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Co-constructing Simulations with Learners: Roles, Responsibilities, and Impact

Diane E. MacKenzie
Dalhousie University - Canada, Diane.mackenzie@dal.ca

Kathleen E. Collins
Dalhousie University - Canada, kathleen.collins@dal.ca

Mylene J. Guimond
Dalhousie University - Canada, mylene.guimond@dal.ca

Abby C. Hunter
Dalhousie University - Canada, abby.hunter@dal.ca

Kassia J. Jurcina
Dalhousie University - Canada, kassia.jurcina@dal.ca

See next page for additional authors

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Co-constructing Simulations with Learners: Roles, Responsibilities, and Impact

Abstract

Co-constructed simulations were designed and piloted with senior occupational therapy master's students in a neurorehabilitation practice module. The instructor served as the guide for the students through all phases of the case creation, simulation development, delivery, and debrief. The instructor facilitation promoted self-regulated learning (SRL) of knowledge and skill development through independent discovery and peer learning. This paper provides an evidence-informed co-construction simulation design with outlined stages, roles, and responsibilities for the instructor and learner. Thematic qualitative analysis of student feedback highlighted enhanced insight and SRL as a result of multiple role preparation, observation and interaction with peers, close interaction with the instructor, and the multi-stage debrief process. Recommended key features and critical interactions for a successful co-constructed design are also identified for the learner, instructor, and simulation. The co-construction simulation process and design elements are suitable for learners in any health-related field of study.

Keywords

simulation, occupational therapy, peer learning, self-regulated learning, co-constructed learning

Cover Page Footnote

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Complete Author List

Diane E. MacKenzie, Kathleen E. Collins, Mylene J. Guimond, Abby C. Hunter, Kassia J. Jurcina, Johanna L. McDonald, Nikki L. Richards, Stephanie. H. Sinclair, and Kelsey Y. Taylor

Credentials Display

Diane E. MacKenzie, PhD, OT, Reg(NS), OTR; Kathleen E. Collins, MSc(OT); Mylene J. Guimond, MSc(OT); Abby C. Hunter, MSc(OT); Kassia J. Jurcina, MSc(OT); Johanna L. McDonald, MSc(OT); Nikki L. Richards, MSc(OT); Stephanie H. Sinclair, MSc(OT); Kelsey Y. Taylor, MSc(OT)

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The overall goal of neurological rehabilitation is to maximize functional performance and enhance return of underlying neurological recovery, where possible. Therapists need to demonstrate the knowledge of and skills for interventions targeted to restore neurological function or to adapt to its loss. Given that an optimal outcome may take months or years (Emerich, Parsons, & Stein, 2012; Stephens, Williamson, & Berryhill, 2015), a therapist must also understand the process of design and intervention plan progression and incorporate correct skill and practice schedules (or "dose" of training) into education sessions for every stage of the recovery. Research shows that simulated learning is an effective method of experiential learning (Kolb, 1984) that promotes skill development and clinical reasoning (Cook et al., 2013), but there is limited direction from the literature regarding use or best practices for simulation in rehabilitation training programs (Bethea, Castillo, & Harvison, 2014; Yeung, Dubrowski, & Carnahan, 2013). And, there is even less guidance for designing simulations targeted at both skill development and therapeutic progression.

To provide an enriched learning experience for senior occupational therapy master's students that addresses both skill development and progressive therapeutic process, a co-constructed simulation series was designed and piloted in an advanced neurorehabilitation practice module. The co-constructed simulation design was conceptualized drawing on findings that collaborative approaches for creating a client-therapist simulation provided a richer learning process due to the diversity of the students' knowledge and clinical experiences (Hanson & Carpenter, 2011). Features from other studies or frameworks considered to strengthen learning and simulation design effectively included experiential learning (Kolb, 1984; Miller, 1990), shared responsibility to strengthen the self-regulated learning of the students (Brydges et al., 2015), fidelity of the encounter (Mori, Carnahan, & Herold, 2015), effective suspension of disbelief (Hamstra, Brydges, Hatala, Zendejas, & Cook, 2014), knowledge of process (Brydges, Carnahan, Safir, & Dubrowski, 2009), and knowledge of performance (Schmidt & Lee, 2011). Other effective elements included peer feedback (Perera, Mohamadou, & Kaur, 2010) and debriefing where students identify performance gaps between the observed performance during simulation and the desired performance (Eppich & Cheng, 2015). In addition, co-facilitation or debriefing where learners are exposed to and can learn from diverse points of view or expertise was reviewed (Cheng et al., 2015).

The purpose of this paper is to contribute new knowledge to the simulation literature by (a) providing design guidance for co-constructing health care simulations informed by best practice standards and (b) reporting the impact on student learning drawn from the qualitative program evaluation feedback following participation in the pilot co-constructed simulations.

Method

The research literature was searched for best practice standards in simulation learning and rehabilitation to inform the educational design of the co-constructed simulation components. Relevant databases were searched, including CINAHL, PubMed, and the university's library database. Search terms included experiential learning, learner-centered approach, self-directed learning, giving and receiving feedback, preparing for simulation, simulated learning, role playing, debriefing, and peer learning. Applicable literature was selected and analyzed for key features relevant to inform the educational design together with best practice clinical and therapeutic content.

The conceptual foundation was informed by educational frameworks (Kolb, 1984; Miller, 1990) best practice simulation standards (Chiniara et al., 2013; Jeffries & Rogers, 2012) and self-regulated learning theories (Brydges et al., 2015; Brydges, Nair, Ma, Shanks, & Hatala, 2012; Brydges, Dubrowski, & Regehr, 2010). Features incorporated in the co-construction also included Cook et al.'s (2013) meta-analysis themes of instructional design features, including method of feedback and sequence of training; instructor role and modality, including the concept of fidelity; and group composition. In contrast to other simulation scenarios where students experience the case and role preparation created by the instructor (Hayes, Power, Davidson, Daly, & Jackson, 2015), the co-construction design of this experience allowed the instructor to guide and support self-regulated learning in all phases of the simulation development, delivery, and debrief. Table 1 illustrates the timeline, roles, and responsibilities for one cycle of the simulation co-construction process. Given the level of the learners and the potential to not be aware of what they need to know for entry-level practice (Eva, Cunnington, Reiter, Keane, & Norman, 2004), the role of the instructor was to ensure content and skill expectations were practice ready. In addition, the instructor was prepared to engage, motivate, and support the learner during feedback interactions (Johnson et al., 2016).

The goal of the co-construction simulation series was to provide students with an opportunity to learn from and with each another where the instructor served as a "guide on the side" (Cheng et al., 2016). The co-constructed approach allowed for directed self-regulated learning (SRL) (Brydges et al., 2015), where responsibility shifted onto the students to take greater control over their own motivation and learning experiences to choose their own learning objectives (Cheng et al., 2016; Chiniara et al., 2013) and enhance the transfer of learning (Mori et al., 2015).

Table 1

Co-Constructed Stages, Roles, and Responsibilities

Weekly Timeline:		**Tuesday**	**Thursday**	**Friday**	**Tuesday**		**On Own**
Stages:	**Module Creation**	**Case Creation***	**Simulation Preparation***	**Case Prebrief***	**Simulation & Recording**	**Individual & Group Debrief**	**Reflection & Refinement**
Instructor	Identify best practice guidelines & create structure for two simulations per week	Provide content expertise, case parameters, & organize recording schedule	Facilitate SRL for case preparation, key features of client portrayal, & intervention skill development	Collaborate to clarify key features, interventions, & equipment. Refine final co-constructed case and distribute	Co-observe simulation from control room and co-contribute to debrief notes	Observe peer debrief (in control room) & co-facilitate large group debrief session	Distribute individual simulation & debrief recordings to guide skill refinement
Student	***Group A:*** *Patient*	Review resources to identify key entry-level practice skills	SRL review key features, develop role, & prepare for realistic simulated client portrayal	Collaborate & co-construct final case features with refinement by instructor	Portray realistic features of simulated client & functional ability	Provide peer feedback from perspective of simulated client	Reflection upon impact of preparing & portraying client

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Group A & B interchange roles for 2nd Case	***Group A**: Observer*	as above	SRL review & prepare core intervention knowledge, skills, & behavior	as above	Co-observe from control room & co-contribute to debrief notes	Debrief therapist with co-constructed feedback	Reflect upon impact of observing & debriefing simulation
	***Group B:** Therapist*		SRL review & prepare core intervention knowledge, skills, & behavior	SRL preparation of case key features, plan session, & complete identified key skills	Complete all simulation demonstrating knowledge of best practice & competent practice skills	Receive multisource debrief: client & peer/ instructor feedback	Reflect upon interaction & recording for refinement in knowledge, skills, & behavior

This was the first time the co-constructed simulation module was implemented. The eight students in this module had previous neurorehabilitative simulation experience but not specifically in the indicator cases of spinal cord and traumatic brain injury. To counter the concern that the simulation environment can induce stress and interfere with learning (Fraser et al., 2012; Lindon-Morris & Laidlaw, 2014), the first simulation in the co-construction series required each student to prepare a task to teach a colleague in 25 min. In essence, they developed a 25-min therapy session in the absence of disability and practiced the skills needed for any therapeutic interaction (e.g., communication, task analysis, teaching, pacing, feedback). These practice simulations prior to the two indicator cases (traumatic brain injury and spinal cord injury) allowed for learning multiple simulation roles (patient, observer/debriefer, and therapist), how to interface with the recording environment control room, processes for large group debriefing, and practice postinteraction video reflection.

In this co-constructed simulation, staggered co-debriefing was completed, first with student-to-student as part of the simulation (with guidance from the faculty member) and then faculty-to-group of students. The multiple perspective debriefing included the opportunity to provide verbal feedback to peers as a client and an observer, as well as to receive verbal feedback in the role of a student-therapist from peers and hands-on feedback from the course instructor. This enhanced de-briefing opportunity to give and receive feedback in different roles and forms provided a variety of experiential learning mechanisms to facilitate learners with different or preferred learning styles and offered an array of experiences for self-reflection. The live viewing and audio-visual capture was done through the SimulationIQ™ platform (http://www.simulationiq.com/) with individual session recording distribution via the university's secure online learning system. The students were provided with recordings of their interaction in the role of therapist to foster the concept that independent learners experience increased motivation from active involvement in the learning process when allowed to access materials on their own schedule (Wulf, Raupach, & Pfeiffer, 2005).

Throughout all phases of the design process and co-construction interactions, the course instructor kept descriptive and reflective content field notes. Method triangulation was accomplished using instructor field notes together with participant survey data (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Investigator triangulation occurred through the use of different researchers involved with review and interpretation of the data sources.

At the completion of the co-constructed simulations, the students were sent a link to the six open-ended feedback questions using Opinio Survey software (Opinio 6.4.1, Copyright 1998-2011 Object Planet) hosted on the University's server. The anonymous feedback collection and evaluation was part of a routine performance improvement process, and did not therefore require Research Ethics Board approval. The qualitative program evaluation data was exported from Opinio into Microsoft Excel 2011 for Mac 14.47 (Microsoft, Redmond, WA) and cleaned. Qualitative methods, including thematic (Thomas, 2006) and content analysis (Elo & Kyngas, 2008), were used to analyze and integrate the free text open-ended questions. For the first round of analysis, three different sub-sets of the author group reviewed two different questions' anonymous responses. The authors then met as a larger group to look across all questions so that a constant comparative approach could be used to refine coding and category development, combine categories, and to detect patterns and relationships among all categories (e.g., in case there were comments that were related across all free-text questions).

The instructor's field notes were then integrated with the participant experiences to gain a broader understanding of the co-constructed experience. The thematic and content analysis together with the field notes and the final analysis were presented to the participants as a member check of the findings; not for consensus, but for accuracy of interpretation.

Results

The qualitative content analysis identified desired characteristics for the learner, instructor, and simulation. The content analysis also identifed critical interaction features between the components that were ulitmately necessary for successful deep learning from the muliple roles in the co-constructed simulation design. Figure 1 illustrates the desired key characteristics of the main components as well as the necessary process interactions. Some of the key terms used for the simulation component directly relate to best practices. For example, Mori, Carnahan, and Herold (2015) note the "fidelity" of the encounter (e.g., how close it is linked to practice) as a critical feature for simulation. The features identified in the co-constructed therapeutic intervention-based simulations were more specifically identified as practice fidelity (e.g., situational skills required for practice) and ecological validity (e.g., the simulation was closely aligned to an actual therapeutic session).

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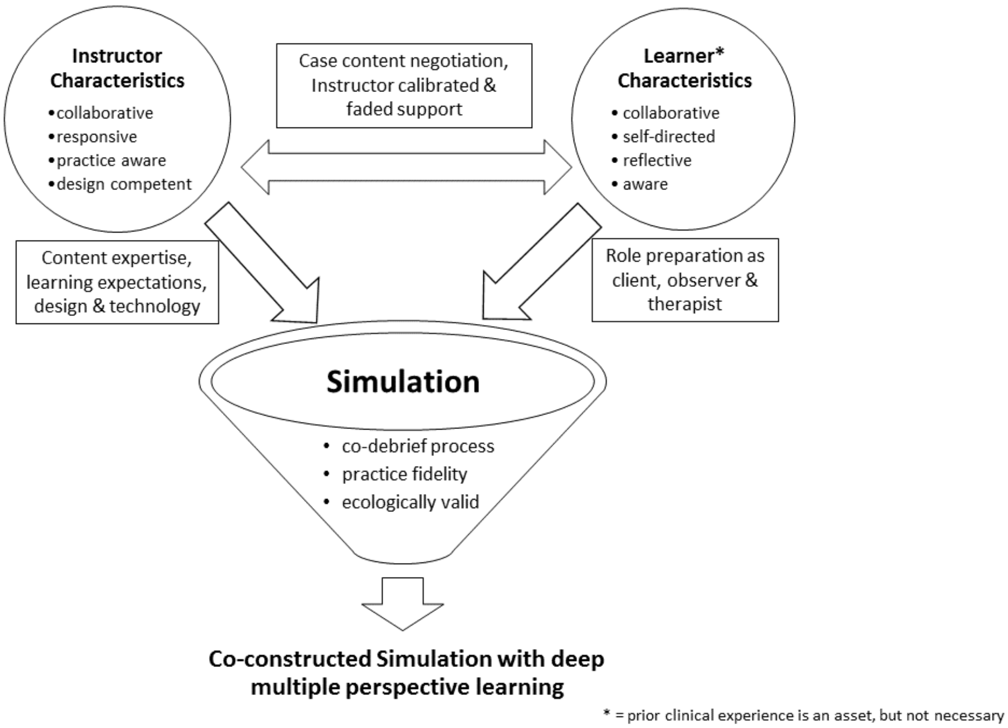

Figure 1. Co-constructed simulation components, characteristics, and interactions.

In addition, the thematic analysis found a deepened insight for learning and the therapeutic process through multiple role preparation, observation and interaction with peers, close interaction with the instructor, and the enhanced debriefing process.

Increased Insight for Therapeutic Interaction Through Multiple Role Preparation

The students found the preparation process to portray the client challenging yet valuable. The concern about realistically portraying the client was reflected in the increased reported preparation time to research and practice necessary skills to meet this objective. The methods of preparation included watching online videos, discussions with classmates, and/or reflecting on personal experiences. In addition, the majority of the students experienced enhanced recognition and new perspective for the effort and skills (or substitute movements) an individual with particular deficits may require for completing functional tasks. While limited in scope, the students reported a new awareness for the client-therapist interaction that they could draw on for future client interactions. The students felt that the process of portraying a client fostered their learning about the case-specific neurological conditions in more detail and fostered reflection on how they would work with future clients.

The students approached their preparation to play the therapist with feelings ranging from confidence, due to previous fieldwork placements, to nervousness, as this encounter mirrored past graded simulated client exams. Self-directed preparation, as well as group work, was used to prepare for this part of the simulation process with specific comments highlighting the benefit of this collaborative peer learning. The students noted that a key difference between this simulation and their experiences in clinical placement was in their preparation, as some students reported the preparation as more challenging because a clinical preceptor was not readily available in the simulation. However, the students reported that the multiple-role simulations created an opportunity for them to try new approaches and to practice thinking on their feet in a scenario that mirrored realistic clinical practice.

Enhanced Insight and Clinical Reasoning Through Observation and Peer Interaction

Seven out of eight students felt that observing their peers gave them insight into other possible approaches to consider using, while three students expressed that their observation skills were enhanced. The majority of the participants felt it was beneficial to have an experienced instructor in the observation room, as they could ask questions and have the instructor provide feedback in real time. Having a video camera take the place of an evaluator in the room was a unique element of the environment, with one student commenting that this arrangement reduced nervousness.

There were mixed feelings among the students about providing feedback to their classmates. One student found providing feedback to peers difficult, whereas another student felt that peers were welcoming of constructive feedback. Overall, the participants felt that observing the simulations allowed them to further develop their observation skills, learn how to present feedback to peers, and improve on clinical skills through knowledge gained from an experienced therapist. The results were overwhelmingly positive regarding the benefits of both observing peers and receiving feedback.

Enhanced Skill Development Through Collaboration and Interaction with Instructor

The process of collaborative case design with feedback from the course instructor was found to expand the students' abilities to design cases and identify relevant skills to incorporate. To build cases, the students commented on using best practice guidelines and knowledge of client function to determine what abilities and skills would be expected from both the client and the therapist. The students were required to learn about client conditions, therapist roles, and the process of organizing the simulation so the therapist in the simulation had to seamlessly link the station skills with the client's functional ability. The students experienced challenges when designing cases and commented on the challenge of determining reasonable case difficulty for senior students with varying clinical experience. In addition, some expressed an uncertainty for what a reasonable amount of content could be for their peers to accomplish in the allotted 25-min time frame, which was a purposeful component of the co-construction design targeted to address the therapeutic process content. Overall, the students felt that the interaction and co-construction aspect allowed them to gain a deeper understanding of the factors needed to analyze their cases, specifically in terms of client abilities and therapist skills.

Value For Layered Debriefing Process with Reflection

The majority of the students found the large group debrief with the instructor immediately following the encounters to be a beneficial component and an interactive learning opportunity to reflect on both positive and negative aspects with a knowledgeable instructor. In addition, the group debriefing, where the instructor facilitated hands-on corrections, allowed for learners to ask questions from the perspective of their respective learning roles in the case. The structure of the group debriefing session allowed for questions and answers, thus providing all learners with an opportunity to engage with the material or concepts at a level that they might not have reached as an individual or in the learner role.

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All of the students expressed that reviewing the video recordings of their role as therapist was a positive experience that fostered an opportunity for self-reflection and refinement of their skills for subsequent simulations. While a few students described this experience as being uncomfortable, all of the students indicated that they learned something about themselves, including areas of potential strengths and weaknesses. For example, students often commented on their own body language, tone of voice, and word choice. Of note, the feedback revealed that this opportunity led to an increase in confidence, solidifying their abilities as therapists and furthering their professional development.

The subtheme that permeated throughout the major themes was a self-reported increase in confidence and comfort with the ability to pursue independent learning methods in order to be practice ready. Similar to the findings of Brydges et al. (2012), the students in this program evaluation study reported improved confidence in their self-regulated learning strategies as they progressed through co-constructed simulation design, with an added ability to be flexible or adaptable to the clinical situation.

Discussion

The co-constructed simulation design facilitated students to collaborate with their peers and instructor to create simulation objectives targeted at refining and enhancing their level of practice-ready skills. This learner-centered method required the students to take greater control over their learning and actively seek resources and feedback from and with one another to achieve their own learning goals (Cheng et al., 2016). Directed self-regulated learning was valued and determined to be a key feature for co-constructed simulation design. The challenge for the instructor in the co-constructed design (as highlighted in the instructor's field notes), is to be responsive to learner's needs and potentially provide additional facilitation for leaners who may not have awareness of their abilities or strong self-regulated learning skills. Students in this pilot project assumed responsibility for their own acquisition of knowledge, which resulted in self-directed learning when preparing for both client and therapist roles. Their contribution to the co-created simulation included key input to the simulation modality, the type of instructional method, and the presentation of the simulation (Chiniara et al., 2013).

Effective feedback and peer feedback were integral elements of the simulations. The co-constructed design allowed the students to gain insight into the difference between their perception of performance, compared with that of their peers and instructor (Rudland et al., 2013). The debriefing component of this co-constructed module included four essential elements: active participation, developmental intent focused on learning and improvement, discussion of specific events, and input from multiple sources (Eppich & Cheng, 2015). Many studies do not support the ability for individuals to self-assess; however, Chiniara et al. (2013) noted that self-assessment could have value as a motivational or development tool. The students received feedback from the instructor as well as from their peers, which enhanced the value of self-reflection.

The students perceived self-reflection as a valuable learning experience and an essential component of this simulation-based learning. In a recent review (Levett-Jones & Lapkin, 2013), video-facilitated instructor debriefing was found not to be effective. However, our pilot work findings suggest not only that video-facilitated instructor debriefing is effective, but that when paired with peer and self-feedback it can be valuable to improve the students' skills and knowledge. In our design, the students used the feedback and video reviewing to refine practice skills for subsequent simulations. The positive view from the students regarding video recordings for reflections and refinement is in keeping with Hulsman, Harmsen, and Fabriek (2009), who reported video recordings are an effective unbiased tool for reflection of self-performance.

While there is limited literature in peer-assisted simulation learning in rehabilitation, our qualitative findings are in line with Mandrusiak et al. (2014), who reported senior students engaged as simulated clients improved both their confidence in providing feedback and their insight into their own learning. To account for varying student skill levels, an encounter requires that the case design be at an appropriate level of challenge. In our experience, to receive the most benefit from the co-constructed design, the instructor needs to be aware of and adjust for different levels of learners, and advanced learners need to be open to challenging themselves beyond their current skill and comfort zone. In addition, group-based simulation proved to be valuable as it incorporated multiple perspectives, which further enhanced learning.

This pilot program evaluation demonstrates a positive and effective impact on student knowledge and skill learning with the co-constructed simulation experiences. Value was found in the directed self-regulated and peer learning process, in the interaction with the instructor, and in the debriefing components that provided opportunity to reflect on their own recordings. The study's findings are limited in scope, as they are derived from the qualitative data of a small homogeneous sample size of students with an interest in neurorehabilitation. While the findings are informative to simulation designers, our results may not directly generalize to health care professionals with different levels of experience or specialties. Larger trials using both validated quantitative tools, together with qualitative analysis, are needed to determine the overall value of co-constructed simulations. Future simulations following the outlined guidelines above should consider both the strengths and limitations of this pilot to best facilitate student learning. Further study is recommended to explore the effectiveness of co-construction design in other simulations and levels of learners.

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