

**Report on the Introduction of  
Oxford Medical Simulation Software  
to Sheffield Hallam University's  
BSc Nursing Course by the  
Department of Nursing & Midwifery**

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**July 2021**

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## Executive Summary

### **Background**

The Covid-19 pandemic poses significant challenges for the delivery of pre-registration nursing courses. There has been a reduction in the availability of practice placements, and national restrictions have impacted on the delivery of face to face, practical teaching sessions.

Sheffield Hallam University's Department of Nursing and Midwifery invested a total of £103,310 in virtual simulation software (Oxford Medical Simulation, OMS) to mitigate the loss of these practical teaching sessions and to contribute to a simulated learning experience for students.

The anticipated benefits of this investment were improved student and staff experience, reduced demand on staff time and University estate. This report examines and describes the extent to which these four anticipated benefits were realised to inform decision making in relation to further investment and use of the software.

The data presented in this report includes qualitative and quantitative data collated and analysed from staff and student online survey responses, routinely collected operational information and cost estimates.

### **The student experience**

The majority of students were satisfied and felt able to participate in OMS sessions.

Satisfactory aspects were the realistic nature of the simulations, having the opportunity to apply knowledge and make decisions, students found the sessions interactive, fun and engaging. Students felt the software provided a safe learning environment, it was easy to use, provided a real time experience, and a novel and challenging learning experience. Students also felt it was helpful to have exposure to clinical scenarios prior to placement to develop their confidence.

Unhelpful aspects identified included technical difficulties, not being able to access the software independently, feeling that the groups were too big and / or there was too little time.

All students who responded felt that OMS would be beneficial throughout their course and students suggested a wide range of additional scenarios that would be helpful. The most common of these were mental health scenarios, CPR and cardiovascular conditions and challenging conversations.

### **Staff experience**

Aspects of OMS most favoured by staff were similar to those identified by students and included; student engagement and interaction, the opportunity for students to make decisions and apply their knowledge, the fidelity of the scenarios, the ease of use of the software and the ability to score and provide feedback.

Least favoured features encountered by staff members were technical difficulties, facilitating large groups with variation in students ability and confidence and too little time.

### **Staff costs**

Taking into account the number of staff, staff time to deliver each session and the number of students in attendance using OMS equates to a reduction of 74% in staffing costs.

1,968 OMS sessions cost an estimated £3,424 in staff time, but would have cost an estimated £13,323 to deliver on campus.

### **Estates cost**

OMS incurs no estate cost because it is delivered online and accommodates twice as many students (35 online vs 18 face to face).

The estimated saving had the OMS sessions completely replaced (rather than augmented) practical classroom sessions is £49,928.

### **Conclusions and recommendations**

Anticipated benefits of the investment in OMS appear to have been realised in terms of student and staff experience and have also reduced staff and estate costs.

From this report, a number of recommendations are suggested including exploring opportunities for student peer support, increasing the number of staff who feel

competent to deliver OMS sessions and identifying the optimal balance of student experience against cost effectiveness.

Further work, now worth consideration includes, identifying where OMS could; replace classroom sessions.

be used to specifically prepare students for practice.

linked to specific NMC professional values and proficiencies.

create opportunities for simulated placement hours.

A research and ethics proposal to formally evaluate the use of OMS would also be useful to evaluate the benefits of OMS in terms of student competency and would provide an opportunity to share any findings more widely.

## 1.0 Background

As with many aspects of teaching and learning at SHU, the Covid-19 restrictions necessitated significant changes to be made to the pre-registration BSc nursing courses. The practical nature of the courses meant they included numerous 'hands-on' teaching sessions, typically undertaken in small groups (15-20 students). Their suspension was further compounded by the reduction in practical placements as the NHS adapted and contracted to manage the continued demand for healthcare with a depleted workforce.

Consequently, the Department of Nursing & Midwifery invested in simulation software to a) mitigate the loss of some practical teaching sessions; and b) enhance the simulated placement offer which could be used to allow students to accrue simulated placement hours if they were shielding, isolating or a suitable placement was unavailable for any reason. The cost of the software for the sessions outlined in this report was £684 (£30 + VAT per session). However, SHU actually invested an additional £102,626 in the software as it was also required for other student groups.

The investment was preceded by a business case (appendix 1) that was approved by the Departmental Leadership Team in October 2020. This decision was based on the anticipated benefits of the investment which were stated as being:

1. *Improved student experience*
2. *Reduced demand on staff time*
3. *Reduce demand on estates*

Subsequently, a fourth benefit was identified as important:

4. *Staff experience*

In addition; *impact on students' competence* has been flagged as a potential future area of inquiry. This benefit mapping is depicted overleaf (Figure 1).

This report describes the benefits realised between launch in November 2020 and the 1st Jan 2021. In this way it will inform the decisions to continue/expand/reduce/cease ongoing and/or further investment in the software.



# High-level benefits mapping

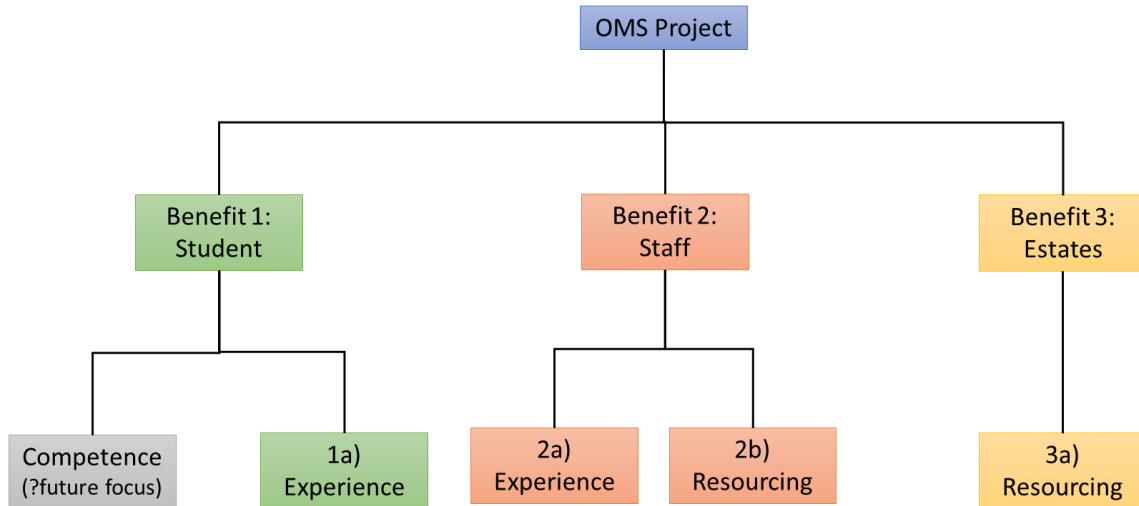


Figure 1: High -level benefits mapping.



## 2.0 Method

As with many naturalistic service evaluations, this study was designed retrospectively. As a result, it has been limited to the analysis of available data.

These data have been sourced from:

1. Staff online survey responses
2. First year students' online survey responses
3. Routinely collected operational information (e.g. number of students accessing the software)
4. A small number of cost estimates.

Figure 2 shows how these data items have been mapped to the four identified benefits.

### Mapping of available data

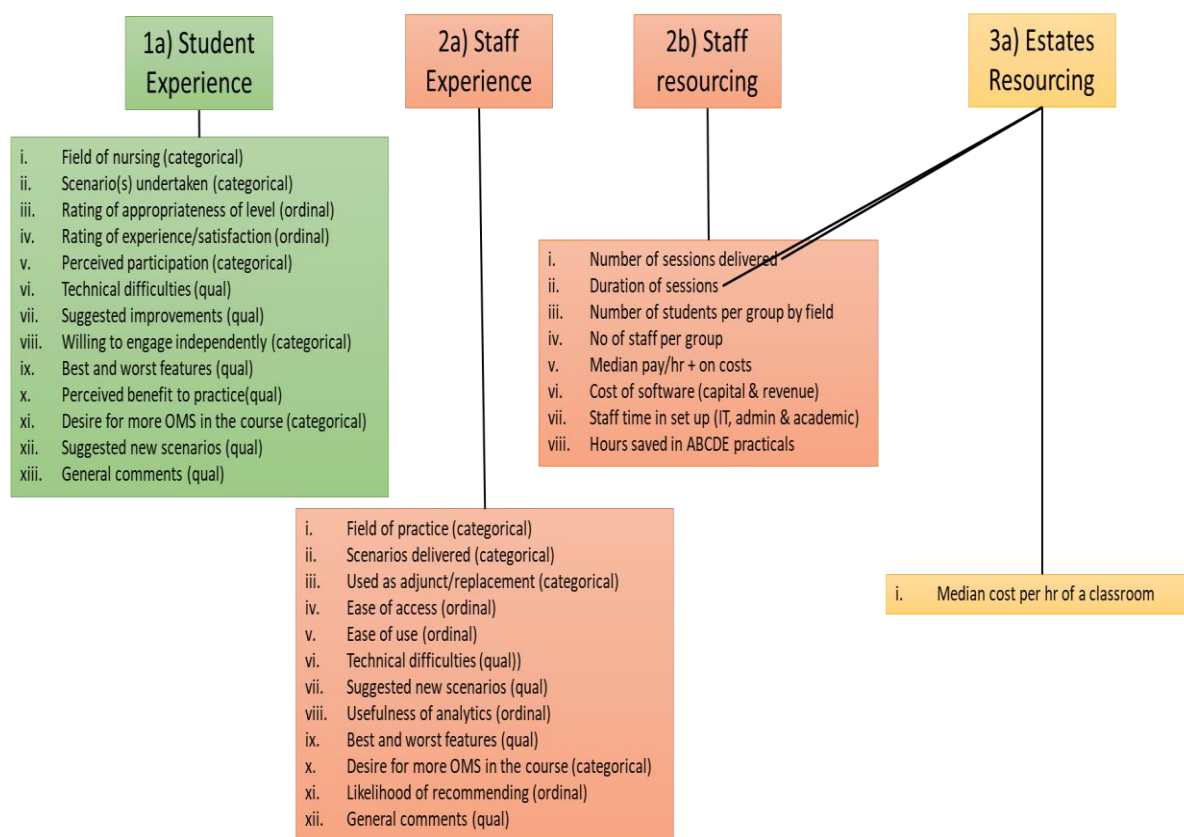


Figure 2: Mapping of data items to benefits.

Quantitative data have been analysed using a combination of Microsoft Excel and SPSS (Version 26). Qualitative data have been managed according to Braun and Clarke's (2006) six phase approach which includes:

1. Familiarisation with data.
2. Coding of the data such that the entire dataset will be reviewed such that each piece of relevant text (data) is tagged with a code.
3. Consideration of themes.
4. Revision of themes.
5. Analysis of individual themes.
6. Write up.

A theme is noted when something important about the data arises relating to a benefit and has a recurring pattern emerging from the dataset.

The results of these quantitative and qualitative analyses have been grouped according to the four benefits and are presented overleaf.

### 3.0 Results

#### 3.1 Student Experience

OMS sessions were timetabled for the level 4 nursing students according to the group sizes outlined below.

Field	Group size	No of groups	Total
Adult	32	13	416
Child	38	3	114
Mental Health	42	3	126
<b>Total</b>			<b>656</b>

These places were scheduled on three occasions during the period, meaning that, in total, 1,968 places were offered.

**3.11** Feedback was received from 188 students (representing a 9.6% response rate). 105 (55.9%) of whom reported their field of nursing as follows:

Field	Frequency	Percentage
Adult	76	40.4%
Child	14	7.4%
Mental Health	15	8.0%
Blank	83	44.1%
<b>Total</b>	<b>188</b>	<b>100%</b>

**3.12** Students were asked to rate their level of satisfaction on a 5 point scale (where 5 was most satisfied). The median rating for the 55.9% (n=105) student responses was 5.0 with no statistical difference between identifiable fields of nursing ( $\chi^2 (2) = 1.882 P=.390$ ).

Field	Frequency of satisfaction ratings					
	1	2	3	4	5	Total
Adult	1	5	12	22	36	76
Child	0	0	5	5	4	14
Mental Health	0	0	2	5	8	15
<b>Total</b>	<b>1</b>	<b>5</b>	<b>19</b>	<b>32</b>	<b>48</b>	<b>105</b>

The aspects of the OMS scenarios that students favoured most were:

Theme (no of responses)	Illustrative quotes
High fidelity / Realistic scenarios (31)	"How realistic they were, with the background noise from a busy area and all the machinery that were being used"
Applying knowledge / decision making (30)	"Being put in the shoes of a registered nurse and having to deal with the scenario in front of you. It's much better than just reading how to do something from a textbook and having to remember how to do things and what order yourself (or with help)"
Interactive, fun, engaging (16)	"That I could interact and learn things by making decisions as I find it easier to learn interactively"
Everything / generally positive (7)	"Really interesting and will benefit me learning. Really enjoyed it"
Safe learning space (5)	"the ability to work in a clinical environment whilst learning at same time not feeling judged"
Technical ease / simplicity (4)	"Flexibility and ease of use"
"Real time" experience (3)	"Real-time decision making skills"
Challenging (2)	"I liked the challenge of being in that clinical situation as it was difficult to figure out the problem"

Novel learning experience (2)	“Different kind of learning to what we’ve had previously.”
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The ways in which students felt OMS would specifically help them in their clinical practice were:

Theme (no of responses)	Illustrative quotes
Having exposure to clinical scenarios prior to placement (33)	“gives you an insight into what placement will be like”
Applying knowledge to practice and improving decision making (30)	“It will help me work through a step-by-step process when administering care”
Develop confidence (17)	“The feedback from the scenarios will allow to think in a systematic approach and boost our confidence going into clinical placement.”
Safe learning space - able to make mistakes without patients coming to harm (7)	“Just by understanding or seeing what’s right and what’s wrong without putting anyone at harm “
Yes (4)	“Yes definitely”
Not sure (2)	“Not sure but helpful”
Having the opportunity to practice skills (2)	“practice, practice, practice”

**3.13** 55.3% (n=104) of students described how challenging they had found the sessions on a 5-point scale (from -2 = A bit too easy through to 2 = Far too challenging). The median rating was 1.0 i.e. “OK-just challenging enough” with no significant difference between scenarios, or fields ( $\chi^2 (2) = .423 P=.809$ ).

Field	Frequency of difficulty ratings					Total
	A bit too easy (-2)	OK - not very challenging - (1)	OK - just challenging enough (0)	A bit too challenging(1)	Far too challenging(2)	
Adult	0	6	44	8	0	58
Child	0	3	6	1	0	10
Mental Health	0	6	6	0	1	13

<b>Unknown</b>	0	0	2	0	0	2
<b>Total</b>	<b>0</b>	<b>15</b>	<b>58</b>	<b>9</b>	<b>1</b>	<b>83</b>

**3.14** 55.9% (n=105) of students confirmed whether or not they had felt able to participate in the session(s) they attended. 88.6% of these students (n=93) reported feeling able to participate with no significant difference between fields.

**3.15** Of the 87 students that responded here, 55.2% (n=48) encountered some form of technical difficulty. There was no statistical difference between fields and hence, thematic analysis was undertaken on the responses as a whole. The broad themes that emerged regarding technical difficulties were:

<b>Theme (no of responses)</b>	<b>Illustrative quotes</b>
Pixelated / lagging image or sound (39)	"it was very pixelated , and the connection wasn't great so it was hard to understand what was being said"
No technical issues experienced (28)	"No, everything ran smoothly with zero issues"
Non-specific technical difficulties (12)	"There was technical difficulties all the way through"
Unable to view writing (6)	"Just not being able to read the writing on the options, but they was read out to us and it was easy enough"
Slow to load (2)	"just that the program was a bit slow to load"
Other students not muting mics (2)	"No only minor interference from other zoom users with mic left on"
Other: Too many students / not enough time (2)	"We got 44% meaning we ran out of time before completing other procedures"

**3.16** By the point at which they provided feedback, the mean number of OMS scenarios accessed was 1.05 (SD .237). One student had accessed three

scenarios, six accessed two and the remaining students a single OMS scenario. The table below shows the scenarios that students had accessed by field.

OMS Scenarios Accessed	Field				Totals
	Adult	Child	Mental Health	Not stated	
<b>SNR103 Asthma</b>	57	8	14	71	150
<b>SNR101 Sepsis</b>	5	0	1	2	8
<b>SNP002 Asthma</b>	0	2	0	4	6
<b>SNR105 Urosepsis &amp; Delirium</b>	4	0	0	1	5
<b>SNP003 D&amp;V</b>	0	0	0	4	4
<b>SNR106 Surgical infection</b>	2	0	0	1	3
<b>SNR112 Anaphylaxis</b>	0	0	0	3	3
<b>MH003 Alcohol dependency</b>	0	0	0	2	2
<b>SNP004 Seizures</b>	0	0	0	0	0
<b>SNP007 NAI</b>	0	0	0	0	0
<b>MH005 Dementia</b>	0	0	0	0	0
<b>Totals</b>	68	10	15	88	181

**3.17** 96.2% (n=101) of the 105 student responses indicated that students would like to be able to access OMS scenarios independently (rather than purely during timetables, staffed sessions). This was later made available to the students at an additional cost. There was no statistical difference in this between fields.



**3.18** The least helpful aspects of the scenarios were reported to be:

Theme (no of responses)	Illustrative quotes
Nothing / positive responses (31)	“Nothing, I love these sessions. I think they really give an insight into the situations we will deal with in future practice”
Technical issues (16)	“It was very pixelated and the scenarios was quite challenging so i wasn't really understanding what the patient needed help for or what to look for.”
Not being able to access it independently (15)	“not being able to do this first hand for myself in my own time”
Not enough time (15)	“The time frame, I understand we have roughly 20minutes to carry out an assessment and commence care/treatment, for the first session I did feel a little under pressure and nervous of making a mistake, but otherwise thoroughly enjoyed the experience”
Needing more support (9)	“Some unfamiliar terms used which I did not understand”
Difficult as a group / group too big (5)	“It was sometimes difficult to speak up in a group on zoom”
Perceived low fidelity with clinical practice (4)	“still hard to grasp what it would really be like in practice “
Students not contributing their ideas (2)	“The lack of interaction from other students..there were quite a few awkward silences!”

However, of the 90 responses received, all (100%) indicated that students felt OMS scenarios would be beneficial throughout their course. The additional scenarios suggested by students included:

<b>Suggested scenario</b>	<b>No of students</b>
Mental Health	21
CPR / Cardiac Arrest / Cardiovascular conditions	20
Challenging conversations with service users, families and staff	8
Sepsis	6
Urgent / Emergency care / first aid	6
End of life care	5
Learning Disabilities	3
Stroke	2
Diabetes	2
Blood pressure, medication, injections, venepuncture, cancer, bones, severe pain, epilepsy, hypothermia, arthritis, respiratory disease, anaphylaxis, hygiene, chronic conditions, neurological disorders, musculoskeletal disorders, asthma, wound care, pregnancy loss.	1

**3.19** Finally, students were given the opportunity to make any other comments about their experiences of OMS. These are presented thematically below:

<b>Theme (no of responses)</b>	<b>Illustrative quotes</b>
Positive responses including requesting more and reiterating the benefit of having simulation prior to clinical placements (50)	"It was amazing! I really enjoyed it and during these times of not being able to go to placement or interact with patients. I feel this gives me a chance to actually put theory into practice and help pulling everything together. This session gave me motivation and actually a feeling of excitement; something I really needed! Please please please can we continue with this until we can actually get out to placement!"
Requesting own account (21)	"I would love to be able to access these by myself and in my own time in order to practice making these type of decisions, further my knowledge and understanding and become more confident as I can make mistakes or find better ways to make decisions safely."
Reiterating a preference for small groups (3)	"It could be a really good thing we can learn from, especially if there's smaller groups"
Reiterating technical issues (2)	"I think all in all it was a good experience but i hope the internet will get better so it can be clearer to see. Thank you"
Not enough time (1)	"i felt it was too short. I would have liked it to have gone on longer and felt like i had more questions to ask"
Preference for facilitated sessions rather than own account (1)	"I'd like to do more of them with direction as I know some people expressed an interest in having individual access but we learn on our own enough at the minute so it's nice to go through the simulation with a facilitator"
Reiterating benefit of "real time" simulation (1)	"It is helpful having the countdown timer as it puts pressure on yourself making you work quicker when completing medical tasks"
Preference for face to face simulation (1)	"Obviously if circumstances allowed I would prefer to do this on an real simulation as I feel there would be a lot more that clicked this way"
Psychological safety / feeling inadequate (1)	"It was good but hard as we are all at different levels so when the people at a higher level kept answering it made me feel a little stupid and made me upset that i didn't know anything"
More opportunities for student interaction (1)	"Instead of the tutor doing the physical observation, perhaps student could get involved rather than just watching"

### 3.2 Staff Experience

Of the 21 staff involved in the OMS project, 12 responded (response rate 57.1%). The number of OMS scenarios they had each delivered ranged from 1-10 with a mean of 4.33 (SD 2.807). Eight staff had taught adult field students; three had taught child field and four had taught mental health field students. One member of staff had taught all three fields; three had taught two fields (adult & MH) the remainder had taught just one field of students. The number of staff that had delivered each scenario can be seen in the table below.

OMS scenarios	No of staff
SNR105 Urosepsis & Delirium	8
SNR101 Sepsis	7
SNR103 Asthma	7
SNP002 Asthma	5
SNR112 Anaphylaxis	4
SNP003 D and V	4
SNP007 NAI	4
SNP004 Seizures	3
SNR106 Surgical infection	3
MH003 Alcohol_dependency	3
MH005 Dementia	2

MH001 Anxiety	2
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**3.21** Staff were asked to identify which OMS scenarios the students found particularly challenging. This table shows the frequency with which each scenario was highlighted in rank order.

<b>OMS scenarios</b>	<b>No of staff</b>
SNR105 Urosepsis & Delirium	5
SNR112 Anaphylaxis	4
SNR101 Sepsis	3
SNP004 Seizures	3
MH003 Alcohol_dependency	2
SNP002 Asthma	1
SNP003 D and V	1
MH001 Anxiety	1
MH005 Dementia	1
SNR103 Asthma	1
SNR106 Surgical infection	1
SNP007 NAI	0

**3.22** The aspects of the OMS scenarios that staff favoured most were:

<b>Theme</b>	<b>No of statements</b>
Student engagement and interaction	8
Opportunity for students to make decisions and apply their knowledge	4

Fidelity / reality of the simulation	3
Ease of use	1
Ability to score and provide feedback	1

Conversely, their least favoured features were:

Theme	No of Responses
Technical difficulties	8
Facilitating large groups with variation in students ability and confidence	4
Not enough time	1
Perceived low fidelity with clinical practice	1
Lack of opportunity to tailor summary sheet to the learning outcomes	1

**3.23** Eight staff had encountered technical difficulties. This equates to a rate of 66.7% of respondents. Issues included:

Technical issue	No of responses
Pixelation of images / lagging of video	5
Difficulties simultaneously navigating OMS and zoom	3
Student internet connection difficulties	2

**3.24** Staff's median rating of the software's ease of access was 0.5 and its usability as 0.0 (with a potential range from -1 = hard through 0 = Ok to 1 = easy). The median rating of the usefulness of the analytics functionality was 1.0 (SD .534) with a potential range from -1 = not useful through 0=OK to 1 = very useful. However four staff were unable to comment as they had not investigated this aspect. Finally, on a

scale of 1-10, staff rated the likelihood of them recommending OMS to a colleague as 10.0 (median) and they all felt that simulation would be beneficial throughout their courses.

**3.25** A wide range of specific clinical conditions were suggested as the basis for additional scenarios, including: Covid - 19, cellulitis, COPD, head injury, post operative care, trauma, wound care and orthopaedics. Staff also felt additional mental health, end of life, medication management, communication, midwifery and learning disabilities scenarios would also be beneficial.

Theme	Number of responses
Community settings	8
Specific conditions (wide range)	3
Mental Health	3
End of life	3
Communication / handover	2
Midwifery /learning disability settings	1

**3.26** Staff were offered a final opportunity to leave any other comments they felt should be taken into account. Some faculty members (n=3) reiterated the positive experience of using OMS, some (n=3) were keen to further develop and integrate OMS into the curriculum, for example, linking the use of OMS with specific learning outcomes and using “VR headsets” to enhance the experience. One member of staff felt it was important to resolve the technical issues encountered in order to improve the experience for staff and students in the future:

*“The equipment which staff use to run it is one of the key aspects of making this successful. Consideration needs to be made for what we are actually trying to do and how this can be supported fully. Access to higher powered laptops and to software that allows for audio mixing is necessary to run this”*





### 3.3 Staff Costs

A detailed cost analysis is beyond the scope of this brief evaluation however the following points are of note:

#### Set up

- In addition to the time required to deliver sessions, approximately ten days of staff-time from the SIM team was required to set up the software initially. This equates to a one-off cost of £2,286 (based on an hourly rate of £30.48).

#### Ongoing

- During this pilot, each one hour session requires two staff and therefore, (based on an hourly rate of £30.48) costs £60.96 in staff time.
- Based on average group sizes of 35 students, this equates to a cost of £1.74 per student per OMS session.
- A one hour OMS session for 35 students could ultimately replace two x two-hour classroom-based practical sessions with two staff and 18 students.
- Based on an hourly rate of £30.48, two x two-hour classroom practicals would cost £243.84 in staff time.
- Based on average group sizes of 18 students, this equates to a cost of £6.77 per student per classroom based practical.

#### Potential saving

- As the OMS pilot sessions augmented, rather than replaced, existing practical sessions no savings were made.
- However, based on the assumptions above potential savings can be estimated.
- The staffing cost per student per practical could be reduced from £6.77 to £1.74. This equates to a reduction of 74% in ongoing staff costs.
- Therefore, the provision of the 1,968 pilot OMS sessions cost £3,424 in staff time but would have cost £13,323 to deliver on campus.
- After adding in the one-off set up time, the saving would have been £7,613 i.e. a %57% reduction in staffing costs however, this percentage would clearly increase as more sessions are delivered and the set up costs become less material.

### 3.4 Estates costs

Again, a detailed cost analysis is out of scope, however:

#### **Set up**

- There were no easily identifiable estates costs involved in setting up the OMS pilot.

#### **Ongoing**

- There are of course, no classroom costs incurred when running OMS sessions and the cost of accommodating teaching staff is negligible.
- A one hour OMS session could ultimately replace a two hour classroom-based practical session.
- OMS sessions accommodated twice as many students (35 Vs 18)
- The cost of a classroom for a two hour practical session (including tech team support) is estimated to be £457.
- Based on a typical practical group size of 18, this equates to a saving of £25.37 per student.

#### **Potential savings**

- As the OMS pilot sessions augmented, rather than replaced, existing practical sessions no savings were made.
- However, based on the assumptions above potential savings in estate costs can be estimated.
- Had the 1,968 OMS places replaced classroom practicals, they would have saved £49,928.

## 4.0 Discussion

As is the norm for a pilot project, many of the lessons learned regarding benefits realisation are limited to proof of concepts. That said, there are several findings worthy of discussion.

### **Student Experience:**

Student feedback was generally positive despite frequent technical issues and some concerns about scenarios lacking realism. There were many requests for independent, asynchronous access and additional scenarios. The former has already been actioned (with second years prioritised) and the latter is also in hand though, (given the widespread demand for additional MH scenarios) development priorities may need to be revisited). Most students felt able to participate in sessions however, there were some comments about *“too many students and not enough time”* which suggest groups should not be any bigger.

Given some of the types of additional scenarios requested, there seems to be a perceived benefit in being able to rehearse high risk / high stress scenarios prior to encountering them in practice. If OMS sessions are integrated into the courses, it may also be possible to create a ‘graded exposure’ by sequencing online scenarios before practical simulations to prepare for simulated learning and after practical sessions to consolidate skills and knowledge, prior students going into placement. This would require careful planning as student-confidence can be adversely affected if they are left unsupported after handling scenarios badly.

A final point that should be borne in mind is that many students that gave feedback had been unable to go out on placement. It is therefore possible that the scenarios were better received than they might otherwise have been as they are seen as better than nothing.

### **Staff Experience:**

Staff were similarly positive about the pilot. Most were keen to integrate OMS sessions into their modules / courses and there were (again) requests for additional scenarios (eg. mental health and midwifery). Unlike the students, staff perceived some scenarios to be more challenging than others; however the sample was too small to draw any firm conclusions in this regard. In addition to the technical issues encountered by students, staff faced the additional challenge of running OMS via zoom for which some staff felt they might need upgraded IT equipment. NB This was also new territory for the company who had not encountered anyone using the software in this way.

Similar to the caveat about the student feedback, it is also possible that staff were more positive than they might have been as, during lockdown, OMS sessions provided more opportunity to interact with students than many other online sessions.

**Staff resources:**

Although there were no savings realised from the pilot, it has shown a potential to significantly reduce the ongoing staffing costs. However, two important factors need to be considered. Firstly, the tension between efficiency and experience regarding group sizes. This potential saving is predicated on groups of 35 which may well need to be reduced. Secondly, if sessions are to be staffed, places need to be filled to be cost effective supporting the reasons for OMS sessions to be integrated and timetabled rather than optional extras.

**Estates resources:**

In a similar vein, the pilot has demonstrated the potential to reduce estate costs and free up over-subscribed classroom space for other purposes. It is, though, important to consider this against the backdrop of Covid19 and the strong desire from most students to return to campus full-time.

As with staffing, there is an inevitable tension between cost-effectiveness and student experience.

It is also important to note that students are still lacking experience in the clinical skills required to fulfil the requirements of professional registration and OMS whilst offering the opportunity to rehearse application of knowledge, decision making and prioritization does not allow students to rehearse skills at this point in time.

## 5.0 Conclusion & Recommendations

The OMS pilot project was approved by DLT on the basis that it impacted positively on student and staff experience as well as costs. Preliminary results show that the anticipated benefits to staff and student experience have been realised though there are Covid-related caveats to this. To date, SHU has invested a total of £6,394 in the delivery of this part of the project (i.e. just the sessions delivered to the first years). As the project augmented (rather than replaced) classroom sessions, no staff or estate savings have been made. However, the pilot has shown the potential for savings to be accrued if sessions are fully integrated into courses. Overall, if the pilot sessions had replaced classroom sessions, the net savings (taking into account set up and running costs) would have been approx £57,541.

The pilot can therefore be viewed as a partial success but to have demonstrated sufficient potential to warrant continued investment. From the analyses outlined in this report, and broader discussions, a number of more specific recommendations can also be made:

1. Consider recruiting a number of paid student OMS champions and/or the adoption of a peer support process (similar to the Repair project).
2. More staff to be trained to increase the pool of competent OMS lecturers.
3. Careful experimentation to identify the optimal balance between student experience against cost effectiveness. (Current aspiration is for groups of 15 students : one member of staff.)
4. Systematically identify where OMS scenarios map onto existing module content and hence where it can replace classroom practicals.
5. Ensure most OMS sessions occur prior to placement to help alleviate students' anxieties.
6. Ensure OMS sessions are overtly linked to the relevant NMC (MYePAD) competencies and identify where completion of a particular scenario could equate to the field-specific step-off point.
7. Explore whether OMS session completion could contribute to students' NMC simulated placement hours.
8. Continue the roll out of individual OMS accounts, prioritising second years.
9. Target technical issues that are easily resolvable and identify potential solutions for others
10. Ensure students are made aware of the system requirements for any IT equipment they intend to use for OMS sessions. NB. This should be at the outset of the course (to avoid them purchasing

incorrect equipment) and the hardship fund should be publicised concurrently.

11. Draft a research proposal and obtain ethical approval to more formally evaluate the project. NB This should include the measurement of any change in students' competence and confidence.

## Appendix 1

### Department of Nursing and Midwifery

#### Business case for Oxford Medical Simulator (OMS)

The following business case has been prepared to support the request to procure the Oxford Medical Simulator. We have discussed at length the OMS and see this as an essential addition to our resources in order to provide high quality learning experiences for our UG nursing students particularly during the Autumn term. By having this resource, we will be able to free up both essential learning space, which we can then spread out to our other nursing courses to enhance our ability to meet the principle of providing 4 hours f2f delivery. Currently it is unlikely we will be able to meet the 4hrs f2f principle. We are also freeing up essential staff resource which will be redirected to meet both the synchronous and asynchronous learning opportunities across all our portfolio.

Whilst we are seeing this resource as essential in the autumn semester we would also work with the company to develop their learning scenarios to develop opportunities going forward for both the Nursing & Midwifery and AHP departments, allowing for an interdisciplinary experience to be enhanced. The Head of Department for AHP sees value in OMS for Autumn delivery and is supportive of the request to procure. Also working with the supplier to develop more patient case scenarios would increase its utility to more of the AHP disciplines. We therefore see this as being a short-term essential requirement to meet the course requirements and a longer-term investment to positively enhance the learning experience for the students.

The business case includes an overview of the OMS, including its functionality; how we intend using it; initial and recurrent cost, student experience and the impact of OMS on freeing-up space and staff resource.

Oxford Medical Simulation is an immersive, interactive healthcare simulation platform which allows participants to engage in a wide range of clinical scenarios. Using either virtual reality headsets or standard computers, learners can engage with fully interactive, acutely unwell patients. They must manage the patient as in real life: diagnosing, instigating treatment and interacting with their interdisciplinary team against the clock.

The environment, patient and other team members are fully interactive, with conversation and physiology adapting to user actions and treatment. Users then receive personalized feedback, performance metrics and a guided self-reflective debrief. The educational focus is on decision-making, clinical reasoning and critical thinking to improve patient care.

A link to this product can be found here; <http://oxfordmedicalsimulation.com/>

Simulated learning is considered essential in the training healthcare professionals (HEE) It is superior to traditional clinical education for clinical skill acquisition, reduces patient harm



and improves quality of care (Cook, 2009; Gutierrez 2007). During the Covid-19 Pandemic access to simulated learning at SHU was suspended and many clinical placements were delayed or not available.

Whilst this was sustainable for a short amount of time, as part of the recovery, we now need to offer a substantial range of simulated practice sessions to our students to enable them to meet the PSRB and programme standards and support their preparedness for placements and practice.

F2F simulated learning is both staff resource and space intensive. Given social distancing and the need to work 'hands on' we are not able to use our space efficiently. For example, to comply with social distancing requirements, we would need to deliver these sessions multiple times (see table 1), all of which impact on how much of the estate we require and the drain on a finite staff resource.

**Table 1:**  
**Occurrences per f2f or practical session**

Pre Covid	450 students	22 occurrences
During Covid (social distance 1 metre)	450	38 occurrences

In addition to the impact on our estate and staff, our practice partners, clinicians in the NHS, have clearly stated they do not have the capacity to teach these practical sessions on placement- this poses potential patient safety risks.

We are currently trialling the OMS virtual simulation software with a group of undergraduate nursing students to test the feasibility and acceptability, whilst determining the impact on space utilisation and staff resource.

As a result of this trial and the covid/post covid recovery needs we propose OMS to be the preferred platform to deliver a range of sessions virtually; rather than delivering in the traditional manner, via simulation on campus. This would allow space and staff time to be used for mandatory practical sessions and specific skills sessions where the handling of equipment is necessary to become proficient and academic advising/academic support sessions. This will create less demand on a finite estate and an ability to follow social distancing requirements.

OMS would replace simulation sessions where students need to rehearse the application of theory to practice, decision-making, clinical reasoning and critical thinking to improve patient care. There are a significant number of these sessions in the curriculum, including care of patients with sepsis, acute coronary syndrome, anxiety, delirium and many others. Clinical skill demonstration, whereby a lecturer demonstrates (virtually or face to face) a clinical skill to a group of students is not an acceptable substitute to either face to face simulation or virtual reality simulation. F2f simulation and virtual simulation such as OMS have been shown to enhance clinical decision-making, clinical reasoning and complex skill acquisition. Clinical skill demonstration is not able to achieve these results. OMS also supports students to manage complex clinical situations which are multifactorial and interlinked, rather than the demonstration or even acquisition of an isolated simple skill.

## **Benefits of using OMS:**

### **Student experience**

Students are feeding back that they are unhappy and under prepared for practice placements due to the lack of simulation sessions they have received during the pandemic. We currently have no means to deliver these remotely and are entirely reliant on f2f delivery of simulated clinical learning- hence there is a now, as a result of covid and the largely blended learning approach, a significant gap in the curricula, which will create a poor student experience and an inability to meet programme learning outcomes and therefore NMC standards. The OMS software offers an opportunity to provide innovative, simulated learning remotely which, whilst not eliminating the need for practical sessions entirely ( a small number of practical sessions are required to be delivered face to face e.g basic life support) , will greatly reduce what is required to be delivered on campus.

Using OMS as a teaching method within modules will support module delivery and enhance the blended learning experience. A study by Haerling (2018 ) demonstrated there was no significant differences in quantitative measures of learning or performance between participants in the mannequin-based (face to face on campus) and virtual simulation groups (such as OMS), suggesting this proposition is appropriate to achieve our aims. Should we be required to adopt local and national lockdowns OMS will enable us to deliver the curricula with least disruption and prevent delay in students graduating and entering the workforce.

Early student feedback from our trial is very positive. Students find OMS exciting, educational and engaging. They report an increase in confidence in decision making, problem-solving and prioritisation. In addition students have their own OMS account and can practice and engage in the virtual simulations in their own time to consolidate knowledge and skills. We know from student feedback including this year's NSS that students' value the practical session highly. Student experience will be affected if they do not have access to practical sessions.

### **SHU student comments from OMS (Local trial ongoing)**

"It's a brilliant simulation and it's just I feel it's really good for practicing how to interact with patients"

"Definitely made me feel like I was in the situation dealing with the patient, as I would be in real life."

"I felt a lot more comfortable in knowing how to manage acute sepsis... as a result of

the feedback received in the previous sort of scenario."

"I think the most important part was that it felt really life-like. It felt really, really real."

### **Impact on estate and staff resourcing**

OMS offers an exciting solution to remote delivery of simulated practice. This is an essential addition to our resources in order to deliver our pre-registration curriculum whilst adhering to government guidance on social distancing and safe risk assessment. The flexibility of the software ensures we can adapt rapidly to any national and local directives and requirements vis a vis covid/lockdowns. It is a flexible and resilient solution for the department, enabling us to continue with business as usual regardless of social distancing etc. within a significant proportion of our curriculum.

In addition, the reduction on space and staff resource enables the department to allocate staff to other teaching and learning opportunities which, if we have to deliver this number of face to face sessions in semester 1 will greatly reduce our ability to support students in other areas of the curriculum such as academic advising. This will also make it more likely that we can offer a greater number of face to face sessions each week and therefore get nearer to achieving the 4 hrs f2f principle.

Without OMS we will be using almost all the staff and a significant amount of estate resource to deliver a limited number of f2f simulated practicals. We are concerned this would have a negative impact on student experience.

**Table 1: Example of using OMS at levels 5 and 6 undergraduate pre-registration nursing course (Nursing and Midwifery Council approved)**

#### Level 6

Number of students enrolled	395
Number of simulated sessions in level	5 x 3hrs
Number of sessions able to be converted to OMS	4 x 3 hours = 12 hours per student
Number of hours of practical room space saved	396 hours

#### Level 5

Number of students enrolled	584
Number of simulated sessions in level	10 x 3hrs
Number of sessions able to be supported by OMS	10 x 3hrs
Number of hours converted from practical f2f to virtual (OMS)	30 hrs per student

Number of hours of practical room space saved	1470 hours (196 days)
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Level 5 and level 6 combined

Number of hours of practical room space saved	1866
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With regards to the number of practical sessions delivered in semester 1 it is worth highlighting that in in semester 1 this year (19/20) 72 practical sessions were delivered to the level 5 students (all 2 hours in length) and 33 practicals were delivered to level 6 students (between 2 and 4 hours in length). These were all delivered face to face but could be delivered by OMS. We do not have capacity (staff and rooms) to deliver these sessions face to face in autumn 2020 given they will need to be delivered in much smaller groups.

### Cost

The pricing structure enables different levels of access for an agreed number of students. In the first instance, for Autumn 2020 we require OMS for second and third year pre-registration nursing and midwifery students (approximately n=1,000). The cost of buying an unlimited licence (approx. 1,000 students) which gives access to a reusable bank of pre-selected scenarios is £131,200 on annual licence (based on 18% discount).

**Table 2: Unlimited access to a bank of chosen clinical scenarios:**

Scenarios per library	Number of learners	Annual cost per learner before discount	Annual total before discount	Reduction	Annual total after discount	Saving	Price per scenario*
10	1000	£160	£160,000	18%	£131,200	£28,800	£4.37

### Box 1

Unlimited licencing includes:
<ol style="list-style-type: none"> <li>1. Institutional access to Learner Management System</li> <li>2. Unlimited scenario repeatability</li> <li>3. Access to data &amp; analytics platform</li> <li>4. Customisable scenario feedback</li> <li>5. Ability to provide software to students at home</li> </ol>

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| <ol style="list-style-type: none"><li>6. Ability to experience scenarios in VR</li><li>7. Full software support</li></ol> |
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It should be noted that the Department of Nursing and Midwifery has the ability and intention to grow pre-registration student number over the next 2-3 years and has had approval from the DfE to increase beyond the student number cap. The department has the potential to significantly increase the student numbers for September 2020 (+ 97). It is highly likely we will be able to achieve substantial growth in the short term and ULT is supportive of this ambition. The OMS will support this expansion as without a viable solution and replacement to entirely F2F practical skill delivery we may not be able to realise increased student numbers in the short term.

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#### **References:**

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