

Impact case study (REF3)

Institution: University of Huddersfield		
Unit of Assessment: UoA 3		
Title of case study: Training educators to deliver high quality simulation-based learning to health professionals in Europe to increase patient safety		
Period when the underpinning research was undertaken: 2011 - 2018		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
A J Bland	Senior Lecturer, Adult Nursing	9/2002 - present
S Prescott	Senior Lecturer, Adult Nursing	8/2005 - present
J Tobbell	University Teaching Fellow	7/2006 - present
A Topping	Professor of Nursing	7/2007 - 11/2013
A Hope	Senior Lecturer, Adult Nursing	8/2010 - 5/2013
Period when the claimed impact occurred: 2014-2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>Simulation Based Learning (SBL) is an educational approach used globally in clinical settings and universities. However, little was known about how best to train educators to deliver SBL. Researchers at the University of Huddersfield (UoH) developed the Nurse Educator Simulation-Based Learning Framework (NESTLED) which increased the knowledge and confidence of SBL Educators. These SBL Educators then delivered NESTLED-based SBL training across professional groups and clinical specialties in seven European countries, including the United Kingdom. Reduced risk of patient harm (e.g. reduced rates of low blood sugar events in one National Health Service (NHS) Trust) has been achieved by increasing staff confidence and knowledge, improving communication between teams and through delivering better clinical care by increasing the 'preparedness' of systems. It has contributed to annual cost savings of £1m in one NHS Trust and increased revenue (e.g. £240,000 in 2016/17) for industry.</p>		
<p>2. Underpinning research</p> <p>SBL is an effective educational approach that is widely used to replicate or intensify real clinical experiences with guided ones, providing a safe environment for student learning. However, educators need training to deliver SBL beyond simply learning how to use a simulation environment. Prior to this research there was no consensus on what was needed to effectively deliver SBL, or how to train nursing educators to use SBL effectively. Universities and healthcare organisations have invested heavily in sophisticated simulation equipment. However, the training of SBL educators has not kept pace with implementation. This has resulted in low educator confidence and a poor understanding of the potential of SBL in practice.</p> <p>Research led by UoH has identified the competencies required by SBL educators and developed the NESTLED framework, to support the training of SBL educators to deliver more effective SBL in their organisations.</p> <p>Bland and Prescott (at UoH since 2002 and 2005 respectively) are Senior Lecturers who led the research; each have approximately 20 years NHS experience in acute, critical and emergency nursing care. Other UoH collaborators were Tobbell, a University Teaching Fellow (since 2006); Topping, Professor of Nursing (2007-2013) and Hope, Senior Lecturer in Nursing (2010-2013).</p> <p>Bland led research [3.1] to explore simulation as an educational strategy within undergraduate nursing curricula and identified the most influential elements of simulation for learning. A concept analysis produced a robust definition of simulation, which was developed into a conceptual framework [3.2, 3.3].</p>		

In 2011, **Bland** and **Prescott** hosted an international SBL conference at UoH and initiated discussions with nursing academics from VIA University College, Aarhus (Denmark) and Metropolia University, Helsinki (Finland), who also used SBL. During these discussions, the lack of structured training programmes that prepared educators to use SBL effectively was highlighted, along with anecdotal accounts of a lack of confidence amongst SBL educators. This marked the beginning of an international research collaboration, leading to the publication of a rapid review [3.4] which identified educator competencies required for effective simulation-based learning.

In 2013, the researchers partnered with Laerdal Medical (a global company, based in Norway, that manufactures clinical simulation equipment) as an industrial partner. They joined the formal international NESTLED Collaboration; the Collaboration successfully bid for European Union Transfer of Innovation funding (€250,000) for the Nurse Educator Simulation-Based Learning (NESTLED) Study. This research involved the development and testing of a prototype competency framework to prepare educators to use SBL. The final NESTLED Framework comprised eight competencies: background to SBL, pre-planning, hypothetical case development, pre-briefing, delivery or “running the sim”, debriefing, evaluation of student learning and evaluation of SBL (the “learning experience”). These competencies, which collectively define the SBL educator role, were built into training sessions designed to be delivered over 30 hours of direct contact time.

The testing of the NESTLED Framework demonstrated a significant increase in participant confidence in preparing for an SBL event, including an understanding of the learning theories that support SBL. A significant increase in confidence in running the SBL event was also identified [3.5]. This prototype was then tested and refined in Denmark and Finland [3.6].

3. References to the research

[3.1] **Bland, A.J., Topping, A., & Wood, B.** (2011). A concept analysis of simulation as a learning strategy in the education of undergraduate nursing students. *Nurse Education Today* 31(7), 664-670. doi.org/10.1016/j.nedt.2010.10.013.

[3.2] **Bland, A.J., & Tobbell, J.** (2015). Developing a multi-method approach to data collection and analysis for explaining the learning during simulation in undergraduate nurse education. *Nurse Education in Practice*, 15(6), 517-523. doi.org/10.1016/j.nepr.2015.07.006.

[3.3] **Bland, A.J., & Tobbell, J.** (2016). Towards an understanding of the attributes of simulation that enable learning in undergraduate nurse education: A grounded theory study. *Nurse Education Today* 44, 8-13. doi.org/10.1016/j.nedt.2016.05.011.

[3.4] **Topping, A., Bøje, R.B., Rekola, L., Hartvigsen, T., Prescott, S., Bland, A., Hope, A., Haho, P. & Hannula, L.** (2015). Towards identifying nurse educator competencies required for simulation-based learning: A systemised rapid review and synthesis. *Nurse Education Today*, 35(11), 1108–1113. doi.org/10.1016/j.nedt.2015.06.003

[3.5] **Bøje, R., Bland, A., Sutton, A., Hartvigsen, T., Hannula, L., Koivisto, J., Raussi-Lehto, E. & Prescott, S.** (2017). Developing and testing transferability and feasibility of a model for educators using simulation-based learning - A European collaboration. *Nurse Education Today*, 58, 53-58. doi.org/10.1016/j.nedt.2017.08.005

[3.6] **Koivisto, J.M., Hannula, L., Bøje, R.B., Prescott, S., Bland, A., Rekola, L & Haho, P.** (2018). Design-based research in designing the model for educating simulation facilitators. *Nurse Education in Practice*, 29, 206-211. doi.org/10.1016/j.nepr.2018.02.002.

Evidence of Research Quality: Both *Nurse Education Today* and *Nurse Education in Practice* employ a double-blind peer review process for all submissions and are two of the leading nursing education journals. Bland’s research provided the foundation for the international collaboration which led to EU’s Lifelong Learning Programme funding in 2013: €250,000.

4. Details of the impact

The impacts from this research are the result of the 2016 adoption of the NESTLED framework by Laerdal Medical. Laerdal’s Educational Services Team worked with the international NESTLED Collaboration to adapt the NESTLED framework into a four-stage training programme, the NESTLED Faculty Development Program in Simulation [5.1]. Between 2016 and February 2019

Laerdal trained 237 NESTLED educators, across the healthcare and education sectors in seven European countries (UK, Germany, Denmark, Belgium, Netherlands, Luxembourg, and Spain) (Global Programs Director, Laerdal Medical [5.2]).

The NESTLED Framework has resulted in impact within three domains across Europe: increased confidence and knowledge of educators, leading to research-derived SBL teaching and changes to educational practices in higher education and the health sector; health and wellbeing of people by reducing the risk of patient harm; and economic benefit, by reducing NHS costs and providing new income streams for the NHS and industry. The NESTLED framework was developed in response to a lack of available training programs for SBL educators.

Increased confidence and knowledge of NESTLED educators, leading to research-derived SBL teaching and changes to educational practice in higher education and the health sector

In an evaluation of the impact of the NESTLED Faculty Development Programme on educators in the UK from 2017 to 2020 (co-authored by Bland and Prescott, [5.3]), 88% of participants (both nursing and medical) had received no other prior training in delivering SBL [5.3a]. The NESTLED training increased the confidence and both practical and theoretical knowledge of all participants (n=9) [5.3b], irrespective of previous experience, to deliver SBL in practice. One educator explained “the biggest thing that I got was a sense of confidence from NESTLED” (NESTLED educator [5.3c]). NESTLED training also changed educators’ understanding of the potential applications of SBL; “NESTLED made me think about how [simulation] is used as an educational tool. So rather than it’s about teaching how to manage a particular condition, it’s about how you implement skills you already have... NESTLED changed my view... it’s about the human factor stuff” (NESTLED educator [5.3d]).

NESTLED training led educators to change their SBL teaching practice at two large European educational institutions. The Bildungsakademie Volmarstein is a state-recognized Vocational Academy of Education for Nursing in Hagen Germany, which trains 100 nurses and 25 operating theatre technicians per year. Prior to NESTLED training, educators had no previous training or experience in delivering SBL and used classroom-based teaching alone. Within a new Centre for Simulation, established in 2019, NESTLED-based SBL is now offered to all students [5.4]. This has enhanced student learning and expanded the repertoire of educational delivery. Feedback from students has been very positive and they prefer SBL to the previous classroom teaching. “This is of course much better learning than usual” (Student [5.4]). The students have reported that they now see the links between theory and practice and they feel much more prepared for their practical placements.

Educators at VIA University College, Denmark, which trains 900 nurses per year, also changed their SBL teaching after NESTLED training in 2014 [3.5]. Their confidence to deliver SBL increased and they changed their approach to SBL to make it more evidence-based, despite being previously trained to use a different method. “On my campus I use my NESTLED training to teach all the nursing students (approximately 120 in each intake)...NESTLED was better for my role as a teacher because it is a research-based full package...The theoretical aspect of the training has made a big difference to way that I teach with simulation and the response from my students has been extremely positive...we get excellent evaluation scores from the students” (Senior Lecturer in Nursing [5.5]). Changes to practice included ensuring a focus on the debrief, including student observers in the simulation to double their exposure to learning opportunities and running simulations as multidisciplinary learning events by including clinical staff from the local acute hospital.

Reduced risk of patient harm

The risk of patient harm has been reduced as a result of NESTLED-based SBL training, by increasing staff confidence and knowledge, through better teamwork, and by increasing the ‘preparedness’ of systems. NESTLED educators have delivered SBL in the NHS across a wide range of clinical teams (optometry, obstetrics, general medicine, surgery, anaesthetics, and endocrinology) and professional groups (medical, nursing, midwifery, allied health professionals, students).

West Suffolk NHS Foundation Trust [5.6] has experienced a reduction in the incidence of low blood sugar (hypoglycaemic) events suffered by diabetic patients (19.5% vs. an England average of 23.3% and a Trust seven-year average of 27.7%), as evidenced in the 2019 NHS Digital National Diabetes Inpatient Audit (NaDIA). A major contributor to this improvement was the Trust replacing classroom-based teaching on the recognition and treatment of low blood sugar with NESTLED-based SBL. In a pilot in 2017 “We measured [before and after] low blood sugar simulation training confidence scores and 93% of staff who received this new method of training felt that they were more confident to recognise and treat low blood sugar. Confidence scores increased from 2.8/10 to 7.7 out of 10” (Diabetes Surgical Specialist Nurse [5.6]). Because the SBL pilot resulted in better identification of deteriorating patients and improved adherence to low blood sugar treatment protocols it was rolled out across the Trust. “Since the pilot we have implemented the hypoglycaemia simulation training across the wider surgery and medical teams. We now include simulation in our regular study days... and we have other general Trust Development Days that are run by our Matrons and we nestle hypoglycaemia simulation into these as well” [5.6].

In Calderdale and Huddersfield NHS Foundation Trust (CHFT) a NESTLED educator developed and delivered SHOC (Simulated Hospital Out of hours on-Call) training for 30 final year medical students in 2018/19, to prepare them to be ‘on-call’ as junior doctors. An evaluation demonstrated a 40% overall increase in students’ confidence in preparation for on-call shifts, a 30% increase in confidence in prescribing, and a 46% increase in confidence in managing an acutely unwell patient. One of the SHOC trainees reported that “the training was brilliant, it definitely helped increase my confidence... in prioritising jobs, prescribing, communication skills, how to be on call...” (SHOC trainee [5.3e]). SHOC has helped to boost CHFT’s reputation as a training hospital; the course won a Clinical Teaching Development Award from Leeds Institute of Medical Education at the University of Leeds in 2019.

In Sana Klinikum, a tertiary care academic teaching hospital in Duisburg, Germany, the Head of Paediatric Intensive Care described how NESTLED has improved patient safety on the unit, by improving teamwork and helping his staff become a more effective multidisciplinary team (MDT). This was achieved by increasing the profile of nurses in the MDT. “In Germany, nursing is not an academic profession and nurses... do not generally have the confidence to... challenge doctors about issues of patient care. We struggle to work effectively as MDTs” (Head of Department [5.7]). Since completing the NESTLED training in 2016, the unit now has a nurse NESTLED educator and more nurses have been included in their SBL. Nurses are encouraged to have a voice in SBL and doctors are encouraged to recognise nurses’ expertise and listen to, value and act upon their feedback as key members of the MDT. “The nurses now see themselves as part of the team. They are less passive and more confident to offer their professional opinions. The dynamics between professions has (sic) changed and our team is much more cohesive” (Head of Department [5.7]).

NESTLED educators improved the preparedness of NHS systems, by using SBL to demonstrate deficiencies that in turn increased the risk of patient harm. In the Queen Elizabeth Hospital NHS Foundation Trust, Kings Lynn, NESTLED educators used SBL to improve patient safety in the emergency department. After observing that the issues recorded in Datix (the risk management software for healthcare and social care organisations) indicated a lack of practical skills with equipment in acute situations, they focussed SBL scenarios on the use of equipment when under pressure and consequently reduced the number of Datix complaints. “We’ve had a huge number of complaints... ‘not using the system properly’, ‘equipment’ and that’s dramatically dropped off,” (Emergency Department Paramedic Educator [5.3f]). In West Suffolk Trust, NESTLED-based SBL was used as part of a Serious Incident Action Plan after a diabetic patient suffered a hypoglycaemic event. SBL made the lack of equipment to manage low blood sugar visible to senior management, who then rectified the system, “So, off the back of that, the very next day, they got all the equipment to manage hypoglycaemic patients” (SBL educator, [5.3g]).

Reducing NHS costs and providing new income streams for the NHS and industry

CHFT and Basildon and Thurrock University Hospitals NHS Foundation Trust saved £1m and £400k respectively per year on their Maternity Clinical Negligence Scheme for Trusts insurance, as a result of NESTLED Educators in the Trust [5.3h]. These educators were, because of their

NESTLED training, judged to be eligible for additional training to equip them to deliver Maternity Acute Illness Management (MAIMs) courses. MAIMs were developed by the Greater Manchester Critical Care Network in response to the 2011 Confidential Enquiry into Maternal Death. In 2018/19 CHFT achieved a 95% MAIMs compliance rate across its two Birthing Centres in Halifax and Huddersfield, one of which is midwife-led. CHFT also now provides MAIMs training for the Yorkshire region, providing a new income stream for the Trust. CHFT has subsequently purchased more SBL equipment and NESTLED training. This echoes the broadening reach and impact of NESTLED training in Germany where educators from the Sana Clinic in Duisberg now provide SBL for paediatricians working in the private sector and other academic paediatric units in Berlin [5.7].

The increased NHS investment in NESTLED training (and the accreditation of NESTLED training at Masters level at UoH) has enhanced the credibility of Laerdal within the NHS. This increased credibility has made viable a new Laerdal Educational Services team, contributing 2.8m NOK (£240,000) to Laerdal revenue in 2016/17 and generating a '10% pull through in NESTLED' related sales (Programmes and Services Manager for Laerdal Medical [5.8].

5. Sources to corroborate the impact

[5.1] <https://www.laerdal.com/gb/services-and-programs/nestled/>

[5.2] Leif Henriksen, Global Programs Director, Laerdal Medical, 25 Feb 2019. Slide 3.

[5.3] NESTLED Evaluation Report 2020. Specific quotes 5.3a to 5.3h (text locations in cover note).

[5.4] Testimonial, Teacher in Nursing and Health at the Bildungsakademie Volmarstein, Hagen, Germany, Dec 2020

[5.5] Testimonial, Senior Lecturer in Nursing, Danish University, Nov 2020

[5.6] Testimonial (NaDIA), Dec 2020

[5.7] Testimonial, Senior Physician and Head of Paediatric Intensive Care, Sana Klinikum, Duisburg, Germany, Dec 2020.

[5.8] NESTLED European Sales Meeting, Jan 18. Slides 2&3.