Creation and introduction of a skills and simulation delivery framework Part I:

Part 1: Student perception of skills and simulation delivery within a nursing curriculum

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Abstract: The existing delivery method for skills training is very task focused and delivered in large groups with limited time for actual 'hands on' practice of skills. Simulation was only included, sporadically, within the curriculum. A questionnaire was designed to ascertain the student's existing level of experience in skills and simulation, in addition to their opinion as to how effective the current method of delivery was in relation to a positive learning experience, and generation of knowledge. Their viewpoint was also sought as to any thoughts they may have in relation to changing the delivery of The results demonstrated that, overall, there was a negative response from the students in relation to the current delivery of skills and simulation. The study identified further areas for research in relation to the delivery and integration of skills and simulation within a pre-registration nursing curriculum.

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Introduction

This paper is the first in a series of studies looking at pre-registration nursing students' perceptions of clinical skills and simulation delivery within the curriculum at the authors' HEI (higher educational institution). This initial paper aims to focus upon the student's perceptions prior to the implementation of a new framework for the integration of clinical skills and simulation. Subsequent papers will explore the specific framework and the student's perception of clinical skills and simulation delivery following implementation.

The primary aim is to gain an understanding of the value student nurses place on the existing delivery of clinical skills preparation within an undergraduate curriculum.

Literature Review

A broad scoping search was undertaken via Google Scholar using the following search terms:

'simulation integration strategies higher education AND OR healthcare, simulation curriculum integration for undergraduate nurses, undergraduate nursing students'

'perceptions of simulation, student nurses negative experience clinical skills delivery in the education setting, nursing student's simulation experience'

For the purpose of this study the search terms were filtered for literature published between the years of 2016 to present to ensure that the most current evidence was explored.

Simulation based education (SBE), is being integrated into many undergraduate nursing programs. Notably, there is a wealth of evidence to support the use of SBE as an effective modality (Bruce et al., 2019). However, there is no current literature that describes a system of integrating simulation within an existing curriculum, in a standardised manner, or one that is based on a 'scaffolding' design, increasing in complexity over a three-year program, as the knowledge and skills increase with the student.

This finding was recently echoed within the literature, as Ferguson et al. (2020) conclude that there is a gap in how a simulation strategy becomes effectively implemented and embedded within an existing curriculum. Using transcribed interviews from higher educational institutes (HEI) within the north of England, it was found that there were 'considerable variations' of SBE implementation (this was over 11 NHS Trusts and 4 HEIs). This lack of a standardised and structured approach has a reportedly profound effect on the effectiveness of learning. Reasons for this lack of standardisation included poor implementation, staff confidence, funding and a lack of general understanding about the delivery of SBE.

One of the common themes among students' perceptions regarding SBE in HEI, is self-reported anxiety levels. Al-Ghareeb et al. (2017) & Shearer (2016) report in their respective studies, that anxiety surrounding SBE included factors such as knowledge gaps (not being prepared for the simulation with prior knowledge), not knowing what to expect from the simulated event, unfamiliar to scenario/subject matter, being judged by their peers and lack of clarity during the debrief period. Al-Ghareeb et al., 2017; Shearer, 2016 found instances where this had a negative effect on their clinical performance. Gray et al. (2019) comment other barriers to SBE being large class sizes, overcrowded clinical teaching laboratories, lack of trained instructors, limited faculty resources, and a general lack of student engagement, (Gray et al., 2019).

In addition, and more recently, Roh et al. (2020) reveal that the majority of anxiety towards SBE resulted from the lack of consideration of 'psychological safety' within the design of simulation events. Interestingly, psychological safety considers many of the aforementioned negative elements, noting that a student-centred approach created a better learning environment. This includes clearly defined learning objectives that are present both in the simulation event and within the debrief, well trained instructors/educators, and the complexity of the simulation meeting the abilities of that student group. Considering psychological safety requires instructors to be more aware of the feelings of students towards SBE, as this level of peer/mentor interaction, improves the clinical performance and engagement levels during their simulation experience, maximising educational value (Roh et al., 2020 & Ferguson et al., 2020).

In a recent meta-analysis, (Chernikova et al., 2020) conducted a review of 145 empirical studies, looking at both the simulation technologies and scaffolding methods used. Although, unsurprisingly, the study reported that the use of simulation to teach complex skills had a 'large' positive

overall effect, the more interesting finding was the comparison between students with either a low or high prior knowledge of the subject. Those who demonstrated a low prior knowledge, benefited from 'examples' of practice, conversely those demonstrating a higher prior knowledge, benefited more from the reflective components of a simulation. Chernikova et al. (2020) conclude that the scaffolding of simulation events, matched alongside different phases of development, were most effective (Chernikova et al., 2020).

Another alternative look at students' perceptions of SBE in HEI, comes from a study by Bruce et al. (2019) looking at the perceived value of SBE, from the viewpoint of a qualified nurse, and the transfer quality of their experiences. Although there are many positive accounts for how their simulation experience impacts on their clinical performance, many commented on the limited access to simulation and the time limitations on them once undertaking simulation. The other noteworthy aspect is that the, now graduate, nurses, believed the lack of exposure time and frequency of simulation opportunities, may be related to their perceived degrading knowledge and skill base, when applied in the clinical environment (Bruce et al., 2019).

This was also demonstrated in the literature review findings of Hanshaw & Dickerson, (2020) who found inconsistent exposure time of SBE with simulations ranging from 15 minutes to 8 hours, and the overall exposure of simulation events throughout the curriculum equally as inconsistent. Furthermore, the 'dose' of simulation exposure for an optimal effect is still unknown, but the regularity of exposure Hanshaw & Dickerson note, is key to gaining necessary critical thinking skills, this was against studies where students received vastly reduced simulation exposure (Hanshaw & Dickerson, 2020).

A study that *has* addressed exposure and scaffolding in the simulation design was that of Woda et al. (2017) by 'sequencing' simulation events over a 14-week period, utilising 3rd year baccalaureate nursing students (against a less structured approach reminiscent of current practice). This structure (providing regularity, gradual complexity increases and scaffolding) found students to feel less anxious, be more engaged and have higher self-reporting confidence scores for clinical decision making (CDM). Amongst other reasons, students reported that these scores most likely reflected a gradual and regular exposure to the, simulation setting, mannequin, and environment over the 'semester'.

The literature review has revealed some common themes regarding

SBE in HEI, looking at many barriers, differences in simulation provision, simulation exposure and from the student perspectives; the anxiety that SBE can create, perception of learning goals and subsequently the perception of 'worth' of the simulation event, and the overall effects on their performance during the simulation. Ultimately, this can affect the application of skills, knowledge and experience to the clinical environment. Conversely, there are common themes pointing towards an improvement in the manner which SBE is designed and 'sequenced'. This review points towards a student focused design- the complexity of which-matches their current knowledge and skills. Additionally, structured and scaffolded, or as Woda et al. (2017) refers to as 'sequenced' integration of a simulation programme that increases in its own complexity alongside knowledge and exposure to simulation over the course of their undergraduate programme, would be desirable. To mirror Ferguson et al., (2020) the review also recognises gaps in the research that looks specifically at student focused and sequenced SBE curriculum integration, although they are reported, they are under researched.

Method

This study used a mixed methodological approach. Denscombe (2017) describes several different ways the methodology of a study can be mixed: it can be a mix of designs, strategies, or analysis. This study took a mixed methodology of research methods with both qualitative and quantitative data being collected using a questionnaire. A mixed methodological approach was chosen in order to allow a more detailed understanding of the impact of our intervention than would be obtained through using either quantitative or qualitative work alone (Östlund *et al.*, 2011). In our work, the qualitative data helped to interpret the quantitative, making what is known as a QUANT-qual study (Fetters and Freshwater, 2015). In complex systems, such as healthcare settings, quantitative and qualitative methods individually are often too simplistic to yield meaningful results (Cresswell *et al.*, 2011).

The study targeted all first and second-year pre-registration nursing students who were asked to complete a questionnaire seeking their opinion about the existing delivery of clinical skills and simulation. This included adult, child and mental health students. The selection of students was

anonymized, and all students were made aware that they were taking part in a research project but could withdraw at any point without providing any explanation. Any data collected would be destroyed. An information sheet and informed consent was obtained. The University ethical permission was granted. The questionnaire consisted of 2 sections; firstly, a group of subject areas which students were asked to rate their confidence in on a Likert scale from 1 (very poor) to 5 (very good). Secondly, students were able to give free-text responses about their experiences of SBE.

The aim of this research is to have both qualitative and quantitative data to support the hypothesis that a framework is needed to integrate skills and simulation with a healthcare education curriculum. The use of this mixed methodological approach should provide stronger data and a more robust result than either method individually (Östlund *et al.*, 2011).

The inclusion criteria for this study were first- and second-year nursing students. The exclusion criteria were any other student groups from other disciplines, and third year nursing students as they would be unavailable, due to having left the University, for the implementation of the new approach, and the follow up questionnaires.

Findings

Quantitative Results

A total of 57 questionnaires were returned by first year students (34 adult nursing, 7 children's nursing and 16 mental health nursing), and 26 by second year students (20 adult nursing, 5 children's nursing and 2 mental health nursing). Mean response scores, and percentage of students rating their confidence as "good" or "very good" were calculated. Due to relatively small numbers of students in each group, statistical analysis of inter-group differences was not performed.

Perhaps unsurprisingly, year 2 students were more confident than year 1 students in most areas. Children's nursing students appeared to rate their confidence higher than adult or mental health nursing students, although this may be a result of the much smaller numbers of children's and mental health nursing students taking part. The majority of students (60%) felt challenged and stimulated by their clinical skills training, but under a third (31%) felt they had received enough clinical exposure in

the university setting. Students were least comfortable in their abilities to communicate with the multidisciplinary team, and most comfortable preparing to give care. Students also felt confident in communication with patients and prioritising care, and lacked confidence in assessing the impact of interventions, and in their own critical thinking.

Mean responses from each group to each question are summarised in table 1.

Table 2 shows the percentage of students in each group who rated their confidence as "good" or "very good" in each area.Table 1: Mean scores from each cohort (adult, child and mental health nursing students in years 1, 2, and all combined) in response to being asked to rate their confidence in each area on a Likert scale.

Table 1

Mean scores from each cohort (adult, child and mental health nursing students in years 1, 2, and all combined) in response to being asked to rate their confidence in each area on a Likert scale.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Adult Y1	3.44	2.74	3.79	3.62	3.59	3.68	3.85	3.24	3.41	3.09	3.18	3.00	3.06	3.41
Child Y1	3.86	2.83	3.50	3.00	3.33	2.67	2.50	2.67	2.83	2.67	2.83	2.67	2.33	2.67
MH Y1	3.94	2.94	3.94	4.06	3.44	3.63	3.44	3.00	3.38	3.44	3.75	3.13	3.56	3.69
All Y1	3.58	2.79	3.79	3.67	3.51	3.54	3.58	3.11	3.33	3.14	3.30	3.00	3.12	3.40
Adult Y2	3.58	3.05	3.63	3.53	3.89	3.95	3.74	3.47	3.00	3.21	3.32	3.16	3.68	3.68
Child Y2	4.00	4.00	4.40	4.20	4.20	4.60	4.40	4.20	4.00	3.80	4.20	3.80	3.60	3.60
MH Y2	3.50	3.00	3.50	3.00	3.50	3.00	3.00	3.00	2.50	2.50	3.50	3.50	3.00	4.00
All Y2	3.65	3.23	3.77	3.62	3.92	4.00	3.81	3.58	3.15	3.27	3.50	3.31	3.62	3.69
All Adult	3.13	2.49	3.43	3.34	3.36	3.43	3.40	2.96	3.00	3.02	3.06	2.74	3.04	3.26
All Child	4.00	3.58	4.25	4.08	4.00	4.00	4.00	3.58	3.58	3.58	3.75	3.50	3.33	3.75
All MH	4.72	3.78	4.50	4.28	4.22	4.22	4.17	3.89	3.89	3.39	4.00	3.89	3.94	4.00
All	3.56	2.89	3.74	3.61	3.60	3.64	3.61	3.21	3.24	3.14	3.32	3.06	3.24	3.45

Key to Questions:
Q1. Communication with patients. **Q2.** Communication with the multi-disciplinary team (MDT). ie. were you prepared to discuss patients with doctors, physios, health care assistants etc.. **Q3.** Preparing to give care. **Q4.** Performing appropriate clinical assessments. **Q5.** Prioritising care. **Q6.** Anticipating and recognising changes in a patient's condition. **Q7.** Taking appropriate action when a patient's condition changes. **Q8.** Assessing the outcomes of care interventions. **Q9** Your critical thinking skills. **Q10.** Your understanding of anatomy and pathophysiology. **Q11.** Your understanding of the rational for treatment. **Q12.** Feedback you have received on your clinical ability (in university). **Q13.** Your confidence. **Q14.** Your competence

Table 2

Percentage of students from each cohort (adult, child and mental health nursing students in years 1, 2, and all combined) who rated their confidence as "good" or "very good" in each area.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Adult Y1	47.06	26.47	58.82	50.00	52.94	52.94	58.82	29.41	47.06	38.24	38.24	44.12	35.29	47.06
Child Y1	57.14	28.57	42.86	42.86	42.86	14.29	14.29	14.29	14.29	28.57	14.29	14.29	0.00	14.29
MH Y1	68.75	31.25	68.75	68.75	56.25	62.50	56.25	37.50	31.25	50.00	68.75	37.50	50.00	68.75
All Y1	54.39	28.07	57.89	54.39	52.63	50.88	52.63	29.82	38.60	40.35	43.86	38.60	35.09	49.12
Adult Y2	57.89	42.11	63.16	52.63	73.68	68.42	57.89	57.89	36.84	36.84	47.37	52.63	68.42	68.42
Child Y2		60.00	80.00	80.00	80.00		80.00	80.00	80.00	80.00	80.00	80.00	80.00	60.00
MH Y2	50.00	0.00	50.00	0.00	50.00	0.00	0.00	0.00	0.00	0.00	50.00	50.00	0.00	50.00
All Y2	62.96	40.74	62.96	51.85	70.37	66.67	55.56	55.56	40.74	40.74	51.85	55.56	62.96	62.96
All Adult	50.94	32.08	60.38	50.94	60.38	58.49	58.49	39.62	43.40	37.74	41.51	47.17	47.17	54.72
All Child	75.00	41.67	58.33	58.33	58.33	50.00	41.67	41.67	41.67	50.00	41.67	41.67	33.33	33.33
All MH	66.67	27.78	66.67	61.11	55.56	55.56	50.00	33.33	27.78	44.44	66.67	38.89	44.44	66.67
All	57.14	32.14	59.52	53.57	58.33	55.95	53.57	38.10	39.29	40.48	46.43	44.05	44.05	53.57

Key to Questions:
Q1.Communication with patients. Q2. Communication with the multi-disciplinary team (MDT). ie. were you prepared to discuss patients with doctors, physios, health care assistants etc.. Q3. Preparing to give care. Q4. Performing appropriate clinical assessments. Q5. Prioritising care. Q6. Anticipating and recognising changes in a patient's condition. Q7. Taking appropriate action when a patient's condition changes. Q8. Assessing the outcomes of care interventions. Q9 Your critical thinking skills. Q10. Your understanding of anatomy and pathophysiology. Q11. Your understanding of the rational for treatment. Q12. Feedback you have received on your clinical ability (in university). Q13. Your confidence. Q14. Your competence

Qualitative Data

The questionnaires encouraged the students to add 'free text' to support their answers. These comments have been collated and transcribed using a 'thematic analytical approach'. All comments were read repeatedly and any phrases or words that stood out as being meaningful were highlighted and coded. These codes were grouped into categories and themes to facilitate abstraction. Three main themes were generated and will be discussed.
Communication -

Many students described their lack of confidence in communicating with senior staff and other members of the multidisciplinary team (MDT). This was, they felt, linked with a lack of experience and a lack of exposure to working with more senior staff.

I enjoy simulation but would like to see less 'task' driven scenarios and perhaps more focus upon communication, escalating concerns and liaising with other members of the MDT

I feel as if I do know when I need to involve more senior staff, but I always worry that I may be viewed as just a student and therefore ignored.

Simulation makes you feel relatively safe, but we need more of it to build our confidence further. Not just in critical scenarios but in more general situations – for example delivering bad news or taking part in MDT meetings, just having a voice.

Confidence within their role
Students felt that simulation did improve their confidence but that there should be much more of it within their curriculum. They discussed the fact that it was a much more powerful resource than '*sitting in a lecture theatre*'.

I feel that simulation does improve your confidence greatly but there is a need for more simulation-based activities. Not only the clinical input but also the communication, team working and joined up working.

I always come away from a simulation session feeling as if I have learnt something, something practical that will benefit me within my clinical role. I would like simulation sessions on other areas too – like critical thinking and analysis. Standalone sessions aren't enough, it would be really helpful to have simulation blocks to really develop confidence.

Feeling stressed and intimidated

Students reported that although the high-fidelity simulation sessions and scenarios could prepare them for 'real-life' emergency situations they did find them rather stressful and intimidating.

> *I wish our skills groups were smaller, there are too many classmates watching you and it makes me feel intimidated and inadequate.*

> *I enjoy the simulation sessions but find them very impersonal. I would rather have more regular, small group sessions that could be more targeted to what the group felt their inadequacies were rather than a large group generalised session.*

> *I'd rather work with other student groups than my own. I think I would feel less self-conscious.*

Conclusion

The results of this initial study demonstrated that students wanted more simulation, smaller skills groups (potentially interprofessional), less 'task' driven sessions, and more time to 'practice' and 'consolidate' skills learnt. Students felt that their confidence and competence would be improved from more simulated practice. From the responses given it was evident that the current delivery of skill and simulation was not effective and student satisfaction was poor, with an emphasis on task rather than the holistic care of the patient.

Within other areas of healthcare, particularly medicine, simulation is an established part of the undergraduate curriculum, and has been positively evaluated (Pawlowicz *et al.*, 2020; Riaz *et al.*, 2020; Manalayil *et al.*, 2020). Pre-registration nursing has remained task focused, possible due in some part to the standards set by the Nursing and Midwifery Council (NMC). However, the new NMC standards (2018) have now included and encouraged the use of simulation. The Association for simulated practice in healthcare (ASPiH) and Health Education England (HEE) Technology Enhanced Learning (TEL) have provided guidance on simulation-based education and frameworks for development of faculty and delivery of simulation but during a literature search no evidence of frameworks for the integration of skills and simulation within pre-registration nursing or other healthcare professionals has been found.

In response to these findings, we have developed a four-stage approach to create a scaffolding of learning bringing simulation into the curriculum from the very start allowing for a gradual cognitive load. With an emphasis on a holistic approach to skills and simulation the early introduction of consolidation and simulation. This approach builds on technical and nontechnical skills alongside an understanding and exposure to simulation, by year three students should be debriefing their own teams in simulation and understand the use of simulation debriefing tools. This integration of skills and simulation and move away from 'task training' skills teaching aims to create both competence and confidence in students enhancing practice placements and ultimately improving the safety of patients.

Our following study will explore students' perceptions after trialling the four-stage approach for a period of six months. At this point the same student group will be asked to complete the questionnaire again in order to evaluate how that have found the change in the delivery.

The authors expect to find an improvement in the student perceptions of both their competence and confidence in relation to clinical practice.

Limitations of the study

The study was carried out as a single centre study in one university, and therefore may not be generalised across other HEI's.

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