Incorporating simulation in professional entry healthcare education.
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Signed: [Signature]

Dated: 12 July 2013

Nicholas E Marlow
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Introduction

The use of simulation as a learning modality has grown at a remarkable rate in Australia. There are now numerous facilities across the country using this powerful modality to educate a range of healthcare professionals.

This report has been written to provide these facilities with an insight into how simulation curricula has been developed, implemented, and audited at leading international facilities.

It is hoped that this report can provide Australian simulation healthcare educators, interested in implementing a course of their own, with some guidance.

This report synthesizes the approaches taken by 12 simulation education providers across Britain, the United States of America and Canada.

Surveys and interviews were conducted with simulation proponents at each facility. This research focused on uncovering how they use simulation, and how they think it should be used. The information collected was then reviewed and examined in order to identify commonalities. These commonalities have been reported to provide educators with an understanding of what factors international simulation providers believe should be addressed in the development, implementation and audit of simulation curricula.

The results detailed in this report have been derived from the responses provided by interviewees. This report does not advocate that these responses are or are not indicative of the positions held by their employers.

I would like to thank all the interviewees and staff that gave their time to ensure this research could be conducted. Your assistance is greatly appreciated, without your help this would not have been possible. Thank you.

To my partner and daughter: Whatever I do, I do it better because of you.
Executive summary

This report is the culmination of planning that commenced in October 2011. The author’s research concept was accepted by the Winston Churchill Memorial Trust in June 2012. The active research phase occurred over March, April and May 2013, and the analysis, writing and review occurred over May, June and July 2013. This report includes a synthesis of results indicative of activities and perceptions held in 2013.

Over 6 weeks of travel, the author visited the United Kingdom, the United States of America, and Canada. In total 12 facilities were visited, and 11 formal interviews were held. Survey data examining simulation use, and facility operations was collected from 11 facilities.

Facilities were either solely based at a university, or were part of a hospital. Although the majority of interviewees were facility directors, facility staff, and simulation educators were also interviewed.

The data gathered from the survey and interviews has been reviewed and synthesized. This report provides a thematic analysis of the most frequently reported concepts reported by interviewees. Seven key concepts and recommendations have been identified and are reported below.

This report was conceived in order to provide Australian healthcare simulation developers with an insight into how curricula are developed internationally, in order to inform their development locally.

Author contact details

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## Program Itinerary

<table>
<thead>
<tr>
<th>Facility</th>
<th>Interviewee</th>
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</thead>
<tbody>
<tr>
<td>Simulation and Interactive Learning (SaIL) Centre</td>
<td>Dr Peter Jaye</td>
</tr>
<tr>
<td>St Thomas Hospital</td>
<td>Dr Clarissa Carvalho</td>
</tr>
<tr>
<td>(Guys &amp; St Thomas)</td>
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<tr>
<td>27 March 2013</td>
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<tr>
<td>St George’s, University of London</td>
<td>Dr Jo Brown</td>
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<td></td>
<td>Head of Clinical Communication</td>
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<td></td>
<td>Division of Population Health and Sciences Education</td>
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<td>28 March 2013</td>
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<tr>
<td>Barts and The London</td>
<td>Professor Annie Cushing</td>
</tr>
<tr>
<td>School of Medicine and Dentistry Queen Mary, University of London</td>
<td>Head of Clinical and Communication Skills Unit</td>
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<td>Dr Ian Curran</td>
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<td>London Deanery</td>
<td>Head of Innovation &amp; Associate Dean for Postgraduate Medicine</td>
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<td>OxSTaR</td>
<td>Dr Helen Higham</td>
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<td>Oxford University</td>
<td>Consultant Anaesthetist, OUH NHS Trust</td>
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<td></td>
<td>Senior Clinical Research Fellow, Oxford University</td>
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<td>Director of OxSTaR</td>
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<td>Columbia University</td>
<td>Professor Dennis Fowler</td>
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<tr>
<td></td>
<td>Medical Director, Simulation Center</td>
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<td>New York – Presbyterian Hospital / Columbia University Medical Center</td>
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<td></td>
<td>Melissa Cappert</td>
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<td>New York Simulation Center for Health Sciences</td>
<td>Professor Thomas Riles</td>
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<tr>
<td>(NYSIM)</td>
<td>Frank C. Spencer Professor of Surgery;</td>
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<td></td>
<td>Associate Dean Medical Education &amp; Technology</td>
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<tr>
<td>Institute for Medical Simulation and Learning</td>
<td>Ms Katie Walker</td>
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<tr>
<td>(IMSAL)</td>
<td>Director IMSAL</td>
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<td>16 – 19 April 2013</td>
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<tr>
<td>STRATUS Center for Medical Simulation</td>
<td>Professor Charles N. Pozner, MD</td>
</tr>
<tr>
<td></td>
<td>Medical Director, Neil and Elise Wallace STRATUS Center for Medical Simulation</td>
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<tr>
<td></td>
<td>Director, Prehospital Care</td>
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<td>Massachusetts General Hospital</td>
<td>Professor James A. Gordon, MD, MPA</td>
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<td></td>
<td>Director, MGH Learning Laboratory</td>
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<td></td>
<td>Chief, Division of Medical Simulation</td>
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<td>Massachusetts General Hospital</td>
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<td>Department of Emergency Medicine</td>
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<td>Associate Professor of Medicine</td>
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<td>Stanford University</td>
<td>Professor David Gaba</td>
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<td></td>
<td>Associate Dean for Immersive &amp; Simulation-based Learning, and</td>
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<td>Professor of Anesthesia</td>
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<td>26 April 2013</td>
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<td>Centre of Excellence for Simulation Education &amp;</td>
<td>Dr Karim Qayumi</td>
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<tr>
<td>Innovation (CESEI)</td>
<td>Director CESEI</td>
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Facility Report Details

This section provides an overview of the discussions held during each meeting as well as the activities undertaken, and observations made during each facility visit.

St Thomas Hospital
Guy’s & St Thomas’ NHS Foundation Trust
Simulation and Interactive Learning (SaIL) Centre

Meeting
Meetings were held with staff from the SaIL centre. Discussions were held with three staff regarding the capabilities, the operations and the management of the facility. Due to time constraints these conversations continued via Skype over subsequent weeks.

Facility
The SaIL centre is situated on the Guys and St Thomas Hospital site, over two dedicated floors. This facility includes a number of flexible work areas. The main clinical skills room is set up as a ward but can be configured to act as an Accident and Emergency, or Surgical setting. There are also learning areas that can be setup as GP clinics or waiting rooms. Each area can be arranged to ensure it suits the required teaching exercise.

An interesting adjunct to the work at this facility is its’ work with children and young adults to teach basic first aid skills. The ‘Hands up for Health’ is a program run within SaIL that enrolls students from the London area to learn skills through simulation.

Image 1: Configurable simulated learning environment at Guys & ST Thomas.

St George’s, University of London

Meeting
This interview was scheduled with one of the leads of Division of Population Health and Sciences Education, and took place in their offices. This meeting was scheduled to gain feedback from university
staff on the development of simulation curricula, not to tour a site or examine the operations of a facility. This interview raised a very important point about simulation for learning versus simulation of learning; the latter occurs where a simulation scenario is an activity that has no meaning for the learner.

Facility
A site tour was not scheduled as part of this meeting.

*Barts and The London School of Medicine and Dentistry Queen Mary, University of London*

Meeting
This meeting was scheduled to gain feedback from the head of the site university staff on the development of simulation curricula. The interview also led to an interesting discussion of communities of practice.

Facility
This facility is split over two areas and three floors within the Robin Brook building on the St Bartholomew’s Hospital site in central London. The top two floors have been fitted out as offices and learning spaces. The top level has a number of dedicated spaces for mannequin-based and separate areas for actor-based simulation training. Part task trainers, Laerdal and METI mannequins, as well as standardized patients are used to deliver training at this facility. The ground floor of the building has a number of dedicated rooms, one of which is setup to give the appearance of a ward that also houses a number of mannequins and hospital beds.

This centre also allows students to book in time to come and practice on the equipment at their convenience. This was witnessed during the facility visit, with up to a dozen final year medical students utilizing a range equipment in preparation for their final exams.

*Simulation and Technology Enhanced Learning Initiative (STeLI) London Deanery*

Meeting
This meeting was scheduled to discuss the use of simulation in healthcare education across the United Kingdom. This discussion covered several topics related to the implementation of simulation. This discussion transitioned from a description of how simulation should be used to address the implicit and explicit needs of the learner, their position within the continuum of education; to the
importance of cultural factors at the site where the learner returns; to
the wide need for professional groups and governmental bodies to
play an active role in determining the educational paradigm, an
integrated commissioning strategy, and a research and evaluation
strategy.

Facility
A facility visit was scheduled at a site within the SteLI network. This tour
showcased the facilities at this site and its role as a provider of
simulation education.

Oxford University
OxSTaR

Meeting
The visit included a tour observation of simulation course and a train
the trainer course as well as a meeting with center staff.

Facility
The OxSTaR facility is located at the John Radcliff Hospital in Oxford in a
separate two-story building that is accessible from either the main
hospital or via its own entrance. This facility has a designated suite
housing an adult mannequin that is operated from a control room.
Through a one way mirror instructors and staff observe and manipulate
the activities within the suite. Additional teaching areas are located
upstairs; these more traditional spaces are used for didactic teaching.

New York Presbyterian Hospital

Meeting
The visit to this center included a tour, observation of a scenario and a
meeting with center staff and hospital faculty.

Facility
The simulation center is a decentralized center with 3 dedicated
simulation labs in different departments across the Columbia campus
of New York Presbyterian Hospital, and primarily conducts in-situ
simulation training as needed.) The role of the facility is to provide
assistance to the simulation practices occurring within the hospital. This
site is still establishing itself, but has growing presence and capability. It
is anticipated that the facility will expand in 2016 when Columbia
University opens a new simulation center.

The visit coincided with a course for residents on “Delivering bad
difficult news” simulation. This simulation involved a mannequin and
two actors. The mannequin “died” and the actors were then brought in and the learners broke the news to them as children that the “patient” had “died”. This simulation used two modalities very effectively, and the learners were transfixed by the actors, and from the debriefing session that followed were able to reflect on their practices.

*New York Simulation Center for Health Sciences*

*NYSIM*

Meeting

Meetings were held with the Executive Director and Associate Medical Director. A second visit was made to this facility to observe a meeting of educators that use the facility. The primary purpose of this meeting was to discuss an innovation developed by the facility, but also to help develop educator networks in order to promote a community of practice.

Facility

The NYSIM facility is the result of a joint collaboration between The City University of New York, and the NYU Langone Medical Center. Located within the Bellevue hospital in New York, this center covers 25,000 square feet and trained over 16,000 learners.

One of the strengths of this facility is its layout. Unlike most other facilities that make minor amendments to existing floor plans, NYSIM has a bespoke architectural design that aids the movement of students from dedicated preparatory areas, to simulation suites, to break-out rooms. The ability to incorporate this structural investment into the simulation education process is a significant benefit of this facility.
Image 2: Several learning areas within the NYSIM facility.

**Institute for Medical Simulation and Learning**
**IMSAL**

Meeting
Three days were spent at this facility. During this time several discussions with the facility director provide essential insight into the operations at this facility. A thorough review of the facility and how it operated was developed and part of an externally run course, operating within this facility at the time, was observed.

Facility
The IMSAL Facility is a custom designed facility located in the Jacobi Medical Center, Bronx, New York. Its facilities are available to learners from 11 New York City Health and Hospitals Corporation (NYCHHC) hospitals, it also hosts courses from other facilities that enroll national and international learners.

The floor plan of this facility has been designed to separate the learning from the administrative environments. This facility utilizes dedicated simulation suites as well as dual-purpose seminar and break-out facilities. The flexibility of this facility ensures that its space is fully utilized.
**Brigham and Women’s Hospital**  
STRATUS Center for Medical Simulation

**Meeting**  
Discussions during this meeting addressed not only the research questions but the perceptions about simulation, specifically, the commonly held belief that more equipment is better. Several salient points on the role of hospital culture in embracing simulation as a learning modality; and, the importance of using the right equipment in the right way, not getting equipment for appearances sake.

**Facility**  
This ground floor facility spreads over multiple rooms in a building close to Brigham and Women’s hospital, Boston. This facility includes a large range of high medium and low fidelity simulators. As well as break-out rooms and administrative offices.

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**Massachusetts General Hospital**

**Meeting**  
This meeting was held with the Director of the Learning Laboratory at Massachusetts General Hospital, who serves as an Associate Professor of Medicine at Harvard Medical School and also directs the school’s Gilbert Program in Medical Simulation. The interview covered the development of simulation curricula for both learners from within the hospital but also for undergraduate medical students.

**Facility**  
The hospital site visited was one of several operated by institutions affiliated with Harvard medical school. The dedicated room was housed in the medical library at the center of the hospital campus, and contained several full-body mannequins as well as their control terminals. The co-location of multiple mannequins and operator stations in an "open ward" configuration was advocated as a strength of this facility, and one that was not at the detriment of simulation fidelity. A new simulation suite was in the final stages of completion during this visit. This room is in the middle of the hospital in an old surgical suite. Active suites continue to operate in the same area that will help to produce a similar form of in situ fidelity. This room will allow for medical and inter-professional simulation education; uniquely, it has a learners viewing gallery located at the top of the back wall. This is an interesting commonality as the historical wing of the hospital still houses a restored surgical amphitheater that was once used for public demonstration and education.
**Stanford University**  
*Center for Immersive and Simulation-based Learning (CISL)*

**Meeting**
The meeting with the Associate Dean for Immersive and Simulation-based Learning provided an excellent description of the development of simulation within this University, but also within the United States of America and the world more generally.

**Facility**
This visit viewed the facilities within the Immersive Learning Centre in the Li Ka Shing building on the Stanford University Campus. This centre provides learners with the opportunity to use a range of different fidelity level simulators. There are areas for didactic training, and break-out areas for debriefing. This tour also took in as yet unused areas of the building that provide the facility with space to develop and adopt additional forms of simulation.

![Image 3: Full body mannequins prepared in a realistic environment.](image-url)
Meeting
Meeting was held with the director of the CESEI facility. This meeting addressed each of the interview questions and also provided important information on the bespoke Learning Management System used by this facility.

Facility
The CESEI facility occupies numerous rooms within the Vancouver General Hospital. There are several rooms dedicated to the use of particular types of simulation equipment, with part task trainers set up in one room, mannequins ready in another. There was also a room dedicated to research fellows who were working at CESEI. At the time of the meeting and site tour the facility was undergoing renovation of two of its rooms. This will result in the updating of its wet and dry simulation area, and the other will enable greater IT and AV connectivity to areas both within CESEI and across Canada.
Main report

Survey

Introduction
A survey was sent to each site to gather preliminary information on the use of simulation within that facility (see Appendix A). The survey was a collection of “Yes/No”, short answer and long answer questions. Each question was vetted with the assistance of a simulation expert, who has experience operating simulation centers both in Australia and the United States of America.

In February 2013 the survey was sent to each interviewee. A total of 10 of the 12 surveys were returned; of the 10 returned surveys eight were completed by the interviewee, and two by a delegated staff member.

Method
Purpose
The purpose of the survey was to gather generic data on each of the sites. This information was gathered before the interview, and was used to help to inform it.

Design
The survey contained three sections that were defined by the length of the responses requested. Section one contained three ‘Yes/no’ answer questions; section two contained 10 ‘short answer’ questions; and section three contained 12 ‘long answer’ questions.

Data Preparation
Survey questions were developed by the researcher and then reviewed collaboratively by the researcher and the researchers’ mentor, who is a director of a simulation education training site. A number of versions were reviewed through this process, which continued until the final document was confirmed.

Question format
Three question formats were used; the first required either a “yes/no” response; the second required reporting of numerical data; the third required a written response of which made up the majority.

Access
The survey was emailed to all interviewees one month before the researcher commenced the first site visit.
Collection
The survey was sent via email to each site, and the interviewees were instructed to return a completed version to the researcher. All survey information was collected by the researcher, and stored on a password-protected computer.
Results

Employees
Respondents were asked to report the number of full-time and part-time staff employed at their site. A total of nine facilities answered the question, “How many full time staff work at your facility?” An average of 7.2 full-time staff work at each site. Eight facilities answered the question, “How many part time staff work at your facility?” It was calculated that an average of 4 part-time staff work at each site. This means that each site employs an average of 11.2 staff, the majority of which are full-time.

Students
A total of eight respondent sites taught undergraduate students. These eight responses identified a total 8,367 undergraduate students were trained in the previous year. This equates to an average of 1,045 per site. The answers range from 100 to 3,096 undergraduates educated.

A different configuration of eight sites answered the question: “How many post-graduate students were educated in your site last year?” These eight responses identified a total of 15,901 post-graduate students trained in the previous year; at a site average of 1,987 per site. The answers ranged from 400 to 3,870 post-graduates educated.

Simulation courses
Sites were asked, “How many simulation courses are taught in your facility?” This question was answered in two different ways. In the first group of responses, five sites answered the question by identifying the number of courses they offered, which on average equaled 23, between a range of 11 and 34. One site reported that they offered “Dozens” of courses; this answer was excluded due to its ambiguity. The second group of responses reported how many simulation courses were taught in their facility. Three sites reported that in the 2011/12 year that they had each conducted, 740, 796, and 924 simulation courses.

Sites were also asked whether they had any ‘train the trainer’ courses, 9 of 10 sites answered that they had a course in place.

Professions
Sites indicated each of the professions that receive simulation training at their facility. The following table identifies those professions taught by more than one site:
Table 2: Number of professional group types trained per facility.

<table>
<thead>
<tr>
<th>Professional group</th>
<th>Number of facilities training profession</th>
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<td>Midwifery</td>
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<tr>
<td>Paramedicine</td>
<td>4</td>
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<tr>
<td>Occupational therapy</td>
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**Inter-professional education**

Facilities were reported the configurations of inter-professional education taking place in their facility. The following table identifies which professions were most commonly reported as taking part in inter-professional education. All combinations of inter-professional education involved medicine and nursing.

Table 3: Number of inter-professional group types trained per facility.

<table>
<thead>
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</thead>
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<td>Nursing</td>
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<td>Physiotherapy</td>
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<td>Midwifery</td>
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<tr>
<td>Paramedicine</td>
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</table>

**Internal audit**

Sites were asked to answer the following question "Have any of your courses undergone any internal audit or review?" Six sites responded that they had some form of internal review process in place, one answered that they used an external body, and three answered that they had no internal audit process.

**Employer feedback**

All sites answered the question "Does your facility get any feedback from employers on the competency of your graduates?" Eight sites responded "no" and the remaining two both answered that they receive only anecdotal feedback.
Discussion
Great care was taken to ensure that the survey questions were focused on the right information, that they were clear, and that they required no explanatory information. However, some respondents struggled with sections of the survey, and regional nuances between Australia, Britain, and North America impacted the interpretation of several questions. As a result this precluded the aggregation and analyses of all but those questions reported above.

There was a wide range in the number of undergraduate students trained at each of the respondent facilities, 100 to 3,096. This outcome can be explained by the age of both facilities, and their local environment. The facility that trained 100 undergraduate students is relatively new and still in the process of formalizing its role within the hospital in which it operates. As a result the hospital does not utilize this resource to its maximum potential in the education of undergraduate students. Conversely, the facility that trained 3,096 undergraduate students is well known within its’ hospital, and the wider geographic area. This facility, has been open for more than a decade and is able to use its’ standing within the educational community to enroll and educate large number of undergraduate and post-graduate students.
Three respondent facilities identified that they trained 3,000 or more postgraduate students, the highest of which was 3,870. This result was reported by the same facility that reported the highest number of undergraduate students. It is advocated that the standing of this facility is the reason for its ability to enroll and educate these larger numbers of students.

The survey asked respondents to report how many fulltime and part-time staff were employed at that facility. It was reported above that on average each site employed 7.2 fulltime staff, two respondents that employ only 1 and 3 fulltime staff lowered this average. The other respondent sites employed either 7 or more fulltime staff. The average number of part-time staff was skewed by one facility that reported the employment of 11 individuals, whereas all other sites employed less than 5.

What the survey did not capture; however, was the role of each employee. This research did not seek to examine how staffing configurations effect the development, implementation and audit of simulation curricula.

A shortcoming of the part-time staff survey question is that it does not identify the fulltime equivalency. This means that staff member that works 1 day a week is counted in the same way as a staff member that works 3 days a week. This potential for inconsistency blurs the actual employment picture at each site, consequently the discussion is indicative rather than definitive.

Although the focus of this research was on professional entry simulation education, on average more post-graduate students were trained in each facility than undergraduate. The primary objective of this research was to investigate the development, implementation and audit of professional entry healthcare simulation curricula. The result that each site delivered more training to post-graduate learners is not detrimental to this objective; This is because interviewees indicated that the process for developing, implementing, and auditing curricula processes were the same for both undergraduate, and post-graduate levels, albeit with different foci.

An interesting outcome is that none of the sites have any formal processes via which they gain feedback from learner workplaces. Only two sites mentioned that they receive any response and this was only anecdotal feedback. Although a solution to this is beyond the remit of this research, this outcome identifies a significant opportunity to gain simulation efficacy data that is currently being over looked. Perhaps the significant challenges in capturing robust and accurate data has
precluded attempts in the past; however, this does not mean that it should be avoided forever.

Conclusions

The information reported above describes that most sites: educate more post-graduate learners than professional entry level students; focus their education predominantly on medical and nursing staff; provide training courses for simulation educators; have varied approaches to the review of their courses; and, do not currently receive feedback from employers on their graduates skills when they return to the clinical environment.

Should further research in this area be conducted it is recommended that staff roles and the use of content experts be reviewed. Investigating the differences in facility engagement of these two professional groups will result in the identification of improved curricula quality and more cost-effective curricula development processes.

These characteristics frame the findings reported in the interview chapter below. The greater the similarity between Australian sites and those described above the more applicable these findings.
Interviews

Introduction
This section reports the commonalities that have been discovered as a result of the semi-structured interviews conducted at each site. The majority, if not all, of the sites visited identified the necessity of these topics in the development, implementation and audit of simulation education. An overview of the methodology behind the semi-structured interviews and the subsequent findings are reported below.

Method
Purpose
The purpose of the semi-structured interviews was to gather information from interviewees on the use of simulation within their facility. Questions were developed to direct interviewees onto topics that would identify their approach to the development, implementation and audit of simulation curricula.

Sampling
A purposive sampling approach was used. Interviewees were either chosen due to their standing in the field of healthcare simulation, or because they were the representative of a site known for its standing in the field of simulation. The range of interviewees was informed through discussions with peers and through an existing understanding of the field of simulation.

Sample size
Twelve sites confirmed their willingness to participate in this research.

Description of sample
Interviewees are leaders within each institution, and are either facility directors, or lead academic staff. In all instances the interviewee was chosen due to their knowledge of their facility and of the field of simulation more generally.

Method of approach
All participants were approached via email to participate.

Setting
The setting at which the data was collected was either the interviewees office, or rooms within their facility. In one instance an interview was supplemented through a Skype teleconference.
Data collection
An interview template listing each research question was developed. This was followed throughout each interview.

Repeat interview
One follow-up interview was held to gather additional information. This was required as not all of the interview questions were asked during the initial interview. This was conducted via Skype.

Audio recording
Audio from 10 interviews was recorded.

Field notes
Notes were taken during the interview; however, the audio recording was the primary data recording method.

Duration
Each interview was scheduled for an hour and a half, the actual interview process differed in duration from half an hour to one and a half hours.
**Number of data coders**
All data was recorded and transcribed by the researcher.

**Analysis approach**
A thematic analysis approach was used. Transcribed interviews were examined, themes identified, and interpreted. The underlying context and ideas that produced these themes were also examined to ensure the accuracy of the information reported below.

**Reporting**
All Interview results are reported qualitatively. The major themes identified through the thematic analysis are reported below.
Results
The following section outlines a series of concepts that have been synthesized from interviewee responses, these seven inter-related concepts are:
   1. Learner relevancy
   2. Institutional Relevancy
   3. Scaffolded Learning
   4. Debriefing
   5. Audit and Review
   6. Facility
   7. Communities of Practice

These concepts were identified in the majority of interviews. The descriptions written below captures how these concepts were reported by interviewees, these are then followed by commentary on how they are applicable to the Australian context.

These sections discuss the concepts that were most frequently raised, it does not report all of the concepts raised. The quality and scope of responses, and the timeframes guiding the publication of this report preclude the additional analyses of these secondary outcomes. Their exclusion does not affect the any of the concepts reported below.

This section moves away from the term ‘curricula’. This is an intentional move as ‘curricula’ refers to set of courses, whereas interviewee responses referred to individual courses or simulation scenarios. The term ‘course’ is used below as to refer to the simulation practice discussed by the interviewer and interviewees.

It is also important to note is that the type of simulation discussed was implicit in many interviews. In these discussions interviewees related their comments to scenario-based simulation modalities; that is, types that are not solely psychomotor-based.

Learner relevancy
The relevancy of a simulation course to the learner was mentioned by a number of interviewees. These discussions identified that this is a multi-faceted concept and that interviewees have their own perspective on how the relevancy of the simulation course can be demonstrated to the learner. These orientations did not follow along any national lines, nor on simulation facility capacity lines.

Interviewee comments promoted the overall view that learner relevancy is promoted through the delivery of simulation courses that use local content to teach skills that engage and develop a learner’s frame of reference along their continuum of learning.
Interviewees emphasized that there is an explicit need for simulation activities to be based on local events. That is, interviewees noted that it was important to ensure that local healthcare needs are reflected in content matter used in simulation scenarios. The inherent strength of simulation is better realized when it is used as an analogy of life events. The more closely it represents these events the easier it is for the learner to identify its relationship to their learning needs. It was advocated that local environmental health issues or critical incidents provide an educational focus through which learning outcomes should be achieved. The use of local content communicated to the learner more readily why the learning outcomes were relevant. The delivery of simulation courses based on local healthcare issues ensures that there is less cognitive distance for the learner to overcome.

Interviewees also noted that simulation education is interpreted through a learner’s frame of reference. A learner’s frame of reference both guides their education and is also developed by their education. Simulation courses must be delivered to learners at a level that enables them to meaningfully interact and engage with course content, but which also improves and refines their frame of reference.

The development of a learner’s frame of reference is important if learners are to progress along their continuum of understanding. This concept was not widely raised by interviewees; however, it is an important concept to note because it places the delivery of simulation on a continuing path of professional education.

This report advocates that the process via which learners understand the relevancy of simulation scenarios (and their outcomes) to their learning needs can be understood through the term ‘poignancy’. Poignancy is a personal attribution made by the learner on realizing why they are learning what they are learning. Simulation scenarios should not only be based on local healthcare needs they should also correctly engage and develop a learners frame of reference. If this is achieved, the course will be more poignant for the learner and they will be more likely to develop.

**Institutional Relevancy**

The need to address institutional perceptions of simulation training was noted by a number of interviewees. In some instances the institutional understanding of simulation was reported as a barrier, in others it was reported as an enabler to the implementation of simulation education. In either instance institutional perceptions effected non-professional entry learners the most.

Interviewees that reported that institutional perceptions of simulation are a barrier to its’ implementation, reported that this is due to
negative perceptions of simulations relevancy as a teaching modality. Conversely, interviewees that reported that institutional perceptions of simulation are enablers for its’ implementation, reported that this is due to positive perceptions of simulations relevancy as a teaching modality. Importantly, it was reported that this movement in perception occurred over time and through concerted effort by simulation facility staff and through institutional staff.

A shift to positive perceptions of simulation can only be achieved if it includes all staff, is accepted by all staff and is thought of by all staff as being a nominal part of their day. In the same way that occupational health and safety has been accepted at all levels of institutions, so to should simulation be accepted.

One facility reported anecdotal feedback they received where, amongst nursing wards, groups compete against each other comparing the number of their staff who have completed simulation courses. It is seen as a ‘badge of honor’ for the group who has the most “graduates”. This demonstrates an institutional culture where the value of simulation is not only accepted its’ value-adding is actively sought.

This report advocates that an institution understands the relevancy of simulation when the cultural, technical (skills/understanding), and/or economic benefits of simulation have been effectively communicated. Proponents that are able to argue the along one of these lines are more likely to succeed in creating a positive view of simulation. This report would further advocate that if proponents are seeking such a change, then creating courses that result in learning outcomes that address local healthcare needs is paramount.

Scaffolded learning

The concept of scaffolded learning as a necessary feature within the development of simulation courses was raised. Interviewees noted that this concept provides a powerful conceptual device for understanding how learning outcomes can be translated to the workplace. Scaffolded learning refers to the theory whereby learning outcomes create a framework of learner understanding on which they accumulate related experiences.

Simulation educators have the opportunity to deliver courses that are based on local health care needs, to achieve learning outcomes that are relevant to that area at that point in time. By capitalizing on this opportunity, educators can provide learners with a scaffold that is unique to that local environment. This has benefits to both undergraduate and professional learners.
Simulation courses that have learning outcomes based on local healthcare needs enables professional entry students to be better prepared for their workplace training. Achievement of these outcomes creates the scaffold on which learners, in the professional environment, accumulate their experience.

These learning outcomes and the resulting scaffold optimize the learner, they create a worker that is better able to address the related situation. This is beneficial for a number of reasons, it helps with learner confidence, and it enables the learner to put their education into practice. Additionally, if the learner is working in a team environment it may provide the other members with a level of confidence that the learner has at least some experience with that situation and therefore can operate with some level of autonomy.

For professional learners the achievement of learning outcomes based on local healthcare needs creates a scaffold that better prepares them for the requirements of their workplace.

For both types of learner, scaffolded learning provides them with the framework against which their professional experiences can be interpreted and accumulated. Simulated courses that create a scaffold specifically related to local healthcare needs will be more beneficial to learners.

**Debriefing**

Debriefing was identified as the part of simulation education where the ‘learning happens’. Many interviewees stressed the importance of having appropriately trained debriefers. This is due to the facilitating role debriefers play in ensuring that learners are aware of why they are learning what they are learning, but also to safeguard their psychological safety.

Debriefing enables the educators to ensure that there is no confusion about the desired learning outcomes. It provides them with the opportunity to ensure that the learners learning needs are met. It should engage a learners frame of reference to explain to them why they do the things they do. This is a difficult association to facilitate for the learner; however, it can enable them to reflect on their implicit behavior and change their explicit actions.

Learning outcomes must be closely tied to the learning needs of the learner this must be communicated at the outset and then reinforced by debriefing. Debriefers assist learners to overcome any cognitive dissonance that has arisen as a result of a conflict between their existing frame of reference and the course learning outcomes.
One of the benefits of simulation is the psychological safety it affords learners, they can make mistakes in a simulated environment and the consequences are far less than the same mistake in a clinical environment; however, as the fidelity of simulation scenarios improves, so does the ability to cause psychological harm. Debriefers can help to ensure that there is no harmful sequelae.

Debriefing is the final and perhaps most important step in simulation education this process enables education to consciously understand their actions and take steps to alter them. The role of the debriefer facilitates the progression of the learner along their continuum of education.

**Audit and review**

All sites indicated that some review of their courses was performed. What format this review took was also very similar, with the majority of sites identifying that they collect satisfaction data. In the most part this was collected from learners; however, there were also sites that collected it from educators. Where this was collected from educators, these tended to address administrative or facility related questions.

When data was collected from learners, this was mostly through participant satisfaction questionnaires. These used standard data gathering techniques, such as Lickert scales, short and long answers questions. In only a few instances facilities reported that they also collected summative and formative course outcome data. The collection of this data was requested by course authors, as opposed to the facility, and delivered to them for their purposes. Several facilities noted that they had the capacity to gather data for examination and peer reviewed publication, but that this was only performed in accordance with Institutional Review Board guidelines.

Although not reported by any site visited during this research, this report argues that there appears as though there is a belief that: if a course is found to satisfy learner needs, then they are a more complete professional. This correlation; however, is not necessarily valid.

This report is not advocating that satisfaction data is irrelevant; satisfaction data is important and goes partly towards determining whether a learner’s needs have been addressed. Where more work is required is determining whether the educational outcomes of a course are having an impact at the point of care. More should be done to identify, through workplace audits, whether simulation education is being applied, and if, so to what effect. If this information were able to be fed back to the facility and correlated to participant learning outcomes, then facilities would get a far better understanding of the quality of their courses. This is an extremely difficult challenge,
confounded by issues such as confidentiality (learner and patient), time, access, and cost. In Australia and around the world there are large sums of money being used for the delivery of simulation, this report advocates that some of this money should be re-directed to the development of robust and valid frameworks that enable the discovery of the impact of simulation education on healthcare delivery and outcomes.

**Facility**

Interviewees were asked about their thoughts on the use of simulation and what needs to be addressed in the development of courses; overwhelmingly, they responded by questioning whether simulation should be used at all. Interviewees noted that they are approached by faculty or hospital staff members that have heard about simulation and who want to develop a course. Interviewees argued that they should only develop a course if, and only if, simulation is the most appropriate modality to achieve the desired learning outcomes.

Each interviewee was a staunch advocate for simulation and believes in its efficacy as a teaching modality. They are also advocates for its appropriate use. As advocates, there was an implicit and occasionally explicit consolation that simulation has been misused, and that this misuse potentially tarnishes the perception of simulation’s efficacy. As directors of facilities several interviewees noted that they have to ensure that simulation is being used responsibly, meaning that they have a responsibility to ensure that simulation is being used if and when it is the most appropriate modality.

In these instances they said that it is important to make potential authors aware of the capabilities of simulation as well as the capabilities of the facility. The questions that interviewees believed should be asked before a course is developed have been collated below:

- Does it address a learner’s need?
- Does it address an institution’s need?
- Does it address a local healthcare need?
- Does it address the current priorities of a facility?
- Can it be delivered properly by a facility?

These questions were not raised by all interviewees, and different facilities identified different questions and placed differing emphasis on their importance. What they represent; however, is the appreciation that simulation may not always be the best modality to train students.
Communities of practice

The importance of Communities of Practice\textsuperscript{2} was identified during interviews across the UK and in North America. It became apparent that no sites operated in isolation, and all were linked in to larger networks. These networks were either formalized such as the UK Council of Clinical Communicators (UKCCC) or were informal, such as the community events held at NYSIM. Both of these examples; however, are representative of the willingness for simulation users to interact with peers who may not occupy a similar geographic space, but whom hold similar ideologies. Although this finding is not unique to this research, what was discovered were the levels at which certain communities of practice operate.

This research has identified that simulation-based communities of practice should be thought of as occurring on two different levels. This can be described using the IT terms of ‘Wide Area Networks’ (WANs) and ‘Local Area Networks’ (LANs). Wide Area Networks are computer networks that connect over a large geographic area, such as the UK; whereas, Local Area Networks are computer networks that connect over a limited geographic area, such as a hospital. It is arguable the UKCCC promotes a WAN-based community of practice, and that the NYSIM promotes a LAN-based community of practice.

This is an important dichotomy as both have different needs, but also offer different benefits for the development, implementation and audit of simulation curricula.

The needs of WAN-based communities of practice may be as simple as being a member of a professional group. It is arguable that by virtue of the geographic area that defines it, WAN-based communities of practice have a less demanding inclusion criteria.

Similarly, as there is less investment required by the member, the benefits of WAN-based communities of practice may be less valuable. It may be something as simple as the acknowledgement that they are part of that community or the opportunity for networking.

Local Area Network-based communities of practice require a more intensive personal relationship with local healthcare and simulation professionals. These needs are addressed at the day-to-day level through interactions with staff and other local members. The benefits of LAN-based communities of practice; however, are more specific to that environment. Members are able to interact with peers that share a similar understanding of local healthcare needs, and of simulation facility capacities to develop more relevant scenarios.
It is important to note that an individual’s participation in one of these communities of practice does not preclude their participation in another. Their participation in either is due to the workplace role, as well as their relationships with others.

The examples above are not an exhaustive description of the needs and benefits of WAN- and LAN-based communities of practice. Although more research in the area is required, this dichotomy provides an opportunity to discover more about how professional relationships can be facilitated to the benefit of simulation curricula development, implementation and audit. Importantly it identifies two levels of professional engagement that need to be addressed within Australia is the development, implementation and audit of simulation curricula is to evolve and progress.
Conclusions and Recommendations

At the outset of this research it was anticipated that through data collection, examination, and synthesis that a key set of fundamental steps or educational requirements would be identified. This report would then advocate the inclusion of these steps in all future Australian simulation curricula.

Once the research commenced, however, the multitude of approaches became apparent. What is now recommended is that readers and users of this report note each of the following recommendations and determine which meaningfully apply to their facility.

Recommendations:
1. The relevancy of courses should be communicated to the learner to ensure that they are aware why they are learning what it is they are learning.

2. The relevancy of courses should be communicated to institutions to ensure they are aware why simulation learning outcomes are meaningful for them.

3. Simulation courses result in learning outcomes that produce a cognitive framework, this should be informed by local healthcare needs, to ensure relevant preparation for local professionals.

4. Debriefing should ensure that learners understand learning outcomes in a manner that is meaningful to them; it should also be used to ensure the psychological safety of learners.

5. The collection of satisfaction and administrative data is the minimum requirement for course review.

6. Before a facility develops and implements a course it is imperative that they have the ability to run it well and that the author is aware of their responsibilities.

7. Communities of practice exist across local and wide areas, participants are able to use this membership to advance not only their own professional networks but importantly their own professional development.
Perhaps the most important outcome from this research is that facilities need to ensure that they are meeting their unique circumstances. Facilities should ensure that they are informing their practice with ‘best practice’ in a way that ensures that their local needs, either of the earner or the area, are being met through their curricula.

This report has been written with the explicit purpose of sharing information to increase the quality and scope of simulation healthcare education in Australia; however, more needs to be done.

As a result of this scholarship the author has seen first hand that Australia is in an amazing position to capitalize on the expertise, equipment and infrastructure currently available around the country.

There is the opportunity now for Australia to become a world-leader in the use of simulation in healthcare. If this goal is to be achieved, however, a greater collaborative approach is needed. The institutional and professional silos that exist need to be abandoned, and the great wealth of expertise that exists in Australia needs to be shared.

It is hoped that this report is of benefit, not only because of its results, but for the dialogue it creates.
References


Incorporating simulation in professional entry healthcare education.

This survey has been developed for the Incorporating simulation in professional entry healthcare education research project.

The purpose of this survey is to gather site-specific information that provides context to the interview data.

Information collected from this survey will be collated, analysed and reported in a document for the Australian Winston Churchill Memorial Trust. Once accepted by the Trust this report will be available from: http://www.churchilltrust.com.au/

Completion instructions:

1. This survey can be completed by a designated representative.
2. Survey questions are written in black and where appropriate further information has been provided in grey.
3. Please complete all three sections
4. If you have any queries regarding any question please contact Nicholas Marlow at: nicholas.marlow@hwa.gov.au

Date: ________________________________________________

Institution: ________________________________________________

________________________________________________________________________

Name and title: ________________________________________________

Name and title: ________________________________________________

Name and title: ________________________________________________

SECTION 1

Yes/No answer questions (1 - 3)
<table>
<thead>
<tr>
<th>#</th>
<th>QUESTION</th>
<th>YES or NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you offer any educator training?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Do your courses have any external accreditation?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Do your educators have any external certification?</td>
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</tbody>
</table>

**SECTION 2**

Short answer questions (4 – 12)

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
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<tbody>
<tr>
<td>4</td>
<td>How many full time staff work at your facility?</td>
</tr>
<tr>
<td>5</td>
<td>How many part-time staff work at your facility?</td>
</tr>
<tr>
<td>6</td>
<td>What year did your facility open?</td>
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</tbody>
</table>

*Please write the year and month your facility taught its first participant.*

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>What is the size of your facility in square feet?</td>
</tr>
<tr>
<td>8</td>
<td>How many undergraduate students were educated in your site last year?</td>
</tr>
<tr>
<td>9</td>
<td>How many post-graduate students were educated in your site last year?</td>
</tr>
<tr>
<td>10</td>
<td>How many simulation courses are taught in your facility?</td>
</tr>
<tr>
<td>11</td>
<td>Have any of your courses undergone any internal audit or review processes?</td>
</tr>
</tbody>
</table>
If ‘yes’ how often does this occur?

12 Do you have any courses under development?

If ‘yes’ then please approximate when the course will be delivered.

13 Please place an ‘x’ in the cell next to the professions that are taught at your facility.

<table>
<thead>
<tr>
<th>Audiology</th>
<th>Optometry</th>
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</thead>
<tbody>
<tr>
<td>Chiropractics</td>
<td>Orthoptics</td>
</tr>
<tr>
<td>Clinical Psychology</td>
<td>Paramedicine</td>
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<tr>
<td>Medicine</td>
<td>Physiotherapy</td>
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<tr>
<td>Midwifery</td>
<td>Radiation Science</td>
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<tr>
<td>Nursing</td>
<td>Social Work</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>Speech Pathology</td>
</tr>
<tr>
<td>Others:</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 3
Long answer questions (14 - 25)

14 Do you conduct any Inter-Professional Education?

If ‘yes’ then please group professions, if you have multiple IPE courses please group professions on separate lines.

15 Do other institutions use your facility for training?

If ‘yes’ then please list the name of the institution(s).

16 Please list the simulation modalities used in your facility.

*E.g. Part-task trainers, or virtual environments.*

17 Please list the types of training outcomes for which simulation is currently used.

*E.g. Communication training, or technical skills training.*

18 Is available equipment driving course development or pre-determined curricular needs driving equipment purchasing?

If neither then please write “N/A”.
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Does your facility operate any undergraduate courses where simulation course results affect degree marks?</td>
</tr>
</tbody>
</table>
| 20 | Have you developed any courses to teach specific competencies as required by a professions registration/accrediting body? 
*If 'yes' then please list the list the course name(s).* |
| 21 | Do you have any courses that do not include assessments? (I.e., completion is attendance-based or duration-based). 
*If 'yes' then please list the list the course name(s).* |
| 22 | Do you have any simulation equipment that is used to educate more than one profession? |
| 23 | Do other institutions use courses developed by your facility? 
*If 'yes please list the course(s) and the related institution.* |
| 24 | Do you use any courses developed by other institutions? 
*If 'yes please list the course(s) and the related institution.* |
| 25 | Does your facility get any feedback from employers on the competency of your graduates? 
*If 'yes' have they made any comments that can be attributed to the use of simulation within your curricula?* |
Appendix B: Semi-Structured Interview template
WCMT Interview Protocol
Incorporating simulation in professional entry healthcare training.

Date: _________________________________________________________
Institution: _____________________________________________________
________________________________________________________________
Interviewee (Title and Name): ______________________________________
________________________________________________________________
________________________________________________________________
Topics Discussed: ________________________________________________
________________________________________________________________
________________________________________________________________
Documents Obtained: _____________________________________________
________________________________________________________________
________________________________________________________________

QUESTIONS

QUESTION 1:
TIME:
What are the triggers that led to the development of simulation courses in your facility?
(The objective of this question is to identify whether there are any common events, across sites that lead to the development of courses. The purpose of this information is to understand what are the important factors that lead to the development of simulation-based courses)

QUESTION 2:
TIME:
What do you believe are the important steps in developing a course?
(The objective of this question is to determine whether the interviewee or the facility have evaluated what’s required in the development of a course. The purpose of this information is to understand whether or not there are any common approaches that are used in the development of courses.)

QUESTION 3:
TIME:
Did you consult with any external organizations, professional accrediting bodies, or other universities in the development of any of your courses? (The objective of this question is to determine whether or not sites liaise externally, or whether courses are developed in isolation. The purpose of this information is to understand if, and how your courses developed in relation to profession-based pressures.)

QUESTION 4:
TIME:
What has been the biggest enabler in the development your courses? What has been the biggest barrier to the development of your courses?  
(The objective of this question is to understand what development processes, and/or implementation techniques you’ve found that have benefitted your sites ability to utilize simulation courses. The purpose of this information is to gather elements that may assist others in the development of their courses.)

QUESTION 5:
TIME:
Has your facility devised any formal processes via which courses are developed and implemented?  
(The objective of this question is to determine whether any policies or procedures have been formally identified that must be followed in developing simulation-based courses. The purpose of this information is to gather elements that may assist others in the development of their courses.)

QUESTION 6:
TIME:
Has the use of simulation in each course been linked to competency/registration requirements for that profession?
(The objective of this question is to learn about the relationship between content, outcomes and professional certification requirements. The purpose of this information is to understand if and how your courses evolve in relation to profession-based pressures.)

QUESTION 7:
TIME:
Do you perform any evaluations of your courses; if so what processes are undertaken?
(The objective of this question is to determine whether any policies or procedures have been formally identified that must be followed in auditing simulation-based courses. The purpose of this information is to understand how the relevancy of courses is maintained.)

QUESTION 8:
TIME:
What are the most important factors you believe that need to be addressed in the development of simulation based education and training?
(The objective of this question is to allow interviewees to address any points they believe are important in course creation. The purpose of this information is to understand from their experience what they believe is important).