

# The role of ultrasound simulation in increasing Clinical Placement capacity for BSc (Hons) Radiography students – how did the students feel?

Donna Holdcroft Radiographer, Sonographer, Academic and Clinical Researcher

## Background

- Ultrasound imaging is included in the range of experiences required within the BSc Diagnostic imaging curriculum (HCPC, 2016). In practice, this was particularly difficult to access in the Hospital Environment during the Covid Pandemic due to social distancing rules. Because ultrasound imaging can be undertaken in an environment without the safety requirements of ionizing radiation or Magnetic Resonance (MRI) imaging, ultrasound examinations are often undertaken in small ward / office areas. This results in social distancing being impossible and students were often excluded as they were not necessary for the patient's examination.
- To overcome this problem, it was decided that ultrasound training could potentially be undertaken within the Clinical Skills facility within the University using handheld transducers (purchased) capable of linking with I pads (already owned by the University) using specialized ultrasound phantoms (loaned) and supervised by an appropriately qualified Academic member of staff. Monies were raised for the purchase of the transducers via funding available from Health Education England (HEE) to support health care training during the Pandemic and arrangements were made to loan the ultrasound phantoms for use in this feasibility study.
- The Clinical Placement team was consulted, and the Modality Placement documentation was adapted by an Academic member of staff who had previously worked full time in an ultrasound department. The title of this scheme was given – "Shared Placement".
- Evaluation and pedagogical reinforcement was subsequently undertaken to ensure this method was fit to meet the requirements of the required regulatory bodies monitoring such educational programmes.

## Aims

- The aim of this study is to review the completed questionnaires related to whether students believe that Reality Simulation has a place in Clinical Training of Student Radiographers. If successful, this study may offer an opportunity to increase Clinical capacity to facilitate the increase in the number of student radiographers in training.

## Objectives

- To create / develop a questionnaires for Student Radiographers.
- To deploy the questionnaires to the correct students
- To collate all the completed questionnaires.
- To analyse and understand the results from the questionnaires.
- To understand the positive and negative reactions of student Radiographers completing reality simulation.
- To understand the thoughts, reasonings and feelings of students regarding whether Student Radiographers should undertake ultrasound reality simulation training.
- To propose recommendations as to whether Student Radiographers should have reality simulation training as part of their studies and to implement these recommendations.
- Ethical approval for the study was granted by Keele University



## Methods

- This was a quantitative and qualitative study using Likert scales and open ended questions to demonstrate the impressions third year radiography students at Keele University, examining the role of ultrasound simulation to compliment or potentially replace ultrasound training in the hospital environment. Student perceptions were investigated qualitatively through an online questionnaire effective for collecting generous amounts of information. This contained an open question, Likert statements and closed option questions. Closed ended questions are effective as the data is easier to analyse, open ended question were built in to achieve a superior level of understanding and more accurately reflect the participants opinion. A five-part Likert scale type of questions were included to indicate a degree of confidence.
- An information sheet was provided along with a consent form. Completion of the questionnaire was taken as consent to participate in the study.
- The questionnaire was created using Microsoft Forms and was both voluntary and anonymous to encourage student participation and honesty.
- Analysis was undertaken using Microsoft Excel software, the raw data was tabulated. The qualitative data was analysed.

## Results

- Following simulation training, 100% of students considered simulation training met expectations, increased knowledge and would recommend to their peers, 80% of students responded with the response of the training offered complimented placements and 50% of students considered University ultrasound training could replace this provision in hospital environments.



## Comments for improvement in future sessions included:

- I think this session was really interesting as we were allowed to experiment and have experience in ultrasound which will help to decide if this a future career option. I think this was more helpful in providing experience than in the clinical setting.
  - It would be interesting to be give a patient request card and to determine the type of probe and scan as required
  - Maybe talk about the common pathologies of areas and what they look like.
  - I wouldn't replace part of the clinical placement with the workshop but it is definitely an additional resource that I think all students should attend
  - Not sure, it was great to watch and listen to you talk us through the anatomy, both in the phantoms and in the students who volunteered to be scanned.
  - There should be more workshops with students being shown step by step in the workshop the anatomy of dummy.
- Analysing the students' comments, it appears they enjoyed experimentation and the opportunity to interact in a more informal environment than the traditional one where patients are present. Indeed, it was suggested that all students should have this opportunity and more workshops should be held. I consider this a positive result!



## Pedagogical support

- Virtual reality simulation is a relatively new concept in Health Care education and provides students with the opportunity to practice their skills in a safe environment, providing scaffolding for real life experiences.
- Constructivists believe that students learn through activities creating meaning and additionally, learning is qualitative rather than quantitative. Ultrasound simulation allows an opportunity for this concept and potentially aligns to the HCPC requirements of the completion of a minimum number of Clinical hours to meet criteria for registration. Literature supporting this theory can be found by authors such as Biggs (2011), Bruner (1961), Dewey (1983) and Vygotsky (1978) among others. Opportunities for personal feedback and individual design of learning events fits well with Virtual Reality Simulation motivating students to achieve their own goal and organise their own time, priorities, and expectations.
- Not only does this improve students' technical abilities, but it also enhances cognitive and behavioural skills, particularly in those students with neurodiversity who often excel at pattern recognition (Marshall, B., 2020). Simulation offers students the opportunity to be better prepared for real-world clinical environments and patient encounters. Situational encounters prior to real life clinical placement can only improve the experience for all parties involved, students, health care supervisors and most importantly, the patient.
- Blooms Taxonomy (1956) suggests that deeper learning is achieved as students start to apply new knowledge. These groupwork sessions offered an opportunity to acquire new knowledge and apply this in a supportive environment underpinned by familiar academic staff and peers. Hockings et al (2008) suggests that students who are most deeply engaged will reflect, question, conjecture, evaluate and make connection between ideas. These sessions offer just this opportunity and probably contributes to their success. Students were offered the convenience to question in a controlled environment away from patients. In contrast students who are disengaged appear to take a surface approach to learning by copying out notes, focusing on fragmented facts and jumping to conclusions. Practical group sessions support engagement and offer opportunities for Academics to identify disengaged students and change their approach to encourage participation.
- Social constructivist theorists believe that knowledge is developed through contestations and struggles. Allowing the students to practice on ultrasound phantoms offered this unique opportunity to them. Ultrasound is a challenging user dependent skill and allowing the students to practice on phantoms supported their discourse and allowed safe development of skills. Creating groupwork situations better creates these scenarios (Ashton and Stone, 2017) and due to the nature of healthcare it is near impossible to offer these opportunities in a traditional Clinical environment. This view is supported by other sociocultural learning theorists such as the Communities of Practice theory (Wenger et al, 2002) who believe social learning occurs when people have a common interest in a subject, collaborate over an extended period of time, sharing ideas and strategies, determining solutions, and building innovations.
- The groupwork theory sessions undertaken prior to the practical work support Masika and Jones (2016) theory who concluded that Membership to a peer community of practice through face to face and online collaboration increased student engagement, confidence, and sense of belonging. Students get immediate and detailed formative feedback, both from each other and from their tutor (Masika and Jones, 2016). In this scenario feedback can be given in a timely and supportive manner promoting student confidence.

## Conclusion

Ultrasound simulation training within the University has the potential to partially replace current Clinical training in the hospital environment. With increased demand for Clinical Placements this could be an option to increase capacity.

**References**

Ashton, S., & Stone, R. (2017). *An AZ of creative teaching in higher education*. Sage

Biggs, J. (2011). *Teaching for Quality Learning at University: What the Student Does*. 4th ed. London: Society for Research into Higher Education (SRHE) and Open University Press (McGraw-Hill). Pg. 40-48.

Bloom, B.S. (1956). *Taxonomy of educational objectives: The classification of educational goals*. New York, NY: Longmans, Green, Bruner, J. S. (1961). *The act of discovery*. *Harvard Educational Review*, 31, 21-32

Dewey, J. (1907/1983) *The control of ideas by facts*, in: J. A. Boydston (ed.) *John Dewey: The Middle Works*, vol. 4

Marshall, b. a. *Neurodiversity, The Next Phase in the Diversity Discussion*. Inclusion, diversity, equity, accessibility, leadership, and social justice (Ideals). *Public Management*, December 2020, pg 13 - 15

Masika, R. and Jones, J. (2016) *Building student belonging and engagement: insights into higher education students' experiences of participating and learning together* *Teaching in higher education*, 02-17, Vol.21 (2), p.138-150

[HS Long Term Plan - Online version of the NHS Long Term Plan](#) (2019) accessed 8.2.2022, Richards Professor Sir Mike (2020) *Diagnostics: Recovery and Renewal - Report of the Independent Review of Diagnostic Services for NHS England*

Wenger, E., McDermott, R. A., Snyder, W. (2002) *Cultivating communities of practice: a guide to managing knowledge*. Harvard Business School Press.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological processes*. MA: Harvard University Press.

