Chapter 23

Title: "Optimizing learning in simulation-based education using video-reflexivity."

Author: Suzanne Gough

Key messages

- Video-reflexive methods are becoming increasingly popular in healthcare to improve educational outcomes, healthcare practice and patient safety.

- Video-reflexivity illustrates the complex interconnectivity of the participants and the simulated learning environment (SLE).

- Video-reflexivity findings have influenced curriculum development and delivery as well as improvements in the design of the university's new simulation facilities.

Overview

This case study provides a brief overview of how the combination of SBE and video-reflexivity can be successfully used to optimize learning opportunities for healthcare students. The context, methods, and impact (on students' learning and changes to the curriculum and SLE facilities) are presented. Potential opportunities afforded when combining SBE and video-reflexivity are highlighted from findings of a sequential explanatory mixed methods doctoral study, in which

undergraduate physiotherapists took part in the assessment of a deteriorating respiratory patient. Considerations for other educational programs wishing to embed elements of video-reflexivity within SBE are proposed.

The identified need

Healthcare educators have a responsibility to promote student engagement and facilitate students' professional development during their studies. Central to this is fostering the students' progression as autonomous practitioners; who can review their own learning in order to facilitate an understanding and propose developments in their own practice, particularly in relation to professional knowledge, skills, attitudes and behaviours[1].

Video-reflexivity has been described as a process whereby the participants replay ethnographic video footage for review and discussion[2]. The combination of video-ethnography and video-reflexivity methods (known as video-reflexive ethnography, VRE) is becoming increasingly popular in healthcare research[2,3]. VRE has also been used by researchers in the quest to improve patient safety in healthcare[2,3]. To the author's knowledge, no previous studies had explored the personal experiences or errors encountered within the SLE using VRE. There is also limited evidence of how digital technologies

have been used to support learning or reflexive practice within physiotherapy.

This case study reports findings from phase two of a sequential mixed methods design(4). The research was based on the perspectives of multiplicity and complexity, drawing on the social constructivism view that knowledge and meaning are constructed, developed and communicated through interactions between humans and their world(5). This was aligned with an interpretive approach using video-reflexive ethnography (VRE) methodology(2,3). The research approach used video-observation and focused, unedited video-reflexive interviews. These methods were selected to capture multiple perspectives (approaches and understandings) of the complexity of managing a deteriorating simulated patient (SP). Roskell and Cross described the complex interactions a respiratory physiotherapist undertakes to function effectively within their clinical environment, including constant observation of the patient, monitors and equipment located within the visual field around the patient's bed space or, in this case, the simulated side ward(6). The importance of the physiotherapist's need to maintain situational awareness to efficiently function whilst optimally managing the patient, and filtering unwanted stimuli from the environment was also recognised(6). With this in mind, the study needed to be able to illuminate these concurrent phenomena, including the differences between participants in their

interactions and abilities. It would not be possible to maintain the essential and embedded features of these phenomena if they were solely measured and reduced to the testing of generated hypotheses.

This case study draws on findings from two of the research questions:

1) To what extent are final year physiotherapy students able to independently manage a deteriorating simulated cardio-respiratory patient?

2) To what extent are final year physiotherapy students able to independently recognise errors within a simulated scenario?

Methods

Twenty-one final year pre-registration (BSc Hons) physiotherapy students were invited to participate in a simulation scenario and video-reflexive interview. Students participated in an immersive authentic simulation scenario designed to replicate the complexity of an emergency on-call physiotherapy situation. The scenario required the students to undertake an assessment and provide appropriate management of an acutely deteriorating patient. Two specific methods of promoting reflexivity were utilized:

1) Video-recording the participants in the simulation scenario,

2) Participants being able to immediately review their respective un-edited simulation scenario video.

The respective participants' video was displayed on a 21'' Apple iMac (which enabled large-screen viewing). QuickTime computer software was used to capture the screen and audio of the interview as one movie file. The students reviewed their respective un-edited simulation videos during the video-reflexive interview. The interview consisted of twenty-one questions which aimed to promote self-reflection, whilst engaging in a critical discussion of themselves and their cultural (clinical) practices(7). The interview questions were specifically designed to reflect the research questions.

All 12 simulation and interview videos were transcribed verbatim, then analyzed using video analysis software (Studiocode, http://www.studiocodegroup.com/) and a thematic framework approach(8).

The impact of the study

The use of VRE in this study illuminated the multi-layered impact of personal experiences, ethics and behaviours on their practices, clinical reasoning, clinical decisions, dynamics, and the complexities and interconnectivity of participants' to the SLE(2-3,7,9). Findings of this study, have demonstrated that the combination of SBE and video-reflexivity has the potential to optimize learning and enhance both professional practice, patient safety(2,7) and organizational change. Additional benefits of using video-reflexivity included the potential to

provide an in-depth exploration of 'learning' and the impact of objects and artefacts embodied within the scenario and SLE, by drawing on the theories of *complexity* and *cultural-historical activity* (7,9). Summaries of both learner and organizational impact are now presented.

a) Learner impact

Video observation identified similarities and differences in patient assessment and management approaches. The students' assessment approaches were generally unstructured despite students trying to use a standardised assessment and management approach. Management approaches also varied in relation to a specific intervention, order and timing of events/actions. During the video-reflexive interview, students explored the content of their respective simulation video, attempting to make sense of the occurrence and highlighting the impact of personal experiences, which they perceived may have been central to their actions, clinical decisions, and the cause or mitigation of errors in their practice. The students demonstrated a capacity for openness and observation, working within uncertainty and complexity of a deteriorating scenario and offering known or alternative solutions. They demonstrated mindfulness as they vocalized being aware of themselves: demonstrating a shared interest in what they and others did. Students also questioned their own knowledge, technical and non-technical skills (strengths and deficits),

professionalism, errors encountered and realism of the simulated experience in a manner that impacted on themselves and how they related to the patient and each other within the SLE(2-3,9). The impact of academic, clinical placement and personal experiences were highlighted as positive influential factors on their subject-knowledge (physiotherapy management of a deteriorating patient), skill acquisition and behaviours. Students also reflected on lack of: respiratory-related placements or lack of practical opportunities (e.g. suctioning or moving and handling patients) and limited experience of immersive scenarios; which may have negatively impacted on their ability to manage the simulated patient.

b) Organizational impact

The findings of this study have already influenced several aspects of curriculum development and delivery as well as improvements in the usage of the University's new SLE facilities. An 'integrated simulation-based education framework' was developed from the literature, theoretical and methodological approaches and findings of this study(4)·Implementation of this framework has led to improvements in scenario design, formalizing debriefing practices and ensuring linked learning activities are overtly articulated to students. Findings from the video analysis and VRE interviews have influenced scenario design in relation to fostering:

- '*emergence*', acknowledging diverse ways of thinking, acting and being responsive to change;

- '*materiality*', consideration of the effects of equipment and environment;

- '*attunement*', proving opportunities to enhance non-technical skills such as situational awareness in order to sense what is unfolding;

- '*disturbance,*' introducing interruptions to routine practices, and

- '*experimentation*', providing diverse learning and feedback opportunities(9).

The identification of errors encountered in the simulation scenario also led to a series of curriculum and SLE design changes. The emphasis of human factors and their effect on patient safety has been made more explicit in simulation scenarios and debriefing activities, and additional learning resources have been created. The study identified a gap between learning and actual practice of knowledge and skills gained from the physiotherapy curriculum, in particular relating to knowledge and skill deficits (*error producing factors*)(10). The provision of additional 'flipped classroom'(11) resources (educational videos and podcasts) have been introduced to support repetitive practice of essential technical and non-technical skills required to manage cardio-respiratory and acutely deteriorating patients. Multiple policies around oxygen therapy (*a latent error*) have been replaced with a single

guideline to minimize confusion and error(10). The combination of a lack of hand-washing facilities (*an error producing factor*) in the previous SLE and identification of infection control and moving and handling violations (*active failures*)(10) have also contributed to the design of the new SLE facilities at the university.

Lessons learned

This study highlighted the power of video-reflexivity to explore and uncover the multiple and complex realities of managing a deteriorating simulated patient, that are constructed via social, verbal and non-verbal interactions with the patient, others and the environment(2,9). The visualization and narratives provided by students during the video-reflexive interview offered the ability to understand the complexity of learning within the SLE. Carefully planned and executed simulation scenarios and video-reflexive methods can offer a safe learning environment to allow students to explore routine, evolving and complex situations whilst allowing them to learn to be become comfortable with making and exploring errors (mistakes/violations).

Table 23.1 highlights potential opportunities afforded when combining SBE and video-reflexive methods drawing on interactions identified in this study and pose considerations for other educational programs. This study highlighted the benefits of exploring dimensions of learning beyond metrics to make sense of the dynamics within the simulated

environment. This study highlights that as Educationalists, we need to be mindful that learning is highly complex, always contextual and continually evolves through social interaction(9). It is essential therefore that evaluation can reflect this multiplicity. Pragmatic measures are suitable for technical and non-technical skills, however, the emergence of new holistic evaluation methods, that draw on both qualitative and quantitative approaches, may have a place to help to establish the extent to which transformations in learning and/or patient care are realized, or not, by the learner(12). Such approaches offer greater enlightenment of the links between educational interventions and outcomes. By employing and triangulating qualitative and quantitative approaches to explore multiple levels of impact, the complexities of learning can be explored identifying areas of best practice and helping to remedy any deficits, to enhance the transformation between theory and practice(12).

Key words: complexity, impact, physiotherapy, simulation-based education, video-reflexivity.

References

1. Chartered Society of Physiotherapy. (2013) *Physiotherapy framework: putting physiotherapy behaviours, values, knowledge*

and skills into practice. September 2013, Chartered Society of Physiotherapy, London.

2. Carroll, K. (2009) Outsider, insider, alongsider: Examining reflexivity in hospital–based video research. *International Journal of Multiple Research Approaches*, 3(3), pp. 246-263.

3. Iedema, R. (2011) Creating safety by strengthening clinicians' capacity for reflexivity. BMJ Quality and Safety, 20(Suppl 1), i83-i86.

4. Gough, S. (2015) *The use of simulation-based education in cardio-respiratory physiotherapy*. Unpublished doctoral thesis, Manchester Metropolitan University.

5. Crotty, M. (1998) The foundations of social research: Meaning and perspective in the research process. Allen and Unwin, Australia.

6. Roskell, C., & Cross, V. (1998) Attention limitation and learning in physiotherapy. *Physiotherapy*, 84(3), pp. 118-125.

7. Iedema, R., Mesman, J. & Carroll, K. (2013) Chapter 3: Does the complexity of care call for 'research complexity? *In* Iedema, R., Mesman, J. & Carroll, K. (eds.) *Visualising health care practice improvement: Innovation from within*. Radcliffe Publishing, London, pp. 41-66.

8. Ritchie J, and Spencer L. (1994) Analyzing qualitative data. In Bryman, A and Burgess, R.G (Eds) *Qualitative data analysis for applied policy research*. London: Routledge, pp.173-194.

9. Fenwick, T. & Dahlgren, M.A. (2015) Towards socio-material approaches in simulation-based education: lessons from complexity theory. *Medical Education,* 49(4), pp. 359-367.

10. Reason, J.T. (1999) *Human error.* Cambridge University Press, New York.

11. Roehl, A., Reddy, S.L. & Shannon, G.J. (2013) 'The flipped classroom: An opportunity to engage millennial students through active learning strategies.' *Journal of Family and Consumer Sciences*, 105(2), pp. 44-49.

12. Drescher, U., Warren & Norton, K. (2004) Towards evidence-based practice in medical training: making evaluations more meaningful. *Medical Education,* 38(12), pp. 1288-1294.

Further reading

Iedema, R., Mesman, J. & Carroll, K. (eds.) (2013) *Visualising health care practice improvement: Innovation from within*. Radcliffe Publishing, London, pp. 41-66.

Fenwick, T. & Nerland, M. (2011) *Reconceptualising Professional Learning.* Routledge, London.

Additional resources

None

Table 23.1: Interactions and considerations for educational programs when using simulation and video-reflexive methods

Interactions identified through simulation and video-reflexivity	Considerations for educational programs
Multiple complexities of learning within the simulated environment • Video reflexivity illustrated the multi-layered impact of personal experiences, codes of practice, conformity/non-conformity, errors, dynamics, and the complexities of interconnectivity of students' and the SLE.	• SBE design requires complex thought and preparation to carefully construct optimal learning experiences. Drawing on learning (adult, social and cognitive) theories and educational practices aligned to SBE, may help to optimize learning. • The identification of routine/non-routine actions, relevant codes of professional practice, conformity and creativity, highlights the need to increase the focus on different types of thinking when designing and debriefing scenarios. • Simulation provides opportunities for students to take managed risks in a safe learning environment, however such risks and potential/actual errors should be appropriately discussed during the debrief (feedback). • Socio-material theories (complexity and cultural-historical activity) are highly relevant to scenario and SLE design considerations (9). For example, complexity theory raises key considerations for scenario and SLE design in relation to the effects of '*emergence*' (diverse ways of thinking, acting and being responsive to change), '*materiality*' (equipment and environment), '*attunement*' (listening and touching to sense what is unfolding), '*disturbance*' (fostering/amplifying the disturbance of routine practices) and '*experimentation*' (providing multiple, diverse learning and feedback opportunities)(9).
Collective competency and enhanced intelligence • Students interact together to manage a deteriorating patient, communicating decisions to reach a shared level of understanding (collective competence) and explore how they enacted the process of knowing together (enhanced intelligence).	• Video-reflexive methods and facilitator-led debriefing strategies can be used to explore the development of collective competence and enhanced intelligence, which may help to understand how these skills can be translated to healthcare practice. • Facilitating opportunities to explore the process of 'knowing' for and alongside each other, potentially equips students to engage with complexity, influence professionalism and impact on patient safety (3).
Learner insight • Students lacked insight into some errors encountered during the scenario, predominantly relating to knowledge and skills (relating to physiotherapy assessment components, intervention and moving and handling/infection control violations).	• The use of simulation and video-reflexivity methods provide potential opportunities for facilitators to identify students who lack insight into their own knowledge, skills, attitudes and behaviours. A structured facilitator-led debrief can provide an opportunity to re-gain balanced discussion between achievements, creativity, the need to appreciate professional boundaries, codes of conduct, policies and procedures, whilst raising learner awareness of deficits in knowledge, skills, attitudes and desired behaviours. Considerations for further remediation opportunities may be required.