

Simulated Learning for Occupational Therapy and Physiotherapy Students



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Students at the University of Waterloo created this product while being trained in the systematic review methods of Knowledge Impact Strategies. Authors are listed in alphabetical order.

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Simulated Learning for Occupational Therapy and Physiotherapy Students

July 2014

Take Home Message

- The question of whether simulated learning environments (SLEs) are as effective as clinical training for OT and PT students cannot be confirmed as very few studies empirically compared the two teaching methods.
- Most of the articles that studied the effectiveness of SLEs did so through pre- and post-test assessments or comparisons between two different types of simulations.
- SLEs provide the opportunity to learn specific skills through guaranteed exposure to different clinical situations, whereas practice within clinical environments is sometimes limited in an attempt to limit potential adverse events/outcomes.

Overview

This project was completed during the Winter 2014 term by students in an upper-level Psychology course, *Community-Based Research*, at the University of Waterloo. The students were: Emily Coon, Ceara Khoramshahi, and Misha Popoff. They were assisted by the course instructor Dr. Kathleen Bloom and teaching assistant Jane Tam. The community partner organization for this project was Conestoga College Institute of Technology and Advanced Learning (Conestoga College). Its partnership with the University was coordinated by Laura Snyder and Laura Turner, occupational therapists who taught at the College.

Conestoga College offers a two-year occupational therapist assistant and physiotherapist assistant (OTA and PTA) training program. OTAs and PTAs are primarily responsible for implementation of treatment plans to promote physical functioning or to enhance participation in activities of daily living for individuals with a wide range of health conditions under the supervision of registered occupational and/or physiotherapists.

Simulated learning refers to any technique in which real-world scenarios are imitated such that students can apply their skills and garner practical knowledge while dealing with realistic problems in controlled collaborative learning situations. For OT, PT, and medical students, simulations are primarily used to replicate typical patient encounters. Simulation tools include mannequins, video scenarios, live actors, written case studies, and so forth.

What Was Studied?

The stakeholders from Conestoga College requested research on the effectiveness of simulated learning compared to clinical experience. Due to a shortage of placement opportunities in the community, the staff at the College had begun to consider the incorporation of simulated learning to their OTA and PTA curriculum as a replacement for some of the clinical placement time. Before implementing simulation based programs, research was needed to determine if simulated learning is comparable to clinical placements in terms of the skills and knowledge they provide students. The precise research question was as follows: “**Are simulated learning environments for occupational therapy and physical therapy students as effective as hands-on clinical training?**”

How Was It Studied?

A literature search was performed using the Scopus database which compiles peer-reviewed articles from over 19,500 academic journals. Articles were limited to those published in English, and no time frame constraint was applied due to the limited number articles addressing the topic.

The search strategy used was:

TITLE-ABS-KEY(occupational therapy) OR TITLE-ABS-KEY(physiotherapy) AND TITLE-ABS-KEY(simulated learning) OR TITLE-ABS-KEY(simulation training) OR TITLE-ABS-KEY(patient simulation) AND (LIMIT- TO(LANGUAGE, "English"))

The search was conducted on January 28 2014, identifying a total of **169** articles.

To ensure the relevance of articles to the research question, articles that met the following criteria were excluded from the review:

- **Not simulation learning:** Articles that were not related to simulation training in the healthcare field (e.g., statistical, financial or mathematical models).
- **For patients:** Articles that studied treatments and patient outcomes (e.g., physical patient rehabilitation techniques).
- **Not student learning:** Articles that focused on professionals working in the field, training of instructors of OT/PT, and assessment tools for training.

Based on the above criteria, **127** articles were deemed to be outliers, leaving **42** articles for further consideration. Further inspection was conducted to identify articles most relevant to the research question. Articles were excluded if they met the following criteria:

- Did not focus on OT and PT students.
- Did not focus on programs that involved learning through SLEs.

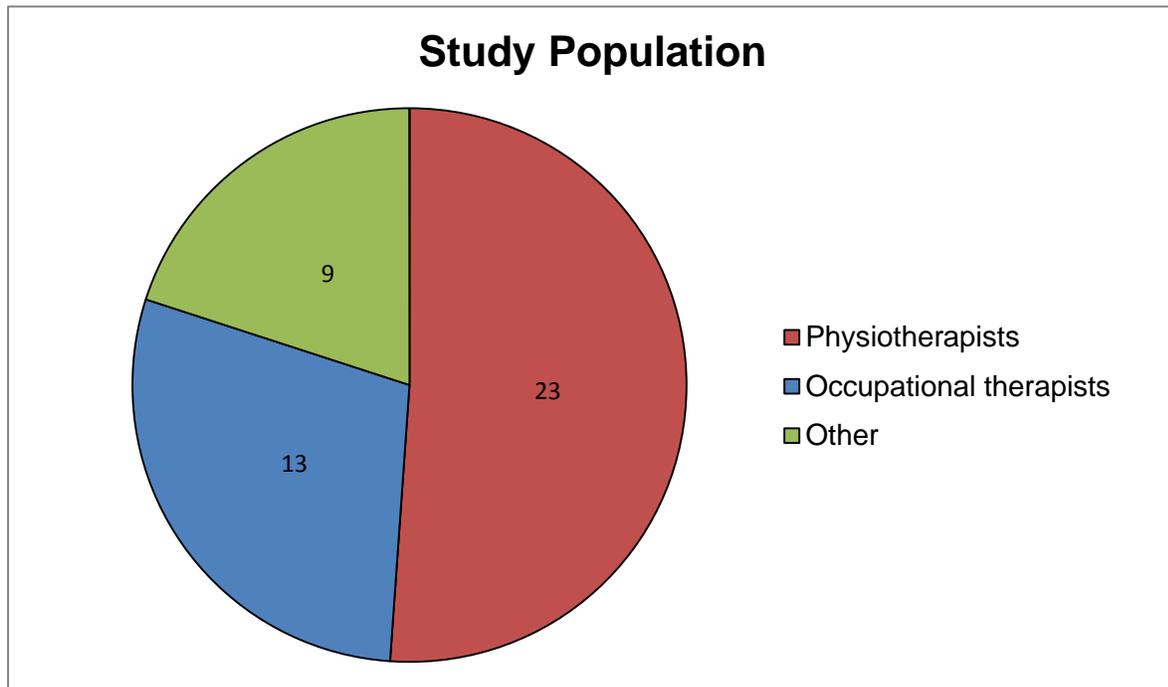
After applying the exclusion criteria to all 42 articles, **11** articles were excluded, leaving a total of **31** articles for inclusion in the final review.

All article inclusion/exclusion and data extraction decisions were reviewed to ensure that there were no discrepancies in the students' understanding and application of the coding categories. Any discrepancies were resolved through group discussion and consensus.

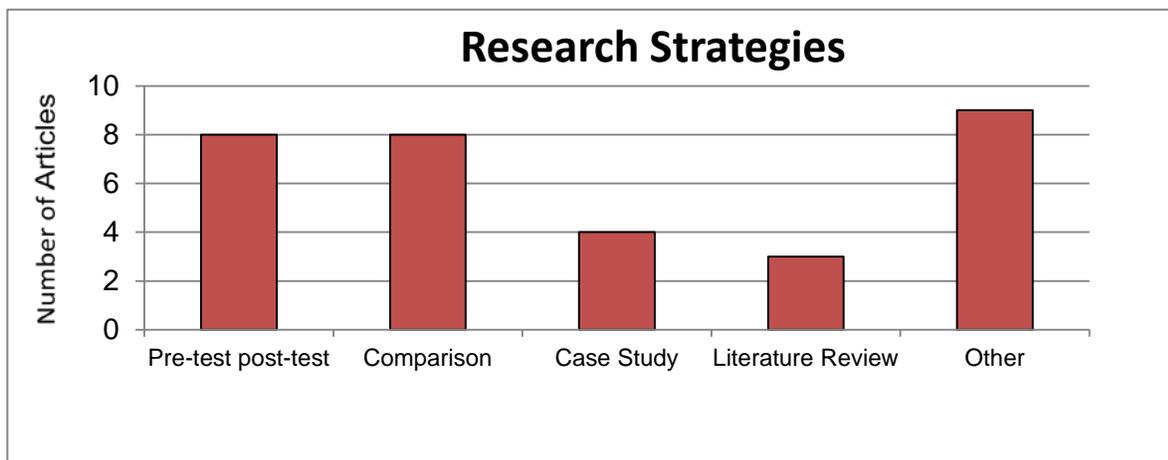
Highlights of Results

- 23 articles (74%) included PT students in their study populations.
- 13 articles (42%) included OT students in their study populations.
- No studies analyzed the cost of using SLEs in lieu of clinical training.
- 3 out of 8 comparison studies compared simulation learning to standard learning which did not involve simulations of any kind. All 3 studies (Blackstock et al., 2013; Preston et al., 2012; Watson et al., 2013) found that students who participated in simulated learning in addition to standard learning performed equal to or better than those who participated in standard learning alone as demonstrated through practical examinations.
- 2 of the above 3 comparison studies were randomized control trials (RCTs) that replaced 25% of clinical training (1 of 4 weeks) for PT students with simulation learning. Students who received 75% clinical training and 25% simulation training performed equally to those who did 100% of their training in a clinical setting (Blackstock et al., 2013; Watson et al., 2012).
- 19 out of 19 studies that assessed participant opinions indicated that staff and/or students considered SLEs to be a valuable tool for learning.
- All 9 articles that discussed the use of simulations for inter-professional learning found them to be successful. Outcomes included increased confidence when interacting with other professional groups, increased positive attitudes towards inter-professional learning and collaboration, and so forth.

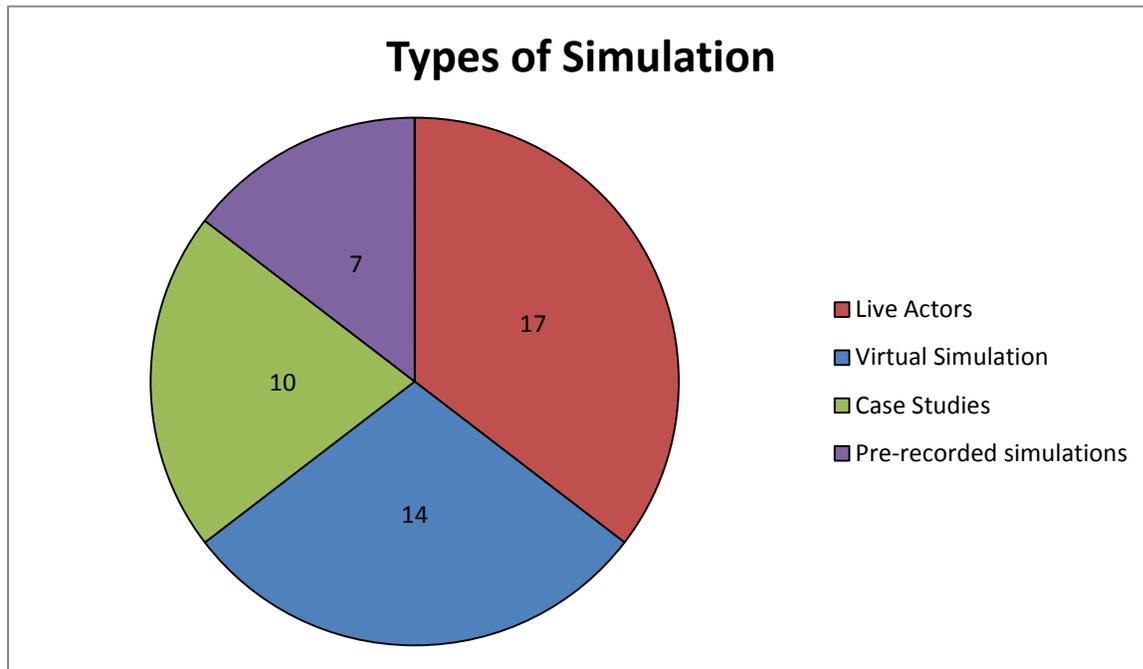
Landscapes of Research Articles



* Some articles studied more than one study population; e.g., OTs and nurses (other)



* One study was categorized both as a literature review and as 'other'



* Some articles used more than one type of simulation

Survey of Research Articles

Each of the 33 articles was summarized in the spreadsheet to answer two questions:

- What was studied?
- What was found?

Information on the following factors was extracted from each of the articles:

- Location in which study was conducted.
- Target population (who was studied):
 - Occupational Therapists: Practicing registered professionals or students training to become registered occupational therapists.
 - Physiotherapists: Practicing registered professionals or students training to become registered physiotherapists.
 - Other: Professionals or students from other health fields (e.g., medicine, nursing, social work) that often collaborate with occupational therapists and physiotherapists.
- Study design:
 - Comparison: Studies in which participants receiving an intervention (e.g., simulation based learning) are compared with participants who received a different intervention (e.g., standard classroom learning).
 - Case Study: A qualitative report of programs for OT and/or PT students involving learning using SLEs.

- Pre-test post-test: Studies in which participants are assessed before and after an intervention.
- Literature Review: An accumulation of research and information that has already been published.
- Other: Study designs not listed above such as questionnaires.
- The type of simulation tool analysed in the article
 - **Virtual simulation:** A technological or computer-based imitation of real-world scenarios involving PT/OT clients (e.g., dolls and mannequins, computer games).
 - **Live actors:** Individuals who have been trained or debriefed to role play various symptoms exhibited by hypothetical PT/OT clients.
 - **Pre-recorded simulation:** A pre-recorded video of a live actor simulation or a real-life PT/OT client.
 - **Case study:** A detailed written report of the background, symptoms, and unique situation of an individual or hypothetical PT/OT client. Students read and analyze these case studies through discussions, questionnaires, oral testing, and so forth.

Citation	What was Studied?	What was found?	Location	Target Population			Study Design					Type of Simulated Learning Environment			
				Occupational Therapists	Physiotherapists	Other	Comparison	Case Study	Pre-Test Post-Test	Literature Review	Other	Virtual Simulation	Live Actors	Pre-Recorded Simulations	Case Studies
Blackstock, F. C., & Jull, G. A. (2007). High-fidelity patient simulation in physiotherapy education. <i>Australian Journal of Physiotherapy</i> , 53 (1), 3-5.	<ul style="list-style-type: none"> Potential uses and barriers of using mannequins in PT case study training 	<ul style="list-style-type: none"> Clinicians tend to limit the amount of practice students have in order to limit potential adverse events/outcomes Simulation can provide guaranteed exposure to a variety of clinical situations Scenarios can progress in complexity and be repeated to increase competency Video re-play of the scenario may facilitate learning One limitation: some students become overly cautious while others are unconcerned as interactions have no real consequences 	Queensland, Australia		•						•	•			
Blackstock, F. C., Watson, K. M., Morris, N. R., Jones, A., Wright, A., McMeeken, J. M., & Jull, G. A. (2013). Simulation can contribute a part of cardiorespiratory physiotherapy clinical education: Two randomized trials. <i>Simulation in Healthcare</i> , 8 (1), 32-42.	<ul style="list-style-type: none"> RCT 1: comparison of 4 week clinical immersion (control) with a simulated learning environment (SLE) programme in which students experienced full time practice in an SLE for 1 week and clinical immersion for 3 weeks RCT 2: comparison of 4 week clinical immersion (control) with an SLE programme in which students spent half their time in an SLE and half their time in clinical immersion for the first 2 weeks followed by 2 weeks of only clinical immersion 	<ul style="list-style-type: none"> In RCT 1, there was no difference between the two groups for competency to practice in the cardiorespiratory field, as assessed through 2 clinical exams In RCT 2, the SLE group had significantly higher scores than the control group for 5 of 7 practice standards, as assessed through 2 clinical exams There were no differences between the two groups in either RCT for self-report ratings of competency Students in both RCTs rated the SLE positively 	Australia		•		•				•	•			

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Bradley, G., Whittington, S., & Mottram, P. (2013). Enhancing occupational therapy education through simulation. <i>British Journal of Occupational Therapy</i> , 76 (1), 43-46.	<ul style="list-style-type: none"> • Introduction of simulation to a pre-registration undergraduate OT program • Final year OT students took part in two structured simulated scenarios over the course of two days and were then debriefed on their insights into what happened, how they felt, and how the experience was relevant to their professional development 	<ul style="list-style-type: none"> • Students and staff felt that simulation learning provided an opportunity for enhanced learning • The authenticity of the situation and the need to act professionally were heightened due to the presence of observing students and the use of uniforms and identification 	Newcastle Upon Tyne, UK	•								•	•	•	
Buckley, S., Hensman, M., Thomas, S., Dudley, R., Nevin, G., & Coleman, J. (2012). Developing interprofessional simulation in the undergraduate setting: Experience with five different professional groups. <i>Journal of Interprofessional Care</i> , 26 (5), 362-369.	<ul style="list-style-type: none"> • PT and inter-professional students' perceptions of inter-professional simulations as a learning experience, their attitudes toward interprofessional learning, and their thoughts on factors that are important for good patient care 	<ul style="list-style-type: none"> • Students reported that the simulations were a valuable learning experience, raised their awareness of the importance of effective team working, and increased their confidence in interacting with other professional groups • Participation from students may be more important than the content of the scenario itself • Specific benefits derived from simulation learning vary depending on profession 	Birmingham, UK		•	•			•		•	•			

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Cavanaugh, J. T., & Konrad, S. C. (2012). Fostering the development of effective person-centered healthcare communication skills: An interprofessional shared learning model. <i>Work, 41</i> (3), 293-301.	<ul style="list-style-type: none"> Survey opinions of an inter-professional shared learning model designed to promote person-centered communication skills among Master of Social Work and Doctor of Physical Therapy students 	<ul style="list-style-type: none"> Students, staff and consumers found the shared inter-professional learning model as a helpful tool that showed promise in fostering person centred communication The role-play aspect of the model was useful in tackling the social discomfort of difficult conversations Peer-to-peer learning and feedback from healthcare consumers was particularly valued by students 	Portland, USA		•	•							•	•	•	
Chard, G. (1997). Should Occupational Therapists use Simulation Exercises? Using Wheelchair Training as an Example. <i>British Journal of Occupational Therapy, 60</i> (4), 161-166.	<ul style="list-style-type: none"> Individuals with and without disabilities and first year OT students' opinions, as represented by their responses on a questionnaire, on learning through methods such as wheelchair simulations 	<ul style="list-style-type: none"> Wheelchair simulations were useful as a trigger for reflections and discussions, but not as standalone activities Wheelchair users and their caregivers need to be involved in the activity Overall, the opinions of the simulation as reported by individuals with and without disabilities were positive 	Liverpool, UK	•							•	•				

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Day, J. A. (1985). Beyond lecture and laboratory in the physical therapy classroom. <i>Physical Therapy</i> , 65 (8), 1214-1216.	<ul style="list-style-type: none"> Students engaged in an Inquiry Training Model (case studies) or Simulation Model (role playing) to determine which method was more suited to teach skills relevant to clinical practice 	<ul style="list-style-type: none"> Students and faculty members considered the use of both models to be helpful and fun The Inquiry Training Model can be used to help students better organize their thoughts and problem solve The Simulation Model can help prepare students for their future clinical experiences 	Florida, USA		•		•						•		•
Efstathiou, N., & Walker, W. M. (2014). Interprofessional, simulation-based training in end of life care communication: A pilot study. <i>Journal of Interprofessional Care</i> , 28(1), 68-70.	<ul style="list-style-type: none"> Use of inter-professional, simulation-based training in end of life care communication 	<ul style="list-style-type: none"> Statistically significant positive change occurred in students' perceptions of their knowledge, skills, and confidence pertaining to end of life care communication Students were supportive of interprofessional learning and recognized its benefits 	Birmingham, UK		•	•		•					•	•	
Gartland, G. J. (1978). Physical therapy education in a non-traditional setting: The clinical learning centre. <i>Physiotherapy Canada</i> , 30 (5), 242-245.	<ul style="list-style-type: none"> Use of genuine patients and live actors in a clinical learning centre to enhance the education and clinical skills of PT students 	<ul style="list-style-type: none"> Initial impressions indicate that the clinical learning centre may prove a useful support to accompany laboratory and clinical training 	Kingston, Canada		•		•						•		
Gough, S., Yohannes, A. M., Thomas, C., & Sixsmith, J. (2013). Simulation-based education (SBE) within postgraduate emergency on-call physiotherapy in the United Kingdom. <i>Nurse Education Today</i> , 33 (8), 778-784.	<ul style="list-style-type: none"> The extent to which simulation-based education (SBE) is used within cardiorespiratory physiotherapy post-registration training, assessed through a national questionnaire-based survey 	<ul style="list-style-type: none"> Simulation is currently used to teach a wide variety of cardio-respiratory PT skills relevant to the acute respiratory and emergency on-call environment Impact of using SBE within emergency on-call training to improve educational outcomes and patient safety is unknown 	UK		•					•	•	•			

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Hassam, M., & Williams, M. (2003). Education via simulation: Teaching safe chest percussion for pre-term infants. <i>Hong Kong Physiotherapy Journal</i> , 21, 22-28.	<ul style="list-style-type: none"> PT students' technique before and after performing chest percussions on a simulated preterm infant and receiving an educational session Comparison of participating students' and non-participating students' recall of key components of safe technique 	<ul style="list-style-type: none"> 3% of students had acceptable technique before the session; 97% were acceptable after the session Students who worked with the simulated infant showed better recall of key components of safe technique than students who did not participate in the session Simulated client scenarios combined with theoretical knowledge may improve retention and application of key safety requirements in clinical situations 	North Terrace, Australia		•							•			
Holland, C., Bench, S., Brown, K., Bradley, C., Johnson, L., & Frisby, J. (2013). Interprofessional working in acute care. <i>Clinical Teacher</i> , 10 (2), 107-112.	<ul style="list-style-type: none"> Development and implementation of an Inter-professional module involving simulation-based teaching for medical, nursing, and PT students to enhance collaboration and communication 	<ul style="list-style-type: none"> Number of faculty competent in the pedagogy of Inter-professional education (IPE) increased Working together in the context of IPE enhanced faculty's understanding of each other's knowledge and skills Student evaluations have been almost unanimous in reporting high satisfaction scores and self-identifying both explicit and tacit learning as having occurred 	London, UK		•	•		•				•			•

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Jones, A., & Sheppard, L. (2008). Physiotherapy education: A proposed evidence-based model. <i>Advances in Physiotherapy, 10</i> (1), 9-13.	<ul style="list-style-type: none"> • Review of experiential learning in physiotherapy education • A proposed model for use in physiotherapy education 	<ul style="list-style-type: none"> • Problem-based learning is an increasingly popular educational model • Simulated patients and peer evaluation have been reported as positive learning experiences for PT students • A key element of existing education models in physiotherapy is experiential learning • The proposed model combines the use of scenarios and clinical education in stepwise progression to allow students time to learn and practice the knowledge or skill 	Townsville, Australia		•							•	•	•	•	
Jones, A., & Sheppard, L. (2011). Self-efficacy and clinical performance: A physiotherapy example. <i>Advances in Physiotherapy, 13</i> (2), 79-83.	<ul style="list-style-type: none"> • Randomised comparison of PT students who had pre-clinical training only (control) and those who also received 8 hours of additional simulation training • Whether or not self-efficacy correlated with actual clinical ability in each group, as measured by the Assessment of Physiotherapy Practice 	<ul style="list-style-type: none"> • Self-efficacy was correlated to control students' clinical performance near the beginning and end of the placement (weeks 2 and 5) • Additional simulation training increased student score of self-efficacy, but did not improve their clinical skills 	Townsville, Australia		•		•							•		

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Kinney, P., Keskula, D. R., & Perry, J. F. (1997). The effect of a computer assisted instructional program on physical therapy students. <i>Journal of Allied Health</i> , 26 (2), 57-61.	<ul style="list-style-type: none"> Effectiveness of a computer assisted instructional program for teaching students evaluation and treatment skills for carpal tunnel syndrome, compared to an interactive lecture involving a case study, role play, and lecture/discussion 	<ul style="list-style-type: none"> The computer assisted instructional program and interactive lecture were equally effective in teaching the techniques The students who used the computer program took less time to complete their post-test multiple choice task than the students who experienced the interactive lecture 	Georgia, USA		•		•					•	•		•
Kraft, S., Wise, H. H., Jacques, P. F., & Burik, J. K. (2013). Discharge planning simulation: Training the interprofessional team for the future workplace. <i>Journal of Allied Health</i> , 42 (3), 175-181.	<ul style="list-style-type: none"> Inter-professional education model of a team-based discharge planning case scenario involving OT, physician assistant, and PT students 	<ul style="list-style-type: none"> Students improved their understanding of their professional role within the inter-professional team, enhanced their clinical reasoning skills, and developed an appreciation for the complexities of discharge planning and communicating with empathy 	South Carolina, USA	•	•	•			•					•	•
Ladyshewsky, R. K. (2002). A quasi-experimental study of the differences in performance and clinical reasoning using individual learning versus reciprocal peer coaching. <i>Physiotherapy Theory and Practice</i> , 18 (1), 17-31.	<ul style="list-style-type: none"> Randomised comparison of students who examined a simulated patient individually (control) and students who did so as a reciprocal peer coaching dyad 	<ul style="list-style-type: none"> The patient evaluation and assessment of the reciprocal peer coaching group exceeded the students who worked alone on measures of history taking, physical examination, and interviewing As a whole, students who received reciprocal peer coaching did consistently better than their peers who worked individually 	Perth, Australia		•		•						•		

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Mohaupt, J., Van Soeren, M., Andrusyszyn, M., MacMillan, K., Devlin-Cop, S., & Reeves, S. (2012). Understanding interprofessional relationships by the use of contact theory. <i>Journal of Interprofessional Care</i> , 26 (5), 370-375.	<ul style="list-style-type: none"> Changes in undergraduate healthcare students' perceptions and attitudes towards inter-professional collaboration following their participation in an inter-professional simulation program 	<ul style="list-style-type: none"> Participation in the simulation increased positive attitudes towards inter-professional collaboration Each inter-professional workshop resulted in positive changes in students' perception of enhanced competency and autonomy, perceived need for collaboration, and perception of actual collaboration 	Ontario, Canada	•	•	•			•						•
Neistadt, M. E., Wight, J., & Mulligan, S. E. (1998). Clinical Reasoning Case Studies as Teaching Tools. <i>American Journal of Occupational Therapy</i> , 52 (2), 125-132.	<ul style="list-style-type: none"> Effectiveness of clinical reasoning case studies compared to traditional case studies 	<ul style="list-style-type: none"> Compared to traditional case studies, clinical reasoning case studies increased the quality of students' treatment plans, confidence in their plans, and understanding of the clinical reasoning process 	New Hampshire, USA	•			•								•
Preston, E., Ada, L., Dean, C. M., Stanton, R., Waddington, G., & Canning, C. (2012). The Physiotherapy eSkills Training Online resource improves performance of practical skills: A controlled trial. <i>BMC Medical Education</i> , 12 (1)	<ul style="list-style-type: none"> Whether or not an online training resource incorporating video simulations and text reference materials in addition to usual teaching increased PT student performance in standardized practical skills assessments 	<ul style="list-style-type: none"> Access to the online training resource improved students' performance of practical skills as compared to those who only had access to normal teaching Students considered the resource to be very useful for learning 	Australia		•		•							•	
Sabus, C., Sabata, D., & Antonacci, D. (2011). Use of a virtual environment to facilitate instruction of an interprofessional home assessment. <i>Journal of Allied Health</i> , 40 (4), 199-205.	<ul style="list-style-type: none"> Utility of a virtual reality environment as a teaching tool to represent clinical assessment and interventions in the home environment 	<ul style="list-style-type: none"> Students found the virtual environment to be supportive of learning Students were supportive of inter-professional collaboration Students produced client goals that were consistent with learning objectives and recommendations that reflected higher levels of decision-making 	Kansas, USA	•	•			•				•			

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Seefeldt, T. M., Mort, J. R., Brockevelt, B., Giger, J., Jordre, B., Lawler, M., & Svien, L. (2012). A pilot study of interprofessional case discussions for health professions students using the virtual world Second Life. <i>Currents in Pharmacy Teaching and Learning</i> , 4 (4), 224-231.	<ul style="list-style-type: none"> Effectiveness of the use of a virtual reality environment, Second Life, for interprofessional discussions of case studies 	<ul style="list-style-type: none"> 60% of students agreed or strongly agreed that the virtual world was an effective method for conducting inter-professional education Students were better able to identify important characteristics of an effective inter-professional team after the simulation Advantages to the use of the virtual world included convenience, flexibility, real-time discussions with other students, and the interactive nature of sessions 	South Dakota, USA	•	•	•			•			•			•
Silberman, N. J., Panzarella, K. J., & Melzer, B. A. (2013). Using human simulation to prepare physical therapy students for acute care clinical practice. <i>Journal of Allied Health</i> , 42 (1), 25-32.	<ul style="list-style-type: none"> Effect of high fidelity human simulation training on the achievement of learning objectives specific to preparation of PT students for acute care clinical practice 	<ul style="list-style-type: none"> 91.5% of students had more confidence in inter-professional communication after the simulation Simulations were deemed valuable in integrating prior learning and providing enhanced understanding of the acute care setting 	New York, USA		•						•	•			
Titzer, J. L., Swenty, C. F., & Hoehn, W. G. (2012). An Interprofessional Simulation Promoting Collaboration and Problem Solving among Nursing and Allied Health Professional Students. <i>Clinical Simulation in Nursing</i> , 8 (8), e325-e333.	<ul style="list-style-type: none"> An interprofessional simulation designed to improve collaboration and problem solving among OT and other healthcare students 	<ul style="list-style-type: none"> Students reported that the simulation supported and provided the opportunity for inter-professional teamwork Inter-professional understanding of the role of the OT was diverse and the role of the OT was not uniformly understood 	Indiana, USA	•		•					•	•			

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Watson, K., Wright, A., Morris, N., Mcmeeken, J., Rivett, D., Blackstock, F., & Jull, G. (2012). Can simulation replace part of clinical time? Two parallel randomised controlled trials. <i>Medical Education</i> , 46 (7), 657-667.	<ul style="list-style-type: none"> • Comparison of 4 week clinical immersion (control) with a simulated learning environment (SLE) programme in which students experienced full time practice in an SLE for 1 week and clinical immersion for 3 weeks • Comparison of 4 week clinical immersion (control) with an SLE programme in which students spent half their time in an SLE and half their time in clinical immersion for the first 2 weeks followed by 2 weeks of only clinical immersion 	<ul style="list-style-type: none"> • In both RCTs, the SLE group and the control group did not differ with respect to clinical competency scores for working with patients with musculoskeletal disorders, as assessed through 2 clinical exams • No differences were found between the two groups, except for communication ratings, on students' self-report ratings of competency • All students showed increases in self-report ratings from the start to the end of the placement • Simulated learning can replace 25% of clinical training with real patients without compromising competencies 	Australia		•	•							•		

Acknowledgements

This work was conducted with the support of Knowledge Impact Strategies Consulting Ltd and the Social Sciences and Humanities Research Council of Canada through a Partnership Development Grant (PDG): “Building Systems for Sustainable Knowledge Mobilization” (K. Bloom, Principal Investigator). After the completion of the course, PDG student research assistants Natalie Chan and Jane Tam reviewed and revised the course project to create the final report.

Disclaimer

This work was conducted by University of Waterloo undergraduate students with the financial and intellectual support of Knowledge Impact Strategies Consulting Ltd. Every attempt was made to produce a systematic review of the highest quality relative to time and our professional judgment as academics. This work is not necessarily definitive, authoritative, comprehensive, or current. It represents the findings, views, opinions, and conclusions of the research team only, and is provided as is without warranties of any kind. The work is neither the official nor the unofficial policy of the University of Waterloo and the University of Waterloo does not necessarily endorse the findings, views, opinions, and conclusions expressed in the work. Knowledge Impact Strategies Consulting Ltd including its directors, officers, employees and agents, accept no responsibility for this work.

Citation

Coon, E., Khoramshahi, C., & Popoff, M. (2014). Simulated Learning for Occupational Therapy and Physiotherapy Students. Knowledge Impact Strategies Consulting Ltd: Waterloo, ON.
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