

**University of Stirling  
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Master of Research in Educational Research**

**The Simulated Human:  
An Actor-Network exploration of the materialities of  
mobilising practice learning in uncanny spaces**

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Professor Tara Fenwick**

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## **Declaration**

I declare that this dissertation is my own work and that all critical and other sources have been specifically and properly acknowledged, as and when they occur in the body of my text and that the work it embodies has not been included in any other thesis.

Signed:

Date: 29 July, 2015

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## Abstract

The use of simulated human mannequins in nursing education is widely assumed to provide active learning of clinical skills in the safety of a realistic ward environment without causing harm to patients. While the uptake of this pedagogy increases, research into its efficacy has concentrated mostly on student perceptions and outcomes with little regard for the perceptions of the lecturers or in relation to the purpose of simulation in nursing education. The body of research has been criticised for being considered only from a positivist perspective that might not adequately fit with the complexities and particular subtleties of how practice learning is mobilised in this context.

This study has been guided by Actor-Network Theory so as to trace the sociomaterial assemblages and identify the practices, patterns and connections that facilitate effective learning of immediate life support skills. Data were gathered by performing ethnographic observations of the delivery of the immediate life skills course at a nursing school in Scotland and by conducting in-depth interviews with the lecturers. These were analysed thematically and the datasets compared in an iterative way.

The findings suggest that the lecturers employ elements of both the real and the imagined nursing practice by creating a hybridity between their own past clinical experiences and the past placement experiences of the students in the simulated scenarios and projecting them into future imaginings of practice. They draw greatly on the strength of this uncanny space to make the unreal real, using the hybridity to enact a form of *créolité*, which seems to facilitate this method of practice learning. This assemblage provides a bridge or scaffolding between the two spheres of practice placement and creates a hybrid space where opposing elements in nursing education are comingled effectively.

This study is the first to consider this particular pedagogy in a sociomaterial way through a postcolonial lens. While this study is very small and cannot be generalised to the wider population of nursing schools, it has opened up new possibilities in understanding this dynamic and multifaceted pedagogy from a more critical perspective so that future research might follow.

Key words: nursing education, high-fidelity simulation, Actor-Network Theory, the uncanny; practice learning



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# Chapter 1 Introduction

In northern Canada, the Inuit have used a form of simulation as a tool of teaching and guidance for thousands of years; the *inuksuk* has functioned as a beacon for navigating unfamiliar territory, as a signpost of familiarity for conveying messages of safety or danger and of abundance of food, and as a memorial for historical events and attributes in the landscape. In Inuktitut (the language of eastern Canadian Inuit) morphology, the word *inuksuk* is made up of the two morphemes, “*inuk*” (one human being, or person) and “*-suk*” (to act in the capacity of), with the combined meaning; “that which acts or performs the function of a human” (Heyes 2002, p. 134; personal correspondence).

Traditionally a nomadic people, the Inuit employed the simulated human, in the form of *inuksuit* (plural of *inuksuk*), to guide them across the arctic landscape, assisting them to make purposeful connections as they traversed the vast network that made up the multiple spaces that they inhabited. In an unexpected and similar way, nurse educators have been employing simulation of the human form as a method of teaching since the profession was in its infancy. Today, the use of increasingly more realistic mannequins, which perform the function of the human patient, is widespread in nursing education. This research project will explore the challenges, opportunities and possibilities that these simulated humans present within the domain of practice education for undergraduate nurses by examining the application of high-fidelity mannequins as a teaching pedagogy within clinical skills training.

## Background to the research

The accelerating advancement of technology in the electronic simulation of real-world healthcare scenarios has led to an increase in the number of nursing schools opting to provide software-programmed mannequins in their practical skills lectures for undergraduate students. The justification for the use of simulation as an effective pedagogy in nursing education is based on the theoretical underpinnings of experiential and situated learning (Bland et al. 2011), and high-fidelity simulation is commonly assumed to provide active learning within a safe environment that closely represents reality. Nursing education providers across the UK have invested much capital in

acquiring and installing the mannequins and their software along with the technologically advanced simulated clinical ward settings in which to house them. The effectiveness of using such pedagogies in medical education has been widely debated in the literature. While many benefits of the use of this technology have been identified within medical education research, others have taken a more critical view and question how its uptake has seemingly been unquestioningly accepted and developed without engaging in a debate about its theoretical foundations (Berragan 2011; Bligh and Bleakley 2006; Bradley and Postlethwaite 2003; Caplan et al. 2014; Hopwood et al. 2014). In nursing education, the benefits of high-fidelity simulation are usually reported in relation to the students' satisfaction and its value in terms of assessment outcomes, but few have considered how technological advances within this particular pedagogy are changing the ways in which nursing education is delivered (Weaver 2011). Additionally, some argue that research about the effectiveness of simulation as a learning tool is built solely upon the infrastructure of meeting the demands of a scientific (positivist) paradigm that may not fit with other effective learning pedagogies, and some researchers have been critical about the strong propensity of the positivist approach in exploring the effectiveness of simulation in teaching clinical skills (Bland et al. 2011; Bradley and Postlethwaite 2003; Cant and Cooper 2010; McGaghie et al. 2011). These researchers have concluded that simulation is a dynamic concept that deserves further empirical investigation in order to explore and understand the complexity, power and subtleties of this learning technique.

Some researchers have argued that the use of high-fidelity simulation is more student-centred (Berragan 2011; Bland et al. 2011), however, reviews of the evidence of the effectiveness of learning by using simulation-based pedagogies concluded that more research is needed on the efficacy and value of these techniques (McGaghie et al. 2011; Weaver 2011). Others have observed that the quality and rigour of previous research is inconsistent and that future research should be more thematic in nature (McGaghie et al. 2010, 2011; Cant and Cooper 2010). Principally, most research posits that the use of simulation pedagogy allows the educators to bridge the gap between classroom theory and practice by building students' confidence while avoiding harm to patients (Kneebone 2009; Yardley et al. 2013). However, in contrast, it has also been argued that the use of simulation may have a detrimental effect on student nurses' construction of their professional identity (Berragan 2011; Sharma et al. 2011). These opposing

observations suggest that there is a need to unpick the ways in which this particular pedagogy is assembled to perform these translations of simulated practice situated within and across the boundaries of the curriculum and effective knowledge-making. In addition, the nursing education literature, in particular, has avoided considering the importance of how simulation might affect psychosocial elements such as power relations, inter-personal and inter-professional conflict, and emotions, which are all recognised as being factors that affect the ways in which student nurses prepare themselves for the world of work (Sharma et al. 2011).

## **Aims and Objectives**

This project proposes to adopt a sociomaterial approach to attempt to identify the practices and patterns that link the assemblages of the human and non-human actors within the enactments of the simulated clinical skills learning space. To achieve this aim, the research will be informed by Actor-Network Theory (ANT) to examine how the social connects with the material within these learning spaces so as to move beyond the assumed purpose of these materialities, placing equal importance on both the social and the material, to explore these complex relationships more critically (Fenwick et al. 2011). Because ANT breaks from the dominant perceptions of learning by challenging the ontological and epistemological foundations of education research, it provides an appropriate set of tools with which to critically address the lack of focus on the theoretical validation of simulation learning in the literature. Moreover, drawing on ideas developed within critical theory that others have successfully combined with sociomaterial thought to thoughtfully examine similar networks of professional learning (Lin and Law 2014) will provide a novel approach that has not yet been considered in nursing education. By exploring these connections through a multi-faceted lens, the underlying subtleties of these pedagogies might be better understood.

To date, these sociomaterial enactments in the context of the simulated human patient in the nursing curriculum have largely been left unexamined. In addition, most of the research within nursing education tends to be guided by previous studies within medical education, which do not address the particular subtleties and nuanced differences that make nursing education distinct from medical. The existing literature for the use of simulation in nursing education tends to focus more on operational description and

student feedback rather than on critical reflection of its educational effectiveness and suitability to translate this learning to practice (Berragan 2011). Furthermore, and most importantly, while most of the literature supports the use of simulation in nurse education from a learning outcomes and student satisfaction perspective (Roh et al. 2013; Thidemann and Söderhamn 2013; Weaver 2011), very few studies have considered the perspective of the nursing educator and how they value the use of simulation as an effective pedagogy (Nehring et al. 2013). Even within this body of research, most of the research to date that has involved nursing educators has focused on their technological and training needs, barriers in terms of simulation teaching skills, and their satisfaction with student learning outcomes, rather than on their perceptions of the purpose and merit of simulation as a teaching method. Again, and similar to most of the simulation literature in general, almost all of these studies have adopted a solely quantitative research design (Nehring et al. 2013). Adopting an ethnographic approach in this study will allow for a more in-depth, intricate and detailed understanding of the issues related to this particular phenomenon (Cohen et al. 2011) to perhaps contribute to the development of the theoretical tools with which to conceptualise simulation in nursing education.

## **Research Questions**

Having to grapple with providing simulation pedagogy within nursing education creates multiple complexities within the already thorny network of practice learning. This research project aims to unravel these multi-faceted connections to illuminate the ways in which the nursing curriculum is enacted in this space and to illustrate how learning is entangled with this technological setting to assist in shaping professional knowing (Gherardi 2014). The research will consider these key questions:

- \* How is simulation learning mobilised?
- \* What are the educators' perceptions of the purpose of simulation?
- \* What do the educators think is valuable about using simulation as part of their pedagogy?
- \* What kinds of knowledge are being valued most by the educators?
- \* What do the educators think is missing?

In order to provide an understanding of the current issues and debates within the research related to the use of high-fidelity simulation in nursing education, a review of the relevant literature will first be presented.

# Chapter 2 Literature Review

## Exploratory scoping of the literature

Because of the duality of the research topic, the literature review process evolved out of a combination of two search strategies; one grounded in the nursing literature, and the other in education research. These searches were modified and repeated several times throughout the research process. Initially, in October, 2014, when writing the project proposal, an exploratory search of the literature was conducted in order to provide a foundation on which to build a clear picture of the existing knowledge and debates in relation to the proposed research questions; not a precise representation, but one that was indicative of the main issues and who was writing about them (Thomson 2012). First, the relevant nursing knowledge databases were searched, using the terms, “nursing” and “education” and “simulation”: PubMed, ProQuest, CINAHL, and Web of Knowledge. No restrictions in relation to publication date or country of origin were placed on the searches, however, they were limited to peer-reviewed literature written in English. The initial number of articles identified was quite high, so the titles and abstracts for the first few pages of the results were scanned within each of the databases.

It soon became clear that the search results in these databases also included the use of simulation in undergraduate medical, paramedic, pharmacy and interdisciplinary workplace education, where qualified nurses were included in the key words as they may have been involved in simulation training within other disciplines. Many of these articles were useful in gaining information about the use of simulation as a teaching method in general, or because the authors discussed the use of simulated learning in terms of learning theory. However, it was necessary to modify the search criteria in order to focus the search within the research topic and reduce the number of articles that had been identified. It also became clear that there are vast inconsistencies within the literature in relation to the terminology used to relate to the use of mannequins in nursing education. However, because most of the authors referred to “high-fidelity mannequins” in the literature, the search was repeated within the same set of databases,

adding the term “hi\* fidelity” and/or “mannequin” or “manikin” to reduce the scope of the search to relate more closely to the research topic.

Searches using the original terms as well as the list of modified terms were then repeated within education-related databases, including Education Abstracts, and through numerous publishers’ databases, such as Wiley Online, Taylor & Francis Online, and Sage Journals. The results within these databases, while offering alternatives not identified within the nursing database searches, also included a large proportion of articles related to the use of simulation in pharmacy, paramedic and medical education, as well as for multidisciplinary team training. These searches did, however, identify several relevant articles not located in the nursing database searches. Searches using the full list of terms were also performed on Google Scholar and the ProQuest database of dissertations and theses, and these identified eight new sources, and included one book that was particularly useful in identifying additional articles and related quite closely to the research topic (Nehring and Lashley 2010). These searches also identified two PhD theses, both not found in previous searches; one that related directly to the use of high-fidelity simulation in nursing education (Alinier 2013), and one that was not related to pre-registration nursing education, but which was informed by ANT and considered the conceptualisation of technology in nursing practice (Booth 2013). Eventually, 83 journal articles and four PhD theses were included in this original review.

Several reviews were identified in this first scan of the literature that proved to be very useful in providing a background to previous literature related to the use of simulation in nursing education (Bland et al. 2011; Cant and Cooper 2010; Foronda et al. 2013; McGaghie et al. 2010, 2011; Nehring and Lashley 2004, 2009, 2010; Nehring et al. 2013; Rourke et al. 2010; Solnick and Weiss 2007; Weaver 2011). Relevant literature found in these reviews but not identified in the literature searches were also added to the list of articles for review. From these hand searches, 17 further sources were identified, bringing the total number of articles to be included in the original review to 100. To illustrate the diversity within the capacity of each individual search engine, Table 1 provides an overview of the numbers of articles identified in each of the database searches in relation to the search term criteria.

**Table 1: Number of sources found within each database search by search terms**

Source	Search 1	Search 2	Search 3	Search 4
	Nurs* AND education AND simu*	Nurs* AND education AND simu* AND hi* fidelity	Nurs* AND education AND simu* AND hi* fidelity AND (mannequin OR mannekin)	Nurs* AND education AND simu* AND (sociomaterial OR actor network)
PubMed	1,882	279	110	0
ProQuest	1,388	149	157	0
CINAHL	1,585	198	7	0
Web of Knowledge	1,591	370	32	0
Education Abstracts	490	86	17	0
Wiley Online Library	85	55	3	0
Taylor & Francis Online	563	133	17	2
SAGE Journals	29	0	1	0

## Mapping of the literature

Importantly, my initial review of the literature revealed only one article that related specifically to the perspectives of nurse lecturers in the use of high-fidelity mannequins in the form of an informal review conducted in the UK (Dowie and Phillips 2011). Most notable, however, and perhaps most interesting, is that none of the studies related directly to the use of sociomaterial perspectives of simulation in nursing education. Considering the importance that is placed on high-fidelity simulation as a teaching method, and on its effectiveness in the realms of student learning outcomes, confidence, clinical competence and satisfaction, it is most surprising that the *materialities* of this particular pedagogy have not been prioritised in the research.

Because a literature review is an ongoing process that should form a major contribution to the development of the project (Thomas 2013), the literature was again reviewed in March, 2015, prior to conducting the fieldwork, and once more, before analysis and



writing up began. The searches were conducted using the same search terms and databases, and several newly-published journal articles were identified. The subsequent searches and further hand searches of the reference lists of other key articles did reveal several other relevant articles (18), including one particularly helpful literature review of research directly related to nursing educators and high-fidelity simulation (Nehring et al. 2013), as well as two further PhD theses.

## **Results**

This review revealed that there is a wealth of literature relating to the use of high fidelity mannequin-based simulation in nursing education, which has increased significantly in the past five years. The authors of one recent integrative review performed an evaluation of mannequin-based simulation in undergraduate nurse education between 2008 and 2012 and examined a total of 101 articles after excluding for other forms of simulation pedagogies (Foronda et al. 2013). However, the key findings were almost exclusively related to the experiences and outcomes of the students, and were reported in relation to their confidence/self-efficacy, satisfaction, anxiety/stress, skills/knowledge and interdisciplinary experiences, while the perceptions of nurse educators were not reported at all. Many of the articles identified in my review focus on learning styles (Bearnson and Wiker 2005; Fountain and Alfred 2009; Shinnick and Woo 2015), and most of them (approximately 78) discuss the impact of high-fidelity simulation on student confidence and clinical competence to some extent (for example, Blum et al. 2010). Also prioritised is the emphasis that is placed on the benefit of safety, a theme that is highlighted in almost all of the articles (87), and is presented as a given in the literature in general, almost to the point of being a cliché.

The aim of this research project is to determine what nursing educators perceive to be the purpose of using simulation and to explore what they think are the most valuable elements of this teaching method; what kinds of knowledge they value the most and how simulated learning is mobilised. After performing a thorough review of the full set of articles, only eight related closely to the perceptions of nursing educators and, of these, only one adopted a sociomaterial approach to their research (Hopwood et al. 2014). Two further articles adopted a sociomaterial approach to examining simulation in practice learning: one of these related to “medical simulation”, including nurses, and

addressed the potential of complexity theory in exploring this topic (Fenwick and Abrandt Dahlgren 2015); and the other related to learning in simulation in the training of both nursing and medical students and was informed by ANT (Ahn et al. 2015). Despite not relating directly to nursing education, these proved invaluable in relation to the discussion of the results of this dissertation. The most relevant results of the literature review will be discussed critically below.

## **Discussion**

The informal review to determine how nursing lecturers perceive the use of high-fidelity simulation (Dowie and Phillips 2011) was particularly helpful. The authors provide a succinct and comprehensive history of the evolution of nurse education “from a vocational discipline to a profession immersed in a university culture”, describing how nursing has “become ‘academic’ as well as practical” (Dowie and Phillips 2011, p. 35). This article charts the effects of *Project 2000* (UKCC 1986) on nursing curricula, a policy that marked the beginning of the “wholesale move” of nurse education into the higher education (Bentley 1995, p. 133) and away from developing practical skills in the ward setting. Most interestingly, the authors posit that these events provided the catalyst that led UK nursing education providers to embrace the use of simulation to support nursing students in the development of their clinical skills.

The authors provide a critical overview of the debate in the literature around the purported benefits of high-fidelity simulation training, citing Alinier et al. (2006), who compare it to the success of flight simulation training for pilots, as well as presenting a contrasting view by Glavin and Maran (2003) who propose that human simulation is “too limited in response and function to replace clinical practice” (Dowie and Phillips 2011, p. 37). Importantly, they highlight that no research has yet been conducted that looks specifically at the “anxieties or attitudes” of lecturers who deliver high fidelity simulation (Dowie and Phillips 2011, p. 37), and reiterate the importance of providing simulated learning in a safe environment to teach clinical and decision-making skills “where their practice can be explored in terms of what they do and why” (Dowie and Phillips 2011, p. 37). Interestingly, the authors describe simulation as being “on the periphery of nurse education” (Dowie and Phillips 2011, p. 38) and give an example of how educators describe returning to the clinical setting as being “like a foreign

language” (Dowie and Phillips 2011, p. 38). Their use of this type of language in relation to simulation draws attention to the perceived opposing spheres of the teaching space and the clinical space and the nurse educators’ positioning within them. It suggests that, in their fear of not having the appropriate knowledge to navigate the clinical sphere, the lecturers are resistant to simulating the culture of the clinical space. Moreover, the authors cite Cave (2005), who suggests that “teachers need to understand and appreciate the clinical realities” that relate to the “application of the theory they teach”, and that spending time in the clinical sphere will make the lecturers more “clinically credible” (Dowie and Phillips 2011, p. 38). These findings are very interesting in terms of the numerous ways in which only the “realities” of clinical practice will allow the lecturers to “practice” in the simulation setting, and are directly related to the constant tension of the perceived practice-theory gap in nursing education. The one issue that seems to be lacking most in this study was to explore the nurse lecturers’ perceptions of the *purpose* of simulation in nursing education, or, as Schiavenato asks, “*why* nursing simulation?” (2009, p. 390).

Another related study, which is described by its authors as “modest”, is a qualitative exploratory study conducted at a regional university in Australia with seven academic staff members who taught subjects that either used simulation or had the potential to use simulation in nursing education (Miller and Bull 2013). The authors draw on the lack of research related to perspectives of nurse educators in relation to their choices in employing simulation, and stress that the literature that has been published is mostly quantitative, survey-based studies, an observation matching my own findings. They conducted semi-structured interviews that were analysed using cross-comparative thematic analysis. The authors admit that their sample was small, but they employed a robust validation of the interview questions, and the findings were validated through three strategies of peer review and expert checking, discussing the interpretation of the analysis thoroughly to reach agreement on the accuracy of the participants’ experiences. Interestingly, their findings revealed the importance of social factors in the implementation of simulation in nursing education, which differ from the findings of previous studies that employed questionnaire surveys, in that they link to pedagogical rather than operational issues. Moreover, their principal finding that the nurse educators consider simulation as a *separate entity*, positions simulation as “other” in

terms of its effectiveness as a nursing pedagogy and places it in the periphery of nursing education, strengthening the observations of Dowie and Phillips (2011).

The authors highlight the doubt and scepticism expressed by the educators and report how they question “the extent to which simulation is superior to current practice” (Miller and Bull 2013, p. 244), with many of the participants comparing the quality of the learning experience and the realism of practice to simulated practice. Similar to others who have called for a more critical approach to simulation in health education in general (Berragan 2011; Bligh and Bleakley 2006; Bradley and Postlethwaite 2003), Miller and Bull conclude that a critical approach must be taken “when making decisions about the level of technology, and thus complexity, to meet learning outcomes” (2013, p. 245). These findings, when considered in tandem with those made by Dowie and Phillips (2011), are indicative of the first modest, tentative steps away from the dominant positivist approach to determining the perceptions of nurse educators which, until now, have either been combined with student satisfaction surveys (Howard et al. 2011) or with interventions to increase uptake of simulation pedagogies (King et al. 2008).

Another exception to the dominant quantitative research is a study carried out in Canada to explore nursing educators’ perceptions of the implementation of simulation in nursing schools across Ontario (Akhtar-Danesh et al. 2009). The researchers gathered 104 statements from educators and students who had experienced simulation in relation to simulation in nursing education in general, that were then analysed by employing Q-methodology, a technique designed “to identify unique viewpoints as well as commonly shared views” (Akhtar-Danesh et al. 2009, p. 315) to determine the “concourse” of the use of high-fidelity simulators. While this method mixes quantitative and qualitative methods, the classification of the statements into domains of perceptions and further refinement in a Q-sorting process was particularly robust, enlisting 28 nurse educators from 17 nursing schools to complete the task. In contrast to Miller and Bull’s (2013) findings, these researchers found very few negative perceptions, concluding that “it was evident that with the correct support and training, many faculty members would embrace clinical simulation because it could support and enhance nursing education” (Akhtar-Danesh et al. 2009, p. 314). This was the first study to explore nursing educators’ perceptions of simulation on a large scale.

However, perhaps because the use of high-fidelity simulation was then in its infancy, the results, again, mostly relate to operational considerations and do not really address the issue of educators' perceptions of simulation as an effective pedagogy. Most interestingly, the authors conclude that while nurse educators perceive simulation to be an important element in nurse education, "it is one that can be used to support learning but cannot be used to replace 'real-life' clinical learning" (Akhtar-Danesh et al. 2009), a view that seems to be shifting somewhat in later commentaries. However, again, in this study, the nurse educators' perceptions of the *purpose* of simulation are not explored.

By far the most relevant article in relation to the topic of my research is one that responds to the calls to examine the use of simulation in nursing education critically (Hopwood et al. 2014). To my knowledge, it is the first to present a sociomaterial account of simulation in nursing education. Relating to the shift in nursing education introduced by Dowie and Phillips (2011), Hopwood and his colleagues start by situating simulation in higher education as the "bridge between the classroom and the world of work" (2014, p. 1). The authors provide an in-depth outline of what is meant by sociomaterial approaches and then identify the need for new theoretical approaches to simulation pedagogy by describing the distinct lack of theoretical approaches in the literature, a lack also identified by others (Caplan et al. 2014; Kaakinen and Arwood 2009; Schiavenato 2009).

In their outline of the sociomaterial, the authors draw on writings that reshape the philosophy of educational research in such a way that allows "approaches that break out of structure/agency divides, eschew representationalist and disembodied views of knowledge and decentre human subjects" (Fenwick et al. 2011, cited in Hopwood et al. 2014, p. 2). The authors describe how actor-network theory has been used to explore how meaning and matter are produced through relationships established in practices: "the focus is on performance, not on stable isolated forms" (Hopwood et al. 2014, p. 2). Further, Hopwood and colleagues directly link the sociomaterial conceptions of "knowing and learning through metaphors of emergence instead of possession/acquisition or participation" (2014, p. 3) with the limiting construction of the barriers, real and imaginary, that the nursing curricula create between learning and work. These observations shift away from the very hierarchical manner in which other research has

considered simulation in relation to practice learning and are strongly linked with my own observations.

This article also identifies the increase in the use of simulation in nursing education and refers to others who have raised concerns about simulation pedagogies and the readiness of graduates for work. The authors argue that a sociomaterial approach “provides a valuable basis to disrupt dominant approaches and offer new insights into simulation-based education” (Hopwood et al. 2014, p. 3). Drawing on Schatzki’s practice theory, the authors explore how his notion of “site ontology” provides a context where the material world is “not just a context for or used in social practices. Rather, the material world is seen as a dimension of all social phenomena” (Hopwood et al. 2014, p. 5). Hopwood and colleagues describe how the two are one and the same: the site encompasses both dimensions. Thinking back to the ways in which previous articles constructed the material world of simulated pedagogy as being distinct and separate from clinical practice, the authors in this article have instead opened up new possibilities to consider these two spheres in a way in which they might be understood to intersect and overlap within the sociomaterial understanding of simulated pedagogies.

Refreshingly, Hopwood and his colleagues do not conform to the prescribed check-list norms of traditional nursing research, going beyond the explorations of other research and provide one distinct difference in posing their research question: “What is being simulated?” (2014, p. 1). This essential question has so far been avoided in the vast cannon of simulated learning research in favour of more limiting forms of exploration. As others have observed, and as this literature review has shown, there is a great need to look critically at this wholesale acceptance of the efficiency of simulation as a teaching method in nursing education. As Hopwood and colleagues affirm, the distinct lack of rich theoretical work in simulation pedagogy is “an explicit cause of concern” (2014, p. 4). It is my aim to take their recommendations forward into my own work so that these concerns might be addressed to some extent.

# Chapter 3      Research Design

## Methodology

It is obvious within the published literature that including simulation in the nursing pedagogy creates multiple complexities within the already thorny network of practice learning. Because the ANT approach prioritises neither the human nor the non-human “things” within these assemblages, the agency of the human elements, typically central to an empirical investigation, loses its hierarchical power. Instead, the objective of the research is to describe how all of the complexities of these actors intersect and connect to produce other more meaningful and powerful agencies (Fenwick et al. 2011, p. 111). This approach is particularly suitable for this project as there is an identified need to move beyond the practice-theory gap to explore and clarify the opportunities and limitations that these sociomaterial assemblages present for the enactment of the nursing curriculum (Edwards and Carmichael 2012).

In order to explore the sociomaterial assemblages in such a way that all actors within this network are treated equally and studied symmetrically, an ethnographic method of observation was employed. Adopting an “ANT-inflected” (Law and Singleton 2013, p. 485) ethnographic approach provided the opportunity to closely observe and chart the network of associations in such a way as to provide rich and “thick descriptions” (Geertz 1973, cited in Cohen et al. 2011, p. 220) of how these connections are made, what is produced through these connections, which things are prioritised and what changes occur when they come together (Fenwick et al. 2011). Previous research has highlighted that knowledge practice, particularly in nursing, is a fragmented, diasporic and multiple hybridity and that there is a need for simulation to “reflect the messy realities and challenges of clinical practice” (Kneebone 2009, p. 956). In addressing this issue, and in keeping with the response to appeals to examine simulation in nursing education more critically (Bradley and Postlethwaite 2003), the methodology attempts to consider this hybridity from a postcolonial perspective. Drawing on postcolonial thought will provide an understanding whereby those taken-for-granted elements of the benefits of simulation in nursing education that have so far been left unexamined and

marginalised can be given a voice, thereby allowing the subaltern to speak (Spivak 1988). Indeed, there are some surprising parallels between postcolonial ideas and the epistemological positioning of ANT. Because ANT is “more interested in associations than in causes or their equivalents” (Lin and Law 2014, p.17), it does not prioritise any one social order above another. In addition, it aims for a certain research equality; “to ‘follow the actors’ without either becoming lost in endless networks, or ‘othering’ important rivulets and lumpy messes that may be overlooked or dismissed” (Fenwick et al. 2011, p. 122). In effect, ANT is situated quite well alongside postcolonial thought in that it provides an alternative way of looking at the world without prioritising any one system of culture, tracing connections between the actors, human and non-human, in the fractured and multiple spaces that separate and connect them.

### **Sociomaterial spaces, artefacts and actors**

A particularly useful concept in ANT is the notion of tracing a “token”, or a particular artefact (human or non-human) as it navigates the network (Gaskell and Hepburn 1998, p. 65). For this project, a prescribed set of clinical skills lectures provided the network and the token was a specific actor within it, that is, the nursing lecturer who “performs” the role of the simulated patient, SimMan<sup>®</sup>. The particular lecture chosen for this project was the immediate life support component of clinical skills training for undergraduate nurses, specifically, a course for which the content and teaching methodology is dictated completely by the guidance of the Resuscitation Council (UK). To accommodate each student in the final year cohort, this lecture is provided in one-day intensive training sessions, and the classes run over four or five days to meet the Resuscitation Council’s instructor-to-student ratio of a maximum of 1:6. Computer-controlled mannequins are used exclusively for the students to practise skills in immediate life skills techniques, such as resuscitation and defibrillation, and to demonstrate competence in their technique. The most advanced of these is SimMan<sup>®</sup> 3G, a high-fidelity simulated patient that can reproduce clinical, neurological and physiological symptoms, and that can be programmed with a wide array of training scenarios in combination with realistic responses to the monitoring and treatment enacted by nursing students. The setting was a Scottish university school of nursing, and a total of four nursing lecturers taught the cohort of 80 students over a period of four days.



In this setting, there are multiple spaces: the classroom, the clinical skills teaching lab and a central control room within the lab, but separate from the ward rooms. Within the skills lab the spaces are further multiplied: there are four mannequins in three separate simulated ward rooms, each connected by a central corridor. Each mannequin is operated remotely by the lecturers by using either a laptop or tablet, and each is connected to a computer monitor that has the potential to display the pre-programmed “monitored” life signs such as heart rate, blood pressure and oxygen saturation rate. The lecturer is also able to manipulate the mannequin’s physiological characteristics, adjusting the software to adapt the mannequin’s “symptoms” in response to the actions of the students, either automatically, or by using programmed algorithms in the software. In some scenarios, it is possible for the lecturers to observe the students remotely from the control room, where they are able to see and hear the activities in the ward, and they can perform all of the controls remotely. For the purposes of this particular course, however, all of these controls were performed by the lecturers in the simulated ward rooms during the sessions, and the control room was not used at all except as a room where they could withdraw to discuss the progress of the students in private. Instead of using the remote technology to provide the voice of the patient, the lecturers “performed” the voice in person.

The participants were recruited purposively; the nursing lecturers were approached in person and provided with information about the study via email (see Appendix 1). They all agreed to participate, and signed consent forms (see Appendix 2). The school’s administrator was approached and provided with information about the project, and permission was sought and granted to perform the observations.

## **Data collection**

Data were gathered in two ways: rich ethnographic observations and in-depth interviews. First, however, to obtain a firm understanding of the infrastructure that guides the simulated lesson, a review of the undergraduate nursing curriculum in relation to clinical skills development was performed, and the guides for both instructors and students provided by Resuscitation Council (UK) (2011) were examined. In addition, the guidance for providing simulated learning within nursing education outlined in the Nursing and Midwifery Council (NMC) *Standards for Pre-*

*registration Nursing Education* (NMC 2010) were also reviewed as they were significant in providing an understanding of how these texts illuminate the culture that has created them (Patton 2002). Becoming familiar with these texts also provided an understanding of how the trajectories of these materials (actors) connect and link with the context of the simulated clinical skills lecture (Hamilton 2012).

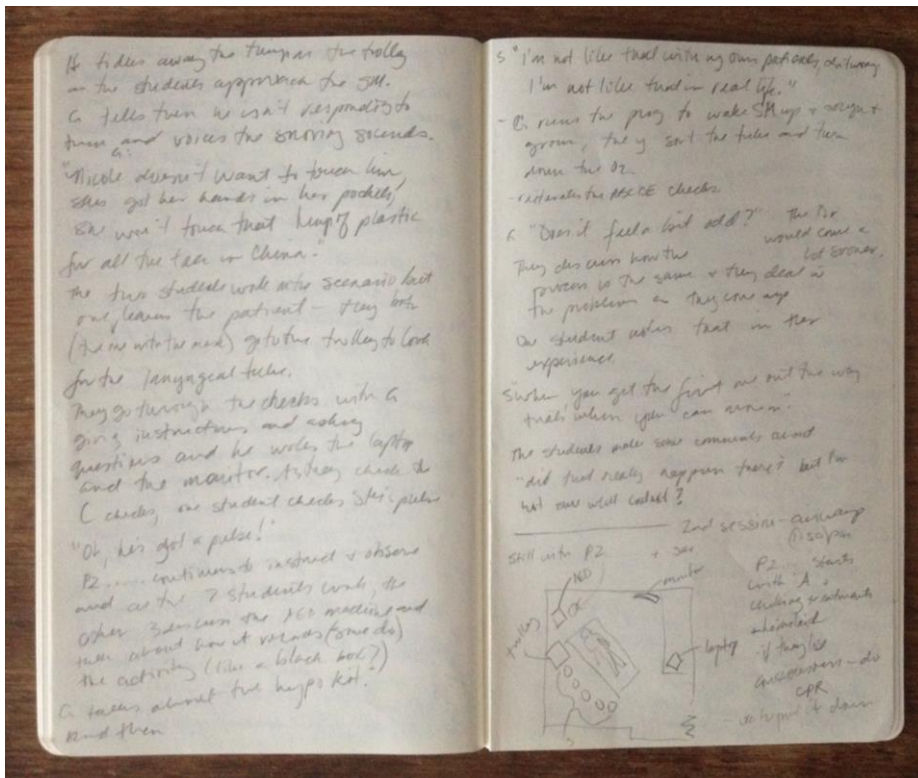
The first stage of data collection comprised rich ethnographic observation of the sociomaterial practices within the three settings: the classroom where the lectures were delivered; the simulated ward where the scenarios took place; and the control room where the assessment discussions took place. The use of “multi-sited” ethnographic observation (Marcus 1995, cited in Hamilton 2012, p. 43) is particularly appropriate within ANT research in that it “links data across different geographical spaces and times” (Hamilton 2012, p. 43) to reveal the thick connections between the trajectories identified within the observations. Moreover, in ANT, the rationale for choosing the most significant data within the observations to include in the analysis is guided by the same principles followed by ethnographers (Hamilton 2012, p. 43), for example, artefacts as well as observations, field notes and texts are included, not just the human actions, gestures and speech. The purpose of the observations were to provide a rich understanding of how the lecturers connect with and between the other sociomaterial actors, both visible and invisible, both human and non-human, within simulation learning; for example, the curriculum, the technology, the other lecturers, the students, the control room and its contents, and the educator’s own knowledge and experience.

In any ethnographic research, the presence of the researcher will always create the potential to influence the data. Acknowledging the effect that the actual process of research may have, and adopting a critical attitude towards the data will help to minimise these biases. Taking into consideration the relationship between the researcher and the participants, the culture and location of the setting, and being sensitive to the research topic and any issues that might arise around obtaining access and permissions, will also aid in obtaining robust data. To facilitate this, it was important for me to adopt a non-judgemental attitude and to set aside any personal ideals or preconceptions while continually following a system of reflexivity so that I was fully aware of any of these biases that might arise. Without reflexivity in ethnographic research, “the strengths of the data are exaggerated and/or the weaknesses

underemphasised" (Brewer 2000, p. 191). Therefore, I continually aimed to reflect on the processes of the data collection that might affect the data and to keep detailed notes of these reflections.

### ***Observations of the lectures***

Observations took place over four days in March, 2015. All aspects of the delivery of the course were observed; the setting up of the learning spaces and equipment, the classroom sessions, the practical sessions, and attending the assessment sessions where the lecturers discussed the progress of the students together. Despite having obtained ethical permission to gather video-recorded data, delays were encountered in obtaining permission to video-record the students from the site chosen originally, and time did not permit me to seek this permission in the alternative site. Therefore, the observations were recorded in a notebook with handwritten notes and sketches (see Figure 1). These notes were word-processed and annotated with reflexive notes at the end of each day's observation.



**Figure 1: An excerpt from the observation notes**

### *Interviews with nursing lecturers*

The analysis of the findings of the observations informed the in-depth interviews with the lecturers. Each of the four lecturers participated in individual interviews using a semi-structured interview schedule developed after the initial analysis of the observations was completed (see Appendix 3). The interview guide was designed to obtain a rich understanding (Flick 2011; Matthews and Ross 2010) of how the educator perceives the purpose and value of using simulation as pedagogy and what kinds of knowledge they value most. The interviews were digitally recorded and transcribed. At the beginning of each interview, the participants were reminded of the purpose of the research and their rights as participants, and permission to record the discussion was reconfirmed verbally.

Throughout each stage of data collection, the concepts of ANT were followed, that is, a “symmetrical” approach was adopted so that the fieldwork did not direct attention exclusively to the human actors (what they said and did), but instead, equal emphasis was placed on the significance of the non-human things (Whatmore 2003) that exercise influence in “assembling and mobilizing the network” (Fenwick et al. 2011, p. 10) that encompasses this knowledge-making activity. Great care was taken to ensure that the electronic data were stored securely on the University server and that files were password-protected to maintain confidentiality. In addition, all handwritten notes and printed transcripts were kept locked in a secure cabinet.

### **Data analysis**

The data gathered from both the observations and the interviews were analysed alongside reflexive notes gathered throughout the data collection stages and afterwards. The notes, sketches and transcripts were reviewed several times to allow me to become familiar with them (Matthews and Ross 2010), and each time I noted down emerging patterns and themes and identified connections between them. These initial themes were compared across both datasets and significant observations in relation to the research questions were compiled and interesting patterns were highlighted. These patterns were mapped, first in tables, and then combined with the notations to form a narrative discourse of the emerging findings. While it is generally accepted that observation produces research of great rigour when combined with other methods

(Adler and Adler 1998), great care must be taken so that the analyses of these observations are not biased by the subjective interpretations of the researcher. However, not having a background in either nursing or the use of simulation in nursing education, it is possible that this bias is reduced, as I approached the data collection with less preconceived ideas, not having prior knowledge of the lectures that I had chosen to observe.

It is also vital to stress here, that these “discourses” that emerged out of the interviews and observations are not to be considered discursive narrative in the conventional sense of constructing a story; instead, these textual data were considered as occurrences of “doing things with words” (Gherardi 2014, p. 14). Thus, it is the “knowing-in-practice”, or the “enactments performed through assemblages that are more-than-human” (Fenwick and Nerland 2014, p. 3), that are crucial to this research and this method of analysis will best allow them to be illuminated in this context of the simulated nursing education lecture. In keeping with the tenets of ANT, caution was taken when analysing the data to avoid prioritising what “appears to be most important and visible” (Fenwick et al. 2011, p. 122) and thus marginalising those materialities that are subtle, silent, unexpected and ambivalent.

## **Ethical Considerations**

Ethical issues were considered carefully and discussed thoroughly with more experienced peers in order to fully explore the potential dilemmas that may arise out of the results of this research. One issue of particular importance was the ethical implications of the role of the researcher as observer in considering the space in which the observation will take place. When people know they are being observed, they behave differently. Would gathering the observation data by “lurking” in the classrooms have a detrimental effect on the performances of the students or lecturers taking part in the exercise (Matthews and Ross 2010, p. 306)? It was important to remain aware of the potentially intrusive aspect of performing the research and to attempt to minimise this risk.

One of the less obvious ethical issues was how to address the critical element that the research topic encompasses. The nature of the research has the potential to reveal issues that contest and contrast with the values and guidance that the curriculum aims to

control. These revelations may prove to be controversial in that they might challenge and oppose the authority embodied in the curriculum and those actors who work very hard to shape and administer it. Because of the relatively small sample of participants, it will be difficult to maintain the confidentiality of the individuals and to guarantee that their thoughts and ideas will not be able to be traced back to them (Thomas 2013, p. 47). If the results of the research are made public, these potential contestations may have a harmful effect on the participants within their working environment and thus the way that these results are reported must be considered very carefully before they are disseminated.

Ethical approval was sought and granted from the School of Education at the University of Stirling. The ethical principles and codes of conduct as dictated by the *Stirling Code of Good Research Practice* (University of Stirling 2014) were adhered to so as to accomplish ethical research that is of high quality that protects all of the individuals involved while maintaining the integrity of the research in its reporting. The next chapter will provide such a report, by presenting a summary of the data analysis and key findings of the research, discussed in relation to the research questions.

# Chapter 4      Fieldwork and Findings

## Immediate Life Support Course

For the delivery of the immediate life support component of clinical skills training for student nurses, high-fidelity mannequins are used exclusively to demonstrate immediate life skills techniques, such as resuscitation and defibrillation, and for the students to practice the skills they are learning. By the end of the course, the students must demonstrate that they are able to work as a team to start cardiopulmonary resuscitation (CPR) in the clinical setting, achieving proficient life support skills that include “good quality chest compressions and ventilation with minimal interruption, and early safe defibrillation” (Resuscitation Council (UK) 2011, p. iii). They are given a copy of the manual a few weeks before they take the course and are expected to be familiar with it. The course lasts for one full day, and the day takes the form of a combination of two short classroom sessions as an introduction to the practical content of the course, which is to demonstrate skills in immediate life support in the simulated ward environment. Table 2 provides an outline of the programme of the day and the content that the course covers.

**Table 2: Immediate Life Skills course outline**

<b>Session</b>	<b>Content</b>
Morning classroom session – Introduction and summary of upcoming skills sessions	<ul style="list-style-type: none"><li>• Human factors and quality in resuscitation</li><li>• Recognition of the deteriorating patient and prevention of cardiopulmonary arrest</li><li>• In-hospital resuscitation</li><li>• Advanced life support algorithm</li></ul>
Morning clinical skills lab session – two scenarios	
Afternoon classroom session – DVD presentation and summary of upcoming skills sessions	<ul style="list-style-type: none"><li>• Airway management and ventilation</li><li>• Monitoring and recognition of cardiac arrest rhythms</li><li>• Defibrillation</li><li>• Post-resuscitation care</li></ul>
Afternoon clinical skills lab sessions – four scenarios	
Final classroom session	<ul style="list-style-type: none"><li>• De-brief and questions</li><li>• Summing up and feedback</li><li>• Course evaluation form</li></ul>

### *Setting and participants*

The course was taught by four nursing lecturers who are certified by the Resuscitation Council to teach the course, but who are also clinical skills teaching fellows employed permanently by the university (3 men and 1 woman, aged between 42 and 57 years). For the clinical skills lab sessions, the students were divided into four groups of up to a maximum of six students. The sessions took place in the simulated ward setting; three rooms with four high-fidelity mannequins lying in hospital beds, set up with their software programs ready to run (see Figure 2). The four lecturers worked individually at the four mannequins, and the groups of students rotated between the four stations. There are a total of six simulated scenarios, so each lecturer will instruct each group of students at least once. In the afternoon, the students first meet in the classroom to watch a DVD presentation, produced by Resuscitation Council, demonstrating the same skills they will be practising in the afternoon sessions. Over the four days, a total of 80 students participated in the course: day one,  $n=24$  (23 women, 1 man); day two,  $n=22$  (19 women, 3 men); day three,  $n=18$  (13 women, 5 men; and day four,  $n=16$  (14 women, 2 men).



**Figure 2: The simulated ward setting**



## **Observations – emerging themes**

In the clinical skills sessions, I was initially struck by the tempo and pace of the activities and the rate at which the students must grasp how they should relate to the materialities in the space, some of which will look familiar to them, but that they will not always have had the chance to use, or even to have seen being used in previous practice placements. They are tentative at first, seemingly waiting for permission to touch and use the equipment, but the lecturers encourage them to do so, all the while reinforcing that this is not a “real” situation. During the course of the day, the lecturers demonstrate great agility in coping with multiple roles and functions at once: teaching, assessing, demonstrating, performing, improvising and providing feedback in a dynamic and fluid space filled with myriad “things”. Over the course of my observations, several key themes emerged that were repeated and reinforced throughout the week, and each of these themes seemed to have an equal and opposite double that comingled simultaneously throughout each of the sessions. In turn, each of these themes interconnected with an ever-present element of a “disturbance of the familiar” (Bennett and Royle 1999, p. 36) in this teaching space; a central theme of the uncanny that haunts these assemblages as the learning is mobilised.

### ***The familiar and the unfamiliar***

The simulated ward is set up to look as realistic as possible, with each mannequin lying in a hospital bed, as a patient would be, covered by a sheet and blanket. The rooms are equipped with bedside tables, chairs, trolley tables, privacy curtains, observation lamps, oxygen and air valves and emergency trolleys with the equipment needed for emergency resuscitation situations. Here is the first encounter with the uncanny: the simulated ward looks exactly like any ward in any Scottish hospital that would already be familiar to these students. However, the presence of the mannequins, the shift in the intended purpose of that space, combined with its simulated equipment, makes it an uncanny space; “the familiar made somehow new and unfamiliar” (Turkle 2005, p. 290). It appears to be a familiar hospital ward, but it is somehow an uncanny double, strangely unfamiliar. The students seem to be aware of the strangeness of the simulated space and often ask questions about the authenticity of the equipment:

*Is it real oxygen?* (Student)

*No, it's just air, it would be a fire hazard if we used real oxygen in here.* (P2, Session 2)

*Is it real morphine in the drawer?* (Student)

*No, it's pretend pretend morphine.* (P2, Session 2)

At first, many of the students found it difficult to relate to SimMan<sup>®</sup> as a “real” patient and were visibly disturbed when asked to interact with the mannequin. The lecturers often dealt with this by accentuating how far removed the situation is from the “real” clinical situation, drawing attention to its uncanniness in order to reduce these feelings of unfamiliarity. This in itself is an example of duality.

*He's disgusting.* (Student)

*It all feels a bit unreal, but it will feel real later, I promise.* (P3, Session 1)

*You're not going to hurt him, he is only plastic.* (P3, Session 3)

As the sessions progress, the students become more and more comfortable with the uncanniness of the situation and begin to relax and feel more comfortable speaking to SimMan<sup>®</sup>, apologising directly to the mannequin if they accidentally knock against him or if they let his arms or legs fall off the side of the bed during treatment.



**Figure 3: The students begin to relate to SimMan<sup>®</sup> as a “real” person**

### *The real and the simulated*

Each of the lecturers constantly reinforced the idea that SimMan<sup>®</sup> is not a real person, but at the same time, encouraged the students to pretend that he is, and that they must treat him as though he were, straddling the opposing ideas that the simulation is not authentic, but that what they are learning is genuinely serious.

*You need to do this right – this is people’s life here. (P1, Session 2)*

In addition, the lecturers constantly remind the students that what they are doing is not real, but what it might be like if it were.

*It feels a bit artificial and a bit odd, but that’s because Jim here is a lump of plastic. But I guarantee, by the end of the day you will be doing everything in your power to help a lump of plastic. If you can help a lump of plastic, you can help a real person. (P3, Session 1)*

This reminder of the real and the simulated extends to the reinforcement of basic clinical skills that are excluded from the simulation. For example, when the lecturers demonstrate intimate procedures, such as inserting a cannula into the airway, they are not wearing gloves, but they often remind the students what should be happening in “real life”:

*Of course, you’d have your gloves on. (P3, Session 3)*

By drawing attention to the exclusion of these things that are integral to safe clinical practice in “real life”, the lecturers both reinforce the element of simulation while at the same time emphasise the “real” importance of cleanliness.

The students constantly ask questions with regards to how close the simulation is to “real life”:

*What happens to the patient in real life? (Student, Session 1)*

Often they express anxiety about how they might cope with the same situation in future practice or reassure their peers that they performed appropriately in the past:

*I hope this doesn’t happen in real life. (Student, Session 2)*

*I'm not like that with my own patients, don't worry, I'm not like that in real life.*" (Student, Session 3)

This continual acknowledgement by the lecturers that these assemblages are not "real" conveys a collective sense of performance; the students are aware that their actions are "pretend" and that they take place in a "pretend" space. The lecturers also constantly shift between the idea that what they are doing is not "real" and reinforcing that the magnitude of what they are rehearsing has consequences in "real life". This doubling of the real contributes even more to the uncanniness of the simulated learning experience.

### ***Real experiences and imagined experiences***

While the nursing lecturers continuously draw on their own "real" experiences to support each scenario, at the same time, they ask students to describe a situation from their previous placement experiences, incorporating these previous "real" experiences into the "imagined" experience of the simulation. This technique adds an additional layer of familiarity to the lessons, making the unfamiliarity of simulation seem more familiar. All of the nursing lecturers use this technique, often asking, "Who has done this before?" or "Has this happened to anyone on placement?" and getting the students to share their experiences with the others. Drawing on the real experiences of the students and comingling them within the imagined assemblage of the simulated ward affords the students the confidence to ask questions about what would happen in "real life", providing the opportunity for them to question uncertainties they may not have resolved during practice placements. The lecturers employ this hybridity to significant effect, allowing these conversations to take place in a learning environment where "real life" can be paused without causing any harm or making the student feel embarrassed, while at the same time providing them with imagined experiences to take forward into future practice.

This theme is linked quite closely to the real and imagined experiences of the simulation itself. In combining the previous "real" experiences of lecturers and students, and fusing them with the imagined experiences of the simulated ward, the students begin to lose the disturbing feelings of the unfamiliar and begin to accept the uncanniness of the materialities of these assemblages and work with them. This is

demonstrated in the shift in students' attitudes towards the mannequins as the day progresses, from describing SimMan® as “scary” and “disgusting”, to forming emotional bonds with the imagined patient. For example, one of the scenarios always involves a situation where the patient cannot be saved. The team of students must decide amongst themselves when the very invasive treatment is no longer working and are faced with the decision of whether to stop CPR. The purpose of this scenario is to make the students work as a team to make a serious ethical decision and to feel comfortable in voicing their reasons for making that decision. The results were often quite emotive and some of the students expressed real grief in relation to the scenario.

*I feel guilty – you're the first one we've lost.* (Student, Session 4)

*So this is just – natural.* (Student, Session 4)

*It's no dummy, that's a real person.* (Student, Session 3)

Some of the students became emotional when their “patient” “died” and they began to cry, showing how quickly they had moved from being disturbed by the unfamiliar to having genuine consideration for the familiar “lump of plastic” that is SimMan®.



**Figure 4:** The lecturer uses commands on a tablet and her own voice to “perform” the role of the patient

### *The human and the non-human*

At the beginning of the defibrillation scenario, the lecturer describes what the students will be doing, and displays different cardiac rhythms on the electrocardiogram (ECG) monitor connected to the mannequin. They are asked to recognise abnormal rhythms to determine those associated with cardiac arrest, and identify those abnormal rhythms that are “shockable” by defibrillation and those that are not. Afterwards, they turn back towards the mannequin, and the lecturer provides some background to the patient and the scenario in front of them and, providing the voice of the patient, complains of having chest pains and feeling unwell. Immediately the students gather round the monitor to determine what sort of cardiac rhythm the patient is experiencing. The point the lecturer is making here, however, is to show the students that they have missed out an important step: they know that simple ECG monitoring will not always reliably detect cardiac ischaemia (restriction in blood supply) and have been taught that their first action should be to treat the patient, not the ECG. The lecturer has purposely selected a cardiac rhythm that is ambiguous and difficult for the students to decipher so that they might examine the patient first. In all of the group scenarios, the students continue to cluster around the monitor, discussing the patterns on the ECG, ignoring the simulated human in favour of the non-human technology. Eventually, the lecturer points out that the mannequin has stopped breathing, and the students are quick to realise that they have not been following the correct order of the resuscitation algorithm; to first speak to the patient and determine their condition while checking the airway for obstructions.

*That patient will tell you 100 times more than that monitor. (P1, Session 3)*

In the simulated space, it is not clear whether the students would have missed this step in a real ward situation, but here the lecturer has manipulated their relationship with the “human” patient and the non-human, technological actors in this space so that they do not prioritise the technological over the human, but work together with both the human and the non-human to resolve the issue.



**Figure 5: The students employ a hybridity of the human and the non-human**

This method of teaching actually recalls the principles of ANT: while the students are taught that their patient (the human) must take priority over the technology (the non-human), in fact, they must employ both elements in symmetry, giving equal importance to both their own (human) interpretations of the human symptoms and the usefulness of the technology (non-human) in the space, in order to bring about effective practice learning. This duality is demonstrated clearly by one lecturer who merged the two contrasting ideas in one point during the scenario:

*Spend time looking at the patient. Think of their humanity. Use your own perceptions and observation skills. Use the technology. (P4, Session 1)*

In the simulated ward space, this duality is again doubled, because here, the human is represented by a simulated human, a non-human. Moreover, in each of these themes there are multiple dualities, adding layer upon layer to the assemblages presented in this network. These observations informed the development of the interview schedule, the findings of which will be discussed in the next section.

## **Interviews with nursing educators**

### ***Participants***

Each of the four nursing lecturers who delivered the Immediate Life Skills course participated in individual interviews. Each lecturer had first qualified as a nurse in adult nursing, but one participant had also later trained as a mental health nurse and possesses dual qualifications. Each of them had had a variety of experiences in multiple clinical settings before specialising in one or several fields: intensive care; cardiology; accident and emergency; hospital chest unit; medical high-dependency unit; and trauma and elective orthopaedics. Each of them had arrived in their teaching positions through a combination of demonstrating excellent clinical skills at work and a propensity towards teaching or being a good teacher in either their working environment or their hobbies or both. All of them are qualified instructors, certified by the Resuscitation Council (UK) to teach the Immediate Life Skills Course (along with other life support courses), and, in addition, two are qualified to teach the instructor courses for these courses. They must keep their qualifications up to date, teaching at least two ILS courses per year, and they must take a refresher course to re-validate their certification every four years.

### **Interview findings and analysis**

I began each interview by introducing the research project and giving a brief overview of the topics to be discussed and confirming the lecturers' consent to take part in the interview and for it to be recorded. I explained that it would take the form of a conversation and that I would introduce topics in the form of questions, but that I wanted them to expand as much as possible on each topic. The interviews had a very relaxed quality to them and it is evident in the transcriptions that the participants provided most of the discussion with very few prompts from me. Three of the interviews were about an hour in length, and one lasted 30 minutes.

During the analysis process, it became evident that the lecturers supported each emerging theme identified in the observations with detailed descriptions of the same connections and assemblages that I had recorded. In attempting to not prioritise these themes, I re-read the transcripts several times while listening to the recordings to



determine whether I had missed out on any subtleties and nuances in the narrative that did not fit with the themes identified in the observations, but as I became closer to the data, I realised that the lecturers' accounts of the sociomaterial assemblages I had encountered provided a mirror in which these themes were reflected and brought into focus. Additionally, further subtle connections between the actors in the simulation learning space that I had not appreciated in the observations also came into focus in the interviews. This uncanny matching and doubling of the two datasets warrants the presentation of the findings in tandem.

### ***The purpose of the simulation – the familiar***

When asked about the purpose of simulation in nursing education, bringing a sense of familiarity to the scenarios was highlighted by all of the lecturers:

*I think there is a number of purposes, I think, one, is, the demonstration of a particular skill, so you could actually do a skill, and, on a passive dummy, before you go in real practice, um, eh, therefore getting familiar with the equipment, because that's a lot of the time, you know, putting a cannula in, or taking blood from, you know, a patient with venepuncture and that, they know the skill, but it's just getting used to the proper syringes, the proper needles, connecting them up etcetera, and putting it in and feeling the give and sort of thing, into the vein, um, I'm not saying it's exactly 100 percent the same as putting it in a patient, but it gives them the eh ... thing, so, I think familiarisation. (P1, Interview)*

Here the purpose of the simulation is to make the unfamiliar familiar; the lecturers use the uncanny simulation space to create a hybridity of skills. They already know the skill, but the simulation provides the space in which they can become familiar with the non-human artefacts and take these new hybridities into the realm of real humans. The theme of familiarity was also closely related to clinical competence, and was given as an example of why simulated learning was effective:

*I think probably because we all like familiarity. I am quite interested in some of the human factors and decision-making elements in our practice, and from a human factors perspective, it's been proven that, regardless of competency level of staff in one area, if you take them out of their area, they will not perform to the same level in an area they are unfamiliar with, and little wonder there are mistakes and errors and, em, harm. So, knowing what I know from that aspect, and a little bit about how people work, people like familiarity. (P2, Interview)*

It is interesting to note that the lecturer described the simulation as “familiar”; that in enacting the simulation in an unfamiliar space can make the “real” clinical space more familiar, and also, that these are related to “human factors”.

### ***The benefits of simulation – the real and the imagined***

All of the lecturers spoke about the benefit of allowing the students to practise their clinical skills in a safe environment, but another facet to the element of safety was that the simulation provided a safe space in which the students could grapple with the anxieties that they may have experienced while out on placement. This is something that all of the lecturers also spoke about; reinforcing the idea that simulation is a safe place where real experiences of the past can be tackled and conveyed forward into the imagined future experiences of practice, as was identified in the observations.

*I think because it's simulated and it's safe, and it also stimulates their memories of something that's happened in practice that they maybe struggled with a little bit, and they've forgotten about it because they're back in class, but this kind of brings it back to them. (P3, Interview)*

This example is particularly poignant because it encompasses elements of the mobilisation of learning represented in the movement of experiences from past to present while capitalising on the familiarity of memory.

### ***The challenges of using simulation – the real and the simulated***

In relation to the challenges associated with using simulation, all of the lecturers first described that the potential of the technology to fail was one of the biggest. However, after a second probe of the question, the lecturers linked these challenges to the reality of the mannequins, and explained that they overcame any shortcomings in fidelity by making the simulated more real.

*If it's not done correctly, people could assume that when you stick a catheter into a plastic dummy that's going to be exactly the same as a real patient, and obviously the plastic dummy doesn't moan or groan, or whatever, or complain, so I think it has to be that – it has to be – the whole scenario, the whole training, has to be in such a way that it's realistic. (P1, Interview)*

Another lecturer described how these challenges can be overcome by anchoring the scenario firmly in the past experiences of the student's practice placement, another strategy that was very prominent in the observations.

*Int: Can you explain why using the scenario makes a difference? Can you explain what kind of difference it makes?*

*P1: I think it just makes the difference that it's real to them, instead of it's just a skill, and, you could actually, you know, and again, you could adapt it to their area, so, if the student is just back from a three – a placement in, eh, for example, theatres, you will say, "Right, this patient is just post-op, eh, still very sedated," eh, you know, "Is recovering from the anaesthetic," and then you could give a wee scenario around that, or you could – somebody who had been in a, you know, a medical ward, so they could have a patient who's had an overdose of drugs, or whatever, so you could relate it to where they've been, and if they can relate it to then, then it's more real for them, and they take on board better, I think.*

### ***The value of simulation – the human and the non-human***

Interestingly, the lecturers all placed value on the non-human "lump of plastic" within the assemblage, but closely related to its currency in the network was its uncanniness. Beyond this connection, however, is the balance that the lecturers must effect in order to achieve thy hybridity that is so effective; working with the uncanny non-human to link these simulated assemblages to the reality of the real human world of clinical practice.

*But often, it's that suspension of belief, or disbelief, should I say, an engagement in the belief that they are treating a real patient, that we have to do, and if we make it too techy, it actually turns them off altogether, it's keeping it related to reality. And I think that comes from clinical experience and the experience of working with people. (P2, Interview)*

In discussing the benefits of simulation, one lecturer directly related the use of the mannequin to the simulation of a very human element of nursing; touch. He explains how the use of this non-human technology actually facilitates learning about the human:

*So, if they have to say, "Right, feel the pulse," then they've got to touch the patient, because nursing is a feely-touchy eh, occupation, and we need to touch our patients, em, and I think gives them – and I think the other thing is that*

*sometimes, if you look at students, they start getting so concerned with the technology, so they're looking at the monitors, etcetera, and they go, "What does that little squiggly line mean?" and they don't look at the patient. And the patient will tell them far more about themselves than that squiggly line on the monitor. So, yeah, touching the patients is quite good, yeah. (P1, Interview)*

This example supports the observation that the lecturers use the uncanniness of SimMan® so that the students learn quickly not to prioritise the non-human elements over the human.

### ***Mobility, movement and familiar routes***

One theme that was particularly prominent within the interviews was the notion of travelling between the realms of practice education. One lecturer spoke metaphorically about the students' practice placements as "where they had been" (P2) and that, in the simulated assemblage, they "can go back there" (P2); effectively, simulation allows them to occupy the two worlds at once. In this example, the lecturer provides an interesting juxtaposition of the human and the non-human things in relation to the mobilisation of learning: it is the uncanny comingling of the familiar with the non-familiar that brings purpose to the simulated learning space.

*Rather than using every facility that SimMan has, striking a balance between me giving some cues in terms of role playing, the patient's voice, "Oh, I've got chest pain," "Oh, I feel breathless," whatever the symptom happens to be, but putting them in their own context, and we find that if you contextualise the scenarios, it often leads to a better performance from the candidate, because they're automatically relating to something that they have experienced and they can go back there, and they can see, yeah, I know where I am in terms of an environment, I know what's available, I know my way around, rather than it being a completely alien experience. (P2, Interview)*

But it is the lecturers themselves who facilitate these imagined journeys, guiding the students between their past experiences of practice, to present experiences of simulation, and projecting forward into future practical experiences, and, importantly, they use the uncanny as a vessel in which to convey the students between these worlds. In addition to this, the simulation becomes a space in which the non-human things overlap with the human, and the authenticity of the simulation is not central to the learning experience; in fact, the opposite is true. As one lecturer points out, the

technological aspects of the simulated learning are most effective when they are not prioritised:

*If we make it too techy, it actually turns them off altogether, it's keeping it related to reality. And I think that comes from clinical experience and the experience of working with people. You get to know a little bit about where you can go and where you can't go. (P2, Interview)*

It is this hybridity, then, of the human and the non-human actors within this space that provides the creativity with which the students can confidently traverse from one realm to the other. The lecturers act as the catalyst, providing a way of linking the real with the simulated, the past experiences with the future imagined experiences, forming the connections in this network that make it effective.

*I think it's more guiding, em, I would say, my role, we're kind of guiding them to the realisation that they do know this stuff, it's just they might be a little bit hesitant about putting it into practice. Now, I know the environment that we're in is a very artificial, because there will be mentors and there will be personalities, and there'll be all that stuff out in the real world, and we sometimes can bring a little bit of that in a well, but only when it's kind of safe to do so. (P3, Interview)*

These assemblages nurture a certain fluidity; a mobility of learning that permits movement between the dimensions of practice learning, simulated practice, and back again. Each of the lecturers remarked how using simulation creates a “different” way of learning. This uncanny and “different” way of learning seems to project this mobility back and forth between these dimensions, but again, allows the student to retain the learning experience from each to take forward, beyond the simulated event, into an imagined future.

*I think it's a very – it's different. It's another way of learning. And, personally, I think the learning from simulation goes way beyond the actual event, or the em, debrief or feedback session, because it's a lived experience, if you like, for the student, em, rather than say, a lecture, or reading information from a book, em, because their lived experience runs much longer and is – students can reflect more and unpick things, make sense of things, and the sense that comes out of their reflection will change as time goes by, because they – initially it can be very emotive, and part of the skill is the facilitator in the debrief to actually ensure that there is a positiveness taken away, and over time, that becomes what they reflect on. (P4, Interview)*

Again, this lecturer relates the simulated learning as a conduit for experiences, past and future, real and imagined. These learning mobilisations are, uncannily, like SimMan®; *like* practice learning, only “different”.

The analysis of the observations and subsequent interviews provided a rich foundation on which to take forward these multiple themes of duality, hybridity and the uncanny. In keeping with the idea of multiplicity of space, movement and symmetry, these findings will be discussed in relation to the research questions and the literature supporting these concepts.

# Chapter 5 Discussion

In the simulation sessions, the learning space is permeated with duality, multiplicity, hybridity and paradox. For example, the very first topic to be discussed in the course is “the role of human factors in resuscitation” (Resuscitation Council (UK) 2011, p. 1). The lecturers reinforce the importance of the human, non-technical skills, such as the “cognitive, social and personal resource skills” (Resuscitation Council (UK) 2011, p. 1) that make up the elements of situational awareness, decision-making, communication and teamwork that are deemed to be critical to nursing practice. They constantly remind the students to spend time looking at the patient’s humanity, reinforcing the idea that they must use their own perceptions and observation skills. Paradoxically, all of this *human* learning is mobilised in a simulated, *non-human* space. This juxtaposition of the significance of the human alongside the agency of the simulated human creates an uncanny double.

This uncanniness of the simulated experience is doubly uncanny in this learning space; SimMan<sup>®</sup> resembles a human, but he is not quite human. He lies in the bed, inanimate, but can be given attributes of life to become animated. He is a bit like a zombie – alive, but at the same time, not alive. The students are disturbed by his uncanniness, but, over a very short period of time, the unfamiliar become strangely familiar, and they venture confidently into the “uncanny valley”. The notion of the uncanny valley was posited in 1970 by Masahiro Mori, a roboticist who developed an algorithm to show that the simulated human form is inherently disturbing when it ventures too close to being real, and that by making sure that robots and other simulated humans are more cartoon-like, simulation technology can avoid the disturbing feelings that are often associated with humanoid technology (Mori 2012). The implications of the uncanny valley have been presented in relation to high-fidelity mannequins in nursing education by Roberts and Roberts (2014), who explore how new developments in making simulated patients more realistic may have implications for the issue of authenticity in simulating practice learning in nursing education. However, the findings of my research suggest that the authenticity of the simulation is not the central concern; instead, in a process of hybridisation, the lecturers make use of this uncanniness by forming connections

between past experiences to effect a sort of *créolisation* in order to mobilise learning. In French postcolonial thought, the hybrid conditions that were created by the comingling and overlapping of multiple cultures in the colonial space eventually eroded the dominant imperialist paradigm, replacing it with a more “authentic” creative freedom that has come to be called *créolité* (Gallagher 2009, p. 41). In the same way, the nursing lecturers, in the overlapping realms of practice learning, simulated learning and the clinical world, mingle cultural elements from each of these domains and employ the uncanniness of simulation as a catalyst to form this hybrid network of learning.

Dunnington (2014) is one of the first to heed calls to adopt a more critical position and considers simulation in nursing education from a philosophical perspective. Drawing on Baudrillard’s (1983) paradox of simulation, she writes that the danger in the uncanny valley lies when “simulation may produce its own reality while representing something different and diminished from the original that may persist as the dominant perception in the mind of the participant” (Dunnington 2014, p. 17). The nurse lecturers in my research alluded to the challenges of simulation being too far removed from reality. While Dunnington warns that “departures from or misrepresentations of the real phenomenon may become the actual phenomena understood and retained” (2014, p. 16), the findings of this study contest this position. It might be argued instead that the re-creations of reality in these simulation assemblages are not misrepresented; by drawing from their own experiences, and those of the students, the lecturers create a hybrid authenticity; by inverting the “contamination” of simulated reality and working with it, the reinforcement of the uncanny elements of this particular pedagogy actually aids in facilitating a more realistic representation. This act, in itself, is uncanny.

In reinforcing that this learning space is simulated, the lecturers prioritise the *human* skills of situational awareness, decision-making, working as a team and being able to multi-task. At the same time, they mobilise this learning by enacting these skills in their connections with the things that are *non-human*. This creates an interesting paradox: simulated learning is designed to mobilise practical clinical skills in a space that would seem to prioritise the non-human actors, that is, SimMan<sup>®</sup>, however, by drawing attention to the uncanny non-human element of this assemblage, the lecturers instead prioritise the human. Just as SimMan<sup>®</sup> represents a doubling of both the human



and non-human in the practice learning sphere, in using SimMan® in their pedagogies, the nursing lecturers address both the human and non-human in practice learning.

For the delivery of the immediate life support component of clinical skills training for student nurses, there is very little scope for change in the programme in terms of delivery and teaching, as it is a programme validated by the Resuscitation Council (UK). The nursing lecturers must work within the confines of the guidelines of the Resuscitation Council, but they do employ an element of creative freedom, or *créolité*, in how they fill the sessions with theatre, performance, and the imaginings of their own past experiences and by linking the uncanniness of the simulated learning experience with the looming reality that the students will face.

Writing about teacher education, Britzman (2006) writes about how Wilfred Bion, a psychoanalyst, argued that there is “a hatred of learning from experience”. “Oddly,” Britzman writes, “this hatred emerges from the need for security that scaffolds basic assumptions which protect the group from the insecurity of experience” (2006, p. 8). Britzman argues that teacher education cannot exist without “creating the conditions to tolerate and value the uncertainty of development as a strange and even alienating resource for understanding the great conflicts our field absorbs, creates, and lives within” (Britzman 2006, p. 2–3). In the same way, the nurse lecturers also address this need for security to protect the students from the alien and uncanny uncertainty of working in the real world: they also tolerate and value the uncertainty of simulated learning to embrace and engage with its strangeness, employing it, despite its alienating features, to perform this act of “scaffolding” between the simulated and the real experience. Practice learning education, then, just as teacher education, is also an uncanny act. Hopwood and colleagues (2014) have also suggested this notion of simulation as scaffolding and suggest that simulated nursing education acts as a supporting bridge between practice learning and the world of work:

*When those actors described uncertainty in or unfamiliarity of the task, tutors encouraged students to make use of opportunities to learn by watching others in their ‘real’ work settings. These realities were not a distant spectre for these students, whose graduation lay only weeks away. Scaffolding and debriefed appropriately, observing students can embody their future professional selves as observers in work. (2014, p. 12)*

These findings are similar to those of my own research: simulated learning acts as a conduit for experiences, past and future, real and imagined, and provides a similar function as scaffolding, as this lecturer describes:

*I mean, I deeply enjoy both sides of what I do, and I think I'm very privileged to be able to experience and learn, myself, through working on both sides of the camp. I mean, there's – there's always so much focus on this theory-practice gap, nursing education and nursing practice is obsessed by this. And yet, we kind of self-perpetuate it by taking university route of education, and moving the students further away from the wards, so I – I kind of see myself, in a way, in a very, very small way, as helping bridge that, in a very small way, I have to say, yet again. (P2, Interview)*

As Hopwood and his colleagues suggest, “through the use of simulations, students might be supported to direct attention and develop a nuanced professional gaze that renders their work environments more pedagogically rich” (2014, p. 12). In the findings of my research, it is the hybridity of these experiences in the simulated space comingled with the uncanny that enriches the enacted pedagogy.

Each of us is familiar with the idea of the uncanny, but it can best be described as a “comingling of the familiar and unfamiliar” (Royle 2003, p. 1), or the existence of the strange and the familiar at the same time. The idea of the uncanny is quite prominent in postcolonial thought and literary theory, but I would argue that, in this case, understanding the use of simulation in nursing education as being uncanny might help to uncover how this network operates. The nursing lecturers use the uncanny SimMan<sup>®</sup> to adapt and hybridise their own familiarities to make the unfamiliar become strangely familiar to the students. In bringing these familiarities to light, the very act of teaching with such methods of simulation is also itself an uncanny act.

Royle writes that:

*Uncanniness entails a sense of uncertainty and suspense, how ever momentary and unstable. As such it is often to be associated with an experience of the threshold, liminality, margins, borders, frontiers. (Royle 2003, Preface)*

Here the mannequins represent the uncanny double of the human patient, while the lesson represents the uncanny double of those events that the students may encounter in “real life”. The lecturers use the familiar by drawing on their own experiences, making

it strangely familiar to the students, who will take that uncanniness forward into their “real life” situations. At the same time, the lecturers draw on those experiences that the students may already be familiar with, creating a double of those experiences and comingling them with their own. This layered, multiple doubling all takes place within the momentarily unstable space of the clinical skills lab, on the margin of clinical practice and at the threshold of their working lives. The lecturers seem to draw strength from this duality, allowing them to occupy the space where the real overlaps with the simulated (imaginary); acting as navigators to guide the students from one sphere to the other.

Because these students are perceived as being on the threshold of moving from the learning sphere into the working (practice) sphere, they are actually assisted by this element of uncanniness. By performing the double of both creating and at the same time debunking the myth of simulation, the nurse lecturers guide the students through the uncanny landscape, to make the strangely unfamiliar, strangely familiar. In this way, the nurse lecturers go beyond the practice theory gap to provide a space in which the students can rehearse the performances they will be expected to give on “the other side”.

## Chapter 6 Conclusion

While the application of high-fidelity mannequins in nursing education has been routinely promoted as an effective pedagogy, little research to date has considered how the nursing educators negotiate these navigations of the practice learning sphere. Moreover, the application of high-fidelity simulation as a nursing pedagogy continues to be accepted without adequate exploration and debate of the efficacy of its theoretical underpinnings (Berragan 2011; Bligh and Bleakley 2006; Bradley and Postlethwaite 2003; Caplan et al. 2014; Hopwood et al. 2014). Recently, there have been calls for more research to examine this pedagogy from a more critical perspective (Miller and Bull 2013) and to develop new theoretical approaches to provide new insights into this complex and dynamic teaching tool, such as those offered by a sociomaterial approach (Ahn et al. 2015; Fenwick and Abrandt Dahlgren 2015; Hopwood et al. 2014). Furthermore, and most importantly, there is a distinct gap in the literature in relation to the purpose of simulation in nursing education, and in relation to this issue, the voice of the nursing educator has yet to be heard. This research project has attempted to address this gap by tracing the connections and unravelling the particular assemblages of the use of high-fidelity mannequins in nursing education so as to examine how practice learning is mobilised within this sociomaterial network. It has achieved this by following the principles of ANT in adopting an ethnographic approach and by including the perceptions of nursing lecturers who are engaged closely in employing simulation in practice learning. Importantly, despite doing so in a very small way, it is the first study to perform a critical examination of this network by exploring the sociomaterial assemblages of this particular pedagogy through a postcolonial lens.

In postcolonial thought, the space of the colonised, where *créolité* is enacted, is considered to be uncanny: the new culture is a simulated double of the imperial centre; but, because of its hybridity, it seems familiar, but at the same time, strangely unfamiliar. Similarly, just as SimMan<sup>®</sup> is an example of the uncanny, so is the network of simulation as nursing pedagogy. This study found that the lecturers, using the materialities of that space, hybridise the overlapping elements of past, present and future experiences in what might be considered a sort of *créolité*, incorporating “both

the look back and the look forward” (Turkle 2005, p. 290) of the uncanny to mobilise practice learning. This hybridity serves as a scaffold to go beyond the practice-theory gap and build strong connections between the real and the imagined to reinforce the mobilisation of practice learning.

Perhaps the most significant contribution of this research is that it has responded to the gaps in the research, showing how adopting a critical approach can open up new possibilities in understanding the pedagogy of simulation in nursing education. At the same time, it has demonstrated the effectiveness of ANT in examining these types of assemblages. ANT is also a hybrid; borne of a marriage of French philosophy and semiotics and its strange bedfellow, the constructivist sociology of knowledge. It is described as “a contradictory combination of the two methodological concepts anchored to its history” (Miettinen 1999, p. 172). Akin to postcolonial thought, in its hybridity lies its effectiveness to afford equal significance to every facet of the network, subject or object, human or non-human, promoting ways in which to challenge the assumptions of how knowledge is produced and professional learning is constructed, establishing a more critical and equitable platform on which to build new understanding. Another contribution of this research study is that it has also responded to calls for this research topic to be informed less by the dominant positivist paradigm (Bland et al. 2011; Bradley and Postlethwaite 2003; Cant and Cooper 2010; McGaghie et al. 2011). It might be inferred that this uncanny doubling of the methodology, like the use of simulation in nursing education, creates a space in which these understandings are formed and conveyed between two contested paradigms. Just as ANT attempts to provide a scaffold between the divides of positive and interpretivist thought, high-fidelity simulation endeavours to provide a conduit to *suture* the practice-theory gap in nursing education.

This research study has demonstrated the effectiveness of ANT for exploring the “material arrangements and how these contribute to the emergence of knowing/learning” (Ahn et al. 2015, p. 2) in the way in which the lecturers confirmed the findings of the observations in their interviews. Interestingly, in an uncanny way, the participants in this study attribute the same benefits to the use of simulation in their teaching practices as I observed in adopting an ANT approach to my research. As one illustrates:

*I think anybody that teaches nurses should expose themselves to using simulation in some way. It might not be the way we've used it, but they might learn something themselves, and in doing so, it might open up a new way of getting that knowledge across to people. So I would encourage any person who teaches nurses to get involved in simulation in some way or another. (P3, Interview)*

## **Strengths and Limitations**

One of the weaknesses of this research is that it focused on one course in one nursing school and that it included a small sample of participants who are known to me as colleagues. For these reasons it is not possible to generalise the findings or to easily duplicate the results within another context. However, many of the key themes and ideas that emerged within the observations were supported by the findings from the in-depth interviews with the lecturers. The key findings were summarised and presented to the participants to verify the authenticity of the inferences that have so far been made, without contest. It is possible, then, that these findings are not robust enough to effect confident recommendations, however, there are numerous inferences that can be made in relation to the findings and the way they have been analysed.

Despite these obvious weaknesses, the research does have strengths. The research process was conducted with great consideration to ethical and methodological issues. A reflexive attitude to the research was adopted and great care was taken to consider the effects of the act of researching on the research itself. This allowed for greater exploration of the data and for more in-depth analysis of the findings and, in this process of rigour and diligence, the reliability of the findings are made more credible. In addition, the agreement between the findings of the observations and those in the interviews, indicate that the results are significant and relevant to the research topic.

## **Future Research**

Given the prominence of multiplicity, movement and the uncanny within the findings, there is the potential to explore the issues in this research further from a postcolonial perspective, particularly in relation to the diasporic movement of the students between realms of practice placement, simulated learning and professional practice. In addition, these themes might be further explored by replicating the hybridity of postcolonial and sociomaterial in exploring the idea of the lecturers as being *nomadic*; a concept familiar

to both philosophical positionings. There is also scope to expand the same methodology and research questions to a wider study sample or to compare between two similar settings.

Almost without exception, the literature highlights that the element of rehearsing clinical skills in a safe environment is the primary justification for employing high-fidelity simulation in nursing education. Indeed, the participants in this study also insisted that this is so. However, this research has also revealed that safety is a multi-faceted concept in simulated practice and suggests that there is more going on beneath this superficial, wholesale assumption. Other research has advocated for a deeper exploration of the implications of simulation as an effective pedagogy in a sociomaterial way (Ahn et al. 2015; Fenwick and Abrandt Dahlgren 2015; Ma 2015), and future research would benefit from considering the purpose of simulation in relation to safety by adopting such tools as ANT in these investigations. In addition, because nursing education occupies a less privileged position within the centripetal domain of medical simulation research, nursing education in particular would benefit from the exploration of each of these ideas in different, hybrid and symmetrical ways, ones in which these taken-for-granted assumptions are not prioritised, marginalising those “subtle, silent, unexpected and ambivalent” materialities and connections (Fenwick et al. 2011, p. 122).

In postcolonial thought, the idea of the postcolonial begins as soon as a place, a culture or a people are influenced by an external, dominating culture; everything else after that is postcolonial. Canada is a postcolonial nation, and, arguably, the Inuit of northern Canada are doubly postcolonial, occupying the positioning of the exotic other in the periphery of Canadian culture. The *inuksuit*, for thousands of years, have acted as simulated human beacons that convey knowledge and messages about “way-finding”, while “communicating stories about place” (Heyes 2002, p. 133), but their significance goes far beyond mere signposting. According to Inuit elders, they also served to align journeys at points where traditional Inuit trails intersect, conveying a sense of reassurance of familiar memories for “those who felt the need to ‘attach their thoughts’ to distant and familiar places” (Hallendy 2013). In the same way, this research project has found that the multiple, nomadic, transient and uncanny network of high-fidelity mannequins in nursing education also facilitates the mobilisation of practice education:

just as the *inuksuit* guide the Inuit across the land by assembling past and present memories to convey them into future landscapes, so do the nursing educators as they guide the nursing students into theirs.



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# Appendices

# Appendix 1: Project Information Sheet for Participants

Supporting Document 2: Participant Information Sheet

v3 01/05/2015

**Masters of Research  
in Educational  
Research Project**



**An exploration of knowing-in-practice: Actor-network theory and simulated patient pedagogies in nursing education**

## Participant Information Sheet

I would like to invite you to take part in a project that will look at the ways in which nursing educators deliver practice-based teaching skills using high-fidelity simulation (SimMan®). Before you decide whether or not you would like to take part, it is important that you understand why I am carrying out this project and exactly what will be involved if you agree. This information sheet should explain what I am doing and should answer any questions that you might have about the project. If there is anything at all that you are unsure of or if you want to find out more, please do ask me for more information.

### Who am I?

I am currently a student in the Master's in Education Research Programme at the University of Stirling who has been funded to complete a doctorate at the School of Education. My supervisor is Professor Tara Fenwick, Professor of Professional Education at the School of Education at the University of Stirling. I am not a nurse, but I do have a background in cancer care research and have a keen interest in nursing education. I have worked at the School of Health Sciences at the University of Stirling for the past ten years. I am completing this study as my Master's research project.

### What is the purpose of the project?

This project forms the backdrop to a doctoral study that aims to explore how nursing educators interpret and enact the curriculum. This study will use a theoretical framework that is relatively new to nursing, called 'actor-network theory'. It helps to show how various actors – such as students, teachers, curriculum and technology – become connected and change one another in learning activities. The aim of this master's project is to look at the challenges of using technology (specifically, SimMan®) in the nursing pedagogy from the lecturer's perspective. This will allow me to form a more comprehensive understanding of sociomaterial thought in general and of actor-network theory in particular while also allowing me to become more familiar with the environment in which nursing education is enacted and with the nursing curriculum. Very few studies have considered practice-based nursing education from this perspective and I am hoping that it will provide some interesting information about the challenges that nursing educators face and the strategies that they use to overcome them.

### Timeline

The project is due to be completed by the end of June, 2015, so I am hoping to perform interviews and make observations during the month of March, 2015.

### Research Questions

The project will consider these key questions:

- What is the purpose of doing the simulation? What do the educators think is valuable about using simulation as part of their pedagogy?
- What kinds of knowledge are being valued most?
- How do the educators link the key texts of the exercise (SimMan® and software) to the curriculum? What is important to them? What do they think is missing?

### Why have I been chosen to participate?

You have been chosen because you have been identified as a nursing educator who is closely involved with the delivery of practice-based nursing skills with the use of high-fidelity simulation equipment (SimMan®).

### Do I have to take part?

No, you do not have to take part in this project. If you do decide to participate, you will be given this information sheet to keep and will be asked to complete the Consent Form and post it or email a scanned copy back to me.

### What will I have to do?

If you are interested in taking part in this project you will be asked to take part in an interview. Because the project will also make use of observation to collect data, Aileen will observe your delivery of the SimMan® practical exercise as well as the following debrief session (if there is one). These interviews and observations will be recorded electronically to allow for the gathering of rich data and Aileen will transcribe them herself. Any audio or visual recordings will be securely stored on a password-protected server at the University of Stirling and all of the information will be anonymised. Manual notes and any printed transcriptions will be kept in a locked filing cabinet. If you decide not to take part, you can withdraw at any time without giving a reason.

### Has this project been reviewed by an ethics committee?

Yes, this project has been reviewed and approved by the Ethics Committee of the School of Education at the University of Stirling and no ethical objections were found to this study being carried out.

### What will happen to the results of the project?

The findings of this project will be reported in a dissertation that will be reviewed by my supervisor, Professor Tara Fenwick, and by two markers who are internal to the University. The dissertation may also be subject to an examination by reviewers external to the University. In addition, the findings may be presented within the School of Education here at the University of Stirling or wider, in academic journals or at conferences. A summary of the findings of the study will also be sent to all of the participants at the end of writing up the findings. Most importantly, it is hoped that the findings will form a platform that will help to inform and guide the progress of my proposed doctoral study. However, great care will be taken to make the reported data as anonymous as possible so that no individual can be identified by others in the writings of the findings.

**What happens next?**

If you agree to take part, Aileen will contact you to find a suitable time to chat on the telephone to discuss potential dates for her to interview you and to visit your campus to perform the interviews and observations.

**Who can I contact if I would like to speak to an independent advisor about the project?**

If you have any questions about the project, please contact Professor Tara Fenwick, Professor of Professional Education, School of Education, University of Stirling, Stirling FK9 4LA.

**Thank you for taking the time to read this information.**

# Appendix 2: Participant Consent Form

Supporting Document 1: Consent Form: Nursing Lecturers

v1 09/12/2014



## An exploration of knowing-in-practice: Actor-network theory and simulated patient pedagogies in nursing education

### Consent Form: Nursing Lecturers

Name of Researcher: \_\_\_\_\_

	Please initial box
1. I confirm that I have read and understood the <b>Participant Information Sheet</b> for 'An exploration of knowing-in-practice: Actor-network theory and simulated patient pedagogies in nursing education'. I have had the opportunity to consider the information and ask questions, and have had these answered satisfactorily.	
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason, without any of my rights being affected.	
3. The information I provide will be treated confidentially and will be stored securely in electronic and paper form.	
4. I give permission for the information I provide to be used in reports, publications and presentations with preservation of anonymity.	
5. I agree to take part in this project.	

\_\_\_\_\_  
Name of Participant                      Date                      Signature

\_\_\_\_\_  
Name of Person taking consent                      Date                      Signature

Please complete two copies: 1 for participant; 1 for researcher's site file.

Please either return this **Consent Form** in the enclosed freepost envelope and post back (at no expense to you) to the address below, or sign and scan it and return it to [a.v.ireland@stir.ac.uk](mailto:a.v.ireland@stir.ac.uk)

**Aileen Ireland**  
School of Education  
University of Stirling, Stirling, FK9 4LA

# Appendix 3: Interview Schedule

Interview Schedule v2 01 05 2014

## Actor-network theory and simulated patient pedagogies in nursing education

### Interview Schedule

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#### Pre-Interview

- Review notes on teaching observations and read the Topic Guide through several times
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#### Interview

##### Introduction

- Introductions and reminder of the purpose of the interview.
- Confirm consent and ask them if they are happy for the conversation to be recorded.
- Outline structure of the interview, focused on three topics for discussion:
  - A) Information about you, your clinical background and your teaching experience;
  - B) Your experience of using SimMan or similar technologies in teaching;
  - C) Your views on the value and benefits of using simulated technology in teaching.

##### A. Information about you

###### *Experience and Teaching Role*

1. Can you tell me a bit about you? When did you qualify as a nurse? When did you start teaching?
2. What teaching role do you have now?
3. What attracted you to the teaching role? [Probe: ...
  - a. If not discussed: did your own experience of nursing education/clinical experience contribute to you wanting to teach?
  - b. In what ways? ]

##### B. Your experience of using SimMan (or similar technologies) in teaching

###### *Experience of using SimMan*

4. How often do you use simulated technology in your teaching?
5. In what ways do you use SimMan (or similar technologies) in your teaching?
6. How do you feel about using simulated technology in your teaching?
7. What challenges do you face when using simulated technologies in your teaching? [Probe: ...
  - a. How do you overcome them?
  - b. Can you give an example of an experience you might have had when you overcame these challenges?]



**C. Your views on the value and benefit of using SimMan in teaching**

*Values and Benefits of Simulated Technology*

8. What do you think is the purpose of using simulating in nursing education? Do you think it is important? [Probe: ...
  - a. Why? / Why not?
  - b. Do you think you need to use it more? / Less?
  - c. Is there anything missing in using simulation?]
9. What are the benefits of using simulation in nursing education?
10. What are the disadvantages of using simulation in nursing education?
11. What do you value most about using simulation in your teaching? [Probe: ...
  - a. Can you give an example of how you might use your own experiences while using simulation in your teaching?]
12. Before we finish, is there anything else about your experience of using SimMan in your teaching experience that you would like to share?

**Concluding Remarks**

- Thank you.
- Ask them if they are happy to be contacted again in future, if necessary.