

A Prospective Cohort Study Using e-Learning Modules as a Supplemental Teaching Resource for Third Year Dalhousie Obstetrics and Gynecology Clerkship Students

Jason Kim

PGY – 5

Supervisor: Dr. Jillian Coolen

ASOG 54th Annual Meeting

September 19, 2014

Introduction

- Traditional medical school teaching:
 - Didactic lectures and hands on experience
- Early 2000's
 - Emphasis on physician shortage across Canada
- Dramatic increase in the average Canadian medical school class size over the past decade
 - Dal 88 - 112
 - UBC: 128 – 288
- Resulted in the expansion of medical schools across distributed clinical learning sites
 - Community-based settings are now heavily relied upon in addition to the traditional acute care institutions
 - Increasingly diversified clinical experiences

Introduction

- Advances in medicine and changes in health care delivery have dramatically changed over the past few decades
 - Opportunities for certain clinical experiences have significantly decreased
- Major challenge to medical schools is to provide comparable teaching and clinical experience regardless of training site
- Difficulty in recruiting additional teaching staff willing to provide a beneficial clinical experience
- New technology has allowed for new possibilities including e-learning

e-learning

- “The use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance”
- Improves the efficiency and effectiveness of educational interventions used to address challenges in teaching students at various health institutions
- Use is highly variable among medical schools
- Also known as:
 - Web-based learning, online learning, distributed learning, computer assisted instruction, internet based learning

e-learning

Synchronous

- Real time
- Instructor led
- All learners
 - Receive information simultaneously
 - Communicate directly with others
- Examples:
 - Teleconferencing
 - Chat forums

Asynchronous

- Transmission and receipt of information do not occur simultaneously
- Instructors and learners do not communicate in real time
- Examples:
 - Learning modules
 - Virtual patients
 - Online bulletin boards
 - E-mail

Benefits of e-learning

- Allows the learner to control:
 - Learning sequence, pace of learning, media (if available)
- Increases accessibility of information regardless of student location (allows for improved standardization)
- Tailors experience to student's own needs
- Engages students
- Enables students to be active participants
- Learner centered
 - Offers stronger learning stimulus
- Provides a means for individual practice and reinforcement

e-learning

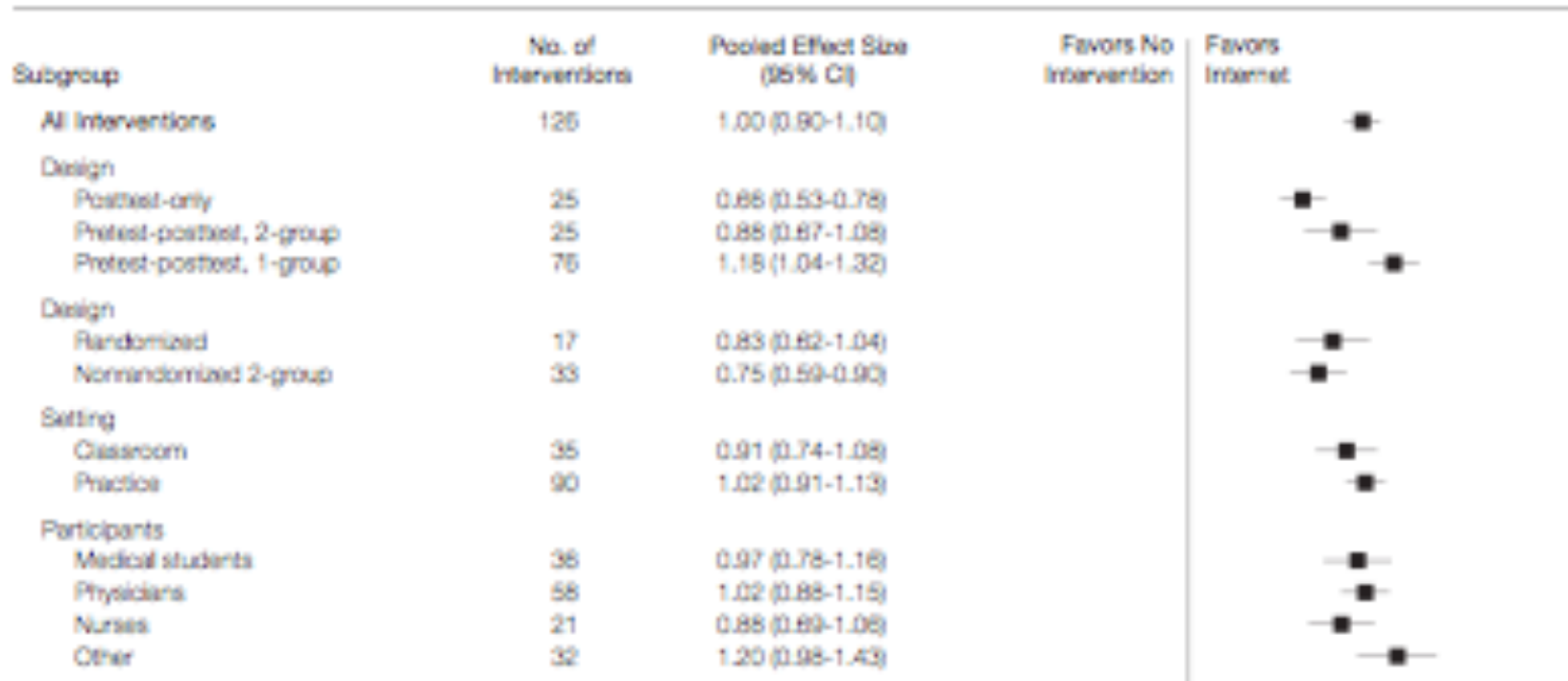
- Appears to be at least as effective as instructor led methods
- Does not replace traditional training
 - Acts as a complement
- May play an important role in a blended-learning strategy
- Can simplify the distribution of educational material
- Aids in providing aspects of learning that students' deem important to their learning experience
- Can bridge the gap between systematic textbook learning and the transfer of that knowledge to clinic practice (2nd to 3rd year medical school)

Evidence supporting e-learning

- Meta-analysis
- “Internet based learning in health care professionals”
Cook *et al.* 2008
 - In comparison to no intervention, internet based learning in health professions is associated with positive effects
 - Knowledge outcomes = 1.00 (0.90-1.10; $P < .001$)
 - Skills = 0.85 (0.49-1.20; $P < .001$)
 - Learner behaviors and effect on patient care = 0.82 (0.63-1.02; $P < .001$)
 - Similar effect compared to traditional learning

Cook *et al.*

Figure 2. Random-Effects Meta-analysis of Internet-Based Learning vs No Intervention: Knowledge Outcomes



e-learning in Medical School

- Shown to be beneficial in Pediatrics clerkship programs
 - Students in this study suggest similar material would be beneficial in other specialties
 - Have been well received by programs throughout North America
- Few studies with regard to effect in an Obstetrics and gynecology clerkship program
 - Previous study showed benefit of introduction to performing a pelvic examination

e-learning at Dalhousie

- Pediatrics
 - CLIPP cases – (Computer-assisted Learning in Pediatrics Program)
- Plastic and Reconstructive Surgery
 - 8 online modules for medical students
- Learning Resource Centre
 - MED II patient-doctor online tutorials
- Evidence Based Practice Block
 - Webcasts

Dalhousie Clerkship Sites

- Obstetrics and Gynecology clerkship sites:
 - Halifax, N.S.
 - Kentville, N.S.
 - Saint John, N.B.
 - Moncton, N.B.
 - Fredericton, N.B.
 - Miramichi, N.B.
- Exposure to clinical situations will likely vary between various locations and within each site
 - Eg: EPCC exposure in Halifax compare to other sites

Hypothesis:

- “Having e-learning modules available as a supplement to the standard Dalhousie Obstetrics and Gynecology clerkship program will have a positive effect on the learning experience and knowledge obtained by Dalhousie medical students during their Obstetrics and Gynecology rotation.”

Objective:

- Primary: Examine the effect of online learning modules on the acquisition of knowledge by Dalhousie medical students during their Obstetrics and Gynecology clerkship rotation
- Secondary:
 - Development of online learning modules for the Dalhousie Obstetrics and Gynecology clerkship program.
 - Provide an additional learning resource for all Dalhousie students
 - Potential resource for preparation for LMCC Part I and II
 - Aid in the development of competent new physicians

Methods

- Develop 6 e-learning modules specific to Obstetrics and Gynecology utilizing the SoftChalk® software program
- Modules will include:
 - Early Pregnancy Complications
 - Menopause
 - Cervical Cancer Screening
 - Normal Labour and Group B Streptococcus Status
 - Gestational Diabetes
 - Post Partum Hemorrhage
- Modules will supplement, not replace, current curriculum

Methods

- Modules developed from Oct 2012 – April 2013
- Modules available in April 2013
 - Accessible to all Dalhousie students
- Students will gain access through the Dalhousie Black Board Learn system
- Each module is designed to be completed in 30-45 mins
- Approval obtained from:
 - Dalhousie Ethics committee
 - Dalhousie Undergraduate Medical Education curriculum committee

Her Exam was as follows:

- Cervical Dilatation: 8cm
- Cervical Effacement: 100%
- Cervical Consistency: Soft
- Station: +1
- Fetal Presentation: Vertex
- Fetal position: Occiput Anterior (OA)



Since the publication of the SOGC guideline, there have been further studies that show a benefit in treating GDM (6). The Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) Study was published in 2008, and shows benefits in diagnosing and managing GDM (7). The study showed a strong association between maternal glycemia and birth weight above the 90th percentile (7). Outcomes of primary cesarian delivery, clinical neonatal hypoglycemia, premature delivery, shoulder dystocia or birth injury, intensive neonatal care, hyperbilirubinemia, and preeclampsia also showed an association with maternal glycemetic levels (7).

Which of the following is/are a risk factor for GDM?

- a. Previous macrosomic infant (>4000g)
- b. Young maternal age
- c. Oligohydramnios
- d. Previous unexplained stillbirth
- e. Being of Aboriginal, Hispanic, South Asian, Asian, African ethnicity
- f. Smoking
- g. Polycystic Ovarian Syndrome (PCOS)
- h. Obesity

[mark all correct answers]

Participants

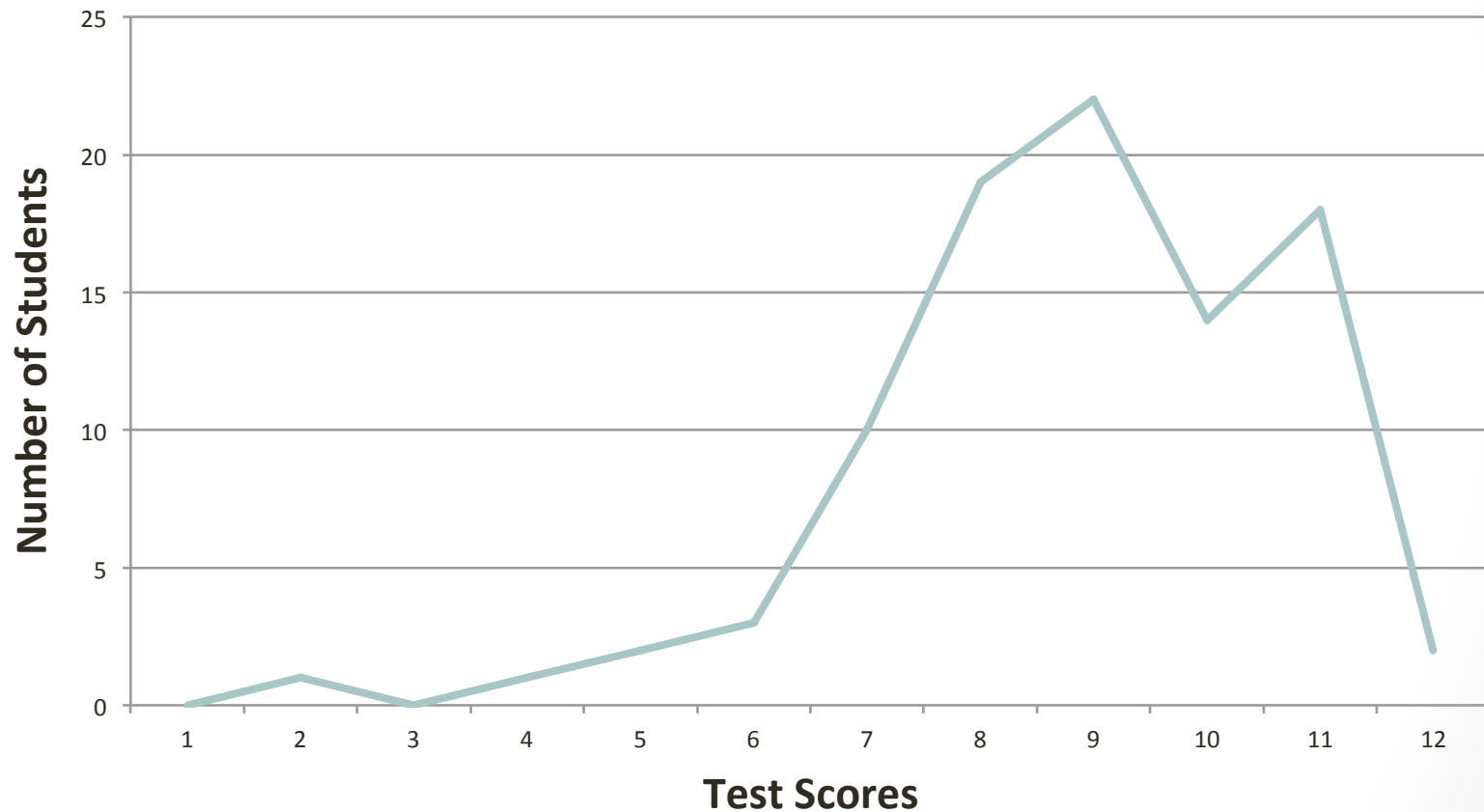
- All clerkship students of the Dalhousie medical school class of 2014 were eligible to participate in the study
 - Participation completely voluntary
 - If student declined, still able to access all of the study material prior to summative examination
- Two separate natural cohorts of students who completed their Obstetrics and Gynecology rotation at different periods of time:
 - 1. September 2012 – March 2013 (n = 54)
 - 2. April 2013 – September 2013 (n = 60)

Evaluation of Effectiveness

- Two multiple choice questions per module developed
- Twelve questions provided as a formative evaluation a week prior to the scheduled summative MCQ examination
- All questions reviewed and approved by Dalhousie Undergraduate Medical Education
- Completion of modules not required to complete formative questions
- Answers to formative questions provided once the student had completed all 12 questions
- Examination scores of the two cohorts compared using appropriate statistical analysis

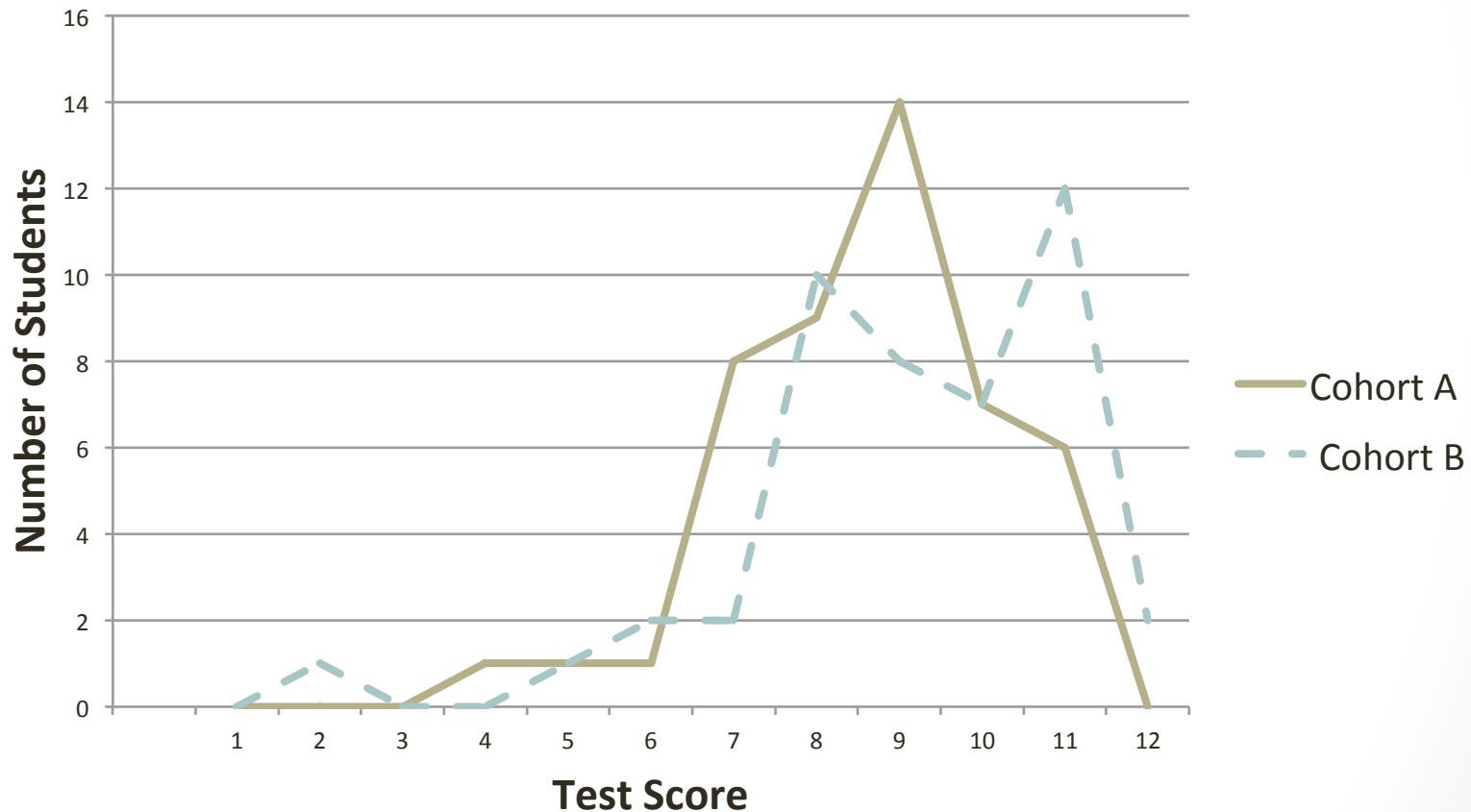
Test Score Distribution

All Students



Cohort Test Score Distribution

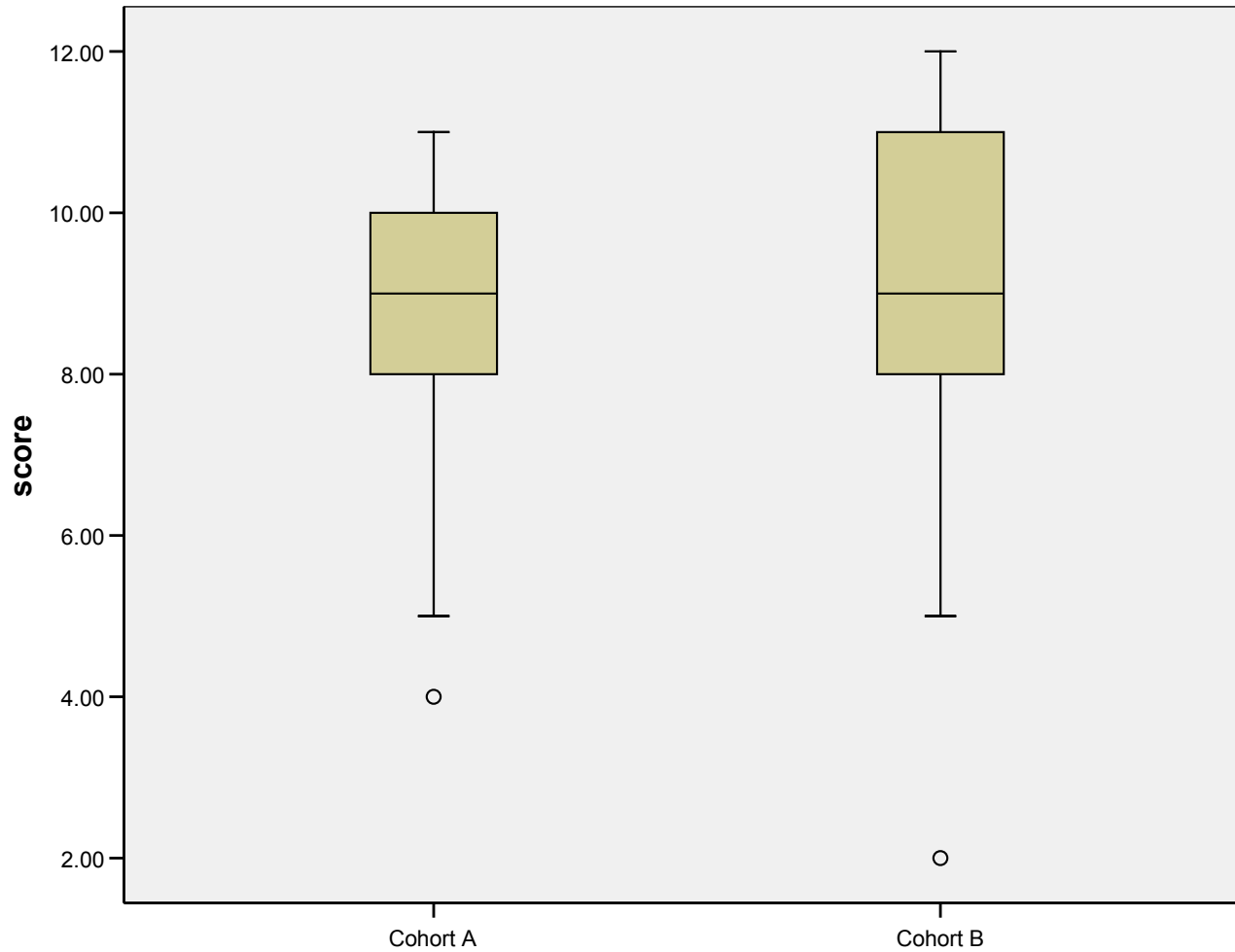
Student Scores



Results

- Calculated using SPS analysis software
- Cohort 1:
 - 47 (87%) students completed formative questions
 - Mean score (out of 12):
 - 8.62 (95% C.I. = 8.17 – 9.07)
- Cohort 2:
 - 45 (75%) students completed formative questions
 - Mean score:
 - 9.13 (95% C.I. = 8.83 – 9.43)
- Data not normally distributed: Mann-Whitney test performed:
 - $P = 0.08$

Median and Inter Quartile Range



Conclusion:

- Having access to six e-learning modules did not improve the third year Dalhousie medical students' scores on a formative evaluation completed prior to their summative evaluation.

Strengths and Limitations

- Strengths:
 - Easily accessible study population
 - Elimination of variables caused by changes in curriculum between years
- Limitations:
 - Occurrence of technical difficulties
 - Natural variation in achievement between clerkship groups
 - Population size is not large
 - Unable to assess long-term impact on students' knowledge
 - “Closed book” nature of assessment could not be assured
 - Answers to formative questions may have been shared amongst students

Final Thoughts

- Although this study did not find a significant improvement in assessment this may be due to the limitations of the assessment process
- May still be beneficial to provide additional modules to future medical school classes
- Although a formal satisfaction questionnaire was not completed, many students commented that the modules were beneficial and a useful resource for studying
- Medical education will continue to evolve to incorporate additional e-learning resources

Acknowledgements

- Dr. Jillian Coolen – Supervisor
- Colleen O'Connell – PERU
- Tracy Fraser MacIsaac – Clerkship Curriculum Coordinator
- Dalhousie Medical Class of 2014

Thank you

