



**QUEEN'S
UNIVERSITY
BELFAST**

Into the uncanny valley: Simulation versus simulacrum?

Johnston, J. L., Kearney, G. P., Gormley, G. J., & Reid, H. (2020). Into the uncanny valley: Simulation versus simulacrum? *Medical Education*, 54(10), 903-907. <https://doi.org/10.1111/medu.14184>

Published in:
Medical Education

Document Version:
Publisher's PDF, also known as Version of record

Queen's University Belfast - Research Portal:
[Link to publication record in Queen's University Belfast Research Portal](#)

Publisher rights

Copyright 2020 The Authors.

This is an open access article published under a Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the author and source are cited.

General rights

Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.

Open Access

This research has been made openly available by Queen's academics and its Open Research team. We would love to hear how access to this research benefits you. – Share your feedback with us: <http://go.qub.ac.uk/oa-feedback>

CROSS-CUTTING EDGE

Into the uncanny valley: Simulation versus simulacrum?

Jennifer Laura Johnston  | Grainne P Kearney  | Gerard J Gormley  | Helen Reid 

School of Medicine, Dentistry and Biomedical Sciences, Centre for Medical Education, Queen's University Belfast, Belfast, UK

Correspondence: Jennifer Laura Johnston, School of Medicine, Dentistry and Biomedical Sciences, Centre for Medical Education, Queen's University Belfast, Room 02.038, Whitla Medical Building, 97 Lisburn Road, Belfast BT9 7BL, UK.
Email: j.l.johnston@qub.ac.uk

1 | INTRODUCTION

The simulacrum is never that which conceals the truth - it is the truth which conceals that there is none. The simulacrum is true.

(Jean Baudrillard)¹

Simulation education is currently enjoying a wave of popularity in health professions education (HPE). The key advantage is that learners can practise their skills in a safe and guided fashion, with appropriate observation and feedback from experts, before using their skills with patients. Simulation has been seen as particularly useful within craft specialties, such as surgery and anaesthetics, where trainees can hone their technical skills, including advanced techniques for endoscopy and robotics.² This is especially pertinent for rarer but high-acuity events, such as cardiac or mental health emergencies, where real clinical environments may not afford sufficient learning opportunities, especially for large cohorts of learners on shorter placements.

There is a further reason beyond pedagogy for why simulation education may be useful. Because novice health care professionals no longer gain experience solely through many hours of on-the-job learning, rotas can be kept within legal limits for hours worked.^{3,4} By investing in high-tech 'sim centres,' institutions can offer modern, fast and efficient training that satisfies the current standardisation and accountability discourses. Against a cultural background of neoliberalism (the extension of free market capitalism into every sphere of life) within third-level education,⁵ the capital potential of this new way of learning should not be underestimated. All of these advantages have contributed to the rapid and widespread uptake of simulation education.

From a critical perspective, rapid and widespread uptake of any new innovation should be accompanied by clear reflexivity on its educational value, including any unforeseen consequences. In this

article, we explore a key concept from postmodern theory, that of Baudrillard's simulacrum, and explore its relevance for the contemporary trend towards simulation education.¹ We use this theoretical approach both to sound a cautionary note regarding the progression of simulation-based education, and to suggest future directions for pedagogy within this frame.

2 | THEORETICAL FRAMEWORK

Postmodernism, the movement to which Baudrillard contributed, offers a philosophical corollary to modernism.¹ Modernism, popular in the mid-20th century, was predicated on belief in forward progress, achieved in scientific terms through experimentation and the scientific method (positivism). Postmodernism is far more relativist and fragmented, with multiple realities, subjective, socially constructed meanings and no singular universal truth. Grand theories (eg, of religion, science or Marxism) are eschewed. Pure (positivist) empiricism is treated as an expression of power by privileged groups within a constructed scientific hegemony.⁶

From this philosophical base comes Baudrillard's concept of 'simulacra.'¹ The basic concept is of a copy that is indiscernible from the original and eventually comes to replace it. The copy then becomes the new reality. Baudrillard defined this process as *orders* of 'simulacra.'¹ First-order simulacra are made from nature and easily discernible as copies. Second-order simulacra, for example, resulting from mechanisation and industrialisation in the 20th century, are indistinguishable from the original. It is the third order, however, which is most disquieting and of greatest contemporary relevance. In a world of virtual reality, email cloning and 'fake news,' there is no longer any clear prototype to be followed by reproduction. We live in a constructed world, which has become 'hyperreal.'⁷ The original is not just indistinguishable, but its meaning is completely lost.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2020 The Authors. *Medical Education* published by Association for the Study of Medical Education and John Wiley & Sons Ltd

There is a long history of theorising the potential for oddness in simulacra; Freud, for example, used the term *unheimlich*⁸ to describe that familiar sense of unease we have all experienced as *déjà vu*. This ineffable dread could be induced by ghosts, fairy tales and human simulacra, such as lifelike dolls. Then in 1970, in the field of robotics, Mori introduced 'The Uncanny Valley.'⁹ He noted that we tend to find lifelike robots more appealing, but only up to a point: if they become too much like us, we are suddenly repelled and afraid. When plotting this relationship on x and y axes, this reaction is represented by a sudden dip in the curve: the uncanny valley.

In HPE, we can discern simulacra of patients, doctors, consultations and more, spanning from the plastic disembodied torsos on which undergraduates practise examinations, to the sophisticated laparoscopic trainers for surgeons, to the widespread use of standardised (simulated) patients (SPs) in teaching and the entire format of examinations known as objective structured clinical examinations (OSCEs). With each of these, however, it is essential that educationalists consider their use critically and reflexively. Arguably, by losing our sense of the uncanny we may lose contact with our original meaningful reality - that of therapeutic relationships between humans. Baudrillard's simulacra provides a useful lens to theorise the future development of these popular forms of education, and a cautionary approach against the hyperreal.¹

3 | SIMULACRA AND ASSESSMENT

The notion of simulacra can be considered within the domain of assessment (particularly more behavioural forms of assessment, such as the OSCE), where aspects of clinical practice are simulated in order to facilitate judgements on competence. We have previously extensively problematised the industrialisation and standardisation of this type of assessment practice, citing unintended negative consequences of OSCEs in terms of identity and pedagogy.¹⁰⁻¹³

In terms of the simulacra, OSCEs can consist of simulated patients, simulated doctors and simulated consultations, often taking place within simulated, constructed environments.¹⁴ These high-stakes, rigid and industrialised examinations offer students 'patient' encounters that really matter, arguably more than workplace encounters, because they are often essential for career progression. Cased within this is dissimulation, where simulation is employed deliberately by a participant as an act of concealment. Through their performance in an OSCE assessment, participants may attempt to exert control of how they are perceived by examiners. In so doing, they may portray a presentation of self that is aligned to assessment objectives, when attempting to conceal any lack of knowledge or expertise, or any other 'undesirable' characteristic that they might have. Although students' participation in these examinations can be constructed as convincing simulations - performing skills for an audience of one, the examiner - the moment may feel as real for them as any 'real life' clinical encounter.¹⁵ One clear illustration of this idea is the assessment of clinical communication skills through role-played OSCEs. These could be considered third-level simulacra,

not just 'driving learning' as the truism goes, but actually 'becoming' learning, and indeed becoming entirely distanced from real-life communication.

4 | SIMULATION EDUCATION AS HYPERREAL

In teaching practice, simulation is not always sophisticated: a simple role play, taking a history or practising examination with colleagues, are all first-order simulacra. In these examples, the 'copy' is clearly distinguishable from clinical practice. More familiarly, however, simulation is often now high tech and based in educational centres, within universities rather than hospitals.

Purpose-built simulation centres are often expensively stocked with technology, mannequins, disembodied plastic body parts, two-way mirrors, and a control bank of switches hidden behind the scenes (Figure 1). They can appear sterile: no life-threatening emergencies, no blood, no mess, and nothing beyond control, although the illusion of chaos may certainly be created (and paused as necessary). Instructions are relayed via a disembodied voice. In an echo of Foucault's panoptic surveillance,¹⁶ learners are watched and then watch themselves on video. These high-tech, highly monitored and highly controlled environments are, in Baudrillard's terminology, 'hyperreal.'¹

To the casual outsider, sim centres may appear to offer little to rival 'real' health care settings as learning environments. The mannequins may well appear to fall into Mori's uncanny valley,⁹ the simulations themselves containing none of the true potential for panic and unpredictability of the clinical workplace, and the whole thing offering potential for parody; the classic misadventure of a breast examination mannequin worn by a man, for example.¹¹ As with OSCEs, however, the serious financial and educational investment in complex simulation means that for both teachers and learners it can become the only form of reality that 'matters,' in the sense of academic progression and accountability. Clinical humanity, complexity



FIGURE 1 Example of a simulation education centre

and uncertainty are at risk of being elided, as the hyperreal replaces the real in hearts and minds. Clinical scenarios are run according to computer protocols, and if it is a disaster, the stakes are far lower than in real life; if a simulation goes poorly and it is 'game over,' there are no patients at risk. The 'players' can simply reset and start again. This is both the greatest advantage and the greatest risk of this form of education.

5 | PRACTICAL IMPLICATIONS

There is nothing as practical as a good theory, said Kurt Lewin.¹⁷ Simulation education is a pedagogical technique, which is massively on the rise, highly technological, but under-theorised. As Bligh and Bleakley suggested, 'by applying analytic lenses such as this, we may hone and harness its capabilities in the best interests of learners and, of course, their non-simulated patients.'¹⁸

5.1 | Maintaining the real from the hyperreal

There is no denying the presence of simulation, and no need to deny it as a force for good, but we argue that simulation has its complement in an increased pedagogical focus on workplace learning and workplace-based assessment. In the recent past, students of health professions learned largely by apprenticeship.¹⁹ They examined and treated patients, functioning as part of a team within hospitals and clinics, and were socialised into clinical practice and culture by role models and mentors.²⁰ Although clinical experience is still an important part of HPE, the contemporary dominance of discourses of accountability, standardisation and efficiency has led a move away from on-the-job learning.²¹⁻²³

Yet it is on the wards, in clinics and in patients' homes where simulation can be translated and made contextual. There is considerable work to do here in joining these two halves together in a way that is coherent and integrated.²⁴ Rather than seeing simulation and workplace learning as separate strands, let us design thoughtful curricula explicitly linking these experiences together.

Opening up new frontiers, in situ simulation offers new and important learning opportunities for health care professionals. Here, the context of the simulation is authentic (ie, the real working environment is used as the learning environment); however, patients are replaced by actors or manikins in a constructed scenario of events. In situ simulation aims to achieve context authenticity in simulation.²⁵ Not just authenticity in the material environment, but authenticity in the uncertainty and complexity that are often entwined in such real-world environments and systems. By means of in situ simulation, such complexities, and potential latent errors, can be brought to the surface and actions taken to reduce patient harm.²⁶ Carefully applied and within a broader curriculum, this can build a bridge between simulation training and clinical practice.

Acknowledging the need to best prepare students to navigate the uncertainty and unpredictability of real clinical environments,

there has been growing interest in harnessing sociomaterial theories in simulation-based education, including complexity theory,²⁷ not only using complexity theory to help guide the design of simulations, but also to make visible the important sociomaterial dynamics and relations that can often go unnoticed in simulation-based education. For example, viewed through this lens, learning with manikins can be challenging and complex. However, even simple interactions between two individuals can be exceptionally complex, with parallel dynamics of sense making and unpredictability in their interactions.²⁸ It could be argued that preparing simulated patients with techniques that promote unpredictability (eg, improvisation acting techniques) may go some way to enhancing authenticity.

5.2 | Developing criticality in simulation education

There is a subtle difference between gaining valuable practice time in a safe space - the first-order simulacra we describe above - and cataclysmic third-order type simulacra in which all useful meaning is constructed within the simulation. In the latter case, just like with OSCEs, we risk producing health care professionals unable to manage the unpredictability of human nature and human illness, or even the sometimes chaotic environments of hospitals and clinics.

Careful reflexivity and critical thinking can be used to counter undesirable effects of efficiency and accountability discourses. We advocate for attention to sociocultural context, emotions and agendas, with person and public participation in designing and delivering simulated scenarios. Debriefing on the essential constructed nature, with clinical role models, can help bridge between workplace learning and simulation.

Technology is at the heart of simulation, but may be humanised by creativity in its application; consider, for example, a simulated living room, with cushions, ornaments and a mantelpiece, in which to conduct a home visit. Language, as a central mediator of relational care, has so far received comparatively little attention in this compelling technology-rich world. With the caveat of our first point applied, and careful attention to language use, simulation may thus become a useful and safe training space for challenging areas of non-craft specialties, such as family medicine and mental health.

6 | REFLEXIVITY

All the authors (JLJ, GPK, GJG and HR) are clinician educators and family doctors. Two are critical researchers, one an institutional ethnographer and one a professor of simulation, engaged in shaping the next generation of simulation educational practice. We collectively draw on the simulacrum to problematise aspects of simulation-based education, in the spirit of critical consciousness and praxis: acknowledging its undoubted strengths and usefulness, but seeking clarity and reflexivity on its limitations, and setting potential directions for its future innovation.

We take a critical position and we contend that no protocol or guideline can truly ever capture the totality of human experience or medical practice. There is a contradiction in discourses of patient safety and accountability and the knowledge that to err is human. We accept that contradiction, and we use simulation to teach our learners how best to manage this uncertainty inherent in health care.

7 | CONCLUSIONS

Education is not apolitical; rather, it can be seen as a tool of reproduction (maintaining the status quo) or evolution (being used to bring about change). We contend that critical and reflexive exploration of any such innovation is essential, but also that this paper is particularly timely given the current neoliberal climate with the university sector. How and what we teach learners coming behind us will determine in part the future of their professional practice.

In this paper, we have brought a theoretical lens to bear on an aspect of education that is seeing rapid uptake and expansion. We have explored Baudrillard's simulacrum in accessible and relevant terms, and suggested means for its practical application.¹ In doing so, we are contributing to essential critical scholarship within simulation education.^{29,30}

Simulation education is of growing utility in educating health professionals. Our key message is that as this important field continues to grow, we should consider paying heed to its consequences. The real-life activities of health care are messy, complex, unscripted and unpredictable. By careful attention to linking workplace learning and other aspects of curricula with simulation, we may avoid creating third-level simulacra and thus, losing touch (metaphorically and physically) with clinical reality and the sheer humanness of health professional practice.

AUTHOR CONTRIBUTIONS

HR conceived the initial idea. JLJ wrote a first draft. GPK and GJG both contributed throughout writing by consultation and their specific expertise. All authors (JLJ, GPK, GJG and HR) were involved in redrafting and all approved the final manuscript.

ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

None.

ETHICAL APPROVAL

Not applicable.

ORCID

Jennifer Laura Johnston  <https://orcid.org/0000-0002-3999-8774>

Grainne P Kearney  <https://orcid.org/0000-0002-9686-3198>

Gerard J Gormley <https://orcid.org/0000-0002-1701-7920>

Helen Reid  <https://orcid.org/0000-0001-8530-1766>

REFERENCES

- Baudrillard J, Poster M. *Selected Writings*. Stanford, CA: Stanford University Press; 1988.
- Boza C, León F, Buckel E, et al. Simulation-trained junior residents perform better than general surgeons on advanced laparoscopic cases. *Surg Endosc*. 2017;31:135-141.
- Beyer-Berjot L, Berdah S, Hashimoto DA, Darzi A, Aggarwal R. A virtual reality training curriculum for laparoscopic colorectal surgery. *J Surg Educ*. 2016;73(6):932-941.
- Harries RL, Williams AP, Ferguson HJM, et al. The future of surgical training in the context of the 'Shape of Training' Review: Consensus recommendations by the Association of Surgeons in Training. *Int J Surg*. 2016;36(Suppl 1):S5-S9.
- Ball SJ. Performativity, commodification and commitment: an I-Spy guide to the Neoliberal University. *Br J Educ Stud*. 2012;60(1):17-28.
- Gergen KJ, Tojo JT. Organization science as social construction: postmodern potentials. *J Appl Behav Sci*. 2004;40(2):228-249.
- Watts M. Higher education and hyperreality. In: Smeyers P, Depaepe M, eds. *Educational Research: The Educationalization of Social Problems*. Dordrecht, the Netherlands: Springer; 2008:141-155.
- Freud S. *The 'Uncanny' (1919)*. MIT; nd:1-21. <https://web.mit.edu/allanmc/www/freud1.pdf>. Accessed September 19, 2019.
- Mori M. The uncanny valley. *Energy*. 1970;7(4):33-35.
- Johnston JL, Lundy G, McCullough M, Gormley GJ. The view from over there: reframing the OSCE through the experience of standardised patient raters. *Med Educ*. 2013;47(9):899-909.
- Gormley GJ, Hodges B, MacNaughton N, Johnston JL. The show must go on? Patients, props and pedagogy in the theatre of OSCEs. *Med Educ*. 2016;50(12):1237-1240.
- Kearney G, Gormley GJ, Wilson D, Johnston JL. Blurred boundaries: sexuality and power in standardised patients' negotiations of the physical examination. *Adv Simul*. 2018;3:11.
- Kearney G, Johnston JL, Hart N, Corman M, Gormley G. Protocol: exploring the objective structured clinical examination (OSCE) using institutional ethnography. *Int J Educ Res*. 2018;88:42-47.
- Bearman M, Ajjawi R. Actor-network theory and the OSCE: formulating a new research agenda for a post-psychometric era. *Adv Health Sci Educ*. 2017;23(5):1037-1049.
- McCourt C, Johnston JL, Cooper S, Gormley GJ. The level playing field: the impact of assessment practice on professional development. *Med Educ*. 2012;46(8):766-776.
- Foucault M. *Discipline and Punish: The Birth of the Prison*. New York, NY: Pantheon; 1977.
- Lewin K. Psychology and the process of group living. *J Soc Psychol*. 1943;17:113-131.
- Bligh J, Bleakley A. Distributing menus to hungry learners: can learning by simulation become simulation of learning? *Med Teach*. 2006;28(7):606-613.
- Dornan T, Osler, Flexner, apprenticeship and 'the new medical education'. *J R Soc Med*. 2005;98(3):91-95.
- Sternszus R, Cruess SR. Learning from role modelling: making the implicit explicit. *Lancet*. 2016;387(10025):1257-1258.
- Wasfy JH, Borden WB, Secemsky EA, McCabe JM, Yeh RW. Public reporting in cardiovascular medicine. *Circulation*. 2015;131(17):1518-1527.
- Ten Cate O, Billett S. Competency-based medical education: origins, perspectives and potentialities. *Med Educ*. 2014;48:325-332.
- Andersen RS, Vedsted P. Juggling efficiency. An ethnographic study exploring healthcare seeking practices and institutional logics in Danish primary care settings. *Soc Sci Med*. 2015;128:239-245.
- Bates J, Schrewe B, Ellaway RH, Teunissen PW, Watling C. Embracing standardisation and contextualisation in medical education. *Med Educ*. 2019;53(1):15-24.
- Sørensen JL, Østergaard D, LeBlanc V, et al. Design of simulation-based medical education and advantages and disadvantages

- of in situ simulation versus off-site simulation. *BMC Med Educ.* 2017;17:20.
26. Weldon SM, Korciakangas T, Kneebone R. How simulation techniques and approaches can be used to compare, contrast and improve care: an immersive simulation of a three-Michelin star restaurant and a day surgery unit. *BMJ Simul Technol Enhanc Learn.* 2020;6(2): 65-66.
 27. Fenwick T, Abrandt DM. Towards sociomaterial approaches in simulation education: lessons from complexity theory. *Med Educ.* 2015;49(359):67.
 28. Gormley GJ, Fenwick T. Learning to manage complexity through simulation: students' challenges and possible strategies. *Perspect Med Educ.* 2016;5(3):138-146.
 29. Issenberg SB, Mcgaghie WC, Petrusa ER, Gordon DL, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach.* 2005;27(1):10-28c.
 30. Bartram R. The infidelity of place: medical simulation labs and disjunctures in pedagogical places. *Sociol Health Illn.* 2020;42: 293-306.

How to cite this article: Johnston JL, Kearney GP, Gormley GJ, Reid H. Into the uncanny valley: Simulation versus simulacrum? *Med Educ.* 2020;54:903-907. <https://doi.org/10.1111/medu.14184>