The power of simulation: a large-scale narrative analysis of learners' experiences

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CONTEXT Simulation-based education (SBE) includes a broad spectrum of simulation activities, which are individually well researched. An extensive literature reports on SBE methods, topics and modalities, but there are limited studies investigating how simulation as a holistic phenomenon promotes learning.This study seeks to identify the ways in which health professionals narrate powerful SBE experiences and through this to understand in what ways SBE may influence learning.

METHODS Three hundred and twenty-seven narratives about powerful learning through SBE were gathered from participants' online reflections from a national faculty development programme in SBE. Narrative and thematic analyses were conducted on included texts, using 'transformative learning theory' as a sensitising notion.

RESULTS Narratives were categorised into the following categories: progress (267/327 = 81%); transformation (25/327 = 8%); practice (27/328 = 8%); and humiliation (8/327 = 2%). Recurrent features across narrative categories were as follows: early experiences in training; dramatic scenarios; developing appreciation of SBE; highly emotional experiences; things that 'went wrong'; and ongoing reflection. Themes regarding mechanisms that supported learning were as follows: verisimilitude; feedback, debriefing and facilitation; observation of self and others; repetition of activities; and role-playing the patient.

CONCLUSIONS The results generally support the notion that SBE is experienced as a holistic phenomenon, rather than separate modalities. The narrative categories, recurrent features and learning themes tended to work across all simulation modalities, with the exception of 'being in the patient's shoes' being supported by role-play in particular. Although powerful experiences were not necessarily transformative ones, they often occurred at formative stages of training. There was a strong sense that *things going wrong* in simulation scenarios (and the associated emotions and reflection) were a key part of learning. This underlines SBE's potential role in helping learners see fallibility as part of professional practice.

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INTRODUCTION

Simulation-based education (SBE) is an important and accepted part of learning and working as a health professional. An extensive evidence base supports SBE, with four decades of research demonstrating that 'simulation technology, used under the right conditions . . . can have large and sustained effects on knowledge and skill acquisition and maintenance among medical learners'.[1] Much of this literature concerns studies that investigate how an SBE intervention improves learners' clinical skills or practice. What is less well explored is 'the power of simulation', to use McGaghie's term.[2] In other words, what is it about simulation as a holistic phenomenon that leads to learning which resonates long after the experience has passed?

Simulation-based education as a phenomenon contains a very broad spectrum of learning activities. Task training, communication skill role-play, Objective Structured Clinical Examinations (OSCEs) and teamwork simulations form familiar and common experiences in undergraduate and postgraduate medical, nursing and allied health education. These activities share core elements: the learner enacts a task set in a specific place and moment, which evokes real-world situations. This interactive experience occurs over time, so that the learner's actions produce effects, which may prompt other actions. The contextually bound enactment is generally accompanied by the learner undertaking the task as if it was real, even though they are aware that it is not.[3,4]

Simulation-based education practitioners often contend that SBE experiences have profound effects on learners. Although there is an increasing body of research that supports this, it tends to focus on particular aspects of simulation. Some systematic reviews report studies of particular pedagogical *methods*, such as debriefing approaches,[5] roles for observers[6] or instructional design features.[7] Other systematic reviews investigate how simulation supports learning in *particular topics*, such as empathy,[8] communication skills[9] or clinical reasoning skills.[10] Likewise, literature reviews describe studies of *modalities* such as simulated patients[11] and virtual patients.[12,13] From a different perspective, a range of innovative qualitative studies *draw from theory* such as activity theory[14,15] and sociomateriality,[16] which provide a deeper exploration of SBE and the complex relationship of SBE and health care practice. Collectively, the literature provides a range of valuable insights; however, individual studies generally relate to specific pedagogical methods, topics or modalities, or to a particular SBE event. There is a gap in understanding as to why the phenomenon of simulation across all its different incarnations may lead to powerful learning experiences.

This study investigates learner narratives across the spectrum of SBE modalities, health care professions and topics of study. It seeks to identify the ways in which health professionals recount powerful SBE experiences and through this to understand in what ways SBE as a holistic phenomenon may influence learning and practice.

The phrase 'the power of simulation'[2] suggests SBE has a transformational effect. Indeed, Parker and Myrick have drawn from Mezirow's transformative learning theory and conceptualised its application to SBE. Mezirow[17] notes: 'We transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based'. Parker and Myrick[18] suggest that using immersive mannequin scenarios can 'disorient [students'] habits of mind', allowing them to make meaning in a social setting through debriefing and critical reflection, thus 'transforming their frame of reference'. Although the nature of the shift in frame is interpreted differently by various learning theorists, the sense is that this transformation is profound. Illeris describes transformative learning as a fundamental change in identity,[19] whereas Kegan describes it as an epistemic shift.[20] That is, the learner doesn't just learn new knowledge, but new ways of knowing or, possibly, new ways of becoming.

One of the fundamental purposes of thinking about theory and SBE is that it provides a framework for understanding how learning takes place.[21] Within this study, we use transformative learning theory as a sensitising notion. By this, we mean that we reflected on the role of transformations prior to conceptualising the work and that this has affected many of the choices that we made in design and analysis. However, this is not a study of transformative learning, but of narratives regarding powerful learning experiences involving SBE.

Personal narratives can be viewed in many ways. At a broad level, narrative and storytelling is held by

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many to be central to social existence.[22–24] For some, they are the stories of lived experience.[25] For others, they are ways in which we construct notions of self.[26] From a societal perspective, some narratives are dominant, and others are silenced.[23] In this study, we take a view that the narratives represent the ways in which learners have made meaning of their experiences and that this meaning making is inextricably tied to some form of learning. In this way, the participant narratives may provide valuable insights into how meaning is made of SBE experiences and through this promote an understanding of simulation as a holistic phenomenon.

We ask the following research questions, with respect to educators describing their own learning experiences.

- What is the scope of powerful experiences narrated by educators about participating in SBE?
- What can these learning narratives reveal about how participating in health care simulation promotes or discourages learning?

METHODS

Context of this study

Since 2011, the National Health and Education Training Simulation (NHET-Sim) programme has been successfully providing thousands of health and social care professionals across Australia with the introductory skills and concepts necessary to facilitate SBE.[27,28] Every educator who commences NHET-Sim completes an introductory module to SBE, which involves a series of online reflections on their experiences as learners. These reflections allow learners to draw on their practice contexts, activate their prior learning and consider the values[29] that underpinned their approach to SBE. This study forms part of a broader investigation into the NHET-Sim program, with approval granted by the Monash University Human Research Ethics Committee: project CF12/4035 – 2012001933.

Characteristics of the data

A specific reflective prompt within the NHET-Sim introductory module is: *describe the most powerful learning experience you have had using simulation*. A portion of the many thousands of responses to this prompt take narrative form and are the foundational data for this research.

The unit of analysis: the 'event-story' and its component dimensions

In this research, we are focused on the 'event-story', following Sandberg's work: the 'unit of analysis (the story) is concrete stories about particular events . . . the focus is not on the essence or individuality of each participant, but instead on key stories in a social and narrative environment'.[30] Reese et al.[31] operationalised this notion by developing three dimensions of narrative coherence: context, chronology and theme. These ensure that: a story is grounded in a particular time and place (context); there is an ordering of events over time (chronology); and the story should revolve around a single point (theme).

Narrative selection: establishing a dataset

Selecting narratives for analysis was a sizeable task. Of 5053 individuals who completed the NHET-Sim introductory module between October 2012 and January 2015, 2624 (52%) consented to use of their deidentified learning management system data. We extracted all responses that had been recorded against the *most powerful learning experience you have had using simulation* prompt. As the focus of this analysis was on health care simulation narratives that promoted learning, we only included responses that were from the learner perspective. That is, we were interested in stories about what was learnt through *participating in the simulation* (including as an observer), but not those about learning through being a teacher of simulation. Although we acknowledge the latter is also powerful, it did not align with the focused phenomenon of learning through SBE.

We also established if each text constituted a narrative. The lead author (MB) and a research assistant (JH) developed explicit selection criteria and came to a consensus as to what constituted a narrative, through jointly identifying 50 texts. We included responses according to Reese et al.'s[31] explicit minimum criteria for a narrative:

- Context: 'Partial information is provided; there is a mention of time *or* location at any level of specificity'[31]
- Chronology: 'Naïve listener can place some but not most of the events on a timeline'[31]

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- Theme: 'A topic is identifiable and most of the statements relate to it'.[31]

Any questions about inclusions were resolved through consensus at this stage, and later during analysis. A total of 327 narratives were included in the dataset. Of those who contributed these texts, 242/327 (74%) identified as female, 70/327 (21%) identified as male, and 15/327 (5%) did not specify gender. Professions were as follows: 184/327 (56%) nursing; 79/327 (24%) medicine; 25/327 (8%) allied health; 24/327 (7%) midwifery; and 15/327 (5%) nominated the 'other' category. Ages of participants ranged from 23 to 86 years; the average was 44 years, with a standard deviation of 11.

Analysis

During the narrative selection process, MB had read and re-read much of the raw data. To commence analysis, she coded 50 narratives and developed the nascent coding framework of four narrative types plus an initial thematic analysis. JG and DN independently coded 15 of these and discussed differences and similarities. In particular, the nuances of the category boundaries were established. For example, the category of 'transformations' was interrogated, drawing from transformative learning theory to define what was meant in this circumstance. This process confirmed the basic narrative categories and associated themes. MB applied the draft framework to a further 50 narratives and out of this refined the thematic analysis framework, in association with a research assistant (KP). All narratives were categorised according to the narrative types and were also thematically analysed according to this final framework by KP. Discrepancies or concerns were highlighted and reviewed by MB. The final categories were also reviewed by MB prior to conducting a count of the narrative types (sometimes called quantitative content analysis[32]).

RESULTS

Narrative analysis

Narratives were grouped in the following four categories: progress; practice; transformation; and humiliation. We offer illustrations from participants' responses with minor adjustments to grammar and spelling and have removed identifiers. These categories did not align particularly to simulation modalities except as noted.

Progress narratives comprised over three-quarters of the narratives (267/327 = 81%). The primary theme of these narratives was about learner development in the knowledge, skills and attitudes of health practice. The focus was on what was learnt at the immediate moment of the simulation, although the narratives could describe how what was learned impacted practice. These were generally reports of learning holistic aspects of practice, often in emergency situations:

> Experiencing a patient passing away, and the processes leading up to this, whilst participating in a resuscitation scenario with mannequins. Experiencing the adrenalin, being part of the confusion of the situation, which was quite chaotic, and then the finality of the patient's death, which was emphasised by the medical monitors surrounding the patient. The debriefing of this event was the most powerful part of the process. (Narrative Pro48, medicine)

On occasion, narratives concerned skills development:

> I attended a workshop that involved a practical component where participants practised inserting a flexible nasendoscopy into a model of a head/neck. The opportunity to practise this invasive procedure and to refine techniques in a safe environment where there was no chance of harming the patient was invaluable. . . . (Narrative Pro215, Speech Pathology)

Participants reported continued relevance to current practice:

> . . . even now, many years later I can still recall the structured process and apply these skills in the clinical setting with confidence . . . (Narrative Pro198, nursing)

Transformation narratives were similar to progress narratives, although much less frequent (25/327 = 8%). These were qualitatively different: they involved a profound shift that played out in practice, often for many years. The key feature that we used to identify transformational narratives is the way that participants described an impact on practice, which entailed a different way of understanding or being. They could focus on social or clinical aspects of practice, or both. An example narrative is:

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> Early in my transition to Critical Care, I was still timid, very used to a 'traditional' compliant nurse role, not used to vocalising my concerns, but rather taking them to my senior nurses for them to deal with. During a visit with a group of nurses and doctors to [simulation centre] for simulation training, one of our scenarios involved a missing patient who was located in the engineering ducts of the 'hospital'. During the stabilising and extraction of the 'patient', I noticed that one of the staff was at risk of 'electrocution'. I spoke up, but so quietly, that the team did not take notice and the staff member 'died'. One of the teachers took me aside and taught me how to make myself heard, without yelling. From that day forward, I've never had trouble conveying information or giving directions in emergency situations. (Narrative T25 nursing)

Another example of a transformation narrative:

> The most powerful simulation experience goes back 31 years ago when I first began my nursing training and stays with me to this day. We were learning how to perform a bed bath and one of the students was the simulated patient. I was the first participant. As I began to wash my colleague she cried out "Gee you're rough". I immediately learnt a very important lesson in how to care for people and respect their bodies and realised what a privileged position I was in. I am now always told by my patients how gentle I am. (Narrative T3 nursing)

Practice narratives were primarily concerned with how simulation and real practice mirrored each other. They were also a minority of responses (27/328 = 8%). The power of the simulation rested on the relationship with clinical practice. This could take the form of flashbacks:

> Simulation was very real - had flash back to clinical incident. Cold bags were used under the bleeding wound - I had the same feeling when I had to apply pressure to a blown graft site. Same feelings of helplessness. Debrief helped. (Narrative Pra24 nursing)

It might also be how the simulation and associated learnings were integrated with practice:

> The first time I ever performed CPR on a real person was with a five year old child. She seemed to me to be the exact size and proportions of the child-size CPR mannequin I had trained on and it was very easy to translate training into practice. I always think of this child (who died of cerebral malaria) when I see the child CPR mannequin. (Narrative Pra11 Medicine.)

Humiliation narratives were the smallest category of narratives (8/327 = 2%) but were distinctive. The primary theme of these regarded how participation in simulation led to overwhelming feelings of humiliation. For example:

> The most powerful learning experience I have had using simulation was my first (and only) experience in a high-fidelity scenario. I was assigned a role that I was unfamiliar with and the scenario was a complete power failure in an operating room, during surgery. When the lights went out and the shouting started I felt lost with what to do first. In my haste to orientate myself in the room I tripped over an IV pole and hurt myself. I felt out of my depth, unsafe and humiliated. The anaesthetist took charge as she had the only light in the laryngoscope and I can't recall what else happened after that. During the debrief there was little acknowledgment of how I felt and that I had been hurt. The powerful learning from this experience was the importance of ensuring the safety and comfort of the participant to enhance, rather than detract from the simulation. (Narrative H4 nursing)

Recurrent features of narratives

There were features that frequently recurred across all different types of powerful learning narratives. Participants recurrently reported events that happened in the *formative early part* of their training:

> Back in 1984 when I was a nursing student . . . (Narrative Pro65, nursing)

> My most powerful learning experience in simulation was in primitive CPR accreditation many years ago . . . (Narrative Pro101, physiotherapy)

Many narratives centred on *dramatic scenarios* such as mass casualties or emergencies:

> Mass casualty simulation training many years ago, I had to enter a bus accident setting . . . (Narrative Pro158, nursing)

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Unsurprisingly, given the group of participants were taking a simulation education course, narratives described events that assisted the participants to develop an understanding or *appreciation of simulation as a teaching method*.

Many of the stories had *emotional valence*, and commonly there were *negative emotions*. Humiliation narratives were associated with only negative emotions, such as feeling 'mortified', 'embarrassed' and 'unsafe'. Practice narratives could be both positive and negative; the latter tended to be around the reactivation of old memories, which led to distress. Progress narratives often had both negative and positive emotions. The general pattern was that, during the scenario itself, participants described their experiences as follows: '*real stress*', '*overwhelming*', '*nervous*' and '*confronting*'. Some described it as:

> Both exhilarating and frightening at the same time. (Narrative Pro186, nursing)

The transformation and progress narratives tended to pair these negative emotions with a strongly positive conclusion. For progress narratives, this was an increase in confidence or a feeling of fulfilment. For example, one participant noted:

> . . . empowered at the end. (Narrative Pro225, midwifery)

The transformation narratives had an even more strongly positive outcome:

> Although [the simulation] was very nerve wracking at the time I found the experience increased my confidence in real life emergency situations . . . To this day my confidence in performing resuscitation of adult patients in real situation[s] or simulation[s] is noted. This experience . . . played a major role in my decision to follow a career into nurse education.' (Narrative T10, nursing)

Participants frequently reported narratives about the *things that went wrong*, not the things that went right. In the progress and transformation narratives, this led to learning about health care practice, and often about the social, intangible aspects of their clinical work. In the humiliation narratives, things going wrong led primarily to negative emotions, with the learning often very divergent from the presumed intentions of the simulation session.

Entwined with the details of *what* happened, were descriptions of learner *reflections*. These described how learners made meaning of the situation within the narrative. This often took place in the debrief, but there was a sense that reflection was ongoing years later.

> In undergraduate physiotherapy, we had actors come in who were our patients for a subjective assessment. It was very challenging to have a very angry patient in front of you to try to work through how best to deal with that situation. My patient was a paraplegic who was frustrated by an injury but was VERY angry. I did not handle the situation well and it left me very aware that I need not try to fix problems, I need to listen, reflect etc. and be capable of modifying my plan as needed. (Narrative Pro24, physiotherapy)

The humiliation narratives had markedly different types of reflection, which tended to focus on how not to conduct simulations.

Themes about learning

There were themes that ran across narratives that concerned mechanisms for learning. These were notable in the progression and transformation narratives, but generally absent from practice and humiliation narratives. These themes were as follows: learning through verisimilitude; social learning through feedback, debriefing or facilitation; observations of others or of self; repetition or iteration; and *being* the patient.

Learning through verisimilitude

Verisimilitude is the 'quality of seeming to be true or real'.[33] Learning took place through enacting something that *felt* real, although it wasn't necessarily completely real. This seemed to promote a sense of immersion and post hoc sense of wonder as to how real the simulation was. For example, one participant described

> . . . standardised patients . . . really got into the role of a distressed patient. It was very confronting the first time to play the nurse dealing with this person, as everything I did or said upset them more. It really felt like it was a real difficult patient in ED. (Narrative Pro12, nursing)

The effects of verisimilitude did not just relate to scenario-based simulation but included part-task training and live animal models.

Social learning through feedback, debriefing or facilitation

Many participants described the critical role of feedback, debriefing or general facilitation in helping them learn from the experience. As one participant described:

> . . . With the feedback, I came to the realization that I have never clearly communicated with my anaesthetic nurse of possible issues and how I was intending to deal with them, should they arise. This made me change my practice to having this discussion prior to induction.' (Narrative Pro21, medicine)

The role of feedback was also critical for task training. The learning through social interaction was an implicit thread through many of the narratives.

Observation of others

Some narratives described learning through observing others participate in the simulation. For example:

> . . . one candidate . . . chose to do a needle, wire, Melker cricothyroidotomy. He managed it but it was really clear to me that I could go wrong with that technique at so many points when under pressure that it just would not be safe . . . (Narrative, Pro10, medicine)

Observation of self

Some participants described the impact of observing themselves on video as part of the debriefing and reflective processes. For example:

> During a debriefing session after viewing a recording of the simulation I observed things that I had not noticed about myself . . . I was less inclined to listen to junior staff members in critical scenarios, which showed on reflection that I missed things they could see. (Narrative, Pro130, physiotherapy)

Repetition or iteration

Some narratives described learning through repetition. As one participant described:

> Following the first scenario we had an opportunity to repeat the scenario; this gave the team a chance to feel less awkward and play our roles better as a real life situation . . . (Narrative Pro22, nursing)

Being the patient

Some narratives revolved around learning through role-plays that simulated the patient experience. For example:

> The most powerful learning experience I have had using simulation was when a community worker who supported people who had Usher's syndrome got participants to perform a series of tasks like threading a needle . . . wearing swimming goggles which had been painted, so that we had the same vision as people who had Usher's syndrome and were at various stages of going blind. I found it took a long time and was really difficult to do these things . . . (Narrative Pro7 education manager)

Researcher reflexivity

As researchers and educationalists, we were very mindful of our previous experience through conceptualising the study, during analysis and while writing this manuscript. We have championed NHET-Sim and SBE in a variety of forums to date. Although we were sensitised to the possibility of transformations in the data, we were surprised by the relatively small quantum of profound epistemic shifts and the way that participants described them. Equally, producing this research has provided us with new and helpful ways of thinking about the benefits and hazards of SBE. The project has extended our understanding of SBE, whereby deep reflection can assist clinicians to learn how to be aware of and deal with our own limitations. We found the input of the research assistants very valuable as they did not have SBE backgrounds, and their queries often prompted reconsideration of assumptions.

DISCUSSION

Review of findings

Powerful SBE experiences can be categorised into progress, transformation, practice and humiliation narratives. The most frequently described form, the progress category, described in detail how SBE

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improved participants' skills or practice. The other three sorts of narrative were considerably less reported. The practice category, which contained narratives that reflected how simulation mirrored health care practice, was approximately one in 10 of all experiences. Stories of transformation, where SBE influenced how health professionals think about themselves and their practices, were similarly around one-tenth of all reports. Stories of humiliation, where SBE created a profoundly negative experience, were very rare, with only eight being reported across the dataset. Simulation modalities (such as task training or teamwork simulations) did not appear to be exclusively linked to any narrative category, although the data in the smaller categories are limited.

Participants' accounts of powerful experiences, irrespective of narrative category or simulation modality, shared some recurrent features. Some took place in a formative part of early training; narratives frequently revolved around dramatic events; the social aspect of learning was often significant; and they sometimes taught the learner about SBE itself. There was a strong sense that making mistakes and the associated unpleasant emotions were a key part of learning through SBE, and although critical reflection could lead to learning how to practise better, sometimes this was not the case. Learning through error has often been described as one of the key benefits of simulation.[34] This study provides broad evidence that learners learn in this way but that, without appropriate simulation design and facilitation, experiencing error may also cause damage.

The thematic analysis suggests that key factors that supported *learning* were as follows: a feeling or sense of reality (verisimilitude); the interaction with the facilitator, especially feedback processes; observation of others and self; opportunity to repeat scenarios; and 'being the patient'. The last was the only learning feature that was particularly linked to a modality: role-play. In general, these results align with previously published systematic reviews, which indicate the importance of debriefing,[5] the advantages of role-play in promoting empathy[8] and the value of observation.[6]

Taken together, these results support our approach of considering simulation holistically and imply that the 'power' of simulation does not reside in a particular modality. We believe that these data therefore support the value of programmes such as NHET-Sim, which approach SBE as a whole, rather than focusing on specific approaches. Clearly, however, the data come from such a programme, so this may also have primed participants' responses. There are some nuances worthy of further investigation. In particular, we wondered about experiences of part-task trainers compared with scenario-based simulations. To a certain extent, it seemed that feelings of immersion resided with the participant more than with the simulation materials. By contrast, learning about social practices was a particular feature that was less related to task training than other modalities. This offers an area for further investigation.

In interpreting these results, it is worth remembering the unit of analysis is the 'event story'.[30] Event stories represent the narratives that learners use to make sense of their experiences. We do not claim this is what 'actually' happened. It is a long time since many of these events occurred. To illustrate the value of this type of narrative lens in illuminating a phenomenon, we use the qualitative technique of imaginative variation[35,36] and consider an alternative study of powerful learning through lectures. In this instance, the results might concern inspiration through charisma or learning how to sleep while sitting in a lecture hall. This imagined alternative illustrates how narratives can reveal the downstream impact of the learning experience. In other words, event stories, possibly told and retold many times over the years, indicate what learners still regard as significant about their SBE experiences.

'Things that go wrong', transformative learning and the 'power of simulation'

As mentioned previously, many of the progress, transformation and humiliation narratives revolved around uncomfortable mistakes, what might be termed 'failures' but perhaps is best characterised by the phase 'things going wrong'. Some of these led to undesirable consequences within the simulation scenarios. This aligns with Mezirow's 'disorienting dilemma' as the beginning of a transformation; there was also a general alignment with 'a critical assessment of assumptions' and 'planning a course of action'.[17] However, although disorienting dilemmas as a consequence of mistakes and failures were common, not many narratives contained the type of epistemic shift that Kegan suggests is associated with transformative experiences.[20] Contrast a progress narrative 'I have never clearly communicated with my anaesthetic nurse . . . This made me change my practice to having this discussion prior to induction' (Narrative

Pro21, Medicine) with the T25's transformation narrative reported in the findings. When T25 reports learning *how to make myself heard* after a simulated death, this seems more than learning communication skills. It is also about coming to understand the value of his or her own voice as a nurse. There is a sense that T25's way of knowing and way of being has profoundly shifted.

The small number of transformation narratives may be explained in multiple ways. Firstly, epistemic shifts may be rarely experienced during SBE. Secondly, learners may have experienced epistemic shifts as part of their progress narratives but not included them in the narrative account. Finally, learners were prompted about their most powerful experience, not one that transformed them. This latter point is underlined by learning theorists, who suggest that transformative learning does not necessarily take place at a single moment or event.[20]

These ideas have practical implications for how we think about the 'power of simulation'. They suggest that it is not sensible or practicable to design SBE encounters as transformative moments, as transformations appear to stem from the learner rather than the simulation itself. However, the repeated stories of 'things going wrong' for individuals and teams, and the consequent learning, suggest SBE could more explicitly contribute to a larger epistemic shift about fallibility. In other words, we think that SBE may give an opportunity to think differently about 'failure', 'error' and 'mistakes' through the power of experiencing them.

Fallibility as a necessary part of working is emerging as an area of research focus.[37] For some years, others have noted the value of SBE in learning from error[34,38]; SBE offers opportunities to make mistakes and to subsequently learn through self-reflection shared with peers and facilitators who are good company. This means that SBE also offers an excellent platform to help learners understand that 'things going wrong' is a part of practice,[37] both for an individual and teams. Given the frequency of these 'failures' within the narratives, it may be valuable for SBE practitioners to consider how to reframe failure as fallibility and to offer facilitated opportunity to examine the role of personal failures in health care.

The challenging nature of learning through error in SBE is reinforced by the humiliation narratives. These suggest that SBE has the capacity to negatively impact on learners' emotions for many years afterwards. Good simulation practice is likely to reduce the capacity for humiliation, in particular through providing an appropriate learning environment,[39] appropriate simulation design[40,41] and expert debriefing.[5,29] However, it also highlights the inherent risk with simulation and begs the question, at what point and why does discomfort become damaging rather than productive?

Focusing on errors may not always be helpful. As many of the narratives concluded with successes, it may be worth considering the role of 'things going right' in equal balance with an emphasis on 'things that go wrong'. Consideration of 'success' is also an emerging focus in the SBE literature[42] and this forms an area for exciting future research.

Narratives and SBE

A surprising facet of the narratives was how many were set early in participants' professional careers. Many stories were from student days or early training, but of these, many still guided current practice. Although narrative in this instance is primarily a methodological choice, narratives may also provide some insight into how people learn through SBE. There has been some suggestion that narrative and simulation are strongly related[43] and that the power of simulation scenarios is in providing a narrative experience.[44] It may be that recounting the narrative acts as a bridge from the SBE experience to current practice. The potential role for storytelling and recounting as a learning device in simulation is also an area for future research.

Limitations

The narrative nature of the data is both a strength and limitation. The inclusion of stories allowed us to analyse the data in a way that maintained a holistic understanding of simulation as a phenomenon that continues to have impact, even decades later. However, narratives form and reshape as they are retold, so any conclusion about the cause and effect of SBE is far from definite. The sampling of the narratives is likewise a strength and a limitation. The data allowed us access to a national sample across health and social care professions, with large numbers of narratives. However, the purpose of NHET-Sim was to educate clinicians about SBE so, as a group, the participants may have had a more

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positive view of education in general and simulation in specific, than the general health professional population. Moreover, the dataset itself was drawn from participant logs that were not intended to be narratives but reflections on experience. As with all qualitative research, categorising the narratives was a highly interpretive approach to data analysis. We introduced a quantification of the data because of the breadth of the data sample. Overall, the study approach balanced the value of size and scale of the number of narratives with a nuanced understanding of the qualitative data.

CONCLUSIONS

This study indicates that the 'power of simulation' is recounted by learners in the stories they tell about their SBE experiences. The power of SBE is mostly about learning new skills and knowledge, but can also be found in transformative or humiliating experiences, or by holding a mirror to health care practice. The narratives suggest that key learnings in SBE happen when *things go wrong,* highlighting the affordances of social debriefings to shift an uncomfortable experience to learning. It may be that SBE offers an opportunity for participants to come to understand the role of error in health care over time and to transform thinking about failure to thinking about fallibility.

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