

## Introduction

The core surgical training (CST) pathway as offered by the Royal college of Surgeons in Ireland (RCSI) has been subject to significant change in the past five years as new entrants to postgraduate surgical training embark on an eight-year program following the traditional intern year to the completion of specialist surgical training.

Although planned as a viable and attractive alternative to the previous pathway, this run through model requires trainees to gain technical competency and exceptional clinical acumen in a significantly shortened time frame. Coupled with an overall reduction in available working hours as result of the European Union Working Time Directive (EWTD), there has been a shift to developing surgical proficiency through simulation, which can then be refined under consultant supervision in the clinical environment.

A potential benefit of integrating a simulated surgical training module into the curriculum for CST participants would be the ability to practice or learn procedures in their entirety, prior to entering the operating theatre. The scope of this study was to assess the feasibility of replacing traditional learning with simulated learning and to look at the evidence available relating to the use and benefits or limitations of simulation in surgical training and where possible to evaluate its role compared to didactic learning methods

## Methods

This research forms part of a MCh in Surgical science. Here, students will be assessed in their ability to perform a simulated surgical procedure, namely, insertion of a chest drain having learned the skill either through a phone or tablet based interactive simulation program or traditional methods available through the RCSI eLearning platform.

This section of the study examined the benefits to be gained from simulation based learning on procedural learning, while it also examined the usability and satisfaction with using this virtual reality (VR) platform. 25 NCHDs were recruited to learn the procedure involved in performing a laparoscopic cholecystectomy using either a surgical simulation application (TouchSurgery™) or the didactic materials currently available to CST's via the MSurgery platform from the Royal College of Surgeons in Ireland. These 25 candidates were randomized to either the VR app or traditional learning methods.

## Assessment

Candidates were assessed using a free text description of the case to be performed in 3 categories; patient preparation, access and laparoscopy and cholecystectomy and closure of the abdomen. Candidates were expected to mention or allude to the necessary steps to be completed prior to progression to the net stage of the operation. This was followed by a 20-question multiple-choice exam examining the specific steps needed to complete the case.

The questionnaire used in the current study assessed NCHDs self rated opinion of the material quality and its ease of use on a likert scale.

## Results

Those learning with the TouchSurgery™ application (n=13) had an average MCQ score of 87% compared with the traditional methods (n=12) of 78%. Similarly, those using the VR platform correctly mentioned 76.7% of the necessary sequential steps in patient preparation, access and laparoscopy and the cholecystectomy itself compared with 69.9% in the traditional arm

Table 1: MCQ Scores (%)

%	Touch Surgery app	Traditional learning
100	3	0
95	3	0
90	2	3
85	0	1
80	3	0
75	2	1
70	1	1
65	0	2
60	0	1
<55	0	0
	t-value 2.2131	p-value .018544.

Table 2: Self-rated quality and ease of usage of the two learning methods

	TouchSurgery % (n)	Traditional materials % (n)
<b>Material quality</b>		
Excellent to Very good	100% (13)	25%(4)
Fair to poor	0% (0)	75% (8)
<b>Ease of usage</b>		
Excellent	77% (10)	55% (196)
Very Good	23%(3)	62% (221)
Average	42% (21)	37% (128)
Fair	12% (6)	27% (93)
Poor	20% (10)	19% (68)

## Discussion and future work

These results show that when learning a naïve skill, an interactive and simulation based platform offers advantages in both procedural learning ability and in satisfaction scores relating to the quality and ease of use of the product. The application used, TouchSurgery™, is a free to all interactive simulation learning application and is one of many available to both undergraduate and postgraduate trainees. It has been validated as a training platform in orthopaedic surgery for intramedullary nailing of the femur, hence its selection as the platform of choice in this study.

This project will now to apply these same learning methods to a cohort of NCHDs and assess their ability to perform a simulated operative procedure and assess them using the current subjective supervised assessment of operative performance score (SSAOP) Forms currently used to assess surgical trainees in their day to day practice. The Hypothesis being that those who learn the skill to be tested with the interactive VR platform will out perform those learning via traditional means.

## Limitations

Although care was taken to exclude those with procedural knowledge of the case to be learned, this could not be guaranteed. The material available via the MSurgery site in no way claims to be exhaustive and common sense would ensure that a trainees would seek further information via a variety of sources.

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