. Simulation-based education achieves success only through debriefing as this essential pedagogical process serves as its core foundation. Reflective theory guides debriefing which receives strong evidence-based support to improve knowledge integration and team competence and emotional resilience. The effectiveness of debriefing depends on the consistent application of well-structured debriefing by trained facilitators.

Simulation technology development requires equal investment in debriefing quality enhancement particularly within emotionally demanding fields such as nursing. Further research should examine how various debriefing methods affect student learning results as well as strategies to enhance reflective practice within nursing education.

2.8 Stakeholder Perspectives on Simulation-Based Education

The implementation of Simulation-Based Education (SBE) is affected by expectations as well as experiences of several stakeholder groups. Each one brings its own set of priorities to the table, and how simulation is designed, delivered, and evaluated will depend on those priorities. It is important to know these perspectives to guarantee that SBE is as effective as possible in meeting both educational requirements and clinical practice needs.

Students

SBE is used by nursing students. Many state that through simulation, they can practice clinical skills in a risk-free environment. This low-stakes environment diminishes fear, enables trial and error, and fosters incremental confidence-building (Foronda, Liu & Bauman, 2013). However, the students do not have similar experiences. High fidelity simulations, especially those that are used for assessment purposes, can cause anxiety and performance pressure to the students. Orique and Phillips (2017) established that simulation can enhance self-efficacy but also increases stress when the scenario is emotionally charged, unclear or complex. Students are likely to feel overwhelmed when the simulations are not well organised or when there is no one to facilitate them. Thus, psychological safety is crucial. To ensure that learners participate meaningfully without fear of being judged, pre-simulation briefings, structured debriefings, and emotionally attuned facilitation are recommended (Rudolph et al., 2014).

Equity also matters. Students in under-resourced institutions are likely to have limited exposure to immersive or interprofessional simulation. Differences in availability of simulation experiences are noted between rural and urban areas (Kiegaldie & Shaw, 2023). Few studies have focused on the simulation experiences of neurodiverse, disabled, or minority students. Simulation in the literature is characterised by design that is not inclusive, participation that is not adaptable, and scenarios that are not culturally diverse.

Educators

Simulation is considered by educators to be a good teaching strategy that provides active learning through experience. It allows for the creation of scenarios that help in the development of technical skills as well as non-technical competencies including communication and problem-solving skills that may be better than in traditional placements (Stroup, 2013; Simmers, 2014). However, many educators face barriers in delivery. Lack of standardised training in simulation pedagogy especially in areas of scenario design, debriefing, and psychological safety leads to variable learning experiences for students (Forneris et al., 2015; Jeffries et al., 2015). Some educators also feel they are not well prepared to handle intricate simulations or work with innovative technologies such as virtual reality or artificial intelligence

enhanced platforms. A recurring issue is the tension between pedagogy and technology. Although high-fidelity equipment presents potential, its application must be grounded on specific educational objectives. Furthermore, time limitations and workload pressures may hinder planning, implementation, and reflection. Educators may also come under pressure from the institution to use simulation for assessment purposes, rather than for formative or reflective learning, which would limit its pedagogical potential.

Clinical and Practice Partners

Ward based supervisors, mentors, and practice learning facilitators who are clinical partners usually consider SBE as a useful add on to placement learning. They acknowledge simulation because it allows students to experience critical or infrequent events such as paediatric resuscitation or safeguarding cases that may not occur during normal practice (Palmer et al., 2024). However, their support is often conditional on simulation's relevance. Scenarios are considered problematic when they are seen as outdated, scripted, or unrelated to the current clinical practices. Simulation scenarios developed through the partnership between academic staff and practice partners lead to scenarios that reflect local protocols and priorities (Lewis, Strachan & Smith, 2012). Another area of concern that is commonly observed is the uncertainty of assessment standards. Practice supervisors sometimes face challenges in determining the level of readiness of students toward duties based on simulation performance. Proposed solutions include standardised objectives, clear handover of learning outcomes, and co-developed assessment rubrics (Busca et al., 2022; Oh & Park, 2023).

Regulatory Bodies

The Nursing and Midwifery Council (NMC) and other regulatory bodies have helped to legitimise simulation as a part of clinical training. Due to COVID-19 disruptions and ongoing placement challenges, the NMC now allows a percentage of clinical hours to be completed through simulation (NMC, 2024). This reflects a wider shift in policy and perception. However, formal recognition brings additional expectations. Regulators now promote simulation quality assurance through clearer learning outcomes, documentation, and facilitator training. The International Nursing Association for Clinical Simulation and Learning (INACSL, 2021) and others provide frameworks that emphasise consistency and alignment with professional standards. The regulatory focus on the readiness of the workforce also increases the scope of simulation. It must enhance technical skills, but also promote professional values, teamwork, and reflective decision-making under pressure—especially in settings such as emergency paediatrics or community care.

Service Users and Public Voices

The simulation stakeholders now include patients together with their carers and members of the public even though their voices remain scarce in published research. Recent work also highlights the importance of embedding service-user perspectives directly into simulation development to ensure authenticity and emotional resonance (Weldon, McKenna, & Prescott, 2020). Some programs have begun integrating service users into the process of creating scenarios and acting in them as well as giving feedback. These methods assist students in acquiring interpersonal competencies together with cultural humility and emotional intelligence. Nursing requires family involvement along with communication thus making co-designed simulations highly relevant. The simulation learning process produces benefits that improve service quality. The preparation of well-graduated nurses leads to reduced risks and increased efficiency and better patient safety. The study conducted by Hippe et al. (2020) established that simulation leads to long-term economic benefits through reduced legal

consequences and decreased medical errors and patient injuries. The current literature lacks studies that investigate how patients experience simulation-based learning and how simulation affects their medical care and the methods used to integrate patient feedback into educational programs.

Triangulating Stakeholder Perspectives

The general perception of simulation remains positive among all studied groups. The stakeholders agree on the importance of relevant practice, consistent delivery and skilled facilitation. All parties recognise the importance of simulation in developing clinical readiness while enhancing reflective capabilities and teamwork. However, tensions also emerge. Students need a safe emotional environment while educators struggle with maintaining institutional requirements for efficiency and assessment. Clinical mentors seek a realistic approach; regulators concentrate on establishing national standards and maintaining accountability. The expectation of service users regarding relational competence remains unaddressed although they usually do not participate in its development. These differences do not undermine SBE—they reveal its complexity. The development of effective simulation requires balancing and harmonising multiple conflicting demands. The process requires students and educators and clinicians and policy makers to maintain continuous communication. Thus, the stakeholder experiences are the primary area of investigation within this study since they provide valuable information on the evolution of simulation towards more inclusive and frontline-sensitive approaches.

2.9 Equity, Access, and Inclusion in Simulation-Based Education

Simulation-Based Education (SBE) is widely recognised for its ability to foster psychological safety. Students can practice and learn while making errors since the simulation environment protects patients from harm. The nursing profession needs this approach because fear of patient harm creates hesitation and decreases student participation (Jeffries, 2015; Cantrell, Franklin & Leighton 2017). The effects of simulation-based education extend beyond individual safety when it comes to educational equity. SBE possesses the power to build inclusive and socially responsible learning environments.

Unequal Access Between Institutions

The advantages of simulation education do not guarantee equal access to quality simulation opportunities. The operation of advanced simulation facilities together with high-fidelity manikins and trained facilitator requires significant resources. University students with better financial support access immersive simulations once a week yet others operate with basic training equipment (Kiegaldie & Shaw, 2023). The analysis of international simulation education programs demonstrates wide discrepancies between countries. National simulation frameworks across different nations vary from well-developed to non-existent due to absent policy backing and insufficient funding mechanisms (Simes et al., 2020; Nestel et al., 2021). The Nursing and Midwifery Council of UK (2024) has issued new guidelines which authorise simulation education as a valid replacement for certain clinical practice hours. The execution of this approach varies significantly depending on budget allocations and institutional goals as well as staff capabilities at local levels. National investment along with quality assurance frameworks remain essential for addressing educational inequality because current policy changes risk worsening the problem without proper implementation.

Representation and Inclusive Scenario Design

Simulation also shapes how learners understand diversity and difference. However, numerous simulation scenarios present patients primarily as default adult patients while failing to show real-world patient diversity. The goal of inclusive design requires representation across different demographics such as age and ethnicity and gender identity and disability and language proficiency and socioeconomic background to prepare students for their future patient population (Galloway, 2009; Graham et al., 2019). Tokenism, however, remains a risk. When diversity is added superficially or used to teach difference without context, simulations can unintentionally perpetuate stereotypes (Miller et al., 2022). Actor-based or role-play simulations need specific attention to scripting and training along with debriefing to prevent the unintentional reinforcement of unconscious bias. Meaningful engagement with complex systems and patient voices together with intersectionality serves to create inclusive environments rather than simply offering representation. Students carry their individual identities when they participate in simulations. Students who belong to underrepresented groups experience intensified feelings of isolation from simulation scenarios that lack proper planning and insensitive facilitation. An inclusive simulation needs diverse patient representation alongside space for students to examine how their identities along with their power and cultural assumptions affect clinical practice.

Adapting Simulation for Diverse Learners

Simulation equity means making sure all students including those with anxiety and neurodivergent students and students with other learning differences can participate. Traditional simulations tend to be performance-based and high-stakes which creates obstacles for student engagement (Krainovich-Miller et al., 2021). Timed tasks alongside group scrutiny and unclear expectations create obstacles that tend to affect specific learners unfavourably. The implementation of universal design principles has received increasing support from research and practice for anticipating diverse learner needs and minimising unnecessary barriers at the start (Seale, 2014).

The following practical strategies should be implemented:

1. Allowing flexible roles
2. Providing preparatory materials in advance
3. Using visual prompts or structured cue cards
4. Offering post-simulation reflection time

The modifications implemented to support inclusive learning do not decrease educational results, yet they allow all students effective participation. Inclusive simulation practices need to expand their focus from scenario content alone to include delivery methods and facilitator awareness as well as physical learning environments.

Institutional Accountability and Policy Gaps

Many institutions place inclusion in their policy documents but their actual implementation strategies for simulation remain weak and without measurement tools. Simulation scenarios remain unmonitored since institutions do not track who accesses simulation or how students construct scenarios, or which students feel excluded. Most simulation centres operate without established equity audit systems which fail to align with inclusive practice guidelines. The INACSL (2021) international guidance promotes learner-centred design and psychological safety, but it does not provide specific benchmarks regarding inclusion accessibility and stakeholder representation. The lack of specific standards restricts accountability measures. Achieving equity in simulation practices needs more than just good intentions from individuals.

Educational institutions must invest structurally while establishing policy frameworks which should involve collaborative work with those who previously lacked decision-making power in education. The curriculum design should include all students as well as patients' families and communities whose experiences are simulated although their perspectives are rarely included.

Learning professionals commonly praise simulation for its educational benefits yet they must also consider which students gain access to learning and how they experience it. The previous discussion has demonstrated that SBE provides distinctive advantages for decreasing placement inequalities and creating inclusive educational environments while developing nurses for various clinical situations. Yet these goals cannot be achieved passively. The absence of balanced access together with insufficient representation along with incomplete institutional policies keeps simulation equity and inclusion from becoming reality in numerous educational settings. The achievement of these goals requires purposeful design alongside inclusive teaching methods, together with significant accountability measures. The implementation of these measures is essential because SBE faces the risk of perpetuating the same inequalities it seeks to eliminate.

2.10 Challenges and Opportunities in Simulation-Based Education

Nursing training institutions use Simulation-Based Education (SBE) as their primary educational method which delivers structured immersive learning experiences to connect academic concepts with real-world practice. The educational benefits of this implementation are well documented although practical implementation remains challenging. The implementation of simulation programs faces multiple obstacles in educational institutions including limited resources alongside variable facilitation quality together with emotional and cognitive difficulties for students. Operational problems affect learning results, student perceptions of fairness, and the sustainability of simulation as an educational method. The persistence of operational problems such as poor organisation, inconsistent facilitation and environmental distractions may undermine students' confidence in simulation-based education which in turn may threaten its long-term acceptance and integration into curricula. The field offers multiple possibilities at the same time. Simulation education benefits from new technologies such as Virtual Reality (VR) and Artificial Intelligence (AI) as well as blended learning models and interprofessional education which enhance both reach and pedagogical effect. Simulation education enables intentional learning outcomes that develop skills while fostering reflective practice and team-based care and clinical competence development.

The following section provides an analytical breakdown of current obstacles and future possibilities in SBE. The analysis draws from established literature to examine seven critical domains: learner psychology, resource distribution, facilitator readiness, simulation fidelity, skill transfer, inclusivity and assessment practice. The analysis connects each theme to its educational outcomes through supporting studies. The analysis examines existing barriers in simulation while proposing specific opportunities for improvement.

2.10.1 Challenges

Managing Emotional Responses and Cognitive Load

Simulation exists to test students, but improper scaffolding may transform the experience into an overwhelming situation. Research literature shows that emotional and cognitive demands serve as significant barriers to optimal learning, specifically for novices and those who lack

experience with performance-based settings (LeBlanc 2009). Students commonly experience intense emotions when participating in simulation scenarios that utilise either high-fidelity equipment or assessment protocols. Simulation-based stress within moderate levels tends to improve student engagement while strengthening memory formation (LeBlanc et al., 2012) but excessive anxiety will diminish decision-making skills and reflective thinking while eroding confidence (Fraser et al., 2012; O'Regan et al., 2016). Students express frequent feelings of vulnerability when they undergo observation by peers and instructors in critical simulation exercises which recreate emergencies and rare patient conditions and patient deterioration. Table 3 illustrates how positive stress improves learning results, but cognitive overload creates poor judgment, and retention issues and erodes student confidence during simulation-based education.

Feature	Positive Stress	Cognitive Overload
Cognitive Engagement	Stimulates alertness and focus	Overwhelms working memory
Performance Impact	Enhances decision-making and memory	Impairs judgment and recall
Emotional Response	Excitement, productive anxiety	Fear, confusion, disengagement
Outcome	Improved learning and retention	Decreased performance and confidence
Facilitation Strategy	Used to challenge and motivate	Requires scaffolding and reduction of complexity

Table 3 Stress impact

The emotional weight of the situation makes students stay away from learning activities to shield themselves from potential failure and public humiliation (Nestel & Bearman, 2015). The absence of intervention will generate a pattern of poor performance and reduced self-confidence. To minimise these consequences, psychological safety needs to be integrated across the entire simulation process.

Strategies include:

- Initial orientation procedures that define what participants should do while reducing their uncertainty.
- The facilitators demonstrate empathy by encouraging participants to share their emotional experiences.
- Non-judgmental feedback that helps students learn from their mistakes instead of criticising them.
- Learners experience gradually increasing simulation complexity that helps them gain confidence before facing demanding situations.

Educator emotional intelligence stands as a fundamental factor in this process. The ability of facilitators to observe learners' emotions and adjust their teaching methods enables them to deliver effective emotional support during simulation training according to Carvalho-Filho et al. (2018) and Forneris & Peden-McAlpine (2018). The simulation requires simultaneous attention to its cognitive elements. Cognitive Load Theory (Sweller, 1994) explains that learners utilise limited working memory to process information, and excessive or complicated requirements will interfere with learning. A student experiences mental overload when performing a complex medical evaluation and operating unfamiliar medical tools and executing various technical procedures simultaneously. The level of the learners should determine the level of simulation

complexity. The novice students require more basic and structured part-task simulations that focus on single aspects like handover or communication while the advanced students can handle more integrated scenarios according to Fraser & McLaughlin (2019) and Hurd et al. (2021). The implementation of a staged curriculum with increasing difficulty will decrease confusion and enhance knowledge retention. The design of scenarios needs to minimise irrelevant elements which do not advance learning objectives through factors such as reduced realistic elements and artificial time constraints. The field increasingly accepts that scenario development should prioritise learning effectiveness rather than pure realism alone (Munroe et al., 2016).

Realism, Fidelity, and Learning Transfer

Fidelity in simulation-based education represents how well a simulation replicates actual clinical conditions. The research evidence indicates that high-fidelity simulations are not consistently superior to other types of simulations for educational outcomes.

Fidelity exists as multiple distinct concepts within a single framework.

- Physical (or environmental) fidelity: The simulation environment resembles real clinical conditions through its realistic equipment and environmental features along with its sensory elements including visual and auditory components (Rehmann et al., 1995). The physical fidelity increases when students use hospital equipment in a simulated ward environment.
- Psychological fidelity: The degree to which students find a simulation realistic and emotionally engaging (Dieckmann et al., 2007). This encompasses the simulation's ability to produce stress, time-sensitive conditions and clinical decision-making responsibility.
- Conceptual fidelity: A scenario maintains its internal coherence and clinical validity. The simulated patient responses together with symptom progression and decision points need to reflect authentic clinical reasoning patterns (Groom et al., 2011).

Advanced manikins together with immersive VR simulations produce deeper student engagement along with improved decision-making abilities and stronger knowledge retention according to Kim et al. (2016) and Astbury et al. (2021). Higher levels of realism do not always lead to improved results. Basic learners require easier low-fidelity or part-task simulations which focus on specific tasks rather than complex systems especially during their initial skill development phase according to Norman et al. (2012) and Zhang et al. (2019). When students encounter excessive complexity too rapidly it generates both performance anxiety and overwhelming cognitive stress which harms their learning process (Fraser et al., 2012). The educational design risks being neglected when institutions place excessive focus on technical fidelity by prioritising expensive equipment alongside detailed replicas. Cook et al. (2011) state that the quality of instructional methods together with feedback quality and scenario alignment to learning goals proves more powerful than fidelity alone. The literature uses the term “fidelity fallacy” to describe this misconception about higher fidelity leading to better results (Munroe et al., 2016). What truly matters is achieving functional fidelity because it defines how well the simulation enables learners to fulfil their educational goals (Hamstra et al., 2014). The main priority of emotional realism exceeds visual and technical fidelity in nursing. Specific case scenarios such as anxious parents or child safeguarding or end-of-life care need well-prepared role players and emotional sensitivity over technical simulation tools. Learning transfer of clinical skills from simulation to real-world practice relies more on scenario quality combined

with repeated exposure and debriefing than on simulation fidelity alone. The effectiveness of simulation depends on its connection to actual clinical practice and its alignment with clinical placement activities which support continuous competence (McGaghie et al., 2010).

Facilitator Expertise and Simulation Pedagogy

In Simulation-Based Education (SBE) the facilitators take a vital part by creating the emotional and cognitive space where learning takes place through their technical scenario delivery. They create scenarios and handle group interactions while ensuring safety for students and conducting debriefing sessions. The research shows that most simulation facilitators do not have proper training in simulation pedagogy despite the literature's constant emphasis on this need (Boet et al., 2011; Levett-Jones & Lapkin, 2012; McCoy et al., 2022). The existing knowledge gap produces disparate learner experiences together with unpredictable educational results. A successful facilitation process demands various types of expertise. Facilitators who manage learner stress must possess the ability to match scenario complexity to learner readiness while delivering clear feedback to promote critical reflection (Cheng et al., 2016; Rudolph et al., 2014). Facilitators face substantial emotional demands because they need to handle their reactions alongside helping students navigate difficult scenarios containing challenging or morally ambiguous material (Anderson et al., 2019).

Bland (2021) believes that facilitators function as emotional regulators and boundary managers when they establish the scenario realism level while safeguarding the psychological safety of participants. This perspective is valuable, particularly in nursing where emotionally charged scenarios such as end-of-life care or safeguarding cases are common. Critics express concern that excessive emotional modulation creates excessive responsibility for individual educators while neglecting institutional training needs (Dieckmann et al., 2012; Nestel et al., 2020). Institutions have irregular facilitator development programs. Some educational institutions provide training programs that teach students about simulation pedagogy through scenario development and debriefing methods and learning anxiety management, but many institutions do not (Forneris et al., 2015; Gordon et al., 2021). The risk exists that facilitators switch back to didactic instruction which conflicts with the experiential and reflective basis of SBE (Jeffries, Rodgers Jeffries, Rodgers & Adamson, 2015). Research now demands facilitator self-reflection alongside identity growth for better facilitation. Facilitators in simulation programs switch between being clinicians, educators, actors and coaches according to Bland & Tobbell (2016) and require space for reflecting on these role identities. Topping et al. (2015) also support this statement when they advocate for facilitator development through mentoring programs along with peer debriefing services to reduce the risk of burnout following emotionally taxing sessions.

Simulation-specific credentials provided by INACSL and ASPIH address these problems through standardised facilitator training protocols and professional standards (INACSL Standards, 2021; ASPIH, 2016). The established frameworks define essential principles for learner-focused design alongside inclusive practices trauma-informed debriefing and outcome-based assessment that enable sustainable evidence-based simulation capacity development. The literature now promotes co-facilitation and interdisciplinary facilitation models through which nurse educators work with psychologists and clinical practitioners or service users to improve scenario authenticity and relational learning (Palaganas et al., 2014; Anderson et al., 2019). Such approaches enhance both the content and process of simulations particularly when dealing with complex interprofessional or emotionally demanding scenarios.

Resource Limitations and Time Constraints

Simulation-Based Education (SBE) demonstrates strong pedagogical value yet demands extensive resources to implement it. Implementing high-quality simulation requires sustained investment in infrastructure, equipment, staffing, and time—resources that are not always evenly distributed across institutions. These barriers can limit access, reduce quality, and hinder scalability. High-fidelity manikins, immersive simulation labs, audiovisual equipment, and dedicated technical support come at a substantial cost. Motola et al. (2013) report that institutions must spend hundreds of thousands on initial setup and then face ongoing costs for maintenance and updates as well as consumables. Financially limited institutions face difficulties in providing modern simulation equipment and sufficient training time which can negatively affect student learning (Delisle & Hannenberg, 2020). Delivering high-quality simulation can be particularly challenging in smaller universities or healthcare education providers operating within constrained budgets. Under austerity policies, funding cuts often limit access to essential resources such as simulation technicians, trained facilitators, and purpose-built simulation spaces. These constraints can undermine consistency, limit session fidelity, and reduce opportunities for structured debriefing — all of which are critical to meaningful student learning. Many programs function with shared laboratories or alternative access periods that could limit student exposure and continuity according to Hayden et al. (2014). The uneven global distribution of simulation resources creates equity challenges because low- and middle-income settings lack adequate digital and physical infrastructure (Al-Elq, 2010).

Workforce Constraints and Time Pressure

Human resources are a critical, and often overlooked, constraint in simulation practice. Facilitators, actors, and support staff require time, training, and funding, all of which can limit how often and how effectively simulation can be delivered. Running simulation requires significant educational effort because facilitators need to create authentic scenarios and practice them before delivery and conduct sessions while leading debriefing activities (Jeffries, 2020). Facilitators typically lack dedicated time for simulation responsibilities so they must perform as a combined element of their clinical teaching responsibilities and administrative and research commitments (Carolan et al., 2020). However, simulation is not simply the sessions; the significant planning, writing of scenarios and staging of the environment can be time consuming. The inconsistency in delivery results from instructor burnout and superficial approaches toward essential pedagogical components such as psychological safety and debriefing (Roussin & Weinstock, 2017). The ability of educators to provide simulation at its complete potential depends on their institution supporting them through workload adjustments and performance review recognition and simulation training availability (Nestel et al., 2014). Simulation operations require specialised support staff who work as technicians along with learning technologists and simulation operations specialists (SOSs). The roles function as vital elements for the administration of equipment alongside the resolution of technical problems and operation of complex simulation scenarios (Society for Simulation in Healthcare, 2021). In certain settings there exists an absence of support staff combined with inadequate funding and insufficient recognition of these roles which results in additional work for clinical educators.

Strategies for Mitigating Resource Challenges

Low-cost and hybrid models consisting of part-task trainers along with screen-based and peer-led simulations demonstrate robust learning outcomes when properly designed according to Brydges et al. (2015) and Munroe et al. (2016). Virtual simulations together with mobile

applications present potential cost-efficient solutions for educational enhancement which work better when implemented through blended learning approaches (Foronda et al., 2020). Strong administrative leadership serves as an essential component. The sustainability and scalability of simulation require administrative leadership to embed it in strategic plans while connecting it to accreditation standards and including facilitator workload in job planning (Bland et al., 2021; INACSL, 2021).

Equity of Access and Inclusion

Simulation-based education (SBE) stands as the preferred clinical training method yet unequal access to quality simulation experiences persists. Educational facilities and their supporting staff, along with equipment resources, show major variations between institutions and countries. Institutions equipped with simulation centres and professional facilitator and advanced simulation equipment conduct weekly intensive training sessions. Rural locations alongside underfinanced universities must settle for basic static mannequins or paper-based training which creates an interrupted learning environment according to Kiegaldie & Shaw (2023) and Cant & Cooper (2017). The lack of standardisation in competency development among nursing programs stems from inconsistent simulation practices. The review previously highlighted that SBE provides equal learning opportunities through repeated simulations, but this potential requires equal access to equipment and facilitation. Strategic investment and national-level policy alignment remains essential to fulfil the equity promise of SBE because without them the equity promise of SBE will remain unachieved (INACSL, 2021; Nestel & Bearman, 2015).

Equity requires more than just device accessibility because it means designing environments that include all students. Standard simulation training settings tend to marginalise participants who require specific accommodations because their needs remain unclear to instructors. The simulation experience becomes overwhelming for students who identify as neurodiverse or possess sensory processing differences or exhibit high performance anxiety according to Krainovich-Miller et al. (2021) and Arvanitis et al. (2020). The need for adaptive and flexible design becomes essential because psychological safety remains a concern which was discussed previously in this chapter.

Inclusive simulation design might involve:

- Providing scenario roles to students which could include the position of observer or team coordinator.
- Students receive preparatory materials beforehand to minimise uncertainty.
- Providing additional time for processing or debriefing.
- Using multiple feedback formats to suit the different communication preferences.

These methods do not lower expectations; they increase participation. Students disengage from simulation and create another source of inequality when they feel excluded by design. This means simulation content should include diverse patient representations in terms of culture, gender, language, and disability to prepare students for real-world healthcare environments. The use of simulations in medical education must include diverse patient representations (culture, gender, language, and disability) if students are to be prepared for the realities of modern healthcare (Galloway, 2009; Miller et al., 2022).

2.10.2 Opportunities for Growth and Development

Technological Innovation in Simulation-Based Education

The potential of Simulation-Based Education (SBE) is expanding through new technologies which include Virtual Reality (VR) and Augmented Reality (AR) and Artificial Intelligence (AI). These tools provide fully immersive simulations which students can replay multiple times to create personalised learning experiences that can complement traditional simulation methods. The incorporation of these technologies into nursing education provides enhanced accessibility while creating more realistic environments and supports personalised educational pathways for each student. Virtual Reality and Augmented Reality serve as primary tools to recreate complicated or hard-to-experience clinical situations such as paediatric resuscitation, mass casualty triage and multi-system trauma (Padilha et al., 2019; Pottle, 2019). Students gain experiential learning through these environments because they practice clinical decision-making under pressure without harming patients while aligning with both Kolb's experiential cycle and deliberate practice models (Ericsson et al., 1993). AR overlays function in hybrid simulations to deliver live procedural instructions and physiological feedback that enhances situated learning and student involvement. Artificial Intelligence systems are starting to transform the way Simulation-Based Education operates. Learners receive adapted difficulty levels through real-time algorithms as well as natural language processing that enables authentic patient conversations in VR simulations (Dai & Ke, 2022). When applied in simulation contexts, Self-Determination Theory (Deci & Ryan, 2000) is strengthened by strategies such as individualised feedback, which support students' development of autonomous learning. While technology-enhanced simulations show great potential they fail to deliver universal effectiveness. The educational field warns educators against giving priority to new technology over educational value (Brydges et al., 2020). When simulations prioritise visual realism over learning outcomes, they fail to deliver meaningful educational value, leading to cognitive overload and surface-level student engagement (Cook et al., 2011). Students may experience negative reactions such as technological disorientation together with motion sickness and decreased immersion because of technological problems mainly found in virtual reality systems (Czerniewicz et al., 2020). Students who have sensory sensitivities or who lack experience with digital learning tools may experience difficulties with technology use at a higher rate. Additionally, equity concerns persist. The lack of financial resources at certain institutions prevents them from implementing advanced simulation equipment so students at different facilities receive dissimilar learning experiences (Kiegaldie & Shaw, 2023). High-quality simulation access for all students requires matching technology investment with educator training and inclusive design and robust support systems (Motola et al., 2013). Simulation pedagogy needs strategic incorporation of technology as its core component. The International Nursing Association for Clinical Simulation and Learning (INACSL) standards require that technology functions to enhance learning objectives and psychological safety and meaningful debriefing rather than replacing them (INACSL, 2021). Relational learning, together with facilitation and feedback, function as essential human components throughout all tech-enriched learning environments.

Interprofessional Education (IPE)

Simulation provides students from nursing along with medical professionals, pharmacy students, physiotherapy students and social work professionals an exclusive training space to learn interactively with each other and from one another and about their roles together (Centre for the Advancement of Interprofessional Education [CAIPE], 2002). Students learn about

professional roles and develop mutual respect through exposure to this experience which enables them to develop necessary communication skills for successful team-based care (Palaganas et al., 2014; Goolsarran et al., 2018). Research demonstrates that simulation-based IPE training enhances clinical performance and situational awareness as well as teamwork abilities most notably during urgent medical scenarios including heart attacks, traumatic incidents and child protection situations (Reeves et al., 2016; Rosen et al., 2018). Students gain experience with complex event responses in controlled psychological safe environments through these simulations which reduces their anxiety levels as they develop teamwork abilities.

The implementation of IPE through simulation faces multiple obstacles during its delivery. The ability to scale up IPE faces challenges because of practical issues including time management between different programs and unbalanced simulation equipment distribution (Croker et al., 2019). Medical students' dominant behaviour in simulations has been reported by several institutions which restricts nurses and allied health students from leading or making meaningful contributions to the simulation activity (Thistlethwaite, 2012). Effective scenario development combined with trainer instruction that builds inclusive team interaction and allows balanced student involvement solves these participation issues. Research indicates that continuous longitudinal studies are necessary for determining how interprofessional simulation affects actual practice settings. Short-term benefits in attitudes and communication practices are documented frequently but the analysis of long-term collaboration benefits in clinical placements and post-registration practice needs more study (Lapkin et al., 2013).

Enhancing Reflective Practice

The foundation of experiential learning rests on reflection and simulation-based learning benefits from debriefing as its most effective practice. Simulation transforms into a thinking space about critical thought and emotional processing along with professional development through debriefing (Rudolph et al., 2008). PEARLS (Promoting Excellence and Reflective Learning in Simulation) and GAS (Gather, Analyse, Summarise) are both structured methods designed to guide facilitators through post-simulation debriefing, helping learners reflect on and integrate their experiences (Eppich & Cheng, 2015; Fanning & Gaba, 2007).

Video-assisted debriefing strengthens this process through student self-observation of body language and communication and decision-making which enables better self-assessment (Zhang et al., 2019). Studies demonstrate this method helps students recognise nonverbal signals while holding themselves responsible and helps internalise learning results (Grant et al., 2017). Debriefing success depends heavily on the presence of skilled facilitators. Psychological safety diminishes when debriefing sessions occur poorly because they either lack structure or become too critical or take place too hastily (Raemer et al., 2011). Educators need to receive training which covers delivering feedback and emotional intelligence, so students feel safe especially after intense and emotionally challenging situations. Research shows that institutions implement debriefing procedures with variable success rates. Students experience differing levels of quality in their simulation training because of different times and lengths of sessions combined with varying facilitator abilities (Sawyer et al., 2016). Simulation literature highlights a critical need for standardised debriefing protocols and facilitator development programs.

Competency-Based Assessment in Simulation-Based Education

Simulation-Based Education (SBE) functions as a competency assessment platform because it delivers controlled learning environments that enable direct observation of clinical competencies and decision-making and behavioural performance. Simulation surpasses traditional written tests because it enables real-time performance assessment of students' skills in dynamic complex situations (McGaghie et al., 2010). The assessment tool of choice for simulation is the widely implemented Objective Structured Clinical Examination (OSCE). These examinations enable educators to measure specific competencies including medication administration, handover communication and clinical reasoning through evaluations based on standardised criteria in controlled environments (Alsulimani, 2021). Well-planned OSCEs create reliable valid and transparent assessment methods that match both professional regulations and real-world practice requirements. Simulation-based assessment has specific restrictions during its implementation. The excessive use of checklists together with binary marking systems has the effect of converting clinical competence into a system of behavioural checklists. Students may only attain surface learning when they focus on completing observable tasks instead of demonstrating deep understanding and adaptability (Sawyer & Gray, 2016; Levett-Jones et al., 2011). Real-world competence demands adaptable behaviour alongside situational understanding and priority-based care abilities, yet these competencies are difficult to evaluate through strict scoring systems.

The high-stakes nature of summative simulation assessments leads to performance anxiety that can produce distorted learner behaviour while suppressing genuine responses. The need to protect learners from psychological harm demands a balance between assessment and psychological safety when evaluating non-technical competencies (Rudolph et al., 2014). The emerging assessment models combine both structured assessment tools and qualitative facilitator evaluations with narrative feedback and learner reflection. The combination of multiple assessment approaches strengthens both data authenticity and reliability (Nestel et al., 2011). Educators now widely accept debriefing as a formative assessment tool to evaluate learner decision-making while helping develop clinical reasoning skills instead of solely measuring performance outcomes. Equity is another important consideration. Simulation-based assessments lack consistency because of assessor bias together with inconsistent facilitation and unequal preparation resources (oet et al., 2011; Bland, 2021). Competency assessment requires placement in strong governance systems which ensure inter-rater reliability and calibration and inclusive practices.

Blended Learning and Scalability in Simulation-Based Education

Healthcare education relies more on blended learning which combines traditional classroom learning with online study. Simulation-based education benefits from flexible delivery models which allow institutions to adapt their teaching methods for different learning environments and student requirements (Lee, Kourgiantakis & Hu, 2022). Simulation benefits both student engagement and facilitator workloads when institutions combine theoretical lessons with practical exercises. Students receive cognitive and emotional preparation for upcoming simulations by engaging with pre-simulation content including video lectures together with case studies and interactive modules and virtual briefings. Students who complete pre-course work will enter the simulation session ready to practice their skills and develop their problem-solving abilities while working with other participants (Chang et al., 2023). The method allows students to enter simulation exercises with prior knowledge, thus enabling them to focus on applying their knowledge during in-person training.

Programmes with large student cohorts and part-time learners as well as those spanning multiple campus sites benefit from the logistical capabilities of blended delivery. Through online delivery institutions maintain standardisation of instruction which helps create equal access to core course materials. The method delivers specific benefits to learners who require flexible study conditions due to scheduling conflicts or learning preferences and clinical responsibilities. Blended learning systems present various constraints for educational practice. Students become overwhelmed or disengage when pre-learning material is not integrated properly or when the content exceeds reasonable limits. The asynchronous materials risk being treated as supplementary materials that students can disregard instead of essential elements for successful simulation execution. According to George et al. (2021) learners achieve the most benefit from simulation when the links between pre-training content and actual simulation activities receive explicit reinforcement throughout the process. The development of facilitator members represents an essential requirement. Instructional staff need confidence in their ability to deliver simulation instruction while building blended curricula that maintain instructional coherence (George et al., 2021). Educators lack proper direction which leads them to either add too much content or fail to connect learning goals between delivery platforms (Cook et al., 2013). The implementation of blended learning approaches may decrease time pressures during classroom meetings but does not automatically decrease teacher workload. Establishing and sustaining high-quality digital resources demands major upfront investments for time and training alongside technological infrastructure development according to Boettcher and Conrad (2016).

Improving Transfer to Practice

Simulation needs to accomplish more than lab performance training if it is to prepare nursing students effectively for real-world clinical settings. Transfer is not automatic. The transfer of learning depends on how simulation reflects actual placement settings including their requirements and essential competencies (Can't & Cooper, 2017). Research evidence supports deliberate and repeated practice as an effective method. The authors of McGaghie et al. (2010) and Grierson et al. (2019) demonstrate that simulation activities distributed across curriculum periods produce better learning retention and clinical practice skills and confidence in students. The progressive structure of the scaffolding approach enables students to master both technical and non-technical competencies which advance in difficulty according to their skill development. The authenticity of training scenarios acts as a critical element that determines how effectively students can transfer learned skills and behaviours into practice. Simulation training produces clinical transferability when it uses current medical procedures and includes realistic patient complexities along with time constraints and decision-making priorities (Nestel & Bearman, 2015; Liaw et al., 2012). Simulation design becomes more authentic when practice educators and local clinical partners join forces to create scenarios which also ensures consistent application in placement settings. Yet, challenges remain. Simulation curricula tend to remain disconnected from real-world placement practices because outdated or generic technology and scenarios prevail in some training programs (Aebbersold, 2016). Learners face difficulties in implementing their practised skills when placement settings present different working environments or cultural norms or administrative expectations. Nursing requires better institutional cooperation between academic and clinical partners because its specialised settings and high emotional demands require coordination. Moreover, timing is important. Learners gain most from simulations when these are delivered at the point of deployment, rather than many months in advance or after the event (Sevdalis et al., 2012). Real time feedback thus helps to narrow the gap between actual and perceived

competence. Soft skill transfer such as communication, empathy and team working are increasingly recognised as being as important as technical skill transfer. Simulation that includes debriefing, reflection and interpersonal complexity, for example, family dynamics and safeguarding, better supports this broader preparation (Shin et al., 2015; Hall & Tori, 2017).

Conclusion

Simulation-Based Education (SBE) is both an enormous source of potential and an ongoing dilemma in the context of nursing education. This review has shown that its value is not just in its realism or novelty, but in its capacity to promote meaningful and reflective learning when well-designed and equitably delivered. The advantages of simulation, skill development, clinical decision making, and the chance to practice complex decisions without putting patients at risk are well reported in the literature. However, the achievement of these outcomes is not automatic and not universal. Learning is still significantly influenced by emotional and cognitive barriers as well as variability in facilitator preparation and uneven access to simulation resources. Simulation is often praised for its ability to reduce risk, but if access is determined by institutional funding, or if learning environments lack psychological safety, it can inadvertently reproduce inequalities. Similarly, new technologies bring great potential, but new demands on educators and learners that are not yet well understood. The literature also highlights that the success of simulation is less dependent on technological sophistication than on thoughtful integration into curricula, inclusive design, and skilled facilitation. It is not fidelity alone that matters, but alignment—between simulation aims and learner needs, between learning activities and assessment methods, and between classroom experiences and the realities of clinical practice.

Opportunities for development lie in the strengthening of the simulation infrastructure, including facilitator development, standardisation of debriefing, adaptation of design for diverse learners, and incorporation of simulation into wider programme goals. Simulation is most powerful when it not only replicates clinical scenarios, but when it allows students to rehearse professional judgment, navigate uncertainty, and build collaborative capacity within safe, supported spaces. These findings suggest that simulation must be studied not only as a tool but as a complex and situated educational practice. This research explores this understanding by listening to the experiences of student nurses through their own words, focusing on what it means to them, the challenges they encounter, and what they think makes simulation effective. In this way the study aims to shed more light on how simulation is being used in practice and how it can be shaped to better meet the needs of learners and the profession.

2.10.3 The Student Perspective in Simulation-Based Education

Although the simulation literature is extensive, much of it privileges educator and institutional perspectives. Studies that foreground the student voice are fewer, but some work has begun to address this.

Cleaver et al. (2022) explored first-year paediatric nursing students' experiences of simulation as a transition tool prior to clinical placement. Students described simulation as a "*kinder introduction*" to practice, supporting confidence, preparedness, and safe rehearsal of skills. At the same time, they noted limitations such as skill decay and the slower pace of simulation compared with real clinical practice. Au et al. (2016) similarly reported that students valued high-fidelity simulation for its immersive qualities and for preparing them to manage emergency situations. However, some felt that aspects of the activity seemed less real, or that it risked becoming rote learning if not well structured.

Brown (2019) offers the perspective of graduate nurses reflecting on their pre-registration experiences. Participants emphasised that high-fidelity, scenario-based simulations, combined with good facilitation and debriefing, helped reduce the theory–practice gap. In contrast, low or infrequent simulation was seen as less useful.

Taken together, these studies show that simulation is not experienced as a uniform pedagogy. Student voices highlight both benefits and challenges, shaped by design quality, emotional safety, and frequency of exposure. In this thesis, fidelity is discussed primarily in relation to technical fidelity, the extent to which manikins and equipment replicate clinical reality. However, the perspectives reported in these studies suggest that emotional, relational, and environmental aspects also influence how students judge realism and transfer their learning into practice.

2.10.4 Gaps in the Simulation Literature and Relevance to This Study

SBE has become a mainstream component of pre-registration nursing programs but existing research continues to focus mainly on technical fidelity and educator measures of success and competency attainment. Although some recent studies have begun to explore student perspectives (Cleaver et al., 2022; Au et al., 2016; Brown, 2019), these remain context-specific and fragmented. These essential areas represent only one side of simulation activities since they fail to acknowledge the full range of human interactions and emotional processes that occur during simulation-based education. The following section identifies major gaps in the present literature, which serves as the foundation for this study, while not all of them receive direct attention in this research. The study adds valuable insights to the fields of student voice, emotional safety, identity formation, and inclusive educational design.

Limited Qualitative Insight into Student Experience

Simulation-based education (SBE) research shows a strong preference for quantitative methodologies, which include post-simulation surveys and standardised satisfaction checklists along with skill acquisition metrics. Measurable results from these methods fail to reveal the complete mental and emotional processes through which students experience simulations. Qualitative research on this topic continues to grow, but it remains limited and inconsistent. Students exhibit diverse emotional reactions to simulation experiences according to Nestel et al. (2019) and Levett-Jones et al. (2015). Students express feelings that range from empowerment and preparedness to exposure, anxiety, and confusion. The research indicates that simulation produces diverse experiences because individual variables like learning preferences, cultural background, and prior experiences determine student engagement. Such variables are infrequently integrated into the planning and assessment of simulation programs. There exists a need to conduct more detailed studies about how students understand and interact with simulation environments in specific contexts.

Emotional and Psychological Consequences of Simulation

The emotional and psychological impacts that simulation produces in participants need further research. The combination of high-pressure situations with peer evaluation, performance anxiety, and unfamiliar learning spaces produces intense emotional reactions in participants. Research indicates that intense stress during simulation sessions damages learning by affecting students' ability to make decisions, remember information, and maintain their self-assurance (LeBlanc et al., 2012; Cantrell et al., 2017). According to Gore et al. (2011) and Hall et al. (2016), students feel most exposed when peers observe them or when they undergo live assessments since they fear public failure and embarrassment. Emotional responses remain

insufficiently studied particularly when they affect student participation in simulation activities and their eventual views about clinical readiness. The rising awareness about emotional regulation through pre-briefing and debriefing tools has not translated into adequate research about student experiences during these phases. Research should expand to study the relationship between simulation-related stress and student confidence development as well as identity formation and motivation patterns throughout their educational journey.

Weak Longitudinal Evidence on Learning Retention

A persistent limitation in simulation literature is the lack of long-term follow-up. Most studies measure performance immediately after simulation sessions, focusing on short-term increases in self-confidence or task competence. Little evidence exists on how well students retain knowledge or transfer simulated learning into clinical practice over time (Shinnick et al., 2011; Harder et al., 2019). The few longitudinal studies that do exist, such as O'Regan et al. (2016), suggest that simulated competence does not always translate directly into real-world clinical effectiveness. This is especially relevant in light of the NMC's (2024) policy change allowing up to 600 clinical practice hours to be replaced by simulation. Without a clearer understanding of whether SBE leads to sustained learning and real-world readiness, there is a risk of over-relying on short-term indicators of success.

Inconsistent Definitions and Applications of Fidelity

Fidelity remains a core concept in simulation theory, yet its definition and implementation vary widely across studies. Most research prioritises technical fidelity, the physical realism of manikins or clinical settings, while giving less attention to psychological and sociocultural fidelity, which arguably have a greater impact on learner immersion and perceived authenticity (Dieckmann et al., 2007). Lavoie and Clarke (2017) highlight that overly complex simulations can overwhelm novice students and reduce learning effectiveness. Despite this, limited research explores how students interpret or respond to different levels of fidelity. Few studies consider how a student's stage of development should influence the matching of fidelity to learning outcomes. There is also minimal exploration of how varying fidelity impacts emotional safety, engagement, and reflective learning, all of which are central to this study's focus.

Poor Integration of Learning Theory

Despite its experiential nature, simulation is frequently disconnected from robust theoretical frameworks. While some studies reference Kolb's experiential learning theory or Schön's reflection models, these links are often superficial or retrospective rather than integral to simulation design and analysis. Nestel and Bearman (2015) criticise the lack of theoretical depth across much simulation literature, noting that simulation interventions are often difficult to compare due to inconsistent pedagogical underpinnings. Particularly in emotionally rich contexts such as paediatrics or mental health, the lack of a guiding theory limits research findings' educational value and interpretive insight. Deeper application of learning theories — including those related to identity formation, self-determination, or relational pedagogy — would offer a more meaningful lens through which to study simulation outcomes.

Equity, Accessibility, and Inclusive Practice

Access to simulation resources remains highly uneven. High-fidelity equipment, trained facilitators, and simulation spaces are expensive, and not all institutions have equal access. Smaller universities or publicly funded systems under financial pressure may be unable to provide consistent or equitable simulation experiences (Kiegaldie & Shaw, 2023; Simes et al., 2020). But equity goes beyond resourcing. There is limited research on how simulation design

and delivery affect students with diverse learning needs, including neurodiverse students or those with mental health considerations. Most simulation designs still assume normative learner behaviour and may unintentionally exclude or disadvantage some students. Knight et al. (2019) argue that inclusive simulation requires co-design with diverse learners and intentional consideration of emotional and cognitive accessibility, yet such practices remain rare in the literature. A critical omission is a lack of research into adaptive approaches, flexible debriefing methods, or differentiated expectations.

Debriefing and Psychological Safety

Debriefing is widely acknowledged as essential for effective simulation, yet student perspectives on what constitutes good debriefing remain underexplored. While frameworks such as the “Debriefing for Meaningful Learning” model are gaining traction, most research evaluates debriefing through facilitator perspectives or checklists. Psychological safety, the belief that one can speak openly and make mistakes without fear of judgment, is essential to learning, yet its definition, measurement, and implementation vary across studies (Edmondson, 2019; Rudolph et al., 2006). Research into how students experience group dynamics, feedback processes, and emotional processing during debriefing is limited, particularly in high-pressure or interprofessional scenarios. This presents a significant gap, as facilitator competence and group structure are known to affect debriefing quality and student reflection.

Lack of Cultural and Global Diversity in Research

Most simulation research has been conducted in Western, English-speaking institutions, limiting its relevance to diverse global contexts. Little empirical work explores how cultural norms, language differences, or healthcare system variations affect simulation learning (Eltaib et al., 2024; Moloney et al., 2022). Understanding cross-cultural learner needs will become increasingly crucial as remote and digital simulation platforms expand international access. Additionally, cultural identity, communication styles, and expectations about authority or error-making may influence how students engage with the simulation. Without greater global and cultural inclusion, the field risks embedding assumptions that do not serve diverse or international cohorts of learners.

Summary and Relevance to This Study

Taken together, these gaps highlight a need to rebalance simulation research. While technical proficiency and short-term outcomes remain important, they must be complemented by inquiry into simulation's emotional, cognitive, and identity-related aspects. Student voices are underrepresented, especially in areas such as emotional regulation, inclusion, accessibility, and psychological safety. Even where student perspectives are included, they often emphasise confidence or technical realism rather than these relational and affective dimensions. Furthermore, simulation continues to suffer from limited theoretical depth, inconsistent use of fidelity, and a shortage of longitudinal and cross-cultural perspectives.

This study responds to several of these gaps by exploring student nurses' experiences of simulation from an interpretive, constructivist perspective. It focuses particularly on how students engage with simulation emotionally, how they perceive simulation to influence their learning and professional development, and how inclusive or exclusive they find these experiences. While this study does not aim to address all of the issues outlined above, it contributes meaningfully to a more student-centred understanding of SBE, particularly around emotional safety, identity formation, and the relational dynamics of simulated learning.

2.11 Chapter Summary

Simulation-Based Education (SBE) has emerged as a crucial component of modern nursing education since it allows students to practice clinical scenarios in controlled environments. This paper critically reviews the historical background and theoretical base of SBE and its practical uses along with challenges of SBE implementation from students' and teachers' viewpoints and the perspectives of clinical partners and service users. The research evidence confirms that simulation increases students' ability to develop clinical competencies and think critically while enhancing their communication skills, leadership abilities and reflective practice abilities. SBE creates conditions that help students gain confidence through structured debriefing while providing safe psychological environments where they can practice risk-free decision-making. The positive outcomes hold value in nursing because this field requires deep emotional engagement and complex clinical decision-making alongside family-focused practice.

Despite its potential, simulation is not available to everyone or used consistently. The review identifies persistent inequalities in access, variable preparedness of facilitators, and variable quality of the scenarios. Furthermore, even though simulation is based on a solid educational theory, research infrequently explores the application of these theories in various technologies, various groups of learners or specialities such as paediatrics. The same can be said about issues of inclusion, which are still not well addressed in research and practice concerning both learners' needs and patients' representation. One of the main findings of the literature is that simulation does not exist in a vacuum. It is successful only if it is relevant to the curriculum goals, clinically relevant, stakeholders' buy-in, and the institution is ready to support it. When these elements are in place simulation enhances readiness for practice. If these elements are not in place, then simulation may become a mere formality without any reference to actual clinical learning. However, the literature also points out several gaps that lead to the development of the present study. Gaps identified in the literature include: there is limited in-depth qualitative research on student experiences particularly in nursing, simulation in support of diverse learners and there is limited research on what makes simulation effective, relevant, or emotionally engaging to students. Furthermore, there is a paucity of research on the long-term impact of simulation on confidence, empathy, and competence, especially in relation to its application in clinical placements or early professional practice.

These gaps justify the aim of this study to explore how learners perceiving simulation, what supports their learning, and where they experience difficulties. Thus, it contributes to the existing body of knowledge and seeks to address the current deficiency in academic and pedagogical discourses. As simulation advances (for example, with the use of artificial intelligence, immersive technologies, and interprofessional approaches), educators and institutions must critically reflect. They should also ask themselves whether simulation works, for whom, in what ways, and under what circumstances. Without this reflection the risk is that simulation will just reproduce the same inequalities or fail to realise its full potential as a truly transformative educational tool.

This literature review has provided a basis for that reflection. It has highlighted the worth of SBE and the need to explore it in greater detail, with a particular focus on the student's viewpoint. The following chapter describes the methodology used to address these questions, based on the themes, tensions, and priorities that arose from this review.

Chapter 3: Research Methodology

3.1 Introduction

This chapter outlines the research design and methodology applied to explore undergraduate nursing students' experiences of Simulation-Based Education (SBE). A qualitative research approach was chosen to provide rich, in-depth data and insights into students' perspectives, aligning with the study's focus on understanding complex, socially constructed phenomena. The rationale for this approach lies in its capacity to capture the subtleties of participants' experiences, emotions, and perceptions, which are critical to evaluating the effectiveness of SBE.

The research design integrates multiple qualitative data collection methods, including observation, photographs, questionnaires, focus groups, and interviews. This multimethod data collection method was selected to ensure comprehensive data triangulation of the findings. Observations captured real-time interactions and behaviours in simulated environments, while photographs documented contextual details, such as the physical setup of simulations. A focus group facilitated dynamic discussions, allowing participants to share and reflect on their experiences collectively. Individual interviews allowed a deeper exploration of personal perspectives and experiences. Questionnaires provided open-ended questions to allow participants to express their experiences and opinions individually.

The research objectives guiding this study were to identify the key elements of SBE that students perceive as contributing to effective learning experiences and explore how they impact their professional development and readiness for clinical practice. The research questions focused on understanding how nursing students engage with different simulation modalities, their challenges, and their perceived benefits of SBE in bridging the gap between theory and practice. By utilising a qualitative methodology, this study aimed to provide actionable insights that can inform the design and delivery of SBE in nursing education.

3.2 Conceptualisation of the Research Approach

The philosophical foundations of research are crucial in shaping its design, methodology, and interpretation. This study adopts a constructivist research paradigm, a relativist ontological stance, and an interpretivist epistemology, all of which were selected to support the study's primary aim of exploring the experiences of nursing students in simulation-based education (SBE). These philosophical positions provide a solid foundation for investigating the subjective, socially constructed nature of learning within SBE, where students actively engage with simulated environments, reflect on their experiences, and collaboratively construct knowledge (Flick 2018).

Overall conceptualisation of the research begins with a consideration of ontology. Ontology addresses the nature of reality and what can be known about it. This study embraces a relativist ontological stance, asserting that reality is subjective and shaped by individual perceptions and experiences. In the context of SBE, learning does not occur in a fixed, objective manner; rather, it is influenced by students' prior experiences, personal reflections, and interactions with instructors and peers (Vanson 2014). For instance, two students participating in the same simulation may derive different insights and meanings, as their interpretations are informed by their unique perspectives and backgrounds. One might focus on technical skill development,

while another may prioritise team communication, depending on their personal perspective, but the challenge here for the facilitator is to ensure all students engage effectively to achieve the intended learning outcomes to the best of their ability (Cant and Cooper 2017). By embracing relativism, the research seeks to capture the diversity of these perspectives, acknowledging that nursing education is deeply personal and context dependent.

This variability underscores the importance of recognising individual narratives in educational research. Alternative ontological perspectives, such as realism and critical realism, may be more suitable in other areas of healthcare education. Realism advances an objective reality independent of human perception, making it more appropriate for studying clinical skills acquisition, where students must meet predefined competency standards (Crotty, 2014). Similarly, critical realism acknowledges the existence of an underlying reality but argues that our access to it is mediated through social structures, discourse, and individual experience (Bhaskar, 1975; Archer et al., 1998). While these perspectives are relevant for assessing procedural competence and standardised clinical training, they are less fitting for this study, emphasising how students construct meaning from simulation-based experiences rather than measuring specific clinical skill acquisition. Simulation-based education is not solely concerned with the acquisition of clinical skills or procedural correctness. The nature of SBE is broader, encompassing decision-making, critical thinking, adaptability, and reflective practice. Unlike strictly defined clinical procedures, the outcomes of simulations are not always predetermined or fixed (Cant and Cooper 2017). Even if a simulation does not unfold as expected or a student makes an error, there remains significant learning value in debriefing, reflection, and discussion (Sahin and Basak 2021). Learning in this context is socially constructed, varying across individuals based on their prior experiences, interactions, and interpretations of the simulation. A relativist ontological stance is thus more appropriate for this study because it recognises that reality is subjective and context-dependent, shaped by individual perspectives and interpretations. The goal is not to measure the accuracy of procedural skills against an objective standard but to understand how students experience, interpret, and construct meaning from their interactions with simulation (MacLeod, Burm, and Mann, 2022). Furthermore, reflection and debriefing are core components of simulation-based education, both of which rely on participants' subjective interpretations of events. This emphasis on individual meaning-making reinforces the appropriateness of a relativist ontology, which recognises that reality is experienced and understood differently by each learner. The effectiveness of a simulation is not solely determined by whether the expected clinical outcome is achieved but by the student's ability to engage in self-reflection, consider alternative approaches, and apply their learning to future practice. From a relativist perspective, each student's reflective process, although the process may not be uniform, is equally valid. The meaning derived from the experience is co-constructed through discussion and interaction, making relativism the most coherent ontological foundation, ultimately aligning with the study's aims and objectives.

Epistemology concerns the nature of knowledge and its acquisition (Vanson 2014). This study is grounded in an interpretivist epistemology, which complements the relativist ontology by emphasising that knowledge is co-constructed through social interactions and contextual influences. Interpretivism asserts that reality is understood through individual meaning-making processes. It is particularly suitable for exploring students' subjective experiences and reflections within SBE, as it helps understand how individuals make sense of their experiences. This is echoed in the work of Jodache, Howe and Siyambalapitiya (2019), who highlight that knowledge is constructed through lived experiences and social interactions, necessitating a

qualitative descriptive approach to capture these complexities. Furthermore, interpretive epistemology enables researchers to engage deeply with participants, fostering co-constructed knowledge that reflects the participants' realities. This aligns with the notion that understanding is derived from the meanings individuals assign to their experiences, a key tenet of interpretivism. Other epistemological stances, such as objectivism or post-positivism, are less appropriate for this research. Objectivism assumes that knowledge exists independently of human perception, making it better suited for experimental or quantitative research. While acknowledging some subjectivity, post-positivism still privileges measurable outcomes and generalisable findings (Flick, 2018). In contrast, this study adopts a constructivist and interpretivist approach, where the aim is not generalisability in the statistical sense, but rather a deep, contextual understanding of how simulation is experienced by student nurses. While the findings may not be universally generalisable, they offer transferable insights that can inform practice and policy in similar educational settings. However, this study does not aim to quantify learning outcomes but rather to explore the diverse and nuanced ways in which students engage with and interpret SBE experiences. Interpretivism supports the use of qualitative methods, such as interviews, focus groups, and observations, to explore the subjective meanings that students attribute to their experiences. This approach acknowledges the researcher's active role in the knowledge-generation process, requiring reflexivity to ensure findings authentically represent participants' voices. Further exploration of the researchers' reflexivity is discussed in more detail later in this chapter.

The constructivist research paradigm is the overarching framework that connects ontology and epistemology to the study's methodological approach. Constructivism asserts that knowledge is actively constructed rather than passively absorbed, with learning occurring through interaction, engagement, and reflection (MacLeod, Burm and Mann 2022). A constructivist paradigm conceives that knowledge is not a mere reflection of an objective reality but is constructed through social processes and interactions. This perspective is supported by Olsen and Pilson (2022), who argue that individuals interpret their realities through their experiences and interactions with others. This paradigm is particularly relevant for SBE, where students participate in realistic clinical scenarios, engage in decision-making, and reflect on their experiences during debriefing sessions. For instance, during a debriefing, students may discuss their thought processes and emotional reactions, which can lead to a richer understanding of their learning journey (Sahin and Basak, 2021). Unlike didactic teaching approaches focusing on information transmission, constructivism emphasises learner agency and active participation, making it a well-suited paradigm for investigating how students engage with simulation. Similarly, Kamal (2019) emphasises that the constructivist paradigm acknowledges multiple realities shaped by social, cultural, and historical contexts, which are crucial for qualitative research. In contrast, positivism or post-positivism would be more suitable for research focused on objective skill assessment or competency validation in SBE. These paradigms prioritise measurable learning outcomes, such as pass/fail rates or procedural accuracy, rather than students' perceptions and reflective processes. Since this study aims to understand how students engage with and construct meaning from their simulation experiences, constructivism provides the most appropriate foundation. This multiplicity of realities aligns with a relativist ontology, which asserts that there is no single truth but rather a spectrum of truths shaped by individual perspectives and experiences.

The study's primary subject of focus, simulation, has a theoretical foundation in constructivist learning theory, which aligns with its constructivist paradigm and interpretivist epistemology, allowing for its exploration. This theory, influenced by prominent theorists such as Piaget,

Vygotsky, and Bruner, posits that learners construct knowledge by integrating new experiences with existing understanding (Chuang 2021). For instance, Piaget's stages of cognitive development highlight how learners progress through distinct phases, suggesting that educational experiences should be tailored to their developmental level. In the Simulation-Based Education (SBE) context, students engage with realistic clinical scenarios that challenge their existing knowledge and encourage them to apply theoretical concepts in practical settings, fostering more profound understanding and retention. Reflection is particularly crucial in SBE, as post-simulation debriefing allows students to critically evaluate their actions, receive feedback, and refine their approach (Kolb 2014). This reflective practice is supported by Kolb's Experiential Learning Cycle, which emphasises the importance of concrete experience, reflective observation, abstract conceptualisation, and active experimentation. For example, after a simulation, students might discuss what went well and what could be improved, leading to actionable insights that enhance their future performance. The theoretical underpinnings of SBE have been thoroughly explored in a broad review of the literature.

By incorporating these theoretical perspectives, the study develops a holistic understanding of learning in SBE, capturing both the cognitive and social dimensions of knowledge construction. This multifaceted approach not only enriches the educational experience but also prepares students to navigate the complexities of real-world clinical environments effectively. By integrating these theories, the study underscores the importance of creating informative and transformative learning experiences, ultimately leading to the development of competent and confident healthcare professionals.

The study's conceptualisation directly informs its methodological approach. The constructivist paradigm and interpretivist epistemology necessitate qualitative methods prioritising depth, context, and participant voice. The selection of focus groups, semi-structured interviews, and observations allows for a rich exploration of individual meaning-making and collective learning processes (Gannon, Taheri and Azer 2022). The alignment between the constructivist paradigm, relativist ontology, and interpretivist epistemology directly informs the study's qualitative research design. This study employs a descriptive case study design (Thomas 2021) to provide an in-depth account of nursing students' interactions with SBE and how these experiences shape their learning and professional development. Bringing together multiple data sources — including interviews, observations, photographs, and open-text responses — allowed for integration during analysis. This process supported triangulation, strengthening the credibility of findings by offering multiple perspectives on how students experienced simulation.

While some studies (e.g., Bogna, Raineri & Dell, 2020) have explored the integration of constructivist and critical realist paradigms to examine the relationship between meaning-making and social structure, this study adopts a purely constructivist and interpretivist position. This framework uses thematic analysis to explore how students construct meaning from their simulation experiences, grounded in their individual narratives and emotional responses. This approach aligns with Braun and Clarke's (2022) interpretivist analysis model, which remains flexible to emerging themes while prioritising participants' lived experiences.

A case study approach to qualitative research is a robust methodology that allows for an in-depth exploration of complex phenomena within their real-life contexts. According to Yin (2018), a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not evident, making it ideal for examining intricate educational experiences, such as simulation-based education in nursing. Creswell (2009) further emphasises that qualitative case studies

are designed to provide a detailed understanding of a specific case or cases, often involving multiple sources of data collection such as interviews, observations, and document analysis.

This qualitative case study unpacks the application of simulation in nursing education and the connections between the facets of SBE. Drawing on the frameworks of Yin (2018) and Thomas (2021), the aim was to unravel those connections and offer a route to explaining the elements which make SBE effective from a student perspective. The study takes an explanatory approach, aiming to understand how and why simulation impacts learning and clinical readiness in nursing students. This study was designed as a nested case study. The overarching case was simulation-based education in nursing, while the sub-cases comprised the two higher education institutions involved, together with the individual student experiences situated within them. This nested structure was chosen to capture both the broader institutional contexts that shape simulation delivery and the lived experiences of students within those contexts. In this way, the research design allowed for comparison across settings as well as attention to the depth of individual meaning-making offering a richer understanding than a single-case or purely individual phenomenological study could provide. Yin's (2018) model supports a structured design with straightforward research questions and multiple sources of data. This approach strengthens the study's explanatory power. His use of embedded case design aligns with the nested structure of this study, enabling comparisons between institutions and an analysis of specific practices within each setting. Thomas (2021) offers a more flexible, context-driven perspective. He argues that the case should be developed in relation to the subject and purpose of the study, not as a fixed entity. This view supports the selection of the two universities as purposeful examples, chosen for their contrasting or comparable approaches to simulation. The use of multiple data sources will support the triangulation of the findings and increase credibility. Combining Yin's (2018) structured design with Thomas's (2021) contextual sensitivity allows for a detailed examination of simulation in nurse education. The nested case study structure supports both in-depth analysis of each university and cross-case comparison, as well as attention to individual student experiences within those settings. The findings will contribute to understanding how different simulation practices influence educational outcomes in nursing. This methodological rigour ensures that the study captures the complexity of students' experiences engaging in and effectively learning during SBE and, thus, the rich tapestry of learning that arises from simulation.

Selecting a constructivist paradigm, relativist ontology, and interpretivist epistemology establishes this research's coherent and robust conceptual foundation. Unlike alternative approaches focusing on measurable competencies and standardised learning outcomes, this study prioritises students' subjective experiences, reflections, and meaning-making processes within SBE. By integrating these philosophical and theoretical perspectives, the research offers a careful exploration of how nursing students effectively engage with, interpret, and learn from simulation-based experiences, yielding valuable insights for the field of nursing education. This approach not only enables the researcher to enhance their understanding of SBE but also ensures a comprehensive and meaningful examination of students' perspectives, informing future educational practices that are responsive to the diverse needs and experiences of nursing students. This approach recognises the diversity of experiences, the significance of social interactions, and the transformative power of knowledge in shaping individual understanding. By embracing these principles, researchers can engage in meaningful inquiry that reflects the complexities of human experience and contributes to advancing knowledge in various fields.

3.3 Recruitment of Participants

The overall sampling strategy for this qualitative study was non-probability and intentionally varied to support triangulation across different data sources. Two sampling methods were employed: convenience sampling, used for distributing questionnaires to a broad student cohort; and purposive sampling, used to recruit participants for interviews, focus groups, and observation sessions based on their experience with simulation-based education. Both approaches are appropriate in qualitative research where the aim is to gain insight into specific perspectives and experiences rather than produce generalisable findings. Participants were undergraduate pre-registration nursing students enrolled in nursing programs at universities in the UK. These participants were selected because of their direct involvement with Simulation-Based Education (SBE), the central focus of the study.

Participants were approached through their course tutors and administrators, who disseminated an invitation email (Appendix 4). This email outlined the purpose of the study and invited students to volunteer to participate. Purposive sampling was employed to ensure participants had relevant exposure to SBE, a prerequisite for capturing meaningful insights into the study's research questions. This method facilitated the recruitment of individuals with direct and varied experiences, enabling a deeper understanding of effective simulation practices (DiCicco-Bloom and Crabtree, 2006). Convenience sampling was utilised to approach students during pre-scheduled SBE activities, enhancing recruitment efficiency and fostering familiarity within peer groups to encourage open dialogue (Liamputtong, 2011). Participants' exposure to different environmental and contextual variables, such as fidelity levels in simulation suites, was considered to assess how these factors shaped their learning experiences (McCallum, 2007).

While purposive and convenience sampling are widely used in qualitative research, they have recognised limitations. Recruiting participants through course tutors and during scheduled simulation sessions may have led to a self-selecting group, where only those with strong views or a willingness to speak volunteered (Palinkas et al., 2015). This introduces a risk of selection bias and may narrow the range of perspectives captured. Convenience sampling also limits diversity, as it depends on availability rather than striving for broader representation (Etikan et al., 2016). Additionally, although participation was voluntary, students may have felt implicit pressure to participate due to the recruitment method (Liamputtong, 2011). These factors can affect the transferability of the findings to other nursing programmes or educational settings.

3.4 Data collection methods and Participant recruitment

To support clarity, providing an overview of the full data collection process at the outset is helpful. Although the study involved multiple forms of qualitative data, each method presented unique recruitment challenges and required adaptive strategies to ensure participation and rigour. Rather than presenting these difficulties in isolation, each data collection subsection describes recruitment issues and adaptations to contextualise the experience of gathering that specific form of data. These adaptations reflect qualitative research's iterative and flexible nature and underscore the importance of responsiveness when working with real-world participants in dynamic academic settings. The infographic below summarises the overall sequencing and structure of data collection across the study, offering a visual reference point as the chapter unfolds.

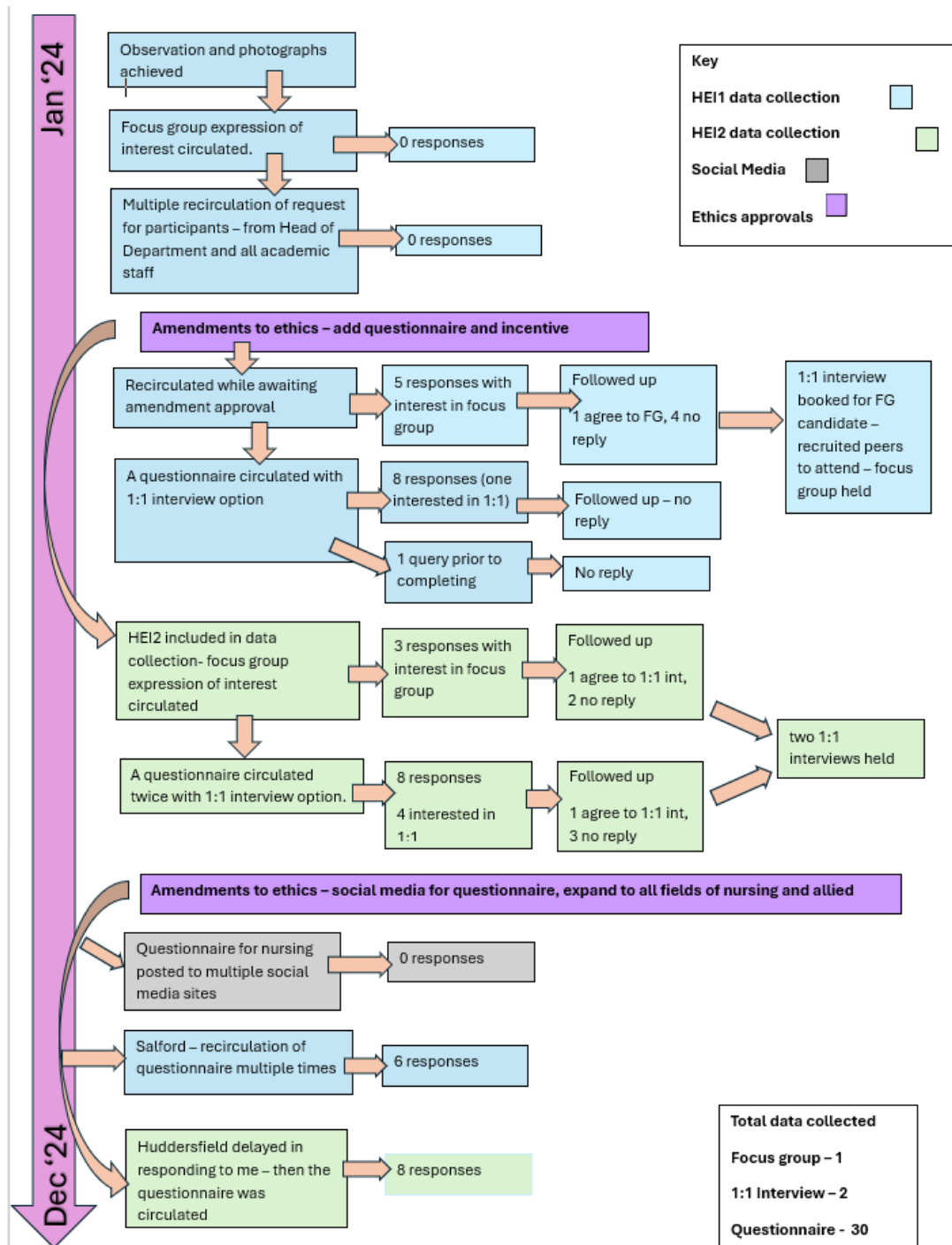


Figure 1 Timeline of participant recruitment and data collection, showing both the planned and the adaptive strategies.

Recruitment did not follow the path originally envisaged. The initial plan was to focus on children's nursing students within a single university. However, limited numbers led to an adaptive strategy of widening recruitment to all fields of nursing and to a second university. While this shift arose from necessity, it also strengthened the study by broadening perspectives and allowing for cross-case comparison. The inclusion of students from different fields and two institutional contexts provided a richer and more varied picture of simulation practice than would have been possible within the narrower original design.

This section also outlines the process of analysing the qualitative data collected through interviews, focus groups, observations, photographs, and questionnaires. A comprehensive and multifaceted approach to data collection was employed to explore simulation-based education (SBE) from the perspective of nursing students. This included observation, photographs, focus groups, questionnaires, and interviews. The researcher used each method of data collection for its ability to provide context-rich insights into how students engage with and experience SBE. The use of multiple qualitative methods reflects the core aim of exploring perceptions, meanings, and experiences in depth, which is central to qualitative inquiry (Creswell and Poth, 2018; Merriam and Tisdell, 2016). Although the questionnaire incorporated some closed ended (yes/no) questions, these were immediately followed by open-ended items that encouraged participants to elaborate on their answers. The purpose of including these limited quantitative elements was to guide and contextualise the qualitative data, not to generate generalisable statistics. As such, this study does not adopt a mixed methods design but remains firmly situated within a qualitative research paradigm (Maxwell, 2013; Sandelowski, 2000). The brief quantitative responses serve to support the collection and interpretation of narrative data, aligning with the exploratory and interpretive goals of the research. Braun and Clarke's (2006, 2021) reflexive thematic analysis framework was used to support an in-depth and flexible exploration of patterns across the dataset. Consistent with the study's constructivist and interpretivist foundations, the analysis focused on understanding how participants made sense of their experiences with simulation-based education in their own words and contexts.

The study aimed to recruit participants from first, second, and third-year cohorts to reflect a broad range of experiences and stages of exposure to simulation-based education. The original plan was to hold 3 to 5 focus groups per year group, with groups stratified by academic year to support shared context and ease of discussion. Mixed-level groupings were also considered to explore potential insights from inter-year interactions. Each focus group was designed to include 4 to 6 participants, with flexibility to accommodate up to 8, following best practices to encourage participation and allow for in-depth conversation (Liangputtong, 2011). Observations were conducted first, during which photographs were taken with the intention of using them in focus groups as prompts for photo elicitation. However, when recruitment to focus groups proved challenging, the design was adapted. A questionnaire was introduced that incorporated selected photographs and also invited respondents to leave contact details if they were willing to take part in a follow-up interview. As a result, only one focus group took place, involving year two students from HEI1. One of the student volunteers took an active role in helping to recruit peers to take part, akin to snowball sampling, resulting in a single, same-level group of year two students. While this helped enable the session to go ahead, it may have influenced group dynamics and introduced potential bias, as participants may have felt a sense of obligation or shared perspective due to existing peer relationships. These factors may have limited the diversity and spontaneity of discussion, and the single group format restricted the ability to compare across cohorts. In addition, the adaptive use of the questionnaire generated two individual interviews (both year two students from the same university) and offered a broader mix of responses across universities, year groups, and fields of nursing practice.

3.4.1 Observational data

Observation served as a foundational method for documenting the interactions and behaviours of nursing students within simulated environments. Recruitment for observational data was arranged in collaboration with academic staff at participating institutions. While overall access

was successfully granted, the process was affected by administrative delays, particularly in securing gatekeeper approval and coordinating observation dates within busy teaching timetables. These delays reduced the total number of sessions that could be observed within the available data collection window. The researcher adopted a flexible approach, attending simulation sessions at short notice where possible and working closely with staff to identify appropriate observation opportunities. These adaptations helped ensure that meaningful observational data were still collected while respecting the constraints of the academic environment.

This technique allowed for the collection of verbal and nonverbal data, which is crucial in understanding the dynamics of student engagement during SBE sessions (Angrosino, 2007). By observing student involvement in SBE activities, the researcher systematically recorded nonverbal actions and interactions. This data encompasses gestures and interactions between individuals in response to the simulated environments, essential for comprehending how students engage with and assimilate simulation as a learning resource (Patton, 2015). The observational framework used for collection of field notes captured the nuances of student interactions with the simulated manikins, their peers and the simulated educational environment, providing insights into their emotional responses and professional behaviours.

The observations were conducted in simulation suites at the two universities included in the study (HEI1 and HEI2). These suites include advanced manikins and various technological tools for simulating paediatric care situations, including immersive technology, live streaming between spaces, and two-way mirrors for observing activities. Studying these environments enables a researcher to capture how the physical and technological setup supports or hinders learning, revealing critical insights into the educational process (Mulhall, 2008). A strong observational framework was essential for the development of detailed and meaningful field notes. As a participant observer in the SBE activities, the researcher adopted an overt, non-participatory stance, present within the setting but refraining from active engagement. The aim was to minimise disruption and observe the sessions as naturally as possible. However, the realities of overt observation must be acknowledged. While efforts were made to remain unobtrusive, the presence of a researcher inevitably introduces the possibility of participant reactivity, where individuals alter their behaviour because they know they are being observed (Kawulich, 2005; Robson and McCartan, 2016). In highly structured environments such as simulation suites, where students are already performing in front of peers or assessors, this influence is difficult to isolate or quantify. Covert observation was not appropriate or viable within this educational context. Instead, transparency about the researcher's role was prioritised, with the understanding that some degree of observer effect is unavoidable. Mulhall (2003) notes that in healthcare settings, participants often return to their routine behaviours over time, suggesting that the observer's influence may diminish as familiarity increases and this could be applied to simulated healthcare environments. Nevertheless, it remains a methodological consideration when analysing observed behaviours and interactions. Observations were recorded using a semi-structured field note framework developed for this study (see Appendix 5 for a simplified version). This framework included broad guiding categories such as session context, spatial configuration, verbal and non-verbal communication, psychological fidelity, group dynamics, and observer reflections. These categories functioned as sensitising concepts (Blumer, 1954), providing direction without imposing rigid expectations on what should be recorded. This flexible structure was intentionally aligned with the study's interpretivist stance, which prioritises openness to participants' lived experiences and the situational dynamics of learning environments

(Emerson, Fretz & Shaw, 2011). The approach balanced consistency across data collection with responsiveness to emerging phenomena, allowing the researcher to remain attuned to unexpected behaviours or emotional cues that may not have been captured through structured checklists. This form of guided yet adaptable observation is well-established in qualitative nursing research and case study design (Mulhall, 2003; Merriam & Tisdell, 2016), where the complexity of real-world educational settings calls for systematic and context-sensitive methods. By adopting this approach, the researcher was able to ensure depth and richness in the data, while supporting reflexivity and analytic clarity during subsequent thematic analysis.

Being present in the simulated environments allows the researcher to observe the social dynamics as they unfold, providing deeper insight into how students interact and engage. This enhances the interpretive depth of the findings (Gray, 2013). The approach reflects the principles of qualitative research, which is rooted in a constructivist worldview, recognising that reality is socially constructed and best understood through context-rich, value-laden interpretations (Merriam & Tisdell, 2016).

The observation aimed to record both spoken exchanges and non-verbal signals including body language and facial expressions because these elements help researchers understand student interactions with simulation as a learning tool (Angrosino, 2007). The interpretation of non-verbal behaviours remains subjective because they provide essential information about emotional tone and group dynamics and student comfort or uncertainty. The ambiguity of non-verbal communication in naturalistic settings remains unclear according to Schwartz and Jacobs (1979) and Emerson et al. (2011). The researcher used reflexive interpretation methods by comparing non-verbal behaviours with verbal interactions and session timing and overall patterns in the dataset. The researcher used interview data and questionnaire responses to validate non-verbal interpretations even though direct participant checking is not always possible in group observation settings. The method acknowledges observational uncertainty while maintaining the value of expressive behaviours when properly interpreted with contextual understanding (Denzin & Lincoln, 2018). The reflexive thematic analysis approach by Braun and Clarke (2021) focused on meaning-making instead of objective truth through multiple perspective analysis with transparent interpretation.

This comprehensive approach aimed to reflect the complexity of the simulation environment and the layered nature of student experiences during SBE. However, it is important to recognise that fully capturing these dynamics was only possible to a certain extent. Observational data is inevitably shaped by the observer's position, perspective, and limitations in noticing or interpreting every interaction, particularly in fast-paced or multi-participant settings like the simulation suites. Despite these constraints, efforts were made to document as much relevant detail as possible to build a rich and meaningful account of the sessions. Maintaining a balance between detailed notetaking and staying present in the moment was demanding. These factors can affect the completeness and reliability of the data collected.

The information gathered from observations was not analysed in isolation, it was combined with the photographs and the data obtained from the questionnaires, focus groups and interviews for a comprehensive analysis. An in-depth thematic analysis of field notes focussed on how students interact with the environment, including their emotional responses and overall behaviours in the simulated scenarios (Braun & Clarke, 2021). This approach facilitates an understanding of how both the setup and teaching methods of SBE impact the learning process. The observer's interpretations are also shaped by their own perspective, which can introduce bias and will be considered further in analysis and discussion.

3.4.2 Photographs as data

In addition to notetaking, photographic documentation was conducted in the simulation setting (with prior consent from all participants) to capture visual details of the environment and to record the equipment arrangement, the placement of manikins in the simulation rooms and interactions between students and facilitators and with the environment. Photographs were originally intended to support focus groups through photo-elicitation, helping to prompt discussion and reflection on students' experiences. However, due to challenges in data collection, including low focus group participation, the photographs were reconsidered as a valuable data source. In qualitative research, photographs can offer insight into context, environment, and interaction that may not be easily captured through words alone (Banks, 2001; Pink, 2013). As Shaw (2013) notes, while photo-elicitation can support dialogue, photographs also hold interpretive value independently. In this study, they were included as a standalone method to contribute additional depth and context to the findings. Photographs were used in this study to capture aspects of the simulation-based learning environment that might not be fully observed in real time. While the images were not taken by participants, they offer valuable contextual insight into how students interact within the space. Using a longer lens enabled the researcher to take candid, unposed images with minimal disruption to the session, helping to reduce observer influence. Photographs in qualitative research are not neutral representations. The researcher's perspective together with theoretical orientation determines both the content and method of photography through framing choices and timing decisions and focus adjustments (Banks, 2007). The researcher's choices about meaningful content and representative material reflect their personal judgments about what matters most. The decisions made during live simulation sessions happen spontaneously because participants lack time to think about their choices. According to Pink (2013) and Rose (2016) visual data emerges from social and cultural positions which researchers co-construct during the research process. The research team integrated reflexivity throughout their data collection and interpretation activities. The researcher documented their thought process through a reflexive journal to explain their image selection choices and their connection to developing themes. The researchers analysed images together with field notes and other data sources to base their interpretations on contextual information instead of visual appearances. Kaplan et al. (2010) state that visual methodology requires both ethical transparency and analytical honesty which means researchers should acknowledge what they leave out as much as what they display. The methodological approach combines strict research methods with the constructivist principles of meaning creation through visual data. A sample of photographs from both institutions are available in Appendix 9.

There is no single method of analysing photographic data, nor one correct way of viewing it (Rose, 2016). Interpretation is shaped by the research question, the context in which the image was produced, and the researcher's own interests. In this study, photographs were treated as a distinct but interconnected data source. While they offered unique visual insights, particularly into space, interaction, and engagement, they were analysed in conjunction with field notes, interviews, and other qualitative data to support a more layered and triangulated understanding of student experiences in simulation-based education.

Ethical considerations were central to the use of photography. To protect participants' anonymity, all identifiable features, particularly faces, will be blurred in any published materials. Care was taken to avoid misrepresentation by ensuring that photographs are accompanied by

sufficient context and grounded in a clear understanding of the setting and purpose (Pink, 2013; Murray & Nash, 2018).

3.4.3 Focus Groups

Focus groups were planned as a key method for gathering qualitative insights into students' experiences of simulation-based education (SBE). This method was chosen for its ability to generate rich, interactive dialogue, where students could reflect on and build upon each other's contributions in a familiar peer setting (Liamputtong, 2011). The aim was to explore collective experiences and perceptions that might not surface in one-to-one interviews, particularly in relation to the emotional and social dimensions of simulation. However, despite initial plans to conduct multiple focus groups across different year groups, recruitment for focus groups was particularly difficult. Despite repeated efforts, including tutor announcements, targeted emails, and face-to-face requests at HEI1, volunteer numbers remained low. An attempt to transfer focus group recruitment to the researcher's employer university also yielded limited success. After obtaining ethical approval, a prize draw was offered, but its effect on participation was minimal. To compensate, students who expressed interest but could not join a group were offered individual interviews instead. This adjustment ensured that student voices were still included while accommodating logistical constraints. Ultimately, only one focus group was conducted, consisting of students recruited through peer networks. While this still provided valuable data, the limited scope reduces the ability to compare perspectives across cohorts or identify broader patterns. This is a recognised limitation of the dataset. .

Focus groups, when successful, offer several benefits. They allow for shared meaning-making, the co-construction of knowledge, and the surfacing of collective memory (Vygotsky, 1978; Davidson, 2010). The group setting can also prompt deeper reflection, reveal areas of consensus and disagreement, and capture verbal and non-verbal communication that adds context to participants' views (Angrosino, 2007). In this study, the discussion was conducted online and recorded and later transcribed (a sample of transcription is available in Appendix 7) for thematic analysis (Braun & Clarke, 2021). Nevertheless, using only one group limits the depth and breadth of insight. Group dynamics may have influenced who spoke and how openly, and the absence of follow-up groups means themes could not be explored in greater detail. The setting and familiarity among participants may have helped facilitate open discussion, but also risks the silencing of minority or dissenting views.

Photo-elicitation was originally intended as a core part of the focus group process, using researcher-generated images to prompt discussion. While the limited number of sessions meant this could not be implemented as widely as planned, it was still incorporated into the single focus group and used to support discussion. In addition, the photographs were also analysed as standalone data to contribute further contextual insight. Despite these constraints, the single focus group contributed to the wider data set by offering insight into how students talk about simulation in peer settings. Its findings were integrated with observational, interview, and questionnaire data to enrich the overall understanding of student engagement with SBE.

3.4.4 Questionnaires

Questionnaires were used as one strand of data collection to gather a broad range of student perspectives on simulation-based education (SBE). The initial rollout was to children's nursing students at the first university (HEI1), then expanded to include child nursing students at the second university (HEI2), and later opened more widely to students across all fields of nursing

practice. This decision was made to increase the response rate and to capture diverse experiences across different nursing pathways. The questionnaire included both closed and open-ended questions. While the inclusion of closed questions generated some descriptive quantitative data, this was not intended for detailed statistical analysis. Instead, these data are presented for transparency and to provide contextual information about the participant group. The emphasis of this study remains firmly on qualitative analysis. Closed questions offered a way to gather basic information quickly; for example, how often students engaged in simulation, or whether they felt it improved their confidence or preparedness for clinical placements. These were followed by open-ended questions that encouraged participants to elaborate on their experiences. While this introduced a small quantitative element (helpful in establishing context), the approach remained rooted in qualitative research principles, where the emphasis is on participants' meanings and interpretations (Creswell & Poth, 2018; Braun & Clarke, 2021).

The survey was anonymous, though participants could opt in to leave a contact email for a follow-up interview. Two such interviews were conducted, offering the opportunity to explore responses in greater depth and clarify points raised in the questionnaire. An attempt was made to promote the survey through social media channels, but this yielded no additional responses, highlighting the limitations of online recruitment in voluntary academic research (Nind et al., 2012). While questionnaires allowed access to a wider student population than interviews or focus groups could reach, there were drawbacks. The quality of responses varied, some participants wrote detailed, thoughtful reflections, while others gave very brief answers. The absence of an interviewer also meant that it was not possible to follow up or probe further, which can limit the depth of insight compared to face-to-face methods (Braun & Clarke, 2021). Nonetheless, the data gathered contributed to the broader thematic analysis (see sample in Appendix 8) and the responses also offered useful context for interpreting the findings from other sources.

Despite its potential for broader reach, the questionnaire also encountered recruitment difficulties. A revised ethical approval enabled its dissemination across all nursing fields, not just children's nursing, to increase accessibility. Distribution via social media (see table 4), institutional channels, and professional platforms was approved and attempted, but yielded low response rates. Gatekeeper limitations, platform algorithms, and participant fatigue may have influenced this. Nonetheless, the responses gathered still offered valuable insight, particularly when triangulated with interviews and observations.

Social media page/group name	Response to request to post
FACEBOOK	
The Student Nurse Mummy	Agreed and link posted on site
Student and Registered Nursing Associates and Future Nurse Group UK	Agreed and link posted on site
Student Nurse Guide	No reply received
Nurses Helping Nursing Students	No reply received
Nursing Student Group	No reply received
UK Student Nurses Support and Advice	No reply received
Children's Nursing Group	No reply received
Student Nurse and Registered Nurse Support Group	No reply received
Royal College of Nursing: Students	Refused to post
TWITTER / X	
RCN Newly Registered Nurses	Agreed and link posted on site
The RCN	Refused to post
Nurses in Research	No reply received
We Student Nurse	No reply received
RCN Students	Refused to post
CYPStNN	Agreed and link posted on site

Table 4 Social media summary

3.4.5 One-to-one interviews

The interview format was introduced partly as an adaptive response to low focus group participation. Students were recruited via purposive sampling based on simulation exposure and willingness to speak about their experiences. Flexible scheduling was employed to improve participation. This approach ensured detailed, individual accounts were captured and allowed students who preferred one-to-one conversations to contribute.

Two one-to-one interviews were conducted with participants who responded to the questionnaire and opted to be contacted for a follow-up discussion. These interviews served as an opportunity to explore individual responses in greater depth and clarify points raised in the written data. While the number of interviews was small, they provided reflective, participant-led insights that enriched the wider dataset. Interviews were semi-structured, guided by themes emerging from the questionnaire, while allowing flexibility for participants to introduce their own perspectives (Gill et al., 2008). This approach is consistent with interpretivist research, where the focus is on understanding how participants construct meaning from their experiences (Merriam & Tisdell, 2016). The format was conversational and open-ended, enabling depth without rigid structure. Interviews were conducted online, recorded with consent, and transcribed in full. The small number of interviews limits their breadth, and the possibility of self-selection bias must be acknowledged, those who opted in may have had particularly strong views or felt more confident sharing them in a one-to-one setting (Barbour, 2001). However, they provided valuable opportunities to deepen understanding of individual experiences and supported triangulation with other data sources (A sample of IV1 transcription is in Appendix 6). Despite their limited scale, the interviews contributed meaningfully to the analysis by expanding on themes that appeared in the questionnaires and highlighting how personal perspectives aligned with or diverged from group patterns.

3.4.6 Piloting and Refinement of Data Collection Tools

While a full pilot study is often recommended to test and refine data collection tools (van Teijlingen & Hundley, 2001), recruitment constraints meant that this was not feasible in this study. Instead, a small group of nursing educators from one of the participating universities

reviewed the draft versions of the questionnaire and the semi-structured prompts for interviews and focus groups. Their feedback focused on the clarity, tone, and neutrality of the questions, ensuring they would encourage open and reflective responses from participants. One example of this feedback related to a question that originally asked, “What elements or aspects of sessions make simulation boring or irrelevant?” It was pointed out that the wording implied that such elements were always present, potentially leading participants or framing their responses. Following this, the question was revised to ask, “Are there any aspects of simulation sessions that you find less engaging or less relevant?” This change made the question more open and allowed for a wider range of responses, including neutral or positive perspectives. This kind of rewording helps reduce bias and reflects good qualitative practice (Gill et al., 2008).

Although not a formal pilot, this informal feedback process served a similar purpose by strengthening the relevance and sensitivity of the tools. As Leon, Davis, and Kraemer (2011) note, even limited pre-testing can improve the quality and credibility of data collection when full piloting is not possible.

In summary, the combination of observations, photographs, focus groups, interviews, and questionnaires formed a comprehensive framework for data collection in this study. Each method contributed unique insights, allowing for a multi-layered exploration of simulation-based education from the perspective of nursing students. The use of data triangulation strengthened the study’s credibility and helped to capture the complexity of students’ emotional, professional, and learning experiences within simulated environments. These choices were grounded in a constructivist approach that values rich, contextualised data to better understand educational experiences (Creswell & Poth, 2018; Merriam & Tisdell, 2016).

3.5 Data Analysis

Each dataset was first examined in its own right to account for its distinctive characteristics before being integrated into the broader thematic analysis. Interview and focus group transcripts, along with open-text questionnaire responses, were reviewed line by line and highlighted and annotated to capture nuance in participants’ words and meanings (Braun & Clarke, 2021). For example, inductive codes such as *Uniform*, *Peer Support*, and *Frustration* were identified and later grouped into higher-order themes, including *Professional Identity and Clinical Readiness*, *Peer Dynamics and Collaborative Engagement*, and *Emotional Impact and Wellbeing*.

Observation notes were reviewed both descriptively and interpretively, focusing on verbal exchanges, non-verbal cues, and contextual detail (Angrosino, 2007). Notes taken during the observation on the template were annotated soon after each session to highlight patterns such as *Confidence*, *Pressure*, and *Distraction*, which were later integrated within subthemes under *Emotional Impact and Wellbeing* and *Peer Dynamics*.

Photographs were examined as expressive and contextual data (Pink, 2013). Each image was annotated to highlight spatial arrangements, relational positioning, and indicators of engagement. Recurring visual cues, such as clustering of students during debrief or use of equipment, were coded under *Peer Support/Shared Learning* and *Environmental Realism*, later contributing to themes of *Collaborative Engagement* and *Environmental Realism and Operational Quality*.

While the questionnaire included some closed-ended items, these were analysed descriptively to provide contextual information about the participant group. They were not used for statistical

analysis but instead offered transparency and helped situate the qualitative findings (Sandelowski, 2000).

To ensure transparency, short annotated extracts of each analytic process are provided in Appendices 10-12. These include annotated field notes, marked-up questionnaire responses, and photographs showing coding notes, demonstrating how initial insights were developed into codes and categories.

Following these separate analyses, an abductive reasoning process (Timmermans & Tavory, 2012) guided integration across methods. Observation data highlighted visible behaviours and group dynamics; interview and questionnaire data illuminated emotional and cognitive dimensions; photographic data provided relational and environmental insights. These strands were iteratively compared and contrasted, with overlapping codes (such as *Confidence*, *Support*, and *Realism*) appearing across multiple data sources.

Post-it notes representing individual codes from all datasets were physically clustered and re-clustered into broader categories, an analogue mapping process that culminated in a thematic map (Appendix 2). This ensured that final themes, were grounded in converging insights across textual, visual, and observational data. The outcome was a coherent and reflexively derived thematic structure that captured the multi-layered nature of student experience.

The following section outlines the thematic analysis procedures in greater detail, using Braun and Clarke's six-phase model as a guide.

3.5.1 Overview of Thematic Analysis

Braun and Clarke (2021) describe thematic analysis as a reflexive and iterative approach to qualitative data analysis. It emphasises the researcher's active role in identifying and constructing themes rather than simply discovering them in the data. This perspective aligns with the constructivist paradigm underpinning this study, which acknowledges that meaning is co-constructed through the interaction between the researcher, participants, and context.

Thematic analysis is particularly suitable for exploring participants' subjective experiences and perspectives, as it allows for the identification of both explicit content and underlying patterns of meaning. Braun and Clarke's six-phase framework was employed for this study, providing a systematic yet flexible guide for analysing the observational, interview, focus group and questionnaire data collected from nursing students.

Data Preparation and Familiarisation

The first phase of thematic analysis involved data preparation and familiarisation. Video recordings of the interviews and focus groups were transcribed verbatim, capturing verbal content and key non-verbal cues such as pauses, emphases, and emotional tones, where relevant. The transcription process was conducted manually to allow in-depth engagement with the data and ensure that nuances in participant responses were captured accurately. This step also facilitated the researcher's initial immersion in the dataset, an essential precursor to identifying meaningful patterns. The transcriptions were cross-checked against the recordings to ensure accuracy and completeness, minimising the risk of data misrepresentation. Notes and initial impressions were documented in a reflexive journal during this phase, allowing the researcher to record early observations and potential areas of interest. Following transcription, the researcher repeated the data reading to become deeply familiar with the content. This

phase involved immersing in the data holistically, reading and re-reading the transcripts alongside any reflexive notes. During this familiarisation, photographs were reviewed alongside field notes to help surface initial impressions of emotional tone and engagement. The goal was to identify initial patterns, points of emphasis, and areas where participants articulated consistent or contrasting views about their experiences with SBE.

Initial Coding

The second phase of thematic analysis involved systematic coding of the data. A code is a label or short descriptor that captures the essence of a data segment, allowing for the organisation of information into meaningful categories. Using Braun and Clarke's (2021) reflexive approach, coding was conducted inductively, meaning that the codes were generated directly from the data rather than predetermined by existing theoretical frameworks. Coding drew on both verbal content and visual representations to capture recurring experiences and contextual insights. Each transcript was reviewed line by line, and meaningful text segments were assigned descriptive codes. The codes captured both what participants said directly, as well as the underlying ideas or assumptions behind their words. For example, when students discussed the "realism" of simulations, codes such as "authenticity of clinical scenarios" or "relevance to real-life practice" were applied. The researcher conducted a complete review of field notes to analyse observed behaviours together with environmental context and their personal reflections. The researchers applied descriptive codes to identify patterns of interaction and engagement and emotional tone in specific segments. The coding process for photographs emphasised recurring visual elements including spatial arrangement and equipment usage and student engagement indicators which researchers analysed together with field notes to maintain context and meaning. The coding process was iterative and reflexive, with the researcher regularly revisiting and refining codes as new insights emerged. This approach allowed for flexibility in responding to the data, ensuring that the codes captured the richness and complexity of participants' perspectives. To maintain consistency, a coding framework was developed and revised throughout this phase, with detailed descriptions of each code to guide subsequent analysis. A summary code table is available in Appendix 3.

Searching for Themes

The third phase involved organising the codes into broader themes, representing coherent and meaningful data patterns that address the research question. This process involved clustering related codes into initial thematic categories based on shared meanings. A thematic map was created to visualise the relationships between initial themes and subthemes. Initially this was a paper exercise to mind map all of the codes and group them, a photograph of this mapping board can be seen in Appendix 2. This map helped identify overlapping areas, hierarchies, and gaps in the emerging analysis.

Refining the themes

In the fourth phase of analysis, the initial themes were reviewed and refined to ensure they accurately reflected the data. This involved returning to the original transcripts to check that each theme was firmly grounded in participants' accounts and genuinely represented their perspectives. Themes that were too broad, overlapped, or lacked sufficient support were either merged, divided, or removed (A final theme table can be found in Appendix 4). To maintain coherence, the data within each theme were assessed for internal consistency, and the differences between themes were examined to ensure they were conceptually distinct. As Braun and Clarke (2021) highlight, it is essential that themes are both clearly defined and meaningfully connected, contributing to a coherent and comprehensive narrative. This review

was an iterative process and continued until all themes and subthemes were clearly shaped and backed by evidence from the data.

In the fifth phase, each theme was defined, named, and described in detail, with attention to capturing its core meaning and scope. At this stage, the themes were considered in relation to the research questions to ensure they directly addressed the aims of the study.

Copies of the code table and theme map can be located in appendix 3 and 4.

3.6 Reflexivity and Researcher Positionality

As the researcher, I held an insider–outsider position. I was a postgraduate research student at York St John University, researching the experiences of nursing students from other institutions. In addition to being a student, I also have a background in nursing education and am familiar with the structure and intended benefits of simulation-based education (SBE). This shared background helped me understand the context of SBE, but I was also aware that my assumptions and professional experiences could shape how I interpreted the data. My identity within the field, both as an educator and a student, carried the potential to influence interactions, interpretations, and even how I was perceived by participants. This dual role reflects what Wilson, Janes, and Williams (2022) describe as the fluid and dynamic nature of positionality in health research. Our identities are not fixed, but shift in response to the context, relationships, and power dynamics at play. My position as an educator may have unintentionally introduced an element of perceived authority, which could have shaped how openly participants felt they could speak, particularly about negative or critical aspects of their learning experiences. I was conscious of this throughout the research and took steps to reduce its influence.

Recognising the potential for bias, I engaged in reflexivity throughout the study, critically examining how my own views might affect the way I framed questions, interacted with participants, and interpreted their responses. The phenomenological concept of bracketing which involves suspending assumptions to view data without preconceptions has been influential across various qualitative approaches but researchers have criticised its practicality and usefulness in interpretivist frameworks. The study recognises that my nursing education background together with my experience in simulation environments influenced my understanding of data. I chose to adopt reflexive practice (Finlay, 2002; Berger, 2015) instead of complete knowledge bracketing by using journaling and analytic journaling to identify and question my assumptions. The interpretivist qualitative research approach accepts that researcher subjectivity exists as a resource which needs management through transparent reflection. Reflexive journaling helped surface these assumptions. For example, after observing a simulation session where students appeared disengaged, I initially judged the session as poorly executed. On reflection, I realised that my expectations, shaped by my background as an educator, may have coloured that view. Revisiting my field notes and transcripts with greater neutrality helped me refocus on participants' actual experiences, rather than my interpretation of what "good" simulation should look like. Supervision meetings also played a key role in challenging early interpretations that were too closely aligned with my beliefs about the value of simulation. Feedback prompted me to revisit the raw data and remain open to alternative or even contradictory perspectives that I might have initially overlooked. These practices were essential in maintaining a participant-centred approach to analysis and in acknowledging, rather than suppressing, the role of the researcher in co-constructing meaning (Finlay, 2002; Berger, 2015; Wilson, Janes & Williams, 2022).

3.7 Ethical Considerations

Ethical considerations are central to research involving human participants, particularly in healthcare and education settings. This study, *An Exploration of Simulation-Based Education from the Perspective of Nursing Students*, was designed with a strong commitment to protecting participants' rights, dignity, and wellbeing. Ethical approval for the study was first granted by York St John University reference number: ETH2324-0068, where the researcher is based. Subsequent approval was then obtained from the two universities (HEI1 and HEI2) where data collection took place. Amendments were submitted and approved as needed, including changes to recruitment strategies and data collection methods in response to low participant uptake.

The study followed established ethical principles of respect for persons, beneficence, and justice (Beauchamp & Childress, 2013). Participants were fully informed about the purpose of the research, what their involvement would entail, and their right to withdraw at any time without consequence. Informed consent was obtained from all participants, and additional measures taken to ensure confidentiality and anonymity, particularly for visual data such as photographs. Given the context of simulation-based education (SBE), which can sometimes involve emotionally charged or high-stakes scenarios, particular care was taken to minimise any potential psychological discomfort. The voluntary nature of participation was emphasised, and debriefing opportunities were provided. Data was securely stored and managed in accordance with the UK Data Protection Act (2018) and GDPR regulations. This study was grounded in ethical guidance for qualitative research in healthcare, where maintaining participant welfare, managing power dynamics, and protecting sensitive information are essential (Holloway & Galvin, 2017; Gelling, 2015). The flexible, iterative nature of the research design required ethical responsiveness throughout, ensuring that as the study evolved, ethical standards were consistently upheld.

The ethical framework outlined in this section was reviewed contemporaneously throughout the research process to ensure any emerging ethical concerns were addressed in a timely and appropriate manner. The researcher's commitment to ethical integrity underpinned all stages of the study, from planning and data collection to analysis, reporting, and dissemination of findings.

3.7.1 Informed Consent

Informed consent is a cornerstone of ethical research, ensuring that participants are fully aware of the nature of the study and their involvement (Beauchamp & Childress, 2013). In this research, informed consent will be obtained from all participants, including nursing students and facilitators or lecturers involved in the SBE activities. Participants were provided with comprehensive information regarding the study's aims, procedures, potential risks, and benefits through the Participant Information Sheets and consent form, which were received electronically before the focus groups or in person at observation sessions (Appendix X), allowing them to make an informed decision about their participation.

Participation in the study was entirely voluntary, and participants were informed they could withdraw at any time up to two weeks after a focus group or interview. This right to withdraw is essential to protect participants from feeling pressured to stay involved (REF). It reflects the ethical principles of autonomy and respect. However, the withdrawal process can be complicated by potential power imbalances particularly in a student-researcher context within

nursing education. Some participants may worry that leaving the study could affect their academic standing or relationships with staff and peers, even if those concerns are unfounded. To address this, the voluntary nature of participation and the right to withdraw without consequence were clearly communicated in the participant information sheet and repeated verbally before, during, and after each data collection session.

3.7.2 Confidentiality and anonymity

Maintaining confidentiality and anonymity is essential to protecting participants' privacy and ensuring their trust in the research process (Wiles et al., 2008). In this study, several strategies were employed to safeguard participants' identities and the confidentiality of the data collected. These measures are designed to give participants a sense of security and reassurance about protecting their privacy.

All data was anonymised using unique participant codes to protect participants' identities. These codes replace participants' names in all records, ensuring that individual responses cannot be traced back to them. Additionally, any identifying features in photographs or video recordings used during the study were blurred or obscured. Anonymisation protects participants and contributes to the research's ethical integrity (Saunders et al., 2015). The study has incorporated measures to mitigate any potential psychological impact on participants. These measures included providing a supportive environment during data collection, offering debriefing sessions after participation, and ensuring signposting to relevant university wellbeing services afterwards if required (Gelling, 2015). Measures were also taken to maintain confidentiality and protect the identities of the institutions involved in this study. The names of the institutions were replaced with pseudonyms in all documentation, including transcripts, analysis, and it will also apply to any subsequent published findings. Any identifying information, such as specific program titles, staff names, or unique institutional characteristics, were generalised or omitted to prevent the potential re-identification of the institutions.

All components of data collection were managed confidentially. Focus groups, while valuable for gathering data, presented specific confidentiality challenges since participants were aware of each other's identities (Kitzinger, 1995). To address this, participants were briefed on the importance of maintaining confidentiality and were asked not to discuss session content outside the group. As recommended by Sim and Waterfield (2019), the limitations of confidentiality in group settings were clearly explained during the consent process.

Collected data including video recordings, transcripts, and photographs were securely stored on the University's OneDrive, following best practices for academic data security (Yin, 2018). Access was restricted to the researcher and supervisory team to prevent unauthorised use. Physical documents, such as signed consent forms, were digitised and securely destroyed, aligning with York St John University's Data Retention and Erasure Policy, which emphasises that personal data must only be retained as long as necessary and securely disposed of thereafter. These measures complied with the Data Protection Act 2018 and the General Data Protection Regulation (GDPR), providing a robust framework for safeguarding personal data in research.

3.7.3 Power balance

The research study faced ethical challenges because power dynamics might have affected students' willingness to share their thoughts. The researcher's dual academic and research roles in nursing education created a potential authority dynamic which might have restricted students' willingness to share their thoughts (Walsh et al., 2016). The study primarily included

participants who did not have established academic connections with the researcher. The participant demographics (see Figure X in Chapter 4) showed that the distinction was not absolute because of recruitment challenges. The research process included measures to guarantee participants that their academic development and evaluation remained separate from research activities while maintaining distinct educational and research roles (Wright, 2020). The literature shows that transparency combined with clear expectations and participant concern response helps researchers manage power imbalances in their studies (Russell et al., 2000). The research adopted a "committed-to-participant" approach which maintained student inclusivity and authentic voice representation.

3.7.4 Ensuring Trustworthiness

In qualitative research, ensuring trustworthiness is key to establishing the quality and rigour of the study. Lincoln and Guba's (1985) framework offers four core criteria, credibility, dependability, transferability, and confirmability, which guide how researchers demonstrate the trustworthiness of their findings.

The table below outlines how each of these criteria was addressed in this study:

Trustworthiness Criterion	How It Was Addressed
Credibility	Triangulation through multiple data sources (interviews, focus group, questionnaire, observations, photographs); returning to raw data during analysis; reflexive journaling.
Dependability	Detailed documentation of changes to methods and recruitment; audit trail through reflective journal and supervision notes.
Transferability	Thick descriptions of the context, participants, and settings; allowing readers to assess applicability to their own settings.
Confirmability	Reflexive journaling; supervision feedback; conscious effort to bracket assumptions based on prior experience; direct use of participant quotes to support themes.

Table 5 Trustworthy summary

These strategies were used throughout the research process to ensure that findings were grounded in participants' experiences, transparently constructed, and responsibly interpreted.

3.7.5 Dissemination of findings

Dissemination of findings is an important element of qualitative research, particularly when the outcomes have implications for practice and curriculum development. In this study, the dissemination plan was outlined in advance and shared with participants during the consent process to ensure transparency and ethical responsibility. Findings will be disseminated to academic, professional, and student audiences, with particular attention to relevance for those involved in nursing education. Participating universities will be provided with a summary of results in written or presentation format, depending on institutional preference. This is intended to support local reflection and improvement in the design and delivery of simulation-based education (SBE). In addition, the findings will be considered for submission to peer-reviewed journals in nursing education and simulation, and for presentation at relevant conferences. Consideration will also be given to accessible dissemination routes for student nurses themselves, including student newsletters or digital platforms, in recognition of their central

role in this study. This approach aligns with Nind's (2014) emphasis on inclusive dissemination and Sandelowski's (1997) argument for the practical utility of qualitative findings beyond academia. All dissemination activity will continue to uphold the confidentiality commitments made during the ethical review process and follow the approvals granted by York St John University and participating institutions.

3.8 Chapter Summary

This chapter has detailed the methodological framework used to explore nursing students' experiences and perceptions of simulation-based education (SBE). A qualitative approach was selected to investigate the complex and subjective nature of these experiences, drawing on a range of methods, including interviews, focus groups, observations, questionnaires, and photographs, to allow for a rich and layered exploration of the research questions. While the methodology enabled in-depth data collection, several limitations must be acknowledged. Recruitment challenges limited the number and diversity of participants, particularly across year groups and nursing fields. Differences in simulation environments and students' exposure to SBE added contextual variation, which, although valuable, limited the transferability of findings. As with all qualitative research, the use of self-reported data and the researcher's own position introduced a degree of subjectivity, which was addressed through ongoing reflexivity and transparency.

These methodological choices were grounded in a constructivist paradigm, underpinned by a relativist ontology and interpretivist epistemology. This approach assumes that reality is constructed through individual experiences and shaped by social and contextual influences. Knowledge, in this context, is not discovered but interpreted through interaction between researcher and participant. The methods employed reflect this stance, seeking to understand how students make sense of simulation within their own educational journeys. By addressing methodological decisions transparently and aligning them with the study's theoretical framework, this chapter establishes a coherent and rigorous foundation for the analysis that follows. A broader reflection on the study's limitations will be taken up in the discussion chapter, where their implications for the findings and future research will be explored in greater depth.

Chapter 4: Results

4.1 Introduction

The research in this chapter investigates undergraduate nursing students' experiences during simulation-based education (SBE) through qualitative methods. The analysis uses interview data along with focus group discussions and questionnaires and field observations and photographs to understand student simulation engagement and meaningful perceptions and professional readiness development. The chapter divides its content into three primary themes that emerged from the coding and analysis. The first section examines student participation through emotional and cognitive and social dimensions. The second section investigates educator responsibilities by studying how facilitators direct and organise simulation activities and control emotional environments. The third section investigates physical and sensory aspects of the environment because they determine student engagement capabilities. The themes revealed several subthemes which emerged through inductive coding and thematic analysis. Students demonstrated multiple ways of handling simulation requirements by controlling their anxiety and thinking abilities while using peer support and reading facilitator signals. The chapter begins with a concise summary of questionnaire data which serves to enhance understanding. The chapter introduces a counter-narrative which presents an alternative student perspective that differs from the prevailing themes to show the diverse nature of student experiences.

The data appear without interpretation or literature discussion in this section because these aspects receive development in the following chapter. The structure enables readers to distinguish between students' actual statements and actions and the theoretical interpretation of these findings in relation to established research.

4.1.1 Data overview and sources

The chapter introduction should be followed by a brief summary of the data sources that support the findings. The research used multiple qualitative approaches together with descriptive quantitative data to study students' simulation-based education experiences. The research data collection took place in two higher education institutions (HEI1 and HEI2) with participants from different levels of undergraduate nursing study. The diverse multi-layered dataset allowed researchers to create detailed triangulated themes. The table presents the total amount and distribution pattern of each data type used in the study.

Data Source	Details
Questionnaires	30 total student responses: 16 (HEI1), 14 (HEI2) (11 closed-ended items focused on engagement, realism, and environment and 10 open-text questions per respondent, thematically coded and analysed)
1:1 Interviews (online)	2 interviews (HEI2); semi-structured, approx. 30–45 mins each
Focus Group (online)	1 session (HEI1); 6 participants; approx. 60 minutes
Field Observations	11 simulation sessions observed: 6 (HEI1), 5 (HEI2); across 7 days total
Photographs	345 images captured: 222 (HEI1), 123 (HEI2); used to support observational data and analysis of spatial realism

Table 6 Participant summary

The research methods delivered distinct insights through questionnaires which provided general information and interviews and the focus group which delivered detailed findings. The observation method recorded students' immediate actions and their interactions while photographs illustrated the physical aspects of student participation. The combined dataset allowed methodological triangulation (Denzin, 1978) which strengthened the findings' credibility through data convergence and divergence between different data types.

Questionnaire Overview and Descriptive Data

A brief overview of questionnaire results appears first to establish context for the upcoming qualitative themes. The collected data provided an overview of student opinions about simulation which added value to the findings obtained from interviews and observations and photographs. The questionnaire consisted of 11 closed-ended items which assessed student engagement and their perceptions of realism and the environment and facilitation influence. The following descriptive quantitative data are included only to provide context about the participant group and to ensure transparency in reporting. They are not analysed statistically and do not form part of the core qualitative findings.

The distribution of responses appears in Figure 3 according to institution type and field of practice and student year level. The overall response patterns are presented in Table 7 and Figure 4. With a key for the questionnaire codes used when discussing data from specific questionnaires seen in Table 8.

Key findings include:

- 93% of students reported enjoying simulation-based learning.
- 63% found the simulations realistic.
- 57% felt wearing uniforms enhanced the experience.
- 83% said the environment significantly impacted their learning.

- 100% identified facilitators and debriefing as crucial to effective simulation.

The thematic findings about emotional engagement and educator guidance and physical and psychological realism receive support from this descriptive data although it does not serve as the main focus of analysis.

Question	Yes	No	(Maybe if applicable)
Have you enjoyed your simulation-based learning experiences (SBLE) in your course so far?	28	2	
Does the simulation learning environment compare to actual clinical settings regarding realism and authenticity?	19	11	
Does wearing a uniform have an impact on your learning in SBLE?	17	13	
You have online and face to face simulation experiences, do you think one is better than the other?	18	9	3
Are there any factors about the simulation environment that impact how well you learn in a session?	25	5	
Do you feel you engage well during SBL sessions?	27	3	
Have you encountered any challenges in the SBLE?	13	22	
Is SBLE ever boring or irrelevant?	7	22	
Do you think working with your peers is important during SBL?	27	1	
Do your lecturers or facilitators contribute to the quality of your SBLE?	30	0	
Do you think a debriefing or feedback session is important after a SBLE?	30	0	

Table 7 Qualitative question responses - questionnaire

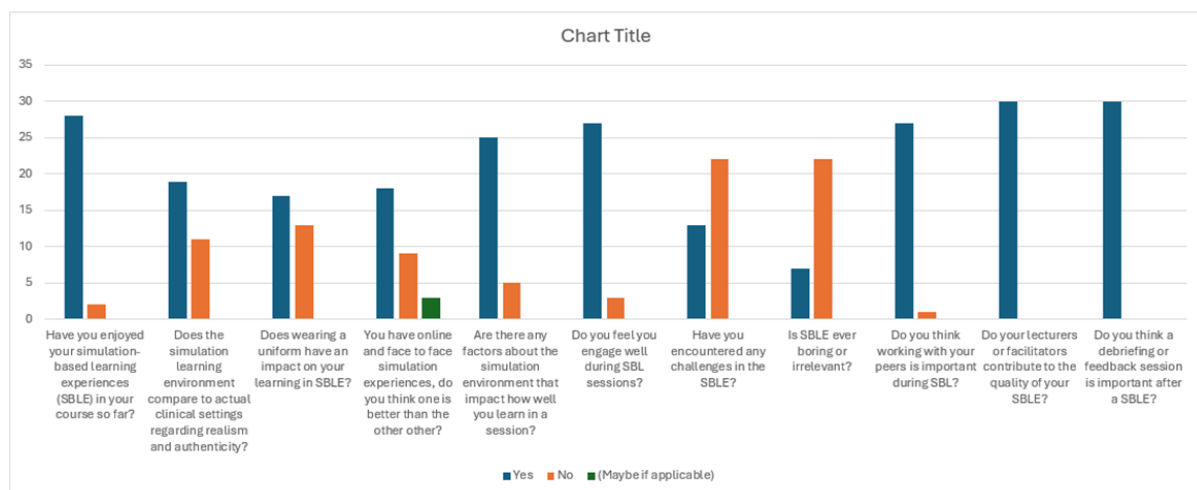


Figure 2 Graph of quantitative responses

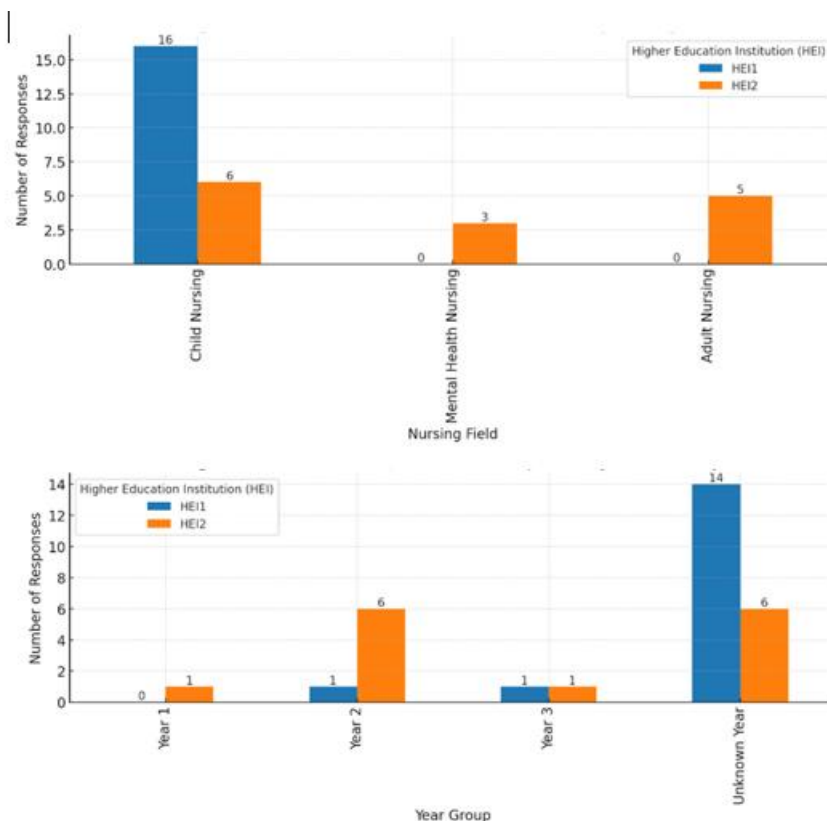


Figure 3 Distribution of cohort year group and field of practice

Questionnaire code	Participant group responses received from
QPC	HEI1 child nursing students
QPN	HEI1 all nursing student fields of practice
QPC12	HEI1 Divergent voice
QCN	HEI2 child nursing students
QNA	HEI2 all nursing student fields of practice

Table 8 Questionnaire key codes

4.2 Presentation of Findings

4.2.1 Theme 1: Student Experience and Learning Process

The participants explained their simulation-based learning experiences through cognitive, emotional and social perspectives. Students throughout the data set highlighted their experiences with peer interaction and the emotional intensity of simulations and the mental effort needed during high-pressure scenarios. The following subthemes present these areas based on data collected through interviews, focus groups, questionnaires, photographs and field observations.

Peer Dynamics and Collaborative Engagement

Students from both HEIs experienced simulation as a common activity. Several students mentioned that they did not view the scenarios as separate tasks, and that the importance of peers as a source of support, help, and collaboration influenced how they participated. Both questionnaire responses, interviews, and observational data showed the importance of peer dynamics in emotional and cognitive engagement during simulation-based learning.

A student from HEI2 said:

“I have always expressed “healthcare” being a field that cannot work without teamwork, teamwork brings together different ideas, opinions and experiences. We all have some kind of information that our peers or colleagues might not think about. So to answer the question, I think working with peers is an important aspect of the learning. You share ideas and experiences, you help and guide one another and for me, that one of the most important aspects of learning.” (QNA 26/8)

Many participants reported during observed debriefing how important it was that they received help from their peers to stay engaged or to feel more confident when faced with challenging simulations. Some participants mentioned that they would glance at or nod at their peers as a way to show support in times of high pressure. The observed field notes supported this behaviour, as they showed a student giving a thumbs up to another student after the student had given important information to an actor patient (Obs 9).

A student from HEI2 wrote in a questionnaire that:

“By everyone participating and playing an active role in learning to help and guide one another so we can work as a team.” (QCN 15/5)

Field observations indicated that students reminded each other softly, assisted each other with positioning the equipment and made hand gestures to remind each other of clinical signs they had missed. During one session, students were observed changing their positions to help a peer in need, and field notes included verbal encouragement.

The peer behaviours were also evident in the photographs. At HEI2, students were most often observed in small groups which faced the simulation task with positive body language such as huddling near equipment or discussing documentation. Pictures from the larger and less organised HEI1 sessions sometimes showed students at the back of the room or with some of them having their phones in their hands or being uninvolved in the main activity (DSC 06257/06349/06356; Obs 4).



Photograph from HEI1

Several students mentioned that the value of peer engagement continued into debriefing, where peer-led reflection provided an opportunity to solidify learning. One participant stated:

“OK, I think I've got that. Have I got that? I'm not quite sure. Have I done that right? And at the that kind of final debrief gives you the opportunity to ask those questions just to make sure you've got it right in your head really.” (FG2)

Students also reported that group dynamics changed based on class size and the level of involvement of the facilitator. HEI1 students mentioned that in the bigger groups, the loud voices usually took over while the quieter voices remained unheard. A field note highlighted students at the edge of the room during a scenario, looking uninterested, while other students were clustered near the facilitator (Obs 4).

In the case of HEI2, where group sizes were smaller and peer roles were more clearly defined, participation was described as more balanced. At one point, the facilitator stopped the simulation to ask which students had not yet spoken, in order to allow the quieter students to participate. This moment was noted in observation as visibly shifting the group dynamic and later referred to in the debrief as supportive.

One student explained:

“Working with peers is vital for practice experience as we constantly liaise with team members during placement and look for support from peers both in simulation and in practice it's all part of learning..” (QPC 22/3)

Participants often compared peer feedback to facilitator feedback and mentioned that they found peer feedback to be more meaningful. This was especially observed during emotionally challenging simulations, when students discussed shared exposure and joint accountability.

Emotional Impact and Wellbeing

Students often reported intense emotional responses both before and during simulation-based learning activities. Students commonly experienced nervousness and anxiety and apprehension before starting scenarios especially when they needed to perform in front of their peers or under observation. The emotional responses did not stop learning from occurring because they actually increased student awareness which led to reflective thinking afterwards.

One student shared:

“Yeah, I think I personally think it's really important. I think it's great at the end of it to kind of sometimes you, especially in the learning environment because sometimes you're doing stuff and it can just get swept along. And sometimes if you're not quite sure of something, you're thinking, what the Hell's going on here?” (FG2)

The emotional responses occurred in both HEIs. The field notes together with participant reflections showed that students became more emotionally invested when they experienced simulations that included human actors or emotionally intense situations like grief or patient distress or safeguarding scenarios. A student explained their emotional response to a difficult actor performance.

“Yeah, cause, because the way she was acting was like very extra. So, so I was a bit like, Oh I don't know how to deal with her. I just found it funny. And then Jess started questioning, I was, I was like, Jess what are you doing?” (FG 4)

Students reported feeling disconnected from the scenario when the simulation lacked emotional depth because actors were absent or mannequins lacked realism. As one student noted:

“getting feedback from lecturers. working with peers. given a unknown task and working on the spot is ok but having actors during SBLE as it makes it more realistic..” (QPC 30/7)

The two institutions HEI1 and HEI2 showed different characteristics. Students at HEI2 maintained continuous emotional involvement because they received structured sessions and clear expectations from facilitators. Students at HEI1 experienced delivery methods that were unpredictable which made them uncertain about their emotional response and the expected level of realism. The unpredictable nature of these situations sometimes caused students to feel uncomfortable while disconnecting from the experience.

A notable instance occurred when students at HEI1 participated in an intense safeguarding simulation exercise. A student showed visible distress which caused her to leave the simulation while shaking her head. The initial field notes showed that the facilitator maintained a hands-off approach at the beginning of the simulation. The student explained during the discussion that the emotional intensity hit her suddenly because she had not received sufficient preparation for the scenario to start.

The facilitators at HEI2 provided students with advance warnings about intense emotions while giving them time to pause during simulations and leading actors through post-scenario discussions. The implemented strategies enabled students to manage their emotions while understanding them as essential components of their professional education. The observational records together with student feedback indicated that students experienced control and safety because of the systematic emotional support provided in the learning environment.

Emotional Safety, Risk, and Learning

Students across both institutions described how emotionally intense simulations were often uncomfortable, yet contributed significantly to their learning. While some participants welcomed the emotional challenge, others reported that strong feelings such as embarrassment, fear, or uncertainty persisted during and after the simulation experience.

One student reflected during debriefing:

“I was just embarrassed when I didn’t know what to do but I get it now (Obs 3)

The emotional responses of students were supported by photographic records and observational findings. Students displayed hand-on-head positions in and after experiencing challenging simulations and other students exhibited brow furrows and hand clasping and physical distance from group activities in the room (Obs 2). The field notes documented students who fidgeted and avoided eye contact and pulled away physically when sessions involved weak preparation or facilitation (Obs 2).

The majority of students identified emotional realism as a fundamental element which made simulations effective. The emotional intensity of scenarios deepened their involvement while promoting profound reflection and making educational experiences more significant. Students who experienced safety within the simulation environment tended to remember these moments as transformative experiences.

The emotional effects of simulation were significantly influenced by the support that students received from their peers. Students used informal support methods including whispered reassurance and gestures and brief peer check-ins to stay composed and focused during intense situations according to observations and student feedback.

A student noted:

“Working with peers is vital for practice experience as we constantly liaise with team members during placement and look for support from peers both in simulation and in practice it's all part of learning.” (QPC 22/3)

The learning process suffered when emotional intensity lacked proper support from preparation and facilitation and debriefing activities because students either became overwhelmed or withdrew from the experience. The intense emotional responses failed to create beneficial learning outcomes in these specific situations. Students mentioned during observed debriefings that they felt “on edge,” “lost,” or “like I wasn’t sure how far I was supposed to go.” (Obs 1)

The implementation of structured briefings and debriefings at HEI2 enabled students to better manage their emotional responses through proper guidance. The facilitators established emotional safety protocols while allowing students to stop scenarios for questions and dedicating time for reflection after each session. The students at HEI1 experienced diverse emotional responses yet some students mentioned they did not receive enough emotional closure and struggled to understand their emotional reactions.

Students at both institutions agreed that emotional safety served as an essential requirement for effective learning. Students needed psychological security and educator and peer support to achieve better engagement and retention through emotional risk-taking.

One student stated:

“i do not feel daft if got something wrong as they were really reassuring and guided us to the correct way without embarrassment” (QCN 24/5)

Another stated:

“I think it’s really important for students to be able to practice their skills in a safe and controlled environment” (QPN 30/2)

Cognitive Processing and Learning Integration

Students frequently explained that simulation required intense mental effort because it needed fast choices and immediate knowledge application and real-time thinking. The task structure forced students to move past simple information reception because they needed to actively use and modify their learning in real time.

As one student explained:

“No, no, no, no, no. It’s about learning, putting into practice even in future as a nurse, when I’m qualified — to know what I’m doing, to know what to do at a particular time.” (IV 2)

Students described simulation as the moment when theoretical knowledge merged into practice. Students mentioned that using knowledge from lectures about anatomy,

pharmacology and communication in authentic and urgent situations made the learning experience more significant. One student stated:

*“When *tutor was saying he was not teaching us to pass an exam, but he said he wanted to teach us, so I mean to learn how to treat and heal children, which we actually put into practise .” (IV1)*

The photographs provided evidence for these statements by showing students actively making decisions while they pointed at monitors reviewed notes checked documentation or discussed treatment steps. The visual data showed the high level of focus and active learning that occurred during simulation (DSC 06228).



Photograph from HEI2

The way students processed information depended heavily on both facilitation methods and session organisation. The students at HEI2 showed better critical thinking engagement because their sessions maintained a good pace and each role had clear definitions. Students paused during the scenario to check medication interactions and previous cases while also consulting their peers (Obs 11). Students at HEI1 experienced reduced opportunities for independent reasoning because their sessions lacked structure, pace or were instructor-centred.

“facilitators they were always engaging, kind, courteous and very knowledgeable and wanting to help but due to resource pressures at times the the whole experience felt hurried when on campus and made it harder to learn.” (QPC 2/1)

Students emphasised the value of reflective discussion, particularly during debriefing, in solidifying their cognitive learning and preparing them for practice. One participant described the experience as layered:

“It's part of every day practice to de brief, or pass on information, and reflection , during handovers,MDT meetings etc, I think it is important and effective. It provides opportunity also for any additional questions that may arise.” (QPC 26/2)

Students found peer-led debriefs valuable because they enabled shared meaning-making and correction of misinterpretations. Students emphasised that these moments were crucial for developing their understanding while gaining multiple perspectives on scenarios:

“You can hear and learn about what they have done in practice. Also nice to work in a team as other may have different thoughts/experiences.” (QPC 22/14)

Through simulation students gained an opportunity to handle intricate clinical data which expanded their mental processing abilities. The advantage of simulation depended on how sessions were organised and how facilitators behaved and the availability of space for reflection after the simulation.

Pressure and Mental Load: Problem Solving

Students from both HEIs identified simulation's cognitive intensity as its most distinctive characteristic. Students experienced the pressure of being "on the spot" through their real-time decision-making which replicated actual clinical requirements and students found this experience both difficult and educational.

"mean we have mannequin the infants direction like infants the child. So it's still like a more or less a clinical setting to me because we use the mannequins for human." (IV1)

The students experienced mental fatigue according to some because they felt exhausted after participating in the simulations. The challenge proved energising for some students who viewed the pressure as productive stress which improved their focus and created realistic conditions. Students expressed their response during debrief, following a particularly challenging simulation about inappropriate care, some students expressed that they had never experienced such high levels of engagement during their learning time due to the pressure they felt to 'get it right for the patient' (Obs 2). The students needed to use their knowledge from different areas while prioritising their work and adjusting their answers under the observation of peers and facilitators.

The intense mental pressure which students experienced did not bring positive results for everyone. The students observed that insufficient emotional support together with unclear preparatory instructions or organisation could lead to overwhelming pressure. One student wrote:

"And you are learning so many things it appears those things will be just being said, but the brain will be just tired. It will be just too much to take." (IV2)

Students viewed their mistakes as essential components of their learning journey instead of failures. Under pressure students transformed their mistakes into valuable learning experiences that they would always remember. Students noted that they recalled their incorrect answers better than their correct ones and these errors received thorough discussion during debriefing sessions. The focus on reflection matches the purpose of simulation to develop metacognition which means learning through self-awareness of thought processes.

"Nothing actually bad happened, but I did something wrong and then but actually writing reflection realise that we can learn so much from our mistakes. So if they don't ever be scared of getting something wrong, because we all get things wrong all the time." (FG2)

Another stated:

"Yeah, but it gives you a background if you make. If you're not sure if you make mistakes, you can. You can go over again over again over again doing it. And you you can improve your skills that way. So to me it's good." (IV2)

Students appeared in photographs taken during high-pressure situations with their bodies showing alertness through standing up and leaning forward and pointing and fast note checking (DSC 06288/06367/06375/06561). Students displayed hesitation or freezing during observation

highlighting the emotional tension documented in field notes. The visual indicators supported the verbal and observational evidence which showed that mental load existed beyond self-reporting.

Simulation proved itself as an essential environment for problem-solving. Students recognised that simulation presented the sole academic environment which duplicated the intense mental demands of clinical thinking. The value of simulation depended on specific conditions which included well-prepared sessions and emotionally supportive facilitators and time for post-simulation processing. The absence of these elements made students less likely to view the challenge constructively while increasing their likelihood of disengagement.

4.2.3 Theme 2: The Role of the Educator in Shaping Experience

The theme reveals how students understand the responsibilities of educators during simulation-based education. The collected data indicates that facilitators shaped both the emotional atmosphere and educational value of simulation activities. Students emphasised that the delivery approach and the psychological environment created by educators together with the simulation structure directly impacted their learning experience. The research findings are structured into three related subthemes which include Facilitation and Guidance, Facilitators as Emotional and Cognitive Anchors and Operationalisation: Structure, Sequencing and Student Confidence.

Facilitation and Guidance

The students revealed that the facilitator played a vital role in shaping their simulation experience and learning outcomes. All participants throughout both locations indicated that the facilitator's communication approach together with their involvement level and their ability to clarify information determined their level of engagement and their sense of empowerment. One student said:

"Yes majority of staff are enthusiastic and very knowledgeable and get us critically thinking which is an excellent way to learn and reflect. However staff who are not CYP trained can effect the delivery of teaching as they simply respon with that they don't know to questions raised and this impacts student learning." (QPC 24/3)

Another noted:

"On an individual basis when on campus the lecturers or facilitators have been engaging, helpful, knowledgeable and on an individual basis have all tried to deliver a useful and informative time" and "limited how expansive they could be and on some of the days it felt like there were a lot of stations to get through and the experience felt hurried." (QPC 24/1)

The students at HEI2 reported that their facilitators created an environment where they could work independently while maintaining supportive guidance. When facilitators achieved this equilibrium between autonomy and support it fostered confidence in their participants.

One participant said:

"Having a supportive and helpful network of staff who encourage students to ask for help and always give their time to respond to any questions." (QNA 34/8)

This was supported by observational data. HEI2 facilitators stayed observant through silence but interrupted the simulation only when necessary by providing occasional prompts. In one

instance, a facilitator asked a student, *“What would you do if this was your patient?”* - a question that encouraged problem-solving rather than instruction. (Obs 11)

Students at HEI1 reported that they encountered different levels of facilitation throughout the simulation sessions. Students experienced two distinct types of simulation sessions where they received minimal feedback and had no structure while others faced frequent interruptions from facilitators that led to decreased student engagement. Students at HEI1 noticed these inconsistencies. One commented:

“In areas where I might have not understood the content, like during deterioration simulation. The lecturer gave feedbacks which helped me to understand it more but not interrupt me.” (QPC 28/8)

Another said:

“I like to have feedback and it assists with my learning. I can't really say I have had personal feedback however when engaged in sessions tutors come round and assist if needed” (QPC 28/14).

That variation in facilitation was noted in multiple data sources and significantly mentioned. One student stated:

“it's like it's like sometimes they're just it's like they're giving us, like, we're children. Like they're giving us something to do. And then they're like, OK, you go and do that. We'll just wait over it while you go and do it.” (FG4)

The photographic evidence supported this observation because HEI2 students maintained concentration while using equipment and interacting with their peers. Students at HEI1 stood away from the main activity while displaying defensive body language through crossing their arms or showing signs of discomfort (DSC 06332). The practices for debriefing showed significant variations. The students expressed positive reactions when facilitators enabled reflective processes and encouraged open-ended thought exploration and links to practice. One said:

“And they're great in sharing their knowledge and obviously they will. They've all worked in different different places and different situations. So they will say, well, this is, you know this, I find that this helps. I find this helps. You know this in this situation, this would be a really great way to deal with it or this in this situation. This is how we would deal with it or I used to deal with it, you know.” (FG2)

Students became disengaged or confused because the debriefing sessions occurred too quickly or contained critical comments, described by a student in observation as: *“Just her talking at us about what we should have done. No chance to say what we thought.”* (Obs 3)

Facilitators as Emotional and Cognitive Anchors

The facilitators used their influence to create psychological safety during the session according to students. Students paid attention to emotional signals that facilitators provided. The students felt more confident when the facilitators demeanour replicated the desired outcome for student experience. Equally their lack of engagement with students impacted their sense of purpose.

“Their confidence and enthusiasm counts towards our positive engagement.” (QNA 28/3)

In contracts one stated:

“like the lecturers weren't going round with us or anything that they were just sat there talking and there were no point in them being there” (FG4)

One student described feeling humiliated after being corrected in front of peers:

“Some lecturers are not as passionate as others and it shows and make you feel silly by how they tell you something wasn't right.” (QNA 28/8)

In contrast, supportive facilitation encouraged composure and reflection:

“The tutors we had were fabulous, extremely supportive and very accommodating when needing to help mid session or had we had to change what we were doing for any reason. If they did not know the answer to a question we had they would be sure to find out for us.” (QCN 32/5)

The observed moments show how facilitators function as emotional regulators and behavioural models. The facilitators maintained clinical composure through their prompts instead of corrections and their respectful treatment of errors which established the emotional atmosphere of the simulation.

Operationalisation: structure, sequencing and student confidence

The third subtheme included the logistical and structural elements of simulation delivery, including timing, sequencing, and group setup, which also significantly shaped students' experiences. These operational elements were described by students as either enabling or impeding their engagement.

At HEI2, students reported a consistent flow: clear briefing, structured simulation, and well-paced debrief. As one student put it:

“They do so much of behind the scene works like putting the effort to set up the room and equipments and other resources.” (QNA 28/5)

HEI1 students in contrast characterised their sessions as either inconsistent or disorganised. One student noted:

“It was a bit unorganised cause obviously, like it was. What was it? An hour. And then the first group who had gone into the flat was then sat there waiting for everyone. All the other groups to go in. But they could have, because like we had all them iPads out, they could have been different things. Maybe on on there. Everyone was just waiting, but nothing really to do just for everyone else to go into the flat.” (FG4)

And:

“it was the same thing on each iPad. We're so realistically that could have been done as as one thing” (FG2)

Students became hesitant or disengaged because of unclear expectations about the simulation, lack of guidance and their expected actions:

“See that was the same two tutors went in, left everyone else in the group on their own. Everyone else was in a flat and they were just sat there talking. Like having a random conversation just sat on the sofa.” (FG3)

These inconsistencies were observable. A facilitator started a scenario in the middle of a group conversation during one session. The students took more than one minute to start their participation while the facilitator's subsequent return to the group caused additional interruptions. Students displayed their confusion and discomfort through their body language which included standing still with their arms crossed and avoiding eye contact (DSC 06357, Obs 5) whether they are cognitively engaged or emotionally distant according to Nestel (2011) and Kneebone (2005).

The simulation lost its seriousness because of minor interruptions which included room noises and missing equipment and unexpected group arrangements. Several students commented on this:

"We only have a certain amount of time in SBL and disruptiveness wastes this time and therefore not used effectively." (QPN 19/1)

The students mentioned that the practice of rotating groups or assigning teams at the last minute caused confusion:

"I feel like in simulation we get to be in different groups, so it's not necessarily just the group that you usually hang around with like the usual friends you get to." (FG1)

It was also recognised that group size played a significant impact on engagement and learning. One student stated:

"Poorer outcomes in a larger group. Struggle to focus" (QNA 17/7)

They also responded about factors that impact a session, with:

"Who is in the group What teacher is there Size of the group" (QNA16/7)

Reinforcing this point about group size made by a HEI2 student, a student from HEI1 stated:

"the most effective is when we are in smaller groups in simulation and set to do an activity in regards to patients." (QPC 30/9)

Students acknowledged that their dissatisfaction was not directed at specific staff members but rather at the absence of organisation. Students believed simulation was an effective teaching method yet they expected it to be managed with proper professionalism.

4.2.3 Theme 3: Setting the Scene: Environment, Realism and Disruption

The theme contains results about the physical environment and sensory aspects and organisational structure of simulation-based learning settings. Students at both sites identified the learning environment as a critical element which affected their professional and emotional and cognitive engagement. The environment's impact on learning was primarily related to its functional aspects and coherence rather than technical equipment or fidelity. The students also evaluated the simulation's seriousness.

Environmental Realism and Operational Quality

Students throughout all data collection methods including interviews and focus groups and observations and questionnaires mentioned that the simulation space condition and organisation directly impacted their ability to maintain session seriousness. Students preferred functional realism over high-tech replication of clinical settings because they needed their required materials in logical locations.

Students interviewed, group discussions, questionnaires and field notes all pointed to environmental quality as key to students' ability to concentrate, feel competent and believe in the simulation. Students reported cognitive and emotional disengagement when the simulation spaces were cluttered, makeshift or obviously 'classroom like'. One HEI1 student said:

"Having real equipment really helps with translation to real practice but there isn't always enough or it doesn't work. (QCN 13/3)

Students reported simulations where the room layout followed ward logic and the environment was tidy and materials were in expected places. These conditions supported immersion and confidence:

"The more resources the better. It helps it to feel like you would on shift and then when you go to do the skill in practise you feel fully prepared." (QPN 14/1)

The HEI2 photographs depicted participants who interacted with the space by facing the patient or actor (DSC 06565). The HEI1 sessions occurred in classrooms that had cluttered environments and visible lecture equipment and non-functional items. A student being observed displayed a defibrillator cable without any visible connection while other students remained inactive in the same area according to field notes which used Obs 25.

Noise, Space, and Distraction

Students at HEI1 often mentioned that noise levels and interruptions from outside and limited space made it difficult for them to focus and become fully engaged. The distractions included unnecessary noise, room changes, or disruptive behaviour. One student remarked:

"When people show up late and disrupt or sit and talk/laugh through sessions with no consequence. Moving round 4 rooms in one day can prove to be hassle and you switch off" (QPC 12/11)

Students needed to move around tables and chairs to access the simulation bedspace during multiple sessions. The arrangement of furniture disrupted both the realistic nature of the simulation and the smooth execution of care tasks.

"I think it does, but I do think the way some students act within the rooms can alter that feeling of it being a clinical setting like all the chairs and their things around and talking." (QPC 6/5)

A lecturer interrupted a scenario during one observed session to verify the timetable which caused students to lose focus and disrupted their learning experience.

Students were witnessed in observation, moving around the room when laid out as part classroom and part ward, heading back to chairs between sections of simulations, putting coats on when they were not actively delivering care and acting in a less obvious professional and consistent manner. Yet when in simulation spaces where not classroom element was also present this behaviour reduced significantly.

Functional and Emotional Realism

Students focused more on functional and emotional realism than on the presence or absence of high-fidelity mannequins. The students were more concerned with whether the simulation made sense and felt authentic than with blinking eyes or responsive technology.

"they are as close to the real life scenario as they can get so it makes it beneficial to learn with these resources" (QPC 13/6)

Students at HEI2 focused on clinical tasks because simulations used basic yet logical props. The scenarios at HEI1 featured advanced mannequins yet students frequently interrupted their practice to ask about equipment locations and to find essential tools such as oxygen masks and documentation.

The ability to stand and move around the environment while speaking aloud and freely interacting with others was a fundamental aspect of emotional realism. Students experienced stronger emotional bonds when the environment permitted such freedom of movement. One student said:

“Make things situations feel more real and for us to learn what each situation should feel like in practice.” (QPC 13/5)

The student appeared in the photo while performing the task with active body language and intense facial expression which differed from the relaxed body language observed at HEI1. (DC 06543, 06557, 06559)

Environmental Signals and Learner Identity

The students used the simulation environment quality as an indicator to determine its worth. The participants felt that unorganised and disorganised settings made the session seem like a time-waster instead of actual preparation.

“If the simulation is faulty or slow it affects how well we can practice on them” (QNA 16/2)

The setting's resemblance to a professional clinical environment influenced student self-perception. Students adopted professional behaviour when the environment matched that of a clinical setting. Students described the impact that poor equipment or faulty resources had on their immersion in to the experience. One student commented on the impact:

“Some things do not work eg when canulating some arms bled and some didnt which impacted my learning.” (QPC 13/13)

Other elements of organisation can impact on learner engagement, such as presentation and in particular wearing a uniform. With some students feeling:

“Uniform allows me to fully get myself into the role of what clinical could be like.” (QPC 8/8)

Correlating with other responses that stated uniform gives a ‘sense of seriousness’ and “feel more professional”. In contrast though some participants felt no connection between uniform and experiences in SBE, it not impacting their ability to learn skills. One stated:

“I wouldnt say it impacts the learning, except that you're recognised as a student nurse which is always nice!” (QNA 12/8)

The simulation environment at both sites either strengthened or weakened the professional identity formation of students. A well-organised environment with functional elements and emotional realism prompted more engaged, confident, and ‘in-role’ behaviour. Environments that were poorly managed created distance and doubt.

4.2.4 Summary

The three themes together present a complex view of simulation-based education through the experiences of undergraduate nursing students. Students explained that simulation requires intense mental effort and emotional involvement and exists within social learning contexts.

Simulation enabled students to connect theory with practice and develop confidence and professional identity and critical thinking skills when it received proper facilitation and clear structure and realistic environments. The research showed that simulation success rates were inconsistent because student experiences depended on multiple factors. Further research needs to explore the student perspective which differs significantly from the main group findings.

4.2.5 A Divergent Voice: Reframing the Outlier Perspective

A single participant in this study demonstrated an entirely unique viewpoint regarding simulation-based learning. This student displayed intense scepticism regarding the educational value of simulation as well as criticism toward the emotional aspects of scenarios, while dismissing the instructional approach which others found beneficial. The nonconforming perspective gives vital understanding about the diverse range of student learning experiences. The student participant labelled simulation as :

“Doesn’t make me learn anything” and “Doesn’t teach us anything” (QPC 12)

This student felt there was too little exposure to hands on SBE experiences to have feel any benefits from simulation towards their learning:

“Practical parts but we don’t do enough and we only get to practice a few times which is why I don’t benefit from these at all” (QPC12)

Simulation debriefing moments which most students found enlightening and finalising did appear to be something this student found important but they could not provide any examples or memories of how or why.

This student exhibited lower confidence levels in and along with doubts, about simulation's effectiveness in supporting their learning. The student wanted content-focused teaching that followed a pattern of increased exposure and seemed frustrated at the delivery of SBE as a whole within their course.

The Role of Divergence in Qualitative Research

Qualitative research requires divergent or dissonant voices as normal components rather than items to be eliminated because they provide essential research value. According to Patton (2002), deviant case analysis builds credibility by checking how well thematic interpretations hold up to boundary tests and revealing minority viewpoints. This counter narrative functions as a necessary corrective to the primary results and reveals the restrictions that apply to prevailing student discourses. This student viewed elements that we know a majority of students found increased the sense of professional identity and behaviour or had just felt made no difference, such as uniform, this student actively felt there was a reverse effect:

“ Impact negatively. Just uncomfortable and we are not even in actual practice so there is no need to wear it.” (QPC12)

The divergent voice in the study opposes the idea that simulation brings positive experiences for all students. The participant's evaluation highlighted problems with authenticity together with emotional manipulation and assessment-related stress. The analysis gained credibility and depth through this perspective because it revealed differences in student readiness and preference and perception. The findings support the requirement for simulation design that

accommodates all learners regardless of their response to emotional intensity or performance-based tasks.

Comparison of HEI1 and HEI2 Student Simulation Experiences

A comparative analysis of student experiences at HEI1 and HEI2 revealed both significant contrasts and notable commonalities. At HEI2, students described a highly structured simulation environment characterised by consistent facilitator support, psychological safety, immersive settings, and well-organised session sequencing. In contrast, students at HEI1 reported inconsistencies in facilitation styles, operational disorganisation, and environmental distractions, which contributed to emotional disengagement and cognitive overload. Despite these differences, students across both institutions consistently emphasised the critical importance of peer collaboration, facilitator behaviour, emotional realism, and structured debriefing in shaping their learning outcomes. Emotional safety emerged as a unifying theme, underpinning students' ability to engage meaningfully with simulation experiences. This comparison highlights the essential role of relational, environmental, and operational factors in delivering effective simulation-based education and underscores the need for coherent and emotionally supportive design in future implementations.

Aspect	HEI1	HEI2	Similarities
Facilitation	Inconsistent facilitation styles: some sessions had minimal feedback; others had frequent interruptions; caused disengagement.	Facilitators offered structured but supportive guidance; encouraged critical thinking and emotional safety.	Students at both institutions reported that facilitators strongly influenced their engagement and confidence.
Group Dynamics	Larger groups led to dominant voices taking over; quieter students marginalized.	Smaller, better-balanced groups; facilitators ensured all voices were heard.	Peer support was important at both HEIs and enhanced engagement.
Environment and Physical Space	Disorganised spaces with clutter, visible lecture furniture; caused distraction and disengagement.	Well-organised, clinical-like simulation spaces; supported immersion and professionalism.	Students at both institutions stressed that environment realism affects their engagement.
Operational Structure	Poor sequencing; frequent disruptions; unclear briefing and debriefing.	Clear structure: proper briefing, action, debrief cycles supported learning.	Both HEIs showed that structure (or its absence) directly influenced learning outcomes.
Emotional Safety	Emotional safety inconsistently managed; students reported confusion and withdrawal.	Emotional safety systematically created through facilitator behaviours and structured debriefings.	Emotional safety was regarded as crucial by students at both HEIs.
Learning Outcomes	Students experienced stress, cognitive overload, and disengagement when environments were chaotic.	Students reported strong cognitive engagement and professional development in well-structured sessions.	Reflection after simulation was important for consolidating learning across both sites.
Noise and Distractions	Noise from hallways, room changes, interruptions disturbed focus.	Fewer interruptions; better protected learning spaces.	Environmental distractions were consistently mentioned as a threat to engagement.

Table 9 Comparison of HEI 1& HEI2

4.3 Chapter Summary

The research in this chapter combines qualitative and descriptive methods to explore nursing students' experiences with simulation-based learning. Two higher education institutions provided qualitative and descriptive data which led to the identification of three main themes including student learning processes and educator roles and simulation environment impacts. The research revealed that simulation presented students with an intense and emotionally charged learning experience which enabled them to establish vital links between theoretical

knowledge and practical applications. The most effective learning occurred when sessions followed a clear structure and students felt emotionally secure within an environment that received responsive support from facilitators.

The essential conditions for student engagement included peer collaboration together with facilitator style and emotional realism and environmental functionality across all themes. Not all students experienced simulation in the same way. A divergent perspective highlighted important limitations, including the potential for simulation to alienate or overwhelm students when not appropriately scaffolded. This complexity underscores the importance of designing simulation not just as a technical or pedagogical tool, but as a relational and emotionally nuanced learning experience.

The following chapter will provide detailed analysis of these findings through an examination of experiential learning theory and identity formation and educational practice. The research findings will be evaluated for their implications on nursing education and program design and policy development.

Chapter 5: Discussion

5.1 Introduction

This chapter synthesises and evaluates the findings presented in Chapter 4 in relation to the existing literature, theoretical frameworks, and the broader educational context. It moves beyond describing what was found to critically analyse what these findings mean for nursing education, particularly simulation-based education (SBE). The chapter explores how the three themes – Student Experience and Learning Process, The Role of the Educator in Shaping Experience, and Setting the Scene: Environment, Realism and Disruption – work together to show how simulation is a complex and multi-layered site for cognitive, emotional, and professional development. The purpose of this discussion is to explore how students' experiences within simulation environments influenced their emerging professional identities, their emotional wellbeing, their cognitive engagement, and their perceptions of educational value. It evaluates the findings in light of existing theories of learning, identity formation, emotional safety, and relational pedagogy, drawing together the implications for practice, policy, and future research.

This chapter also addresses divergent perspectives identified within the data, particularly how some students found simulation alienating or overwhelming rather than developmental. These divergent voices provide critical insight into the challenges of designing simulation experiences that are effective, equitable, and inclusive for all learners.

Finally, the chapter situates the research findings within current policy developments, including the increased emphasis on simulation hours within nursing curricula, and proposes a practical framework for future simulation design based on students' lived experiences. The chapter concludes with a critical reflection on the research process itself, including researcher positionality, methodological strengths and limitations, and the personal learning journey undertaken through this project.

5.2 Theme 1: Student Experience and Learning Process

5.2.1 Peer Dynamics and Collaborative Engagement

The research results showed that students' simulation experiences depended heavily on their interactions with their peers. Students at both institutions emphasised that peer support remained essential for emotional control and mental workload management and active engagement during intense simulation scenarios. The study confirms Vygotsky's (1978) socially mediated learning theory which demonstrates that knowledge development happens through social interactions instead of individual study. Students learned skills while they jointly constructed meaning and handled emotional difficulties and developed their confidence. The study supports Cant and Cooper (2010) by showing that peer feedback together with informal gestures such as nods and whispered encouragement functioned as essential support mechanisms.

The findings demonstrate the application of Bandura's (1977) observational learning theory. Students observed their peers' achievements and errors to learn new things which demonstrated vicarious learning beyond direct simulation experience. Observational and photographic data supported this pattern by showing students providing non-verbal support to

their peers during simulation activities. The research shows that peer learning faces constraints when facilitation is not properly organised. Li et al. (2019) indicate that peer learning becomes unfair when roles are not established because dominant students take control while shy students remain ignored especially at HEI1. The study shows that peer dynamics served as essential components which created emotional safety and cognitive challenge and professional development throughout simulation activities.

5.2.2 Emotional Impact and Wellbeing

Students reported feeling strong emotions ranging from anxiety to nervousness and pride while participating in the simulation and sometimes experienced embarrassment. The emotional engagement produced positive effects because it led students to create personal meaning and reflect deeply according to Kolb's (1984) experiential learning cycle which connects feeling with doing and reflection. The educational value of simulation became apparent to students only after the session finished which demonstrates Schön's (1983) reflection-on-action concept. The photographs together with observational notes demonstrated the emotional intensity of simulations by showing students' hand-clasping gestures as well as their physical withdrawal and emotional tension. The core element of emotional realism stands as the key factor. According to Nestel and Bearman (2015) emotional fidelity which means realistic emotional experiences leads to better learning outcomes and this study confirms their theory. The simulations that incorporated actor-patients and emotionally intense scenarios such as grief or safeguarding cases produced stronger student engagement and longer-lasting reflection periods.

The research results match warning findings presented by O'Regan et al. (2016) and Rudolph et al. (2014) because students at HEI1 experienced distress and disengagement and emotional withdrawal when emotional intensity was not properly managed through facilitation or preparation. The absence of emotional scaffolding in simulation practice poses a threat to student learning achievement instead of providing beneficial support. The emotional safety depended on both the actions of facilitators and the social interactions between participants. Students received emotional support from their peers through basic statements of encouragement such as "*You're doing fine*" which helped them maintain their emotional strength throughout difficult situations. The research revealed that emotional safety developed through social interactions between facilitators and peers as well as students' self-regulation methods.

5.2.3 Cognitive Processing and Learning Integration

Students across the board identified simulation as the educational component that required the most mental effort. Students described their experience of making clinical decisions in real time while synthesising information and prioritising tasks under pressure which aligns with cognitive load theory and the NLN/Jeffries Simulation Framework (Jeffries, 2016). The students observed that simulation required them to actively apply theoretical knowledge including anatomy and pharmacology and communication skills. Bland et al. (2011) discovered that high-fidelity simulation generates both increased mental workload and enhanced student engagement than traditional classroom instruction.

The debriefing phase proved essential for this integration. The students demonstrated that they reacted during simulation but they gained understanding only after the simulation ended, which reflects Schön's (1983) distinction between reflection-in-action and reflection-on-action.

Students found peer-led discussions to be most valuable because they corrected mistakes while introducing fresh perspectives which improved their mental mapping of clinical situations. The facilitation approach created a significant impact on the learning process. Students followed the script instead of engaging critically when facilitators gave excessive guidance at the beginning which supports Motola et al.'s (2013) warning about over-scaffolding that reduces learner autonomy. Students' simulation behaviours such as leaning forward and pointing and note-checking matched their reported high cognitive processing and mental workload which researchers observed through both self-reported data and visual evidence.

5.2.4 Pressure and Mental Load: Problem Solving

Students ranked being “on the spot” as the most difficult yet valuable aspect of simulation. Students experienced mental exhaustion following sessions yet they understood this condition as “productive stress” which replicated actual nursing situations. The development of clinical competence through situated practice-based learning matches Benner’s (1984) novice-to-expert theory which rejects passive observation as a learning method. The educational value of pressure depends on proper emotional preparation and organisational structure because otherwise students may experience overwhelming stress instead of educational growth. Students who received inadequate preparation experienced mental blocks despite knowing the correct answers thus demonstrating the necessity of emotional management during simulation according to Cantrell et al. (2017) and LeBlanc and Posner (2012). Students viewed their mistakes as essential learning opportunities instead of failures. Students remembered their incorrect responses better than their correct answers and preferred debriefing sessions that analysed mistakes instead of imposing penalties, a practice that matches metacognitive learning theories. The combination of emotional and cognitive and relational aspects in simulation led to deep learning experiences when the environment received proper management.

5.2.5 Summary

Simulation provided students with an environment to deeply engage their emotions and cognition and social abilities. Students acquired knowledge through their emotional responses as much as they did through their mental processes and physical activities. Simulation transformed into a transformative educational experience or caused confusion and disengagement based on peer collaboration and emotional realism and structured debriefing and facilitator behaviours. Learning reached its highest potential when simulation experiences combined emotional safety with cognitive autonomy and relational support at the same time.

5.3 Theme 2: The Role of the Educator in Shaping Experience

5.3.1 Facilitation and Guidance

All students from both HEIs reported that facilitators established the emotional atmosphere while simultaneously determining the intellectual demands and reflective potential of simulation activities. Facilitators through their actions decided whether students experienced self-determination or received support or felt overwhelmed or lost interest. According to Jeffries' (2016) NLN Simulation Framework the facilitator remains central to simulation learning. An effective facilitator establishes proper guidance and independence to enable students to discover while learning from mistakes while maintaining appropriate boundaries. The data matches the recommendations in Motola et al. (2013) and Eppich and Cheng's (2015) PEARLS

framework about adapting facilitation techniques which involve stepping in or out based on learner requirements. The facilitators at HEI2 maintained sparse guidance while asking open-ended questions to help students develop their critical thinking skills according to students' reports. Facilitators only interrupted to respond to essential matters. The experience felt like we were leading the process but we had constant support. The facilitation at HEI1 exhibited inconsistent practices. The feedback from facilitators ranged from insufficient support to excessive interruptions which reduced student control. Students during these sessions reported feeling as though they were participating in role-playing exercises rather than experiencing actual clinical scenarios. The role of facilitators included managing emotional security as well as cognitive assistance. Rudolph et al. (2014) contend that psychological safety needs facilitation through specific relational cues rather than being taken for granted. Students within this research group paid close attention to how facilitators used body language along with their speaking tone and their responses to mistakes. The students remained composed when they received clear directions from a calm facilitator yet panicked when the facilitator became stressed or produced unclear instructions. Facilitator behaviour directly influenced both emotional strength and critical thinking abilities and professional identity development thus validating Dieckmann et al.'s (2007) conclusion that simulation operates as an elaborate social relationship beyond technical aspects.

5.3.2 Facilitators as Emotional and Cognitive Anchors

The facilitators offered instructional guidance and simultaneously served as emotional and cognitive references for the students. The facilitators either stabilised or destabilised the students' performance levels during high-pressure situations. The research conclusions demonstrate full alignment with O'Regan et al. (2016) because they state psychological safety should exist throughout the entire simulation cycle including debriefing. The students monitored the facilitator's expressions during all phases of the session. Students shared specific scenarios where facilitators used calm interventions to help them regulate their emotions in the middle of the simulation. Students reported lasting emotional shutdown after receiving critical correction during a scenario which caused them to withdraw both cognitively and emotionally.

“Some lecturers are not as passionate as others and it shows and make you feel silly by how they tell you something wasn’t right.” (QNA 28/8)

Research findings align with relational pedagogy which holds that trust together with care and respectful communication serve as necessary conditions for intellectual risk-taking alongside emotional engagement (Dieckmann, 2001; Sellman, 2006). Students viewed facilitators as emotional containers because they maintained the space while absorbing tension and managing affect throughout the simulation. The social-emotional aspects of facilitation received little attention in traditional technical descriptions of simulation yet proved fundamental to the learning process.

5.3.3 Operationalisation: Structure, Sequencing, and Student Confidence

The way simulation sessions were organised through time arrangements physical spaces and activity order and participant grouping patterns directly affected student emotional and intellectual participation. The research supports Jeffries (2016) who emphasises simulation requires clear structure and predictability as well as structured environments that Motola et al. (2013) confirm students need to avoid distractions. Students at HEI2 experienced simulations

with precise organisation patterns through briefing followed by action and debriefing phases. These professional and serious sessions provided students with immersive experiences that increased their confidence and promoted professional conduct. Students at HEI1 described their learning sessions as chaotic because poor preparation combined with unclear transitions and unorganised settings created confusion and self-consciousness and emotional withdrawal.

These findings agree with Dieckmann et al. (2007) who state that simulation is a framed activity, students have to know when it starts, how to behave and what the rules are. Operational inconsistency didn't just cause problems with the technical performance; it made it difficult for students to feel safe emotionally and prevented them from developing their professional identity. Students became disengaged in their thinking and with others when environmental or procedural indicators seemed to say that the simulation was not serious or unprofessional. Equity concerns also arise. Nestel et al. (2011) suggest that unclear simulation conditions favour students who are more outgoing and confident but disadvantage students who need more guidance. This study moderates that warning: even the more confident students mentioned that they felt detached emotionally when there was no structure or clarity in the sessions. So operational excellence, which included planning, consistency and professionalism, functioned as the emotional and cognitive scaffolding for learning.

5.3.4 Summary

The educator's role in simulation extended far beyond technical instruction. The facilitators created emotional safety and cognitive challenge and professional identity development. Good facilitation, which included clear structure, emotional understanding and relational sensitivity, allowed students to really engage with simulation. Operational consistency and environmental clarity were equally crucial. Bad facilitation and organisational chaos caused both a lack of engagement and made simulation seem less serious as a preparation for professional practice.

5.4 Theme 3: Setting the Scene: Environment, Realism and Disruption

5.4.1 Environmental Realism and Operational Quality

The physical, sensory, and organisational environment where simulation took place directly shaped students' ability to engage, learn, and feel professional. Multiple students indicated that environment-based indicators such as neat spaces, structured layout, operational equipment enhanced their transition into nursing roles with confidence. The research findings support Dieckmann et al. (2007) because they explain simulation as a social practice which emerges from both explicit and implicit environmental signals. Students evaluated the simulation environment by interpreting how equipment positioning and the state of readiness of tools along with ambient noise affected their internal sense of professionalism. The research findings support Rudolph et al. (2014) by indicating that psychological safety starts when students begin the learning space before the scenario officially begins. When students encountered untidy rooms with equipment scattered and external noise and interruptions they entered simulation spaces with caution and hesitancy and defensiveness. Students attending HEI2 emphasised that their learning environment fostered both deep engagement and professional assurance:

"It gives a appears as real in the clinical setting"(QCN 13/4))

Students at HEI1 encountered simulation areas that lacked authenticity because projectors and lecture chairs remained visible which disrupted the clinical simulation environment. The students at HEI1 reacted negatively to the broken bed alongside misplaced equipment because

the situation seemed unreal despite being simulated. Photographic evidence reinforced these themes, showing body language of active engagement at HEI2 versus passive or disoriented stances at HEI1. The research results confirm Alinier et al. (2014) who prove that learners value environments with coherent functionality and believability more than modern features such as blinking mannequins.

5.4.2 Noise, Space, and Distraction

The students mentioned that simulation sessions became disturbed by environmental noise together with limited space and outside interruptions. HEI1 ran its simulations within rooms which lacked adequate insulation from surrounding activities. The students encountered sudden loud noises as well as door slams and nearby conversations in corridors and tutors interrupting the sessions for schedule checks.

The environment disrupted both student concentration and their ability to maintain emotional engagement which simulation-based learning requires for effective learning. The students experienced feelings of self-consciousness together with exposure and embarrassment that disrupted the psychological agreement between students and nurses during practice. The study demonstrates strong agreement with O'Regan et al. (2016) about the importance of clinical scenario-related stress rather than environmental disturbances. Environmental distractions introduced unnecessary mental workload which was not connected to educational targets thus causing students to detach emotionally and pause in their role-playing and perform superficially.

5.4.3 Functional and Emotional Realism

The study clearly distinguishes between technical fidelity (e.g., advanced mannequins) and functional and emotional realism (logical spaces, believable props, authentic interactions). Students cared far more about whether the simulation “made sense”, whether equipment was realistically placed, notes were accurate, communication felt authentic, than whether mannequins had blinking eyes. One student compared a SBE experience where they had been asked to get the crash trolley in a simulated emergency and the benefit of this from a cognitive perspective in a real situation:

“I was really grateful of that on my on my second placement, which was my first clinical placement because that did actually only my second shift and someone shouted Mel get the crash trolley and I was like, oh, I've just make sure it's unplugged. Make sure the brakes are on, and I was actually very grateful for doing that. That that's what I remember is mostly that, OK, we did it. In practise, we can do it now. Just grab the trolley, walk over with it. It's fine.” (FG2)

This distinction resonates with Nestel and Bearman (2015), who argue that emotional and functional fidelity often matter more than technical perfection in creating meaningful learning experiences. Emotional realism also required active participation: standing, moving, speaking aloud, rather than sitting passively.

Students reported moments of transformative engagement when allowed to “live” the scenario: *“because it allows us to believe its real.” (QPC 8/9)*

Again, photographs captured more upright, interactive postures in well-organised environments compared to slouched, passive body language in cluttered or chaotic ones.

5.4.4 Environmental Signals and Learner Identity

The research study shows that technical fidelity stands apart from functional and emotional realism because it focuses on the accuracy of mannequins yet also includes logical environments and authentic props and interactions. The students found equipment placement and note accuracy and authentic communication more important than blinking eyes on mannequins. The setting lacked sophistication yet it presented logical connections. The trolley was where it should be. The notes were realistic. The realistic aspects of the simulation exceeded those of the expensive dummy simulation. (HEI2, code) The findings from Nestel and Bearman (2015) align with the observation that students prefer emotional and functional fidelity more than technical perfection to develop meaningful learning experiences. Emotional realism required active participation which included standing moving and speaking aloud as opposed to sitting passively. Students experienced **profound** moments during the simulation because they were permitted to participate fully in the scenario. *“I feel like I’m actually doing it.”* (code) The photographs depicted students maintaining better posture and engaging more actively in well-structured spaces yet showing a slouching posture with disinterest in disorganised and chaotic environments. Environmental quality served as an indicator for students to understand the simulation's worth which reflected their developing professional identity. Unorganised or chaotic simulation environments led students to view simulation as an extraneous task instead of genuine preparation for clinical practice: Students questioned the true significance of the activity because the room condition combined with non-operational equipment did. (code) The findings demonstrate that Black and Nestel’s (2017) concept of fidelity gaps leading to confidence gaps in students. The poor state of the facilities unintentionally sent messages that simulation along with students' professional training had low priority. The students received the message that they belonged to the professional category through well-prepared simulation spaces which provided challenging authentic experiences. The connection between environment and identity development fully supports the work of Cruess et al. (2014) who state that professional identity develops optimally when students experience environments that demonstrate authenticity and agency and sense of importance. The simulation environments functioned beyond their physical capacity to contain actions because they actively shaped the development of professional identity.

5.4.5 Summary

Students' emotional safety together with their cognitive engagement and professional development received critical influence from the realism of their environment rather than technology fidelity alone. Students practiced nursing when simulation took place in organised environments that resembled real nursing settings but felt insecure when spaces were chaotic which resulted in their disengagement. The environmental quality served as a dual function by both providing learning support and delivering identity cues which affected student simulation commitment levels and their confidence in professional roles.

5.5 A Divergent Voice: Reframing the Outlier Perspective

The majority of students found simulation to be emotionally powerful and professionally transformative but one student diverged from this dominant theme. This dissent provides important insights into the complexity of simulation-based education and highlights the need for inclusive, emotionally intelligent educational design.

5.5.1 Simulation as Artificial Performance

The participant failed to experience simulation as an immersive developmental experience. The participant viewed the simulation as a staged artificial experience which emotionally manipulated them. The student's perspective matches Bleakley's (2015) argument that simulation can develop into theatrical performances which result in emotional detachment or cynicism among students who lack confidence or preparation. The student's feelings about simulation match the research of Reime et al. (2011) and Al-Ghareeb et al. (2017) which demonstrated that insufficient preparation and emotional support during simulation leads to increased anxiety and learner alienation rather than educational development. The divergent participant felt emotionally manipulated and pressured instead of being supported by the emotional realism. The findings contradict Nestel and Bearman's (2015) assumption that emotional fidelity directly leads to better learning outcomes. Emotional realism works best for students who already possess sufficient support and internal motivation to participate in it.

5.5.2 Simulation as Assessment, Not Learning

The student experienced simulation through negative eyes in relation to its effectiveness and felt there was a significant wasted opportunity:

"We need to do more in these lessons such as more practical and practising. Less teaching and talking and more doing x." (QPC12)

The student's perception turned the simulation environment from its intended safe container' status (Rudolph et al., 2014) into an underutilised and wasted space where emotions were exposed. The literature warns of this risk. The educational value of simulation suffers when students lack psychological safety according to Cantrell et al. (2017) and LeBlanc and Posner (2012). The majority of participants in this study reported feeling empowered by simulation challenges yet this student's experience demonstrates that emotional safety is not automatic and requires active construction.

5.5.3 Psychological Safety and Emotional Readiness

The divergent voice strongly reinforces the centrality of psychological safety. Rudolph et al. (2014) argue that psychological safety is not something that emerges automatically from good design; it requires facilitators to do relational work, to pay attention to nonverbal cues, and to be sensitive to the emotional readiness of individuals. Even well-designed simulations can cause harm if students feel exposed, unsupported, or judged. For this student, simulation produced defensiveness and disengagement, not reflection and growth. This finding highlights the dangers of assuming that emotional realism alone guarantees learning.

5.5.4 Implications for Educational Equity

This outlier perspective also challenges assumptions about educational equity in simulation. The design of inclusive simulation requires recognition of the differences among students regarding their emotional state and their past experiences and their ability to cope. According to Levett-Jones et al. (2015) and Gaba (2007) true simulation inclusion requires flexible pathways that include student role selection and detailed prebriefing and emotional processing support after intense sessions. Every student possesses different emotional capabilities which should determine their educational experience. The high-intensity simulation approach which benefits numerous students creates disadvantages for those who lack emotional preparedness thus

expanding the gaps between confidence levels and learning achievements and identity development. The research supports the Nuffield Trust and Florence Nightingale Foundation (2024) recommendations to create simulation experiences that are emotionally safe and student-co-created with inclusive delivery and debriefing approaches.

5.5.5 Summary

The different ways students experience simulation-based education proves that this educational approach does not empower all students equally. The study demonstrates why psychological safety combined with emotional scaffolding and inclusive design approaches must consider students' emotional readiness and learning preferences. The inclusion of these voices enhances simulation pedagogy through increased equity and emotional intelligence and ethical foundation.

5.6 Becoming a Nurse: Confidence, Identity, and Clinical Readiness

The analysis unites the three main themes from the research data to study the role of simulation in students' professional identity development. The data showed that emotional and cognitive and social experiences interacted dynamically to create a collective effect on students' development from student to professional nurse. The synthesis presents a unified view of simulation through the integration of existing findings which demonstrate its dual role in educational learning and professional identity development.

5.6.1 Simulation as a Space for Identity Formation

Students viewed simulation as an educational activity that went beyond skill development because it provided them with a simulated experience of real-world nursing practice. Students experienced authentic nursing roles through their performance of clinical tasks and emotional management while peers and facilitators observed them.

One student in debrief explained that simulation is:

“more of a rehearsal of what is to be expected in real life situations. But that makes it scarier because then we have to do it to real people.” (Obs 10)

The model of professional identity formation described by Cruess et al. (2014) shows how identity develops through performance and emotional labour and reflective processing within authentic social environments. Through simulation students gained access to a realistic environment which enabled them to practice using clinical language and professional behaviours and emotional boundary management skills necessary for nursing practice. The developmental process follows Wenger's (1998) Communities of Practice framework because learners develop their identities through active social engagement instead of receiving instruction.

Professional identity, however, extends beyond role performance and also encompasses the adoption of professional values and the exercise of agency. As Cruess, Cruess & Steinert (2019) argue, identity in healthcare forms through the internalisation of values such as compassion, accountability, and ethical responsibility, which students gradually align with through lived practice. Simulation contributes to this process by providing a protected environment where students can *try on* these values, making decisions and reflecting on their consequences without direct patient risk. Importantly, identity is not passively bestowed but actively negotiated. Agency, the capacity to participate, question, and make judgments, shapes how

students inhabit the role of “nurse” in simulated spaces (Monrouxe, 2010). This study demonstrates that moments of decision-making, emotional challenge, and peer collaboration enabled students to test their agency, reinforcing that professional identity is a dynamic interplay of socialisation, value adoption, and self-authorship.

Yet professional identity does not emerge overnight. It is a gradual and cumulative process of becoming, consolidated through repeated experiences in practice settings and, crucially, through work within multidisciplinary teams (MDTs), where students learn professional norms, responsibilities, and collaborative behaviours (Ho, 2025; King, 2024). Simulation cannot replicate these contexts in their entirety. Still, it can scaffold them by offering early opportunities to rehearse values, practise decision-making, and encounter the emotional labour associated with nursing. In this sense, simulation contributes to the trajectory of “being and becoming” a nurse (Poole, 2021), bridging classroom learning and the socialisation processes of professional practice. Debriefing, in particular, gave students space to articulate these experiences, reflect on identity, and begin to internalise the values that would later be reinforced in clinical environments.

5.6.2 Confidence as a Gradual Process

Students’ confidence levels fluctuated throughout simulation sessions. Students experienced increased confidence when they managed challenges successfully and worked well with peers and received helpful facilitation. The students’ confidence levels decreased when they faced organisational issues and unclear expectations and overwhelming emotional challenges.

The essential discovery revealed that students gained more value from reflection activities than from their actual performance.

“Yeah. Is always useful. It’s always with use and it’s always help me to improve more.” (IV1)

The development of confidence occurred through continuous cycles which included action followed by reflection and validation from peers and guidance from facilitators. The pattern demonstrates Benner’s (1984) theory that clinical competence and professional confidence develop through practical learning experiences instead of theoretical teaching methods.

5.6.3 Integration of Emotional, Cognitive, and Social Aspects

Students experienced the most powerful development when three dimensions converged:

- **Peer Dynamics:** provided emotional safety and encouraged active participation.
- **Facilitator Behaviour:** set the emotional and educational tone, creating space for reflection and risk-taking.
- **Environmental Realism:** signalled professionalism and allowed students to immerse themselves authentically in their nursing roles.

Additional factors enhanced the integration:

- **Actor involvement** demanded genuine ethical and emotional responses.
- **Organisational structure** supported clarity, reduced uncertainty, and enabled students to focus on clinical reasoning rather than navigating chaos.

The students who received peer support during high-pressure situations followed by debriefing sessions demonstrated substantial development in their clinical reasoning abilities and emotional strength. The combination of these elements produced an educational environment which exceeded the basic value of its individual components to become a transformative professional learning space.

5.6.4 Becoming a Nurse as an Ongoing Process

The students understood that simulation training by itself was insufficient to achieve their professional development needs. The students recognised simulation as an essential tool which connects academic learning to actual clinical practice.

"But then it's all about my professional development, so if you find yourself not having the opportunity to gain those skills so you're like, is it worth it or it was better when I was doing clinical skills?." (IV2)

This aligns with broader understandings of professional identity as a gradual, situated process of "being and becoming" (Poole, 2021), consolidated over time and most powerfully shaped in practice within multidisciplinary teams (Ho, 2025; King, 2024). Simulation provided students with an early arena to begin rehearsing professional values and agency, but they understood that fuller identity development required immersion in authentic clinical environments.

The simulation environment compelled students to take an active role by making decisions while handling uncertainty and evaluating their performance in a protective yet demanding setting. The students demonstrated varying degrees of immersion in their learning experience. The students at institutions with inconsistent delivery or weak facilitation often failed to achieve this sense of professional engagement.

5.6.5 Summary

Becoming a nurse follows no straightforward path. Simulation created an educational environment which combined emotional challenges with cognitive engagement and social support and professional behaviour development. Students evolved from passive learners into active participants while building their confidence and clinical reasoning abilities and initial professional identity. The research shows that simulation serves as an effective tool for developing future nurses when it includes proper design elements and emotional support and social interaction.

This research demonstrates that simulation functions beyond being an educational technique because it serves as a space where professionals develop their identities and emotionally mature while engaging cognitively. The increasing importance of simulation in nursing education policy requires examination of its educational structure and support systems and evaluation methods. The Nursing and Midwifery Council's new simulated hour regulations and national demands for student-centred simulation design create an immediate need to transform student experiences into practice standards. The upcoming section places the study's results in relation to current policy developments which establish essential conditions for simulation to achieve its potential as an innovative learning space that promotes equity.

5.7 Policy Context: Expanding Simulation in Nursing Education

The Nursing and Midwifery Council (NMC) established in 2024 that student nurses can fulfil up to 600 of their 2,300 required practice learning hours through simulation. The major policy

change establishes simulation as an essential element for professional education instead of treating it as an additional educational tool. Simulation maintains its official status as an essential factor which supports competence and patient safety and workforce preparedness.

The Nuffield Trust together with the Florence Nightingale Foundation (2024) stress that quality assurance must be robust while educators need training and students must participate in designing and evaluating simulation activities. The report advocates for simulation activities that learners help design while promoting reflection and preventing assessment-focused models which could distance students and maintain clinical power structures in educational environments.

The research results demonstrate complete consistency with current policy directions. Students identified multiple essential conditions which support their positive simulation experience and professional identity formation:

- Skilled and responsive facilitation
- Structured but adaptable approaches to simulation delivery
- Emotional and psychological safety
- Peer support and collaborative learning
- Immersive and coherent realism - feeling the simulation, not merely observing it

The educational space of simulation became transformative for students when these specific conditions existed. Students experienced confusion and disengagement and their confidence and professional identity suffered when structure and emotional support and inclusivity were absent. The growing number of simulated practice hours requires simulation delivery to become more critical than before. Student satisfaction with simulation goes beyond personal taste because it directly affects their clinical competence and emotional resilience which leads to better patient care results. The growing use of simulation as a replacement for clinical experience requires educators to concentrate on both simulation duration and the depth of learning combined with inclusive practices and emotional safety measures. The research results provide critical knowledge about how simulation needs to be delivered to reach its educational goals of producing students who are technically skilled and emotionally strong and reflective and professionally competent.

Given the growing role of simulation in nursing education and the critical factors identified through this research, it is essential to consider the practical steps educators, institutions, and policymakers must take to ensure simulation-based learning meets its full potential. The following section outlines key implications for practice based on the study's findings.

5.8 Implications for Practice

The findings from this research offer practical insights regarding the structure and delivery methods of simulation-based education (SBE). The process of simulation functions beyond technical protocols because it creates essential effects on students' emotional preparedness and their professional development alongside their confidence building. The effectiveness of simulation depends equally on human elements and environmental conditions as well as the content of the curriculum. The study includes implications for nurse educators along with programme leaders/institutions and policy/regulatory bodies.

For Nurse Educators

The simulation environment is established by educators through their practices. Students in this study strongly reacted to both verbal and non-verbal communication from facilitators which included their voice tone and instruction clarity as well as their physical attendance throughout the scenario. The psychological safety environment developed from human interactions rather than design protocols because of consistent behaviours and mutual trust. The findings from this study support Rudolph et al.'s (2014) theory of the "safe container" which enables students to engage in both interpersonal and cognitive risks without facing judgment. The educational approach known as relational pedagogy (Diekelmann, 2001; Sellman, 2006) confirms the value of this teaching method. The simulation experience became most valuable to students through debriefing sessions which maintained respect while being collaborative and emotionally sensitive. Emotional realism also mattered. Learning became possible through intensity only when the instructor provided appropriate support followed by reflective activities. The emotional intensity of scenarios caused students to become detached from the learning experience. Teachers need to acquire technical abilities alongside emotional competencies along with the capacity to modify their instruction methods during actual sessions. The facilitator development curriculum should incorporate specific training regarding psychological safety and group dynamics alongside relational teaching methods.

For Programme Leads and Institutions

The design of simulation needs to follow consistent principles with equal opportunities for all participants. The students at different sites encountered considerable variations regarding room arrangements and scenario organisation together with actor involvement and facilitation approaches. Learning outcomes together with student participation levels suffered from these differences and students considered them unfair. Simulation needs structured institutional frameworks to ensure quality control and immersive physical spaces and proper timetabling for meaningful preparation and debriefing. Kift's (2009) transition pedagogy supports this, highlighting the need for deliberate curricular planning across time. The development of confidence and readiness for practice along with professional identity requires students to experience simulation as an integrated and ongoing process instead of separate events. The amount invested in simulation resources plays an essential role. The presence of trained actors together with reliable equipment and dedicated spaces communicates that simulation holds value. When students encountered environments characterised by disorganisation or hurry they assumed the lack of seriousness and this situation decreased their level of engagement. The research supports Nestel and Tierney's (2021) demand for context-sensitive strategic design over standardised content.

For Policy and Regulation

Simulation delivery guidelines need to expand their focus beyond technical standards to address emotional and relational elements and pedagogical aspects of delivery. The students in this study expressed their clear understanding of simulation effectiveness which should guide national guidance development along with simulation audits and facilitator training. Simulation should be developed collaboratively with students according to the Nuffield Trust and Florence Nightingale Foundation (2024) guidance which also requires emotional safety assessment and inclusion support alongside technical performance enhancement. This study reinforces that position. The effectiveness of simulation depends on both the number of sessions conducted and the quality of delivery and the student experience during each session.

Educators	Programme Leads / Institutions	Policy & Regulatory Bodies
• Build psychological safety through relational presence and tone • Use emotionally attuned debriefing approaches • Train educators in emotional literacy and facilitation reflexivity	• Standardise core aspects of simulation delivery (e.g., time, environment, facilitation) • Embed simulation longitudinally across the curriculum • Invest in resources to show simulation is valued	• Incorporate emotional and relational quality into national standards • Co-design simulation experiences with students • Monitor emotional safety and student experience, not just technical delivery

Table 10 Summary of Key Implications for Simulation-Based Education

5.9 Methodological Strengths and Limitations

Strengths of the Study

This study employed a multi-method qualitative design that included interviews, focus groups, open-ended questionnaires, field observations and photographic data. The triangulation across methods helped to increase the trustworthiness of the findings and to cross check themes across different data types. Visual data was particularly useful as it was able to capture nonverbal interactions, spatial use and group dynamics that were not always present in spoken accounts. The photographs provided a view of how students interacted with the equipment, the space and each other during the simulation. This visual approach is in accordance with the principles of constructivist methodology in which meaning is co-produced by context and interpretation. Visual research theorists such as Banks (2007), Pink (2013), and Rose (2016) have been saying for a long time that photographs can capture the affective and relational dimensions of experience. In this study, they provided a context for the spoken data and picked out emotional cues and collaboration patterns that supported the development of the themes.

The sample included students from different year groups and from different simulation modalities, such as skills labs, immersive suites, ward-based environments and community scenarios. This variety enabled the examination of how physical and psychological fidelity impacted the student experience. McCallum (2007) defined physical fidelity as the degree of realism of equipment and layout and psychological fidelity as the degree to which a scenario elicits real emotional and cognitive responses. This study included participants with experience of both and thus provides a more general view of simulation-based education (SBE) in practice. The study, despite the practical limitations, generated thematically rich data which allowed for a layered analysis of how students experience and interpret simulation. The inclusion of an outlier voice added to the credibility of the study by acknowledging variation and demonstrating reflexivity in the analysis process. To enhance transferability, rich descriptions of the simulation environments, student cohorts, and context were provided to allow readers to determine relevance to other settings. Dependability was supported through a transparent audit trail, documenting key decisions made throughout data collection and analysis. Finally, confirmability was strengthened through reflexive journaling and triangulation of multiple data sources, helping to ensure that findings were grounded in the participants' experiences rather than researcher bias.

Limitations of the Study

Acknowledging the limitations of this study is important for interpreting its findings and ensuring methodological transparency. The main research restriction arose from the limited application of the planned focus group design. Multiple focus groups were intended for this study to explore time-related experiences between different student year groups. Due to recruitment problems and scheduling difficulties, only one focus group was conducted. The group discussion provided useful information about collective memories and emotional responses, yet it limited the opportunities for peer interaction and group diversity. Liamputtong (2011) states that focus group dynamics depend on both familiarity and existing social structures between group members. The pre-existing friendships between participants potentially enabled more honest disclosure yet simultaneously restricted open communication among participants who feared social judgment or group pressure. The single focus group recruitment and facilitation occurred through student volunteers and their peer leadership. The group composition and power relations were less predictable, as students both recruited peer participants and largely led the discussion, while I facilitated only by asking occasional guiding questions. The approach established comfort but simultaneously impacted which participants could participate and how genuinely their views emerged.

The research design planned to integrate photo-elicitation techniques into the focus group sessions during the study. This research approach was intended to let participants view simulation pictures before engaging in dialogue about their observations. The small number of conducted focus group sessions limited the implementation of this research method. The researcher analysed photographs independently from participant interpretation as standalone data since the study did not allow significant participant input. The restricted application of visual methodology because of this limitation prevented the co-construction of nonverbal and spatial meaning in simulation (Banks, 2007; Pink, 2007).

The recruitment process resulted in an unbalanced distribution of participants in the study. Recruitment also presented challenges. The original design focused on children's nursing students within a single university, but low numbers necessitated broadening participation to include students across all fields of nursing and from a second institution. While this adaptive strategy enriched the study by providing wider perspectives and enabling cross-case comparison, it also meant that representation was uneven and the sample could not be considered fully representative of the wider student nurse population. The increased diversity of perspectives in the larger sample group weakened discipline-specific understanding and created additional variations in placement and curriculum exposure which might have made some thematic findings more complex.

The study collected data from self-reports which consisted of interviews, a focus group and questionnaires. The research methods depended on participant recall and their willingness to share information while possibly being affected by social desirability bias (Morgan, 1996; Liamputtong, 2011). The use of individual interviews and anonymous questionnaires helped reduce these effects but participants may have avoided critical feedback and basic emotional responses to simulation. The researcher's existing relationship with some participants affected their willingness to share information.

The observational data provided detailed insights into group dynamics, engagement, and learning behaviours in real-time simulation settings. However, as the researcher had prior expertise in both simulation-based education and clinical teaching, there is a risk that

familiarity may have influenced what was noticed or prioritised during data collection and interpretation. The researcher's insider position brought advantages but simultaneously created possible biases. The researcher utilised reflexivity combined with reflective journaling and peer discussion to reduce the impact of researcher influence although observer interpretation of visual and affective cues remained linked to researcher positionality (Gray, 2013). The study's main findings received strong validation from methodological triangulation even though specific limitations existed. Future research needs to adopt expanded methods for increasing participant diversity while enhancing visual data co-interpretation and reducing researcher-driven meaning-making processes.

A further limitation of this study relates to diversity and inclusion within the participant group. Recruitment difficulties, shaped by ongoing pressures on nursing education, meant that the sample was smaller and less diverse than would have been ideal. Representation across different demographic and social groups, such as ethnicity, disability, or neurodiversity, was therefore limited. Similarly, the ability to compare institutional differences in access to simulation lay beyond the scope of this research. While these constraints were largely outside my control, it is important to acknowledge that they restrict the extent to which the findings can be assumed to reflect the experiences of all student nurses.

Researcher Positionality and Reflexivity

I brought to this project both my simulation experience and my nurse education. Although the familiarity with the context and the access to the field sites was a plus, this familiarity may have introduced bias. This is especially true for my interpretation of the observed behaviours and emotional cues in photos since I already perceived to understand from the organiser perspective what makes simulations effective. Journaling and reflective writing and discussions with peers were ways in which reflexivity was embedded in the analysis process. Data coding and theme development was undertaken with a clear awareness of avoiding assumptions and with attention to the participants' words and actions. Nevertheless, researcher influence is not possible to rule out, especially in a study where a lot of emphasis is placed on affect, tone and behaviour.

The relational aspect of data collection especially for the observations and the one focus group may have affected how participants responded. Liamputtong (2011) pointed out that peer dynamics and the presence of a known facilitator can both inhibit and enhance discussion. In this study, steps were taken to try to reduce this, but in educational settings power relationships may always be a factor.

Overall, even though the study has limitations in terms of scope, sampling, and interpretive generalisability, its methodological strength, such as multi-modal data collection and attention to context, makes it a strong and useful study of student experience in simulation. The limitations of this study also suggest some useful directions for future research which are discussed in the next section.

Researcher Learning and Professional Development

The research work I conducted transformed my knowledge about simulation-based education together with student learning experiences while reshaping my educational and research roles. My previous simulation facilitation experience did not prepare me for the systematic evaluation of students' emotional, cognitive, and relational responses which forced me to question my assumptions about meaningful simulation practices. Students' learning experiences heavily depend on emotional safety and relational trust and their perceptions of inclusive learning

environment yet these factors tend to be delicate and hard to detect through typical evaluation instruments. The research process allowed me to develop greater understanding about how emotional engagement operates within educational settings. Students' emotional labour became visible through their actions that included both supportive interactions and disengagement and struggles and flourishing behaviours which revealed their professional identity development. I became more aware of the multiple factors which interact including relational cues and facilitator behaviour and environmental signals and group dynamics that determine both student learning outcomes and their entire learning experience. The discovery has transformed my educational practice thinking by leading me to adopt more relational approaches that prioritise student needs during simulation design and facilitation.

The study validated the importance of continuous reflexivity from a research standpoint. Researcher positionality exists as a dynamic factor which demands ongoing attention because it cannot be acknowledged once and then ignored. The demanding yet valuable aspect of my research involved managing my dual identity as an insider (a nurse educator familiar with simulation) and outsider (a researcher seeking to interpret experiences systematically). Through this experience I learned that active listening and humility alongside the ability to revise interpretations based on participants' voices are essential skills for me. The knowledge gained through this project will serve as a direct guide for my upcoming research as well as my educational work. I plan to integrate principles of psychological safety alongside relational pedagogy and emotional literacy into simulation environments with greater purpose. As a researcher I dedicate myself to maintaining reflexive learner-focused methods that emphasise participant voices to develop inclusive emotionally intelligent educational practices.

5.10 Recommendations for Future Research

This study examined nursing students' perceptions of simulation-based education (SBE) in various settings and modes. Although the results provide a good understanding of students' perceptions of, and engagement with, simulation, there are areas that need further research. These recommendations are intended to suggest directions for further research that will help improve simulation teaching and make it more equitable for students.

Investigate the Long-Term Effect of Simulation on Readiness for Practice

According to students, simulation is a watershed in their professional growth, particularly if the experience is emotionally intense and the facilitation is excellent. Nevertheless, this study collected those perceptions at the time. It is thus not possible to determine how these perceived watershed moments influence the long-term performance, retention of learning, or entry into actual clinical practice. Possible future studies may involve longitudinal qualitative or mixed methods approaches that track students through the rest of their programs and into their early years of practice. Interviews, reflective journals, or simulated check-ins could monitor changes in identity, confidence, and critical thinking after simulation. This type of research would also help determine if the emotional and professional learning from simulation is remembered when learners are under real-world stress. This may provide more evidence of the effectiveness of simulation in achieving learning outcomes and developing professional identity and safe practice.

Assess Simulation Implementation in Different Settings

One of the most interesting findings from this study was the heterogeneity of the simulation programs across institutions. Students reported on variations in the availability of virtual reality, use of actors, simulation realism, and instructor competence. These variations affected the

level of engagement and achievement of learning objectives. Future studies could use a comparative case study or cross-institutional audit approach to describe simulation implementation in a variety of universities and countries. Some of the questions that could be asked include: Is simulation considered during the process of allocation of resources? What types of staff training are provided? How do students from different institutions rate the effect of simulation on their readiness to practice? Results from such studies could help in the creation of the national standards or standards for the quality of simulation that goes beyond the physical aspects of simulation to include the instructional and emotional aspects of simulation design.

Assess the Impact of Emotional Realism and Debriefing on Learning Outcomes

Students in this study have, time and over again, pointed out that simulation is a high-intensity emotional process. Some emotional stress led to better learning while at other times it was too much for students or even made them disengage. Realism was only effective if it was properly built and supported by reflective interventions.

Further research should consider the definition of emotional fidelity, that is, the extent to which simulation emulates the emotional aspects of practice and the relationship between emotional fidelity and psychological safety. Research may involve the use of different facilitation techniques, debriefing techniques (such as PEARLS, advocacy-inquiry) or the rate of simulation to establish the most appropriate balance between realism and learning readiness. This area of inquiry is particularly important given the increased simulation hours that are likely to be required under new regulatory frameworks. Without proper emotional containment, simulation may cause psychological distress or fail to achieve learning objectives, particularly for students who are less confident or come from marginalised backgrounds.

Increase the Use of Visual and Participatory Methods

Photos were useful in this study to depict group processes, space utilisation, and student feelings that complemented the thematic analysis. However, their potential was limited by the absence of photo-elicitation during focus group sessions. Future work could try participatory visual methods in which students select, decode or explain the visual data. Photo-elicitation, video-reflection or digital storytelling could be especially useful in simulation research, where much of the learning is kinaesthetic, fast-paced, and not easy to articulate in retrospect. Visual methods are well-documented in qualitative research (Banks, 2007; Pink, 2013; Rose, 2016) and could provide simulation researchers with a useful way to uncover the emotional, social, and personal aspects that lie beneath the surface of the students' discourse. The ethical principles regarding consent, privacy, and authorship will continue to be important, especially when working with images that depict distress, error, or vulnerability. Yet, the potential for a deeper, student-centred insight makes this an area worth further exploration.

Examine the equity and inclusion dimensions of SBE

This study brought to light some important issues regarding how simulation affects different learners in unique ways: some students benefited from it, while others felt lost or failed to see the relevance. These reactions are usually not reported in the facilitator's debrief or in peer discussions.

Future research may be directed towards how SBE is experienced by students from marginalised or underrepresented groups, or students with previous negative experiences in clinical education. Then this can explore simulation through a stronger lens of equity, diversity, and inclusion. This study could not fully address these issues due to participant numbers and

recruitment challenges, but they remain crucial considerations. Students' experiences of simulation may be shaped by factors such as cultural background, disability, or institutional access, and so understanding these perspectives would offer valuable insights for designing more inclusive simulation practice. An analysis of how simulation affects confidence, communication style, language, and cultural norms through an intersectional lens would be beneficial. Investigating power, participation and the 'hidden curriculum' in simulation may assist institutions in making these learning spaces more inclusive, more responsive and safer emotionally for all students, not only for those who are confident and self-assured coming into the simulation.

Develop and validate frameworks for simulation design informed by student experience.

This study found that simulation was experienced as transformative by students when it was emotionally coherent, relationally supported, and pedagogically structured. Learning was hindered when these elements were not present. This opens the door to creating a student-informed model or template to guide simulation design, delivery, and evaluation. Such a framework could help educators and institutions to align simulation environments with how students actually experience and learn from them. Unlike current models, which are more likely to be educator, outcome or system-based, this approach would begin with the learner. This concept is further elaborated in the following section, where a prototype framework is proposed as an outcome of the study.

These recommendations suggest a future research agenda that is student-focused, emotionally intelligent, and pedagogically sound. As simulation becomes more widespread in health education, it is crucial to continue to ask not just how it works, but for whom, under what circumstances, and to what purpose. Research based on the lived experiences of learners will be key to guaranteeing that simulation remains a worthwhile and fair tool in professional education.

5.11 Recommendations for Practice

5.11.1 Proposal for a Student-Centred Approach to Simulation Design and Evaluation: The CARE-ful framework

The research provides essential knowledge about simulation effectiveness and meaningfulness through nursing student perspectives. The thematic findings showed that students needed several connected conditions to engage in reflection and develop their professional identity. The students' experience focused on more than just technical design or equipment fidelity. Students found value in structured learning environments with emotional safety and skilled facilitation and realistic scenarios and opportunities to reflect on their professional role within a supportive setting.

The CARE-ful Framework emerges from this analysis as a student-centred model which serves both simulation-based education design and evaluation purposes. The framework derives from student experience while focusing on four essential domains.

The acronym CARE-ful was deliberately constructed, with "CARE" standing for the pillars identified in the findings, Clarity, Authenticity, Responsiveness, and Emotional safety.

The suffix "-ful" was not designed as a separate acronym. Instead, it completes the word to emphasise the qualities essential for simulation to be careful, thoughtful, and meaningful. This linguistic choice was intentional, aiming to reflect the holistic nature of simulation when properly delivered: not just technically sound, but emotionally, relationally, and educationally powerful. It is important to note that this framework should not be confused with the Careful Nursing Philosophy and Professional Practice Model (Meehan TC, 2012), which is spelled differently, and is a nursing model that emphasises a value-based approach to providing high-quality, fundamental nursing care, and operates in a different context. The CARE-FUL Framework presented here is specifically grounded in contemporary student experiences of simulation-based learning and seeks to offer a practical model for designing, delivering, and evaluating simulation activities in nurse education.

While the CARE-ful framework includes several relational and affective components, the next section (5.11.3) will specifically reconceptualise debriefing, not just as a formal concluding step, but as a relational thread woven throughout the simulation experience.

5.11.2 The CARE-ful Framework

Component	Reflective questions	Themes on which based
Cognitive	Are students mentally engaged, able to reflect, and meaningfully challenged?	Cognitive Processing & Learning Integration
Affective	Is the emotional tone supportive? Are students safe enough to take risks and reflect on their responses?	Emotional Impact & Wellbeing
Relational	Is the experience facilitated in a way that builds trust? Are peer and educator relationships enabling learning?	Peer Dynamics; Role of the Educator
Environmental	Does the physical and psychological space support immersion? Are consistency and realism built into the design?	Environmental Factors; Fidelity

Table 9 Outline of framework

Each domain is informed by students' lived experiences. They are not abstract categories, they are what students repeatedly described as either enabling or disrupting learning.



Figure 4 summary of CARE-ful model

How the Framework Can Be Used

The CARE-ful framework can be used in two main ways:

1. Simulation Design

A list of criteria based on the framework can be used by educators and simulation teams to assess scenarios during their development or review. The framework contains essential questions for each domain:

Cognitive: Is the level of challenge appropriate? Does the setting provide adequate room for reflection?

Affective: Students need preparation for dealing with intense emotions during the session. Debriefing techniques focus on achieving meaning while avoiding correction mode.

Relational: Before beginning the session, students should understand the expectations of their facilitators. The study evaluates anticipated peer dynamics and their corresponding support systems.

2. Simulation Evaluation

The framework serves dual purposes after simulation sessions to analyse student and instructor feedback about their experiences. The evaluation tool helps determine simulation

success points along with potential modifications for enhancing future delivery effectiveness. The assessment tool enables institutions to move past basic checklist assessments toward evaluating how simulation promotes identity formation, confidence, and professional development.

How It Differs from Existing Models

The CARE-ful framework stands apart from NLN Jeffries Simulation Theory (Jeffries, 2012; 2016) because it places student experience at its core while the latter focuses on educator and outcome results and so offers a complementary perspective centred on the student experience. The framework emerged directly from students' descriptions of simulation aspects that made it meaningful, stressful, or impactful instead of starting with theoretical foundations. This framework maintains emotional, cognitive and relational elements because simulation represents both technical functionality and social-emotional processes. The framework avoids defining standard simulation practices for different situations because it delivers tools for educators to analyse student needs and shifts emphasis from structural and pedagogical inputs and emotional, relational, cognitive, and environmental factors that shape how simulation is *lived* by learners. Future research should investigate how simulation personnel deploy the framework during practical implementation while determining if learners recognise its domains during session delivery and assessing its ability to minimise institution-wide inconsistencies. As simulation continues to grow following NMC guidance revisions the sector demands tools which capture student experiences rather than educator delivery standards. The CARE-ful framework presents one approach to address this educational gap.

5.11.3 Debriefing Reconsidered

Debriefing is widely regarded in simulation pedagogy as the most important element of the learning cycle, often positioned as the phase in which meaning is made and performance is consolidated (Fanning & Gaba, 2007). A number of structured approaches, such as Dreifuerst's (2012) Debriefing for Meaningful Learning (DML) model, have shaped best practice by emphasising structured questioning, feedback, and reflection. Similarly, professional standards (Decker et al., 2013) formalise debriefing as a distinct stage following the simulation event. These models have been influential in advancing simulation practice but also risk positioning debriefing as a formulaic and somewhat detached "add-on" to the main activity.

Findings from this study challenge such delimiting conceptions. Students' accounts repeatedly showed that the processes of sense-making, emotional regulation, and peer reflection were not confined to the post-scenario discussion but occurred before, during, and after the simulation. For example, trust built in the pre-briefing and facilitation phase set the emotional tone for later discussions, while micro-moments of peer reassurance and encouragement within scenarios carried a debriefing quality in themselves. From this perspective, debriefing is not a singular endpoint but an embedded relational process woven throughout the entire simulation experience.

This reconceptualisation positions debriefing less as a discrete technique and more as an affective and relational thread that relies on emotional safety, trust, and responsiveness across the four CARE-ful domains. In this sense, debriefing is "fluid", a way of thinking and relating that supports learners' professional identity formation at multiple points, rather than only as a retrospective review.

Recognising debriefing as an integrated process offers two important contributions. First, it highlights the need for facilitators to attend to relational cues and student agency throughout, rather than saving reflection for a designated moment. Second, it emphasises that professional identity, confidence, and emotional labour are constructed dynamically during simulation, and thus require debriefing practices that are adaptive, relational, and continuous. This approach provides a foundation for further work that will extend beyond the current framework and form the basis of the next stage of my academic research trajectory.

Figure 5 illustrates this reconceptualisation by showing debriefing as a spiral woven through the four domains of the CARE-ful Framework, emphasising its role as a continuous relational process rather than a discrete endpoint.

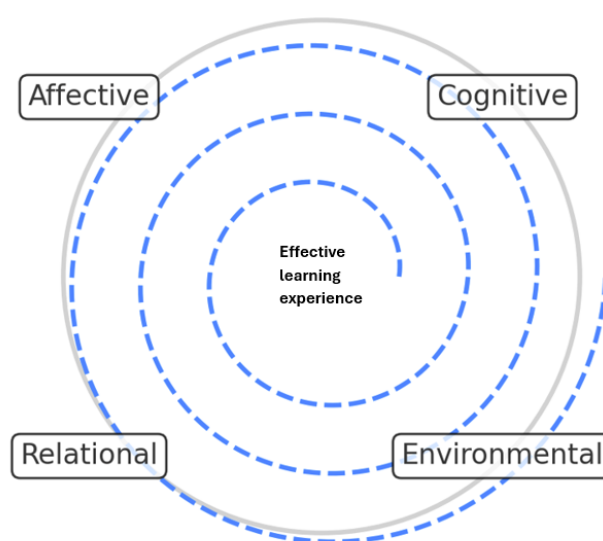


Figure 5 Visual representation of debriefing as an embedded relational process.

5.12 Chapter Summary

This chapter has integrated and explained the research findings presented in Chapter 4. The analysis investigated the impact of simulation on students' learning and professional identity formation through their cognitive, emotional, relational, and environmental experiences. The chapter used existing theoretical frameworks and recent educational policy developments to explain simulation as a complex, situated, and emotionally charged learning practice. The chapter stressed that simulation-based education requires psychological safety together with skilled facilitation and structured delivery and peer support to achieve effective and inclusive learning. The chapter also stressed the need for a more intentional and student-focused approach to simulation design and delivery in light of the increased role simulation now plays in nursing education policy. To support this, the CARE-ful Simulation Framework was introduced, offering a practical tool to help guide the development and evaluation of emotionally safe, pedagogically sound, and professionally meaningful simulation experiences.

The implications for educators, programme leads, and policy makers were outlined, emphasising that simulation is not a neutral technique but a relational, emotional, and developmental experience that requires careful construction. Methodological strengths and limitations were critically considered, and future directions for research and practice were proposed.

The final chapter will return to the study's research question, review how the study met its original objectives, and offer concluding reflections on the contribution of this research to the field of simulation-based education.

Chapter 6: Conclusion and Recommendations

6.1 Overview

The research investigated simulation-based education (SBE) by studying undergraduate nursing students' real-life experiences. Simulation has become a standard part of nursing education yet most research about it investigates technical aspects or educator and institutional learning results. The research study focused on student voices to understand their experiences and interpretations and how simulation activities influence them. The research employed qualitative methods which combined interviews with focus groups and open-text questionnaires and field observations and photographic data to produce a multi-dimensional thematic analysis of simulation experiences. The CARE-ful Simulation Framework emerged from research findings to provide students with a framework for designing and assessing simulation-based education.

6.2 Addressing the Research Aim and Objectives

The central research aim was:

Explore Simulation Based Education from the perspective of a student nurse and subsequently, any educational implications in simulation delivery

This aim was pursued through five specific objectives, all of which were met through the study:

- Students' descriptions of the simulation environments they encountered illuminated the importance of structure, realism, and emotional tone.
- Their accounts of emotional reactions - including anxiety, excitement, fear, and pride, demonstrated the centrality of affective experience in simulation.
- Students explained how meaning was constructed not merely through technical tasks but through emotional challenge, peer collaboration, facilitator support, and reflection, reinforcing the view that simulation fosters identity development.
- Students clearly articulated factors that enhanced learning: skilled facilitation, psychological safety, peer support, coherence, and immersion.
- Participants also identified areas for improvement, particularly the need for consistent operationalisation, better preparation, and recognition of emotional impacts.

Thus, the study answered the research question by revealing that simulation is not simply a technical rehearsal space; it is an emotionally and socially constructed environment where professional identity begins to form.

6.3 Key Contributions

6.3.1 A Student-Centred Understanding of SBE

Jeffries' Simulation Framework (Jeffries 2005, 2012) focuses primarily on educator planning, inputs and outcomes; this study contributes a deeper student-informed understanding. It draws out the emotional, relational and identity-shaping aspects of simulation which are often not captured in conventional design models. Students are not only technical subjects in simulation, they live it as an event in their personal, professional and social life. It contributes to calls by Nestel and Tierney (2021) for more simulation approaches that are based on equity and experience.

The CARE-FUL Simulation Framework:

This thesis introduced the CARE-FUL Simulation Framework as a practical model that is grounded in student data. It identifies four domains critical to effective simulation:

- Cognitive (mental challenge and reflection)
- Affective (emotional safety and readiness)
- Relational (trust and support in facilitation and peer dynamics)
- Environmental (physical and psychological fidelity)

The framework offers a new way to align design and evaluation with how simulation is actually experienced by learners, rather than how it is intended by educators.

Emotional Fidelity and Identity Formation

The study reinforces the idea that simulation is impactful not simply because it replicates clinical tasks, but because it allows students to step into, and feel, the role of the nurse. It also supports the position of Dieckmann et al. (2020) that emotional realism must be scaffolded in order to promote meaningful learning. In this context, students' experiences also reflected aspects of emotional labour, the effort of managing one's own feelings while displaying the emotions expected within a professional role (Hochschild, 1983). Within healthcare, emotional labour is recognised as integral to nursing practice, involving both the management of personal anxieties and the responsibility to support others (Mann, 2005). In simulation, this was evident as students balanced their internal stress with the expectation to remain composed and to encourage peers. When well delivered, simulation provides a safe space to explore the pressures, decisions, and responsibilities that students will face in practice.

Relevance to Policy and Professional Practice

Given the NMC's (2024) expanded endorsement of simulation for practice hours, institutions must ensure that simulation is not only frequent but meaningful. This study offers evidence that effective simulation is not defined by hours completed or equipment quality alone but by the emotional, cognitive, and relational environment created for learners.

Study Limitations

As outlined in Chapter 5, the study had limitations regarding participant recruitment, and particularly in relation to the focus groups. The planned multi-cohort design was reduced to a single group, limiting comparative analysis. Sampling was made to be broad to cover nursing and other areas to increase the data richness, but this also reduced the field specific focus.

The analysis of photographic data, although methodologically rich, was also somewhat subjective. As Berger (1972) and Banks (2007) point out, images do not speak for themselves, they are constructed by the researcher's frame and way of seeing the world. However, measures were taken to reduce this through the use of triangulation and reflexivity and visual interpretation remains context dependent.

Finally, there were differences in the delivery of simulation across institutions that resulted in variability in fidelity and design which may limit generalisability. Nonetheless, these same variations were informative in highlighting the unevenness of current simulation practice.

6.3.2 Future Directions

In light of the limitations and findings of this research, several areas require further investigation:

- Longitudinal research to look at the longer-term impact of simulation on identity and professional development
- Cross institutional audits to look at differences in simulation structures and emotional safety.
- Experimental work on debriefing methods and emotional fidelity.
- Participatory visual methods to engage students more directly in the interpretation of simulation experiences (Pink, 2013, Rose, 2016)
- Equity-focused studies to examine how simulation impacts different learner groups in different ways.

The CARE-FUL Framework also presents a clear opportunity for further development and testing in practice. Future research could refine the framework, test it with educators, and assess the impact on student engagement, confidence and performance.

Building on these proposed directions, the following section provides a summary of key recommendations for education practice and research arising from this study.

6.4 Recommendations (summary)

On the basis of this study's findings, several recommendations are proposed for both education practice and future research. These are presented here in summary form, with fuller discussion available in Chapter 5.

For Education Practice

- Acknowledge emotional and relational dimensions of simulation alongside technical fidelity, ensuring that debriefing explicitly supports students in managing emotional labour.
- Promote peer interaction and collaboration within simulation design, recognising the value of student-to-student dialogue as well as facilitator input.
- Adopt adaptive and inclusive approaches to simulation delivery, taking account of the different needs, backgrounds, and confidence levels of students.

For Research

- Investigate diversity, equity, and inclusion within simulation more systematically, particularly in relation to recruitment, access, and representation across nursing fields.
- Explore emotional labour in simulation as an area of growing importance, including its impact on learning, professional identity, and preparedness for practice.

6.5 Final Reflections

Simulation has reached a stage where it cannot be ignored by the nursing education system. Simulation has become essential for nursing education, and it is replacing traditional clinical practice hours for students. The effectiveness of simulation education requires immediate attention because it has become a fundamental teaching method.

The research evidence reveals simulation serves as more than a training site for nursing procedures. Simulation provides students with their first experience of nursing practice. Students develop skills in action while learning effective emotional management and decision-

making skills and self-reflection about their professional development. Such learning experiences have great impact yet remain susceptible to breakdown. The effectiveness of simulation depends on proper planning and delivery methods as well as sufficient organisational support.

A simulation approach that attends to cognitive, emotional, relational, and environmental dimensions can offer students more than traditional methods such as lectures, demonstrations, or skills checklists. Unlike these conventional approaches, simulation has the capacity to transform not only what students know and can do, but also how they think, feel, and relate as developing professionals. That is its potential, to shape knowledge, confidence, and professional identity in ways that students require from their education.

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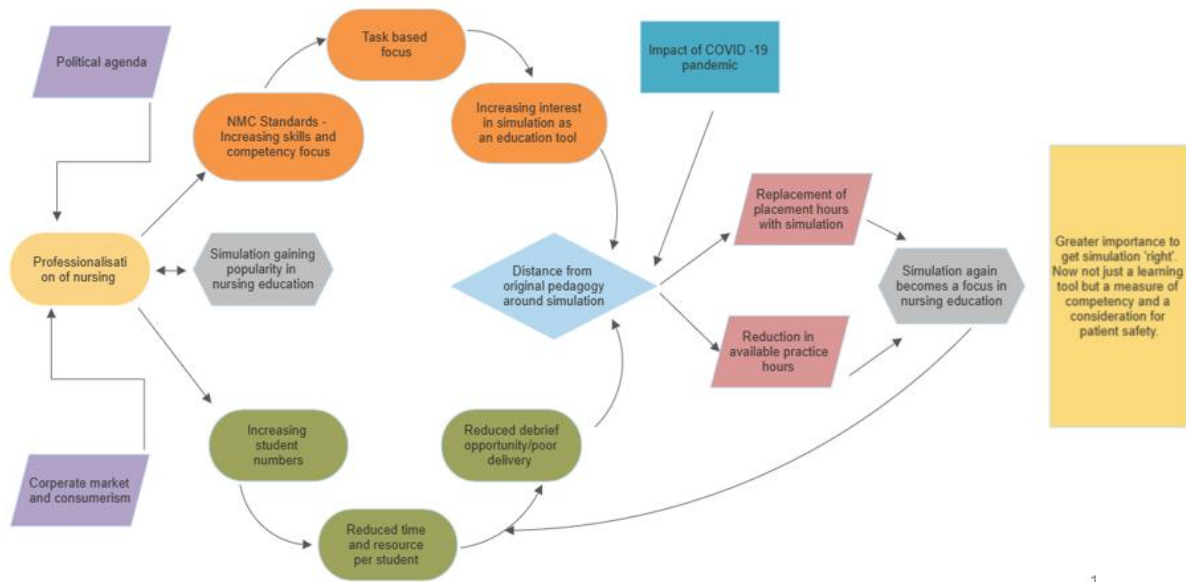
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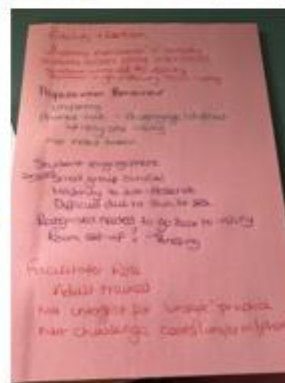
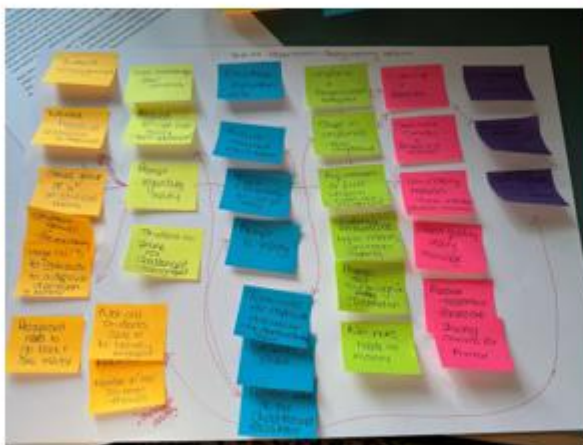
Appendices

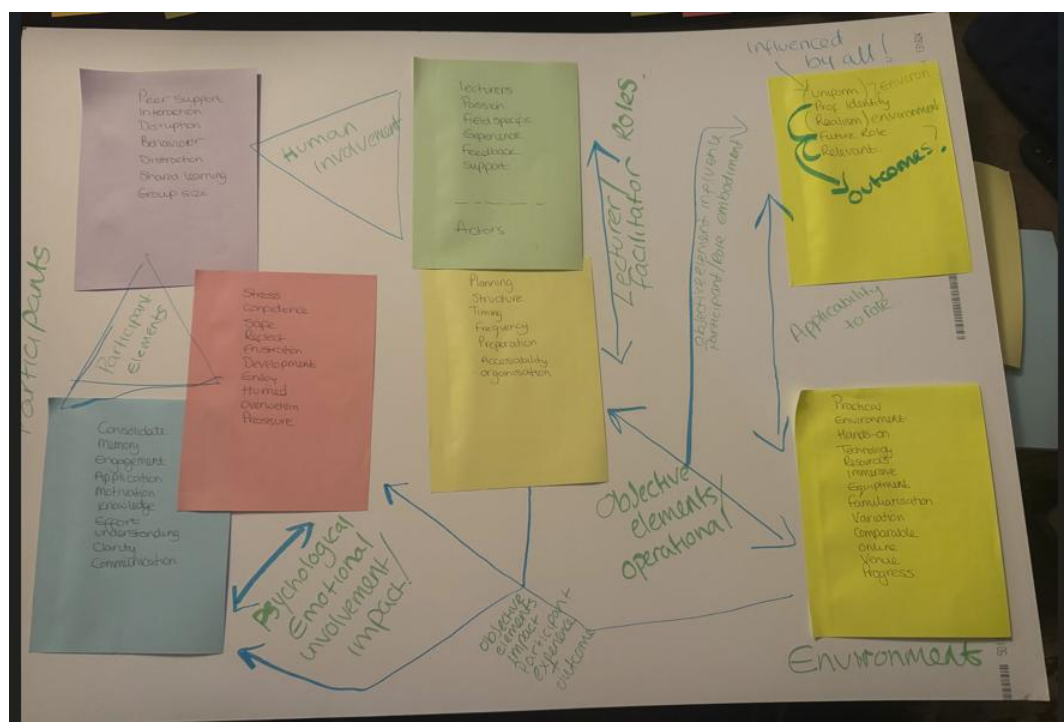
Appendix 1. Problematisation mind mapping

Problematisation



Appendix 2. Code map development – part of the thematic analysis process – developing themes





Appendix 3. Simplified Code Table

Peer support	Confidence	Pressure	Engagement	Planning	Realistic/realism
Interaction	Safe	Passion	Application	Structure	Uniform
Shared learning	Reflect	Field-specific knowledge	Motivation	Timing	Environment
Disruption	Frustration	Experience	Knowledge	Frequency	Hands-on
Behaviour	Development	Feedback	Effort	Preparation	Technology
Distraction	Enjoy	Support	Understanding	Accessibility	Resources
Group size	Hurried	Consolidation	Clarity	Organisation	Immersive
Stress	Overwhelm	Memory	Communication	Practical	Equipment
Online	Venue	Progress	Professional identity	Future role	Relevant
Lecturer	Familiarisation	Actors	Variation	Comparable	

Appendix 4. Final themes table

Theme	Subtheme	Codes linked to theme
Theme 1: Student Experience and Learning Process	Peer Dynamics and Collaborative Engagement	Peer support, interaction, disruption, behaviour, distraction, shared learning, group size
	Emotional Impact and Wellbeing	Stress, confidence, safe, respect, frustration, development, enjoy, hurried, overwhelm, pressure, reflect, professional identity
	Cognitive Processing and Learning Integration	Consolidate, memory, engagement, application, motivation, knowledge, effort, understanding, clarity, communication, shared learning
Theme 2: The Role of the Educator in Shaping Experience	Facilitation and Guidance	Lecturers, passion, field specific, experience, feedback, support, development, interaction, clarity, communication, safe , progress
	Operationalisation	Planning, structure, timing, frequency, preparation, accessibility, organisation, hurried
	Actor Incorporation	Immersive, interaction, experience, feedback, application, relevant, actor
Theme 3: Setting the Scene: Environment, Realism, and Disruption	Environmental Realism and Operational Quality	Practical, environment, hands-on, technology, resources, immersive, equipment, familiarisation, variation, comparable, online, venue, progress realistic/realism
Outcome: Becoming the Nurse: Confidence, Identity, and Clinical Readiness		Uniform, professional identity, realism, future role, relevant. (Influenced by all themes)

Appendix 5. Observation Field Note Template (Simplified Version)

Date: _____ Time: _____ Location: _____ Student Group: _____	Session Purpose and Aims (Brief summary of the session's goals)
Contextual Information - Student presentation (e.g., uniform, readiness) - Staff presentation and roles - Session structure and intended learning outcomes	Setting Description - Physical environment layout and use of space - Equipment and technology used - Level of fidelity (physical and psychological)
Behaviour and Actions - Verbal communication (notable quotes or phrases) - Non-verbal communication (body language, facial expressions) - Professional behaviours - Interaction patterns (peer-to-peer, student-staff, student-manikins)	Observations and Impressions - Significant events or incidents - Unexpected occurrences - Observer's initial impressions and reflections - Challenges faced during observation
Patterns and Themes - Emergent patterns or recurring behaviours - Unexpected or contradictory behaviours - Initial interpretations of group dynamics and learning processes	Summary and Recommendations - Main insights and key findings - Areas for future exploration or improvement
Additional Notes	

Appendix 6. Sample from Interview (IV1) transcript



KATHERINE BATLEY 32:30

Mm hmm.

So the pre reading before is really important.



32:35

Yes, yes, yes. Then reflection. Also on both. I've done also is helpful from.



KATHERINE BATLEY 32:42

So pre reading before reflection afterwards.



32:44

Yes, yes.



KATHERINE BATLEY 32:46

And during the session itself, when you're there doing the scenarios.



32:49

Then also interaction and get interaction and ask questions also and even feedbacks also has been helpful.



KATHERINE BATLEY 32:58

Yeah. OK.

And are there any specific changes or improvements that you could suggest that would enhance how effective those simulation based learning sessions could be for you as a student?



33:15

OK, what I would just consider is let me say more equipment's, more equipment's should be. What is it called should be should be introducing to the? Was it going to the? Should I call it? The labs got me the skill lab so that's we can learn more and get to know better about them.



KATHERINE BATLEY 33:28

Mm hmm.

Yeah. So more equipment, is there anything else, any other changes you could think of?



33:38

Yes.

Or should I?

OK. OK. Like this? Yeah. Now maybe 'cause we are doing MSC. It was just two times we had it. So I think it's it should be like have more more more sessions should be introduced. That's me. More sessions should be introduced.

Appendix 7. Sample from Focus Group Transcript

FG4 10:10

Hmm.

I think they've they've helped a lot. Obviously for me 'cause I've never done anything like nursing wise before. So it's helped me for when I go on placement. But then I think that because we're in such well, I won't say a big group but because when we do things and we're in quite big groups, there's not like enough opportunity for you to repeat on them skills. It's like you do it once and then that's it. You've learned it then.

FG3 10:42

Yeah, I think they think when you go on placement placement expect you to know more than you know kind of thing. I don't know if any of these have experienced that.

FG2 10:42

Yeah.

FG1 10:43

OK.

FG4 10:48

Yeah, yeah.

Yeah, definitely.

FG2 10:53

I think that the the enhancement labs, the pop up labs that Dan and Helen have have done have been really helpful for that because my first placement was a community as you know. And then so then when I went to my second placement, I hadn't done any jobs or anything. So it's been so long since we've had that first session on doing observations. I was petrified and if Dan and Helen hadn't done those enhancement lab pop up things, I yeah, that was really helpful for me.

FG1 10:57

What?

FG4 11:22

Hmm yeah.

FG2 11:24

I find a lot.

FG1 11:24

Yeah, I agree with that.

Appendix 8. Sample from Questionnaire summary of results -QCN

30. What key things make your learning during Simulation Based Learning Education (SBLE) the MOST EFFECTIVE?

6 responses

ID	Name	Responses
1	anonymous	The practical scenarios we get to do
2	anonymous	Being able to ask questions and allowing us to make mistakes without actually hurting anyone
3	anonymous	Active participation, getting hands on and asking lots of questions.
4	anonymous	Practice and repeat if a mistake is made.
5	anonymous	examples from tutors own practice, when doing theory relating SBLE the same day or week was good rather than weeks later.
6	anonymous	Being able to watch skills and then practice them myself with the equipment while receiving feedback/help.

31. Are there any specific changes or improvements you would suggest to enhance the effectiveness of the SBL for you as a student?

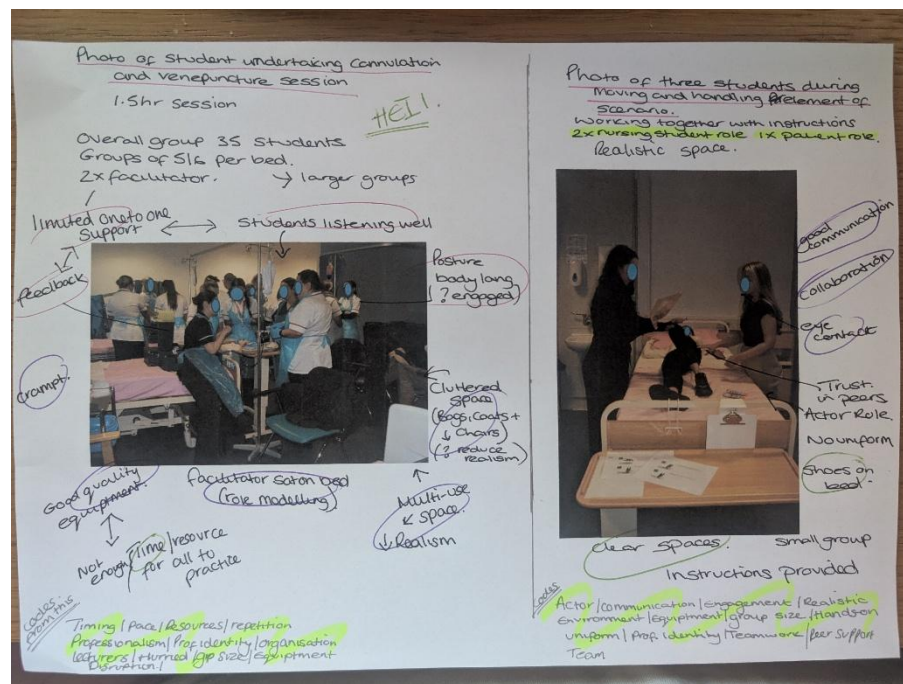
6 responses

ID	Name	Responses
1	anonymous	Not really
2	anonymous	N/a
3	anonymous	Just a bigger volume of SBLE.
4	anonymous	Increase of time in simulation sessions.
5	anonymous	Just more sessions.
6	anonymous	More sessions or time on more difficult skills.

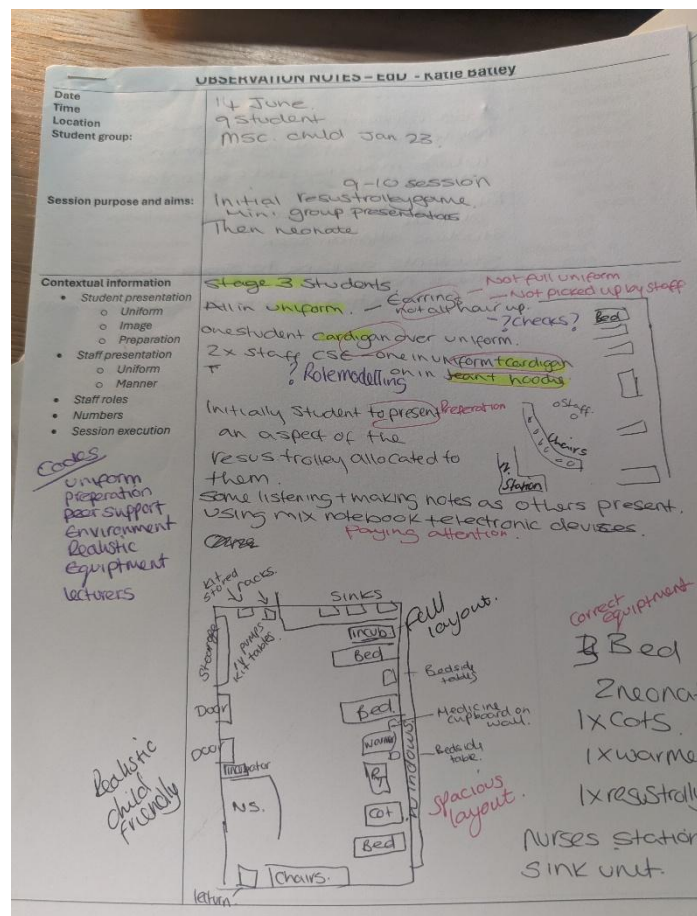
Appendix 9. Sample of observational photos



Appendix 10. Sample of Photo Analysis



Appendix 11. Sample of Observation Notes Analysis



Appendix 12. Sample of Questionnaire Analysis

An exploration of simulation based education - questionnaire (3)

An exploration of simulation based education - Nursing and Allied Health Professions.

28. Can you explain your answer to question 27 in as much detail as possible please
8 responses

ID	Name	Responses
1	anonymous	explaining in lots of detail and answering <u>any</u> questions no matter how silly we may think the question is. <i>Knowledge Trust support</i>
2	anonymous	They keep us <u>on track</u> and <u>guide</u> when we're unsure of our next step <i>support guide</i>
3	anonymous	Their confidence and enthusiasm counts towards our positive engagement <i>enthusiasm / attitude / passion</i>
4	anonymous	They need to be engaging and knowledgeable <i>Delivery Knowledge Time</i>
5	anonymous	Yes some of our lecturers explain things <u>so many times</u> so that we understand and explain it for us in a way that we can understand. They do so much of <u>behind the scene</u> works like putting the <u>effort</u> to set up the room and equipments and other resources. <i>preparation Organisation recognise</i>
6	anonymous	Yes if they are engaging we learn more <i>support</i>
7	anonymous	Some lecturers are not as passionate as others and it shows <i>How? Passion</i>
8	anonymous	The sessions are always well led and detailed. There is always <u>time</u> for questions and students are encouraged to reach out should they need to, which is always reassuring, especially being a first year! <i>Organisation Time development support</i>

level of experience