

Online Non-Technical Skill Simulation-Enhanced Interprofessional Education: Changes in Attitudes and Behaviors of Health Professions Graduate Students

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Abstract

INTRODUCTION Challenges to the successful implementation of interprofessional education (IPE) include attitudes, logistics and resources. Online non-technical simulation-enhanced interprofessional education (SIM-IPE) is a scalable, low-cost educational strategy that lacks representation in the literature. The objective of this study was to measure the effectiveness of online non-technical skill (ONTS) SIM-IPE to change attitudes toward interprofessional teams and the team approach to care.

METHODS A quasi-experimental pre/post-test design using an online survey explored the effectiveness of ONTS SIM-IPE. Graduate health professions students' attitudes toward interprofessional teams and team approach to care was measured using the SPICE-R2.

RESULTS Post-test scores on the Student Perception of Interprofessional Clinical Education Revised (SPICE-R2) revealed significant differences in the following subscales: Roles/Responsibility ($Z=-.313$, $p<.002$), Patient Outcomes ($Z=-.347$, $p<.001$).

DISCUSSION Based on these results, ONTS SIM-IPE is an effective instructional method that is scalable to meet the global needs of contemporary graduate health professions' education.

CONCLUSION The novel nature of these results leads to the need for standardization in ONTS SIM-IPE pedagogies and research designs. The augmentation of health professions education with SIM-IPE is no longer a luxury, but a necessity as global health crises require social distancing to manage and deliver high quality, cost-efficient, team-based health care to diverse populations.

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Implications for Interprofessional Practice

- Online non-technical skill simulation-enhanced interprofessional education (ONTS SIM-IPE) has been shown to be effective in changing attitudes toward roles and responsibilities on interprofessional teams and the impact on patient outcomes.
- Online scalable strategies for interprofessional education are essential in health professions education as public health crises are globalizing and social distancing becomes pervasive in delivering care.
- Utilizing ONTS SIM-IPE is scalable and can mitigate geographical barriers to expand education to an international audience, preparing a healthcare workforce relevant to community and global responsiveness.

Introduction

The Institute of Medicine (IOM, 2003) expressed concern over the delivery of inconsistent quality healthcare within the US healthcare system. Despite advancing science and technology, healthcare delivery remains replete with error and inefficiencies. It is paramount that the education of current healthcare professionals pivots to become an integral part of the process to overhaul the health delivery system by contemporizing curricula to advance newly identified proficiency requisites (IOM, 2001; IOM, 2003; World Health Organization [WHO], 2010, 2013). As a result, academic institutions have been charged to adapt and undergo reformation to meet the needs of an everchanging healthcare system. What is inspiring is that many health professions' accrediting bodies have risen to the call in a united fashion by embracing the Interprofessional Education Collaborative (IPEC) Core Competencies as a consistent framework across professions [Health Professions Accreditors Collaborative (HPAC), 2019]. While the "why" and "what" have been outlined by the IOM, WHO, IPEC, HPAC, the "how do the health professions manage IPE" remains the question.

Literature Review

WHO (2010) outlined the state of collaborative healthcare practice across the globe and provided recommendations for interprofessional education (IPE) and interprofessional collaborative practice (IPCP) to enhance world health outcomes. IPE is defined as oc-

curing "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (WHO, 2010, p. 7). Described within this manuscript is the role that academic institutions are called to fulfill as key contributors to the state of healthcare and the opportunity to organize intentional scalable models of simulation-enhanced IPE (SIM-IPE) focusing on non-technical skill (NTS) development using an online delivery modality. NTS can be comprised of competencies related to situational awareness, leadership, communication, decision-making, and teamwork activities (Coggin et al., 2017; Peddle, 2019). Flin et al. (2013) describes NTS as "cognitive, social and personal resource skills that complement workers' technical skills and contribute to safe and efficient task performance" (p. 1). These skills are an important component of health providers' daily activities that impact patient outcomes (Torabizadeh et al., 2019) and potentially minimize medical error.

To promote effective interactions between the disciplines, Interprofessional Education Collaborative (IPEC) developed a model of education that centers on four primary domains of competency for IPCP: values and ethics, roles and responsibilities, communication, and teams and teamwork (IPEC, 2011; IPEC, 2016). The premise for this model is that high-functioning teams would be able to provide more cost efficient, better coordinated care to diverse populations while achieving improved health outcomes and patient experiences (Institute of Healthcare Improvement [IHI], 2008). See Figure 1 for an example of the continuum of interprofessional team-based care.

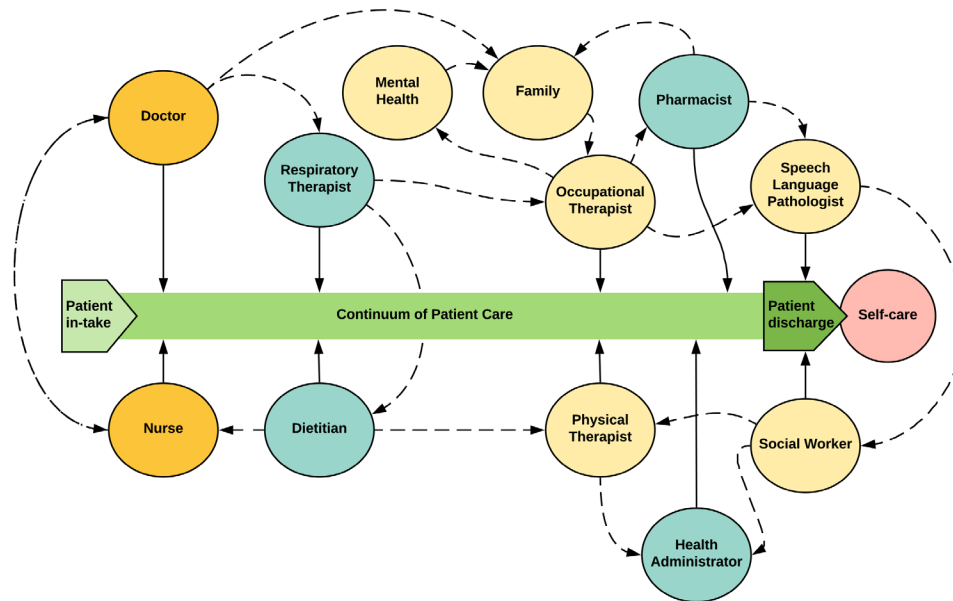


Figure 1. Flow map of the continuum of interprofessional team-based care

Academe's function is to ensure that practitioners develop a dual identity, one that is not only competent within a provider's scope of practice, but also contributes to the collective competence of an interprofessional healthcare team (HPAC, 2019); the sole focus on the individual's professional acumen was deemed insufficient for meeting the health care needs of society (IOM, 2001; IOM, 2003). What's more, the requisite for collective team competence is now the standard for healthcare delivery (HPAC, 2019; IOM, 2001; IOM, 2003; WHO, 2010, 2013), yet academic healthcare programs are not meeting these societal needs consistently and equitably. However, attitudes about healthcare peers and teaming on patient care remain a significant barrier to meeting academic health professions learning objectives and patient care outcomes.

The research to date on attitudes about IPE and IPCP remains inconclusive, however, the findings supporting the effectiveness of IPE suggest that health professions students' attitudes improve as a result of IPE (Schack-Dugré & Hamson-Utley, 2021). From this, researchers can postulate that attitudes may be a significant barrier to students engaging with their healthcare peers and feeling compelled to team on patient care; as a result, attitudes about IPCP behavior should continue to be studied.

The Institute for Healthcare Improvement (IHI, 2015)

published the Triple Aim to guide healthcare systems toward cost-effective, outcomes-based healthcare for the populations. Furthermore, the IHI calls for interprofessional collaborate practice to achieve the Triple Aim. Therefore, there is a need to emphasize academe's responsibility to facilitate the development of interprofessional healthcare practitioners and providers to optimize patient outcomes. To assist in the achievement of the Triple Aim, academic institutions should aim to produce competent clinical practitioners qualified to perform in a highly technical, constantly changing work environment as members of an interprofessional team. Expectations of the interprofessional team performance include heightened patient safety, improved communication and optimization of health outcomes within a structure of fiscal responsibility; these pressures accelerated the use of simulation strategies during IPE activities (Palaganas et al., 2014).

Improved efficiency of operational processes and improved patient outcomes, which are two elements of the Triple Aim, were found to result from the use of IPE (Reeves et al., 2013). Less frequently, other research revealed either neutral or no effects from engaging in IPE; however, there is a lack of research to-date incorporating the use of simulation in IPE (Reeves et al., 2013).

Simulation in education is an instructional methodology that incorporates scenarios that mimic real-

world situations (Granheim et al., 2018). There exists a significant body of evidence supporting the use of SIM-IPE in health professionals' education (Cook et al., 2013; Granheim et al., 2018; Iverson et al., 2018; Shanahan & Lewis, 2015; West et al., 2016). SIM-IPE instructional outcomes include the creation of positive postures for advancing knowledge of interprofessional collaboration (IPC) in the areas of role identity, professional identity and IP teamwork (Rossler & Kimble, 2016). Also important, SIM-IPE can occur in an online environment, in a traditional classroom, or in a hybrid, blended format.

From an instructional perspective, a challenge for implementation of SIM-IPE is that there is no standardized approach to its execution (Shanahan & Lewis, 2015). Multiple factors influence the implementation of SIM-IPE, such as various levels of blended teaching, observing versus active participation, varied length of activity, technology considerations, use of simulated actors and their training, and debriefing strategies were found (Palaganas et al., 2016). Variations within each of these factors (and in research design) present roadblocks to a clear path forward, resulting in a deficit of understanding about SIM-IPE. Additionally, there is even less of an understanding of online NTS (ONTS) use and its effectiveness as an educational tactic (Evans, Ward, & Margerison, 2016; Munshi et al., 2015) for health professions educators. Taken together, insufficient understanding and the ubiquitous nature of the use of technology for IPCP provides the impetus to pursue further discovery within the realm of ONTS SIM-IPE. Additionally, the nature of the spread of novel disease that has presented as a global threat in recent times provides the judicious need for studies that allow for health professionals to be educated using online simulation that will mirror health delivery environments such as telemedicine (Schack-Dugré, Snyder, & Utley, 2019).

Rationale

Graduate student enrollments in academic programs are on the rise with a 78% increase in enrollment from 1985-2015 (National Center for Education Statistics, 2018). Efficient and effective mechanisms of instruction are necessary to provide the capacity to educate increasing numbers of students. Developing an effective online instructional strategy that mitigates IPE barriers to implementation, develops transferable NTS, and heightens IP interaction would help solve

this deficit in academic practice, as well as address gaps in the evidence (Evans, Sønderlund, & Tooley, 2014; Zhang et al, 2018).

Competency is no longer solely defined by a practitioner's effort, it involves a collective outcome of the healthcare delivery team (Jong et al., 2016; Shinnors & Franqueiro, 2017). IPE has been determined to be effective in cultivating skills to enhance this collaborative approach to healthcare delivery (D'Amour & Oandasan, 2005; HPAC, 2019; IPEC, 2016; IOM, 2015; Reeves et al., 2013). However, there are significant barriers to IPE that constrain its full capacity for implementation across the health professions in academic settings (Dudding et al., 2016; Homeyer et al, 2018). Negative attitudes and perceptions about IPE and IPCP were identified as barriers that may impact the teaching and learning in IPE at all levels of higher education (Steinert, 2005; Roberts, et al. 2018). Other barriers mentioned in the literature include professional territories or silos (related to respecting peers), understanding roles and responsibilities of healthcare peers, inconsistent language used across professions and differences in health professions accreditor requirements (Hamson-Utley, 2021).

Specific Aims

The purpose of the study was to examine the effectiveness of ONTS SIM-IPE to change attitudes in a positive direction toward IPC in graduate health professions education. Health professions' educators must produce competent practitioners ready to work in a collaborative healthcare delivery system with an attention to population health (IPEC, 2016). This collaboration requires the removal of siloed, discipline-specific, education practices. Academe must also fulfill the demands for workforce-ready IP providers utilizing scalable models of delivery to meet global demands for services and modes of service.

Understanding pedagogical strategies that can influence health professionals' attitudes toward IPC using ONTS SIM-IPE can support future inquiry using the same strategies to determine if behavioral changes can also be induced (Schack-Dugré et al., 2019). Examining change in licensed health professions graduate students' perceptions about IPC using ONTS SIM-IPE will enrich the body of knowledge and is the area of interest for this study. Much of available research focuses on the use of high-fidelity technical simula-

tions for carrying out IPE activities; the deficit in the literature is in the use of ONTS SIM-IPE activities.

Methods

The conceptual framework used as the basis for the study was the IPEC model (IPEC, 2016). This model was also the underpinning for the development of the Student Perception of Interprofessional Clinical Education Revised (SPICE-R2) survey (Zorek et al., 2016). The SPICE-R2 includes 10-questions Likert type questions on three subscales measuring participant's responses from 1 "Strongly Disagree" to 5 "Strongly Agree" (see Appendix A for a copy of the open source survey tool). The SPICE-R2 consists of three subscales: Roles and Responsibilities, Teamwork, and Patient Outcomes. The SPICE-R2 is reliable and valid as a collective score of ten items ($\alpha = .85$); each subscale was also found to be reliable and valid (Roles/Responsibilities ($\alpha = 0.76$), the Teamwork ($\alpha = 0.85$), and Patient Outcomes ($\alpha = 0.78$)) (Jong et al., 2016). A sample question from the Roles and Responsibilities subscale reads "My role within an interprofessional team is clearly defined", while a question from the Teams subscale reads "Participating in educational experiences with students from different disciplines enhances my ability to work on an interprofessional team".

Participants

The target population for this study was composed of students from a variety of healthcare backgrounds (athletic training; healthcare administration; nursing; occupational therapy; physical therapy) who were enrolled in graduate distance education health professions degree programs at a multi-campus Health Sciences University with campuses in the PST, CST, and EST time zones of the United States. The sampling frame was a multi-section first term interprofessional course required for all graduate health professions students in the College of Health Sciences (N=139).

This investigation was conducted over one 15-week trimester in Fall 2018 and included n=65 participants who responded to both the pre and post-test surveys.

Experimental Design

A quasi-experimental pre-/post-test survey design examined the efficacy of ONTS SIM-IPE to change graduate health professions students' attitudes toward roles and responsibilities, interprofessional teams and teamwork, and patient outcomes as measured by the SPICE-R2.

Intervention

Utilizing the IPEC (2016) guidelines for interprofessional education and collaboration, the ONTS SIM-IPE case-based interventions were created by an interprofessional team for use in a required introductory graduate health professions course. The cases, in a paper-based format that is consistent with low-fidelity simulation practices, were added to the third and fourth units of the seven-unit course delivered via a learning management system. Each case was designed around a set of learning outcomes associated with the IPEC (2016) document and the SPICE-R2. The course included five units on the University mission and associated student resources including the writing center, library, and included guidance on digital literacy and professional communication strategies (Figure 2). The orientation content allowed for initial benchmarking and assessment of incoming graduate health sciences students, while introducing them to online learning and striking a life balance with their new role. Of special note to this study, two units of the course focused on interprofessional education through two case-based scenarios that are described below. In preparation for the implementation, students were assigned to interprofessional (IP) teams of four to six members (including at least two professions). Through a set of instructions, students collaborated (synchronously and asynchronously) on two paper-based vignettes, one in Unit 3 (lasting 2

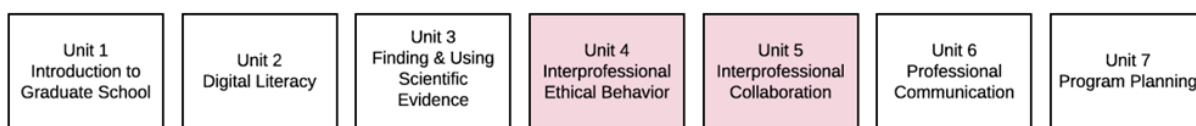


Figure 2. University Course Unit Map

weeks) and one in Unit 4 (lasting 2 weeks); a Lead Course Instructor, who was also an IPE facilitator, led students across the five course sections. All students in the course were required to engage with all elements of each case to pass the course; while student participants had the opportunity to drop out of the research, they were still required to complete the two case studies to pass the University coursework.

Case One

Case One addresses an obese patient's medical plan at an in-patient weight management facility. The health professions included in the case are athletic training, nursing, occupational therapy, physical therapy, mental health, and healthcare administration. The assessment deliverable was a group artifact illustrating the interprofessional roles and responsibilities required to manage the case. The learning outcome of Case One is linked to values & ethics and roles & responsibilities (IPEC, 2016). For specific details about Case One, see Appendix B.

Case Two

Case Two addresses the implementation of a care plan for a complex patient with comorbidities utilizing a medical home model. The health professions included in the case are athletic training, nursing, occupational therapy, physical therapy, mental health, and healthcare administration. Building on the skills and competencies from Case One, communication and teamwork (IPEC, 2016) competencies were also assessed through an individually developed artifact that outlined how the case could be managed by applying the scopes of practice of each healthcare peer. Learners were required to first interact as a team to address the case. Their reflection on those team activities were used to create their individual graded submissions. In addition, ethical decision-making models were applied to this case, linking patient outcomes to actions taken by each provider. For specific details about Case Two, see Appendix C.

Procedures

This study was approved by the University's Institutional Review Board. Students were strategically assigned to interprofessional (IP) teams by the course section faculty member; there were at least two professions on each team (IPEC, 2011). The IP teams remained the same for both cases for continuity and enhanced team performance (Eggenberger et al., 2014).

Student IP teams were required to collaborate through synchronous and asynchronous online discussions. An electronic pre-/post-survey was conducted utilizing the SPICE-R2 to assess changes in perceptions of the subscales Roles and Responsibilities, Teamwork and Patient Outcomes related to IPC. The surveys were administered to participants before and after engaging in ONTS SIM-IPE activities with a 2-week reminder sent following the initial post-test survey email.

Data Analysis

SPSS 26.0 software was used to analyze the data. Data examination began with parametric analysis; however, as normalcy of data could not be established, nonparametric statistics were utilized. Descriptive statistics are provided for a thorough understanding of the sampling frame and outcome measures that were studied (see Table 1).

Results

There were 136 responses to the pre-test and 112 responses to the post-test, resulting in 65 sets of paired responses. Participants' age, gender, profession, and years of professional experience was reported in Table 1, while Table 2 presents the sample by years of professional experience.

Initially, there were 14 different healthcare disciplines that responded to the pre-test, however, following the pre-post-test pairing, the following six healthcare professions remained: nursing, physical therapy, occupational therapy, healthcare administration, athletic training and other. The "other" category consisted of a representative of one of each of the following professions: emergency medical technician ($n = 1$), radiology technician ($n = 1$), and a patient care technician ($n = 1$). Due to the sample not meeting the normality assumptions of the paired samples T-test (i.e., normal distributions, difference between pre- and post-test distributions), nonparametric analyses were performed. For this analysis, the Wilcoxon signed-rank test was used in place of the paired T-test.

The analyses were run with a confidence interval of 95%. A Wilcoxon Signed-Ranks Test indicated a significant change in subscale scores (pre-test vs. post-test) for Roles/Responsibility ($Z = -.313, p < .002$) and Patient Outcomes ($Z = -.347, p < .001$), however, not for Teamwork ($Z = -.311, p < .756$) subscale (Figure 3). In addition, an exploratory analysis revealed no signifi-

Discipline	N		Age		Professional Experience	
			Years		Years	
	n	%	M	SD	M	SD
Nursing	29	44.6				
Male	7	10.7	53.1	4.2	16.6	8.9
Female	22	33.8	45.4	8.8	19.1	9.7
Physical Therapy	10	15.4				
Male	4	6.2	44.8	9.0	18.0	10.4
Female	6	9.2	41.7	10.3	14.5	7.3
Occupational Therapy	12	18.5				
Male	0	-	-	-	-	-
Female	12	18.5	37.3	8.5	10.7	8.5
Athletic Training	7	10.7				
Male	1	1.5	25.0	-	4.0	-
Female	6	9.2	28.7	5.4	6.5	5.1
Health Administration	4	6.2				
Male	0	-	-	-	-	-
Female	4	6.2	31.0	10.0	0.8	1.0
Other*	3	4.6				
Male	1	1.5	53.0	-	31.0	-
Female	2	3.1	31.5	9.2	9.0	10.0

*Other includes an emergency medical technician (n = 1), radiology technician (n = 1), and a patient care technician (n = 1).

Table 1. Participant Demographics by Discipline and Gender

Years	n	%	Cumulative %
0-5	15	23.1	23.1
6-10	12	18.5	41.5
11 - 15	10	15.4	56.9
16 - 20	10	15.4	72.3
21- 25	9	13.8	86.2
26 - 30	4	6.2	92.3
31+	5	7.7	100.0
Total	65	100.0	100.0

Note. This table outlines the experience students have in their healthcare background prior to entering their current graduate academic program.

Table 2. Years of Professional Experience of Participants

ificant difference in SPICE-R2 subscale change scores based on healthcare profession: Roles/Responsibilities ($H(5) = 5.905, p = .316$); Patient Outcomes ($H(5) = 8.335, p = .139$); Teamwork ($H(5) = 4.740, p = .448$) (Figure 4). Continuing with the use of Kruskal-Wallis statistical analysis (Figure 5), a second exploratory analysis revealed that years of professional experience did not significantly impact change scores for any of the three subscales: Roles/Responsibilities ($H(6) =$

$4.062, p = .668$); Patient Outcomes ($H(6) = 4.820, p = .567$); Teamwork ($H(6) = 3.547, p = .738$).

Discussion

This investigation measured the efficacy of ONTS SIM-IPE to change attitudes of graduate health professions students toward IPC in the domains of Roles and Responsibilities, Teamwork, and Patient Outcomes.

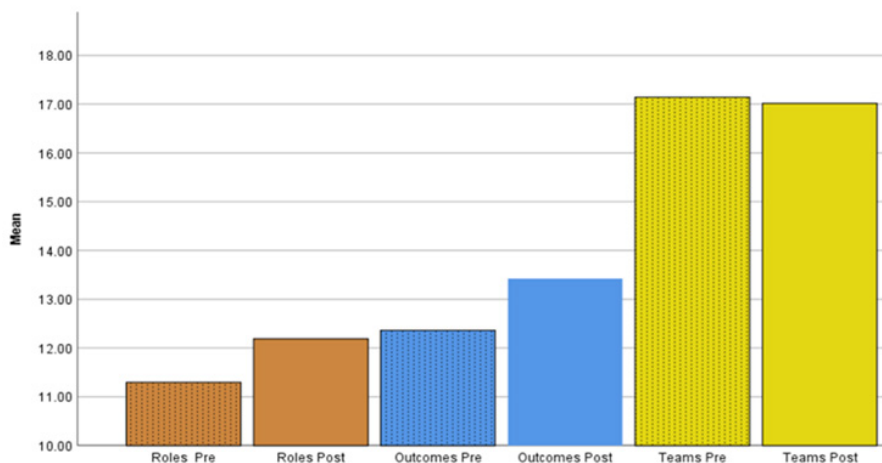


Figure 3. Comparison of pre- and post-test SPICE-R2 scores.

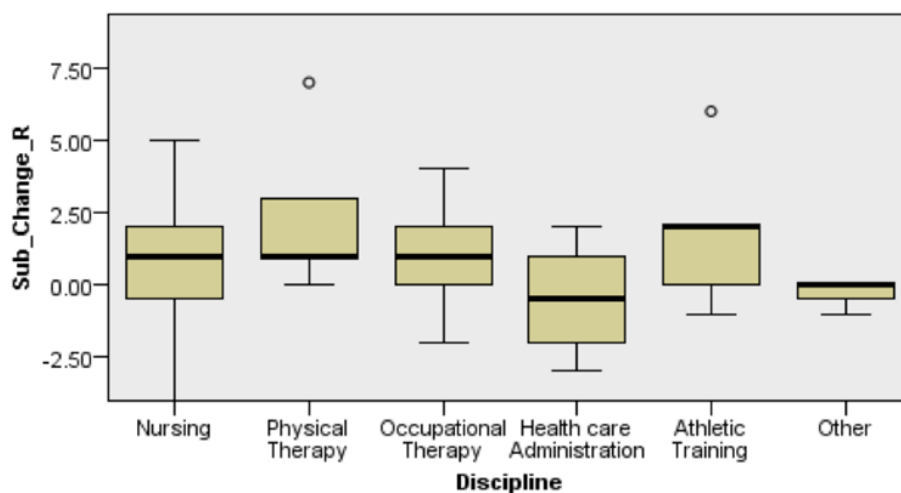


Figure 4. SPICE-R2 change scores by healthcare profession.

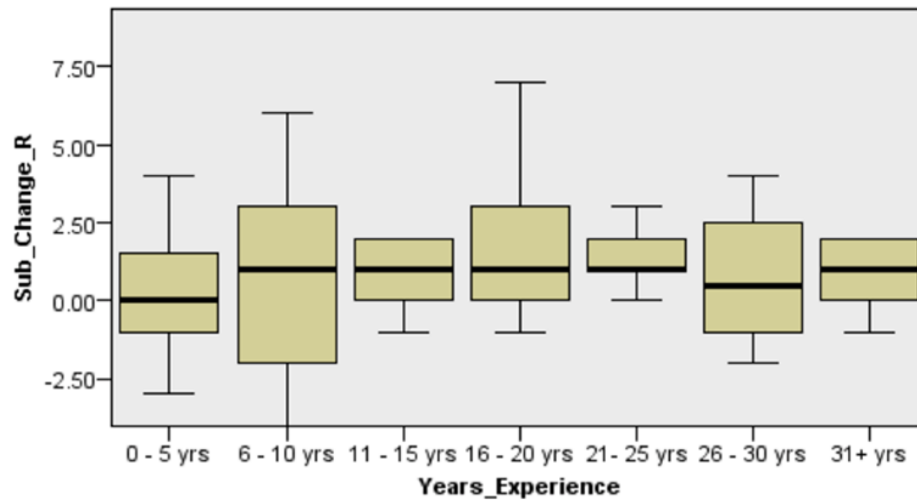


Figure 5. SPICE-R2 change scores by years of professional experience.

This outcome adds to the body of knowledge in ONTS SIM-IPE. Additionally, it contributes to the narrowly reported licensed graduate health professions student population and ONTS SIM-IPE areas of the literature. The utility of ONTS SIM-IPE demonstrates the potential to meet the growth of graduate health profession programs delivered online. What's more, the use of ONTS SIM-IPE is vital to academic stakeholders as a fiscally efficient delivery model that can mitigate barriers of cost, logistics, social distancing, and geography while creating vital opportunities for global healthcare delivery education (Schack-Dugré et al., 2019). This educational delivery model is no longer a luxury but a necessity in health professions education (Schack-Dugré et al., 2019). Global pandemics that involve highly infectious novel diseases support this requirement of this type of learning strategy. The online environment is now a vital delivery modality for health and wellness.

This investigation revealed positive perception changes in Roles and Responsibilities that align with previous investigations using a variety of outcome measures (Arenson et al., 2015; McGehee et al., 2018; McLeod et al., 2014; Zamjahn et al., 2018); contrasting results also exist (Soubra et al., 2018). Consistent with our findings, Teamwork skills were found to be enhanced in undergraduate health professions students following online and face-to-face IPE activities (McLeod et al., 2014; Packard et al., 2016; Soubra et al., 2018; Zanotti et al., 2015). In contrast, there were also discrepancies in reported Teamwork results (Curran et al., 2010; McFadyen et al., 2005).

These disparities of results within the literature corrob-

orate the need for more standardization in ONTS SIM-IPE pedagogies and research design. Evidence-based ONTS SIM-IPE pedagogies are valuable for overcoming barriers associated with both IPE and simulation. Research designs that capture authentic pre-test assessments of knowledge, attitudes and behaviors, may also move the field toward consensus. The positive findings surrounding the Roles and Responsibilities and Patient Outcome subscales in this study offer ONTS SIM-IPE as a way for health professions educators to overcome aforementioned barriers.

Generalizations from this study on ONTS SIM-IPE's ability to change attitudes are made with caution. To better understand the changes between groups a higher n , recruited over multiple trimesters, would provide a more robust parametric analysis. The paucity of representation in the literature on this topic suggests this a valuable path for novel evidence to be further developed.

Exploratory analyses were conducted examining the influence of years of professional experience and health care profession in our sample, to better understand factors that may guide the implementation of ONTS SIM-IPE. Neither years of professional experience nor healthcare profession demonstrated significance; however, the small and varied sample sizes across the groups make the reliability of these comparisons limited. The rationale to include such variables was that they might influence the outcomes of this, and subsequent research. As healthcare providers spend more time practicing in the healthcare industry, the exposure to a team environment could create a positive posture toward in-

terprofessional collaboration, or the converse—a strong, entrenched negativity. In addition, pre-test attitude differences between healthcare professions may exist that mediate how health care professionals interact; nursing is an organic leader in interprofessional healthcare education and delivery. These factors should be included in subsequent investigations.

Implications for Practice

The purpose of this study was to address the efficacy of ONTS SIM-IPE to improve graduate health professions students' attitudes toward IPCP. Statistical significance was found in the SPICE-R2 subscales of Roles/Responsibilities and Patient Outcomes. These results suggest that the instructional tactic, ONTS SIM-IPE, can be used as an alternative strategy to mitigate logistical (Abu-Rish et al., 2012; McKenna et al., 2014; West et al., 2016) and cost barriers (Cook et al., 2018) inherent to IPE and SIM delivery.

Furthermore, the use of an online delivery modality affords convenience and ease of access that can overcome many scheduling and time constraints if the students have Internet access. Although ONTS SIM-IPE experiences are not thought to be a panacea for all teaching activities, any can be incorporated into curricula with less difficulty than some higher technical experiences. ONTS SIM-IPE can also create opportunities for increasing the frequency of deliberate practice of IPCP in health professions curricula. Expanding the prospects for IPE learning experiences addresses the WHO (2003) mandate and can accelerate the vision of IPE's impact on healthcare delivery and health systems (IOM, 2010; IPEC, 2016).

Limitations

Several limitations were present in this study. Clinical faculty in each section of the course had various levels of experience in teaching, teaching online, debriefing knowledge and IPE; while the lead faculty was an IPE facilitator, the section faculty were also involved in the IPE work and discussions of each student group. Sample size and length of study were also limitations. The study was conducted over one 15-week trimester, thus resulting with a constrained sample size and unequal representation of health care professions. To better understand the changes between groups, a higher *n* recruited over multiple semesters would conceivably reduce this limitation. A final limitation relates to the survey design. Utilizing a traditional pre-/post-test survey to measure the effectiveness of an educational intervention introduces response-shift bias, making the pre-test score unreliable (Howard, 1980). Researchers in the future should consider a retrospective pre-test design to improve the accuracy of the pre-test and overall results. With this recommendation, the authors also suggest shortening the intervention time (and resulting number of ONTS SIM-IPE cases) to minimize the effect of subject recall using the retrospective design.

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Recommendations for Future Research

To date, most IPE research has been conducted at Level 1 (learner reaction), Level 2a (attitude/perception), and/or Level 2b (knowledge/skills) change on Kirkpatrick's Expanded Outcomes Typology (Reeves et al., 2016); this study assessed learning at the Level 2a and 2b. Further investigation should include longitudinal investigations with a post-test survey following graduation, as well as after the learners have returned to practice to determine behavioral change in the workplace (Level 3). Additionally, examinations of how systems of health care delivery have been influenced through the application of IPE and IPCP (Level 4) need to be conducted (Schack-Dugré & Utley, 2021). These study types will elevate the rigor of investigation to a Level 3 (Behavioral Change), Level 4a (Organizational practice change), and Level 4b (Benefits to patients, families and communities) (Schack-Dugré & Hamson-Utley, 2021), thereby advancing knowledge in the field.

Several other key areas of study surfaced during this investigation for future opportunities: examination of the implications of faculty knowledge of IPE and IPE facilitation, the quality and type of debriefing that occurs online, and the use of online competency-based curriculum to support the use of ONTS SIM-IPE. The degree of evidence needed to create change is great within the novel domain of ONTS SIM-IPE. The implications for using this strategy is significant if the data supports its efficacy.

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Appendix A

SPICE-R2 Instrument

Dear Student:

In this survey you are being asked about your attitudes toward interprofessional teams and the team approach to care. By interprofessional team, we mean two or more health professionals (e.g., nurse, occupational therapist, pharmacist, physical therapist, physician, social worker, veterinarian, etc.) who work together to plan, coordinate, and/or deliver care to patients/clients.

PLEASE NOTE: The following scale progresses from “Strongly Disagree (1)” → “Strongly Agree (5)”

INSTRUCTIONS: Please be candid as you indicate the extent of your disagreement/agreement with each of the following statements related to interprofessional teams and the team approach to care.		<i>Strongly Disagree (1)</i>	<i>Disagree (2)</i>	<i>Neutral (3)</i>	<i>Agree (4)</i>	<i>Strongly Agree (5)</i>
1. [T]	Working with students from different disciplines enhances my education	1	2	3	4	5
2. [R]	My role within an interprofessional team is clearly defined	1	2	3	4	5
3. [O]	Patient/client satisfaction is improved when care is delivered by an interprofessional team	1	2	3	4	5
4. [T]	Participating in educational experiences with students from different disciplines enhances my ability to work on an interprofessional team	1	2	3	4	5
5. [R]	I have an understanding of the courses taken by, and training requirements of, other health professionals	1	2	3	4	5
6. [O]	Healthcare costs are reduced when patients/clients are treated by an interprofessional team	1	2	3	4	5
7. [T]	Health professional students from different disciplines should be educated to establish collaborative relationships with one another	1	2	3	4	5
8. [R]	I understand the roles of other health professionals within an interprofessional team	1	2	3	4	5
9. [O]	Patient/client-centeredness increases when care is delivered by an interprofessional team	1	2	3	4	5
10. [T]	During their education, health professional students should be involved in teamwork with students from different disciplines in order to understand their respective roles	1	2	3	4	5

Factors:

T = Interprofessional Teamwork and Team-based Practice

R = Roles/responsibilities for Collaborative Practice

O = Patient Outcomes from Collaborative Practice

Appendix B

First ONTS SIM-IPE Case with Instructions

IPEC Competencies: Values & Ethics, Roles & Responsibilities

Health Professions: Athletic Training, Nursing, Occupational Therapy, Physical Therapy, Mental Health Practitioner, Healthcare Administration

Instructions: For this assignment, you will join an interprofessional team to solve a patient case. You will learn from the various scopes of practice and the roles of each member of the interprofessional team.

Deliverable: Group artifact illustrating the interprofessional roles and responsibilities to manage the case.

Case: You are employed at Johnson Ranch which is a camp established by Dr. Mitchell Johnson. The purpose of the camp is to provide intensive medically-monitored 12-week weight loss program for obese and super obese adults, in Orlando, Florida. The camp guarantees that campers will have “considerable” weight loss during the program. While the camp is owned and operated by a physician, he is rarely present on the campgrounds. He insists that medical issues are managed on the campus grounds.

The leadership staff of the camp is composed of 4 athletic trainers, a nurse practitioner and a healthcare administrator. There are several physical and occupational therapists on staff as well as mental health practitioners.

One of your campers is Susanne Jones.

- She is 30 years old
- She is 5’ 4” and weighs 350 lbs.
- She has a history of depression
- Prior to attending the camp, she tried Weight Watchers® and Jenny Craig® without success
- She shared that she is has not been “into exercise”
- Due to her size and activity tolerance she as difficulty with self-care
- She smokes 2 packs of cigarettes a day
- She denies alcohol use.

Two weeks into the camp stay, Susanne Jones suffered a left knee strain. This has led to her not participating in any weight loss programming events. While she has no edema, she complains of pain when she runs. She is no longer compliant with her dietary restrictions and is seen walking to her care frequently for “smoke breaks”. She is not interested in discontinuing the program and has approached the camp leadership several times about her weight loss “guarantee” requesting her money back.

As a healthcare team, create an evidence-based plan to address Ms. Jones’ weight loss plan. Refer to Florida’s Practice Acts for

- Athletic training
- Healthcare administrator
- Mental health practitioner
- Nurse/nurse practitioner
- Occupational therapy
- Physical therapy

Utilize with National Guideline Clearinghouse to locate a clinical practice guideline on the treatment of obesity. If a profession is not represented in your group, review the Practice Acts and provide an overview of the intervention the profession could provide.

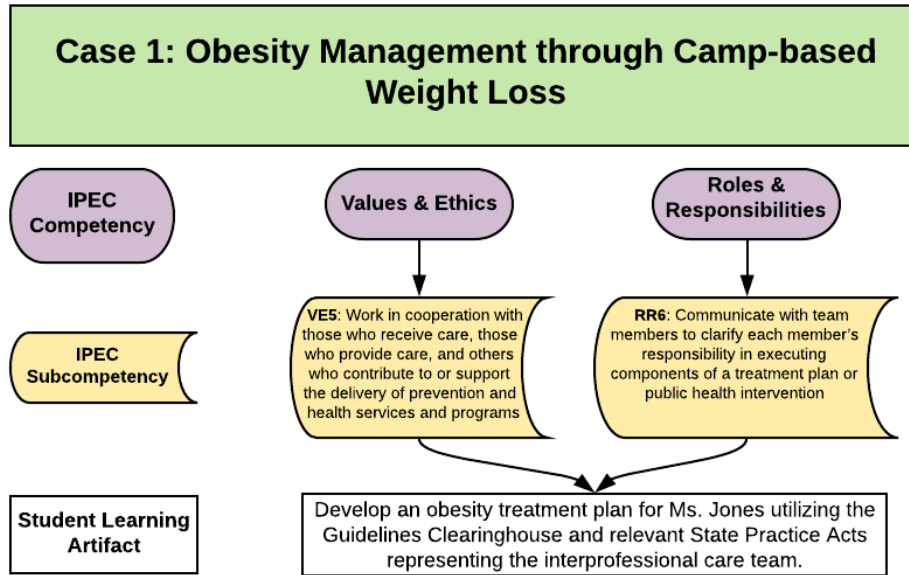


Figure 6. Assessment Map for Case 1 Linking IPE Core & Sub-competencies Competencies

Appendix C:

Second LF SIM-IPE Case with Instructions

IPE Core Competencies: Values/Ethics, Communication, Teamwork,

Health Professions: Athletic Training, Nursing, Occupational Therapy, Physical Therapy, Mental Health Practitioner, Healthcare Administration

Instructions: As a member of the same interprofessional team you will collaborate to solve this patient case. You will apply professional scopes of practice and ethical decision-making models presented in this unit to the roles of each member of the interprofessional team. Once you achieve group consensus of the plan of care, reflect on the roles and ethical practice of each member of the interprofessional team.

Deliverable: Individual artifact outlining how the case should be managed applying scopes of practice and ethical decision-making models linking patient outcomes to actions taken by providers.

Case: Mr. Elmer Jones is a 64-year-old African American male with a history of CVA and HF. While he has been stable for many years, since the loss of his wife 6 months ago, he has had 4 admissions to the hospital for HF exacerbations followed by 2 weeks of inpatient rehabilitation.

Dr. Smith is Mr. Jones' primary care physician and her has just transitioned his care model to the Medical Home model in order to improve outcomes and decrease readmissions. Dr. Smith's practice is owned by the hospital and hospital administration is very concerned with Mr. Jones' frequent readmissions and how it impacts their repayment. Dr. Terrence Smith has called you, his healthcare team, together to create a plan for Mr. Jones.

He describes the situation:

At present, Mr. Jones lives alone.

- He is non-compliant with his diet due to residual paralysis in his right arm and an inability to prepare complex meals.
- Due to the residual weakness in his right leg, he has suffered a recent fall and sustained an ankle sprain.
- He has poor balance, so he does not weight daily.
- He takes his medication when he can, but he has difficulty opening his pill bottles.
- Due to his frequent readmissions, he has very few inpatient Medicare rehabilitation days left, and he would really like to save those in case he has another admission.
- He had "good" insurance, but he is very confused about his benefit package as his wife had handled these business issues after his stroke.
- He is receiving outpatient physical therapy and occupational therapy 2 times a week, but would really like to have more therapy, maybe with a personal trainer at home.
- Due to his weak ankles, he needs bracing or taping prior to beginning his "work outs" and guidance on what he can do now that he has sprained his right ankle.
- He lives in a food desert.

As a team, what recommendations would you have for Dr. Smith on managing Mr. Jones' care? Create Mr. Jones' plan based on your actions after your degree completion.

Assessment Map for Case 2 Linking IPE Core & Sub-competencies Competencies

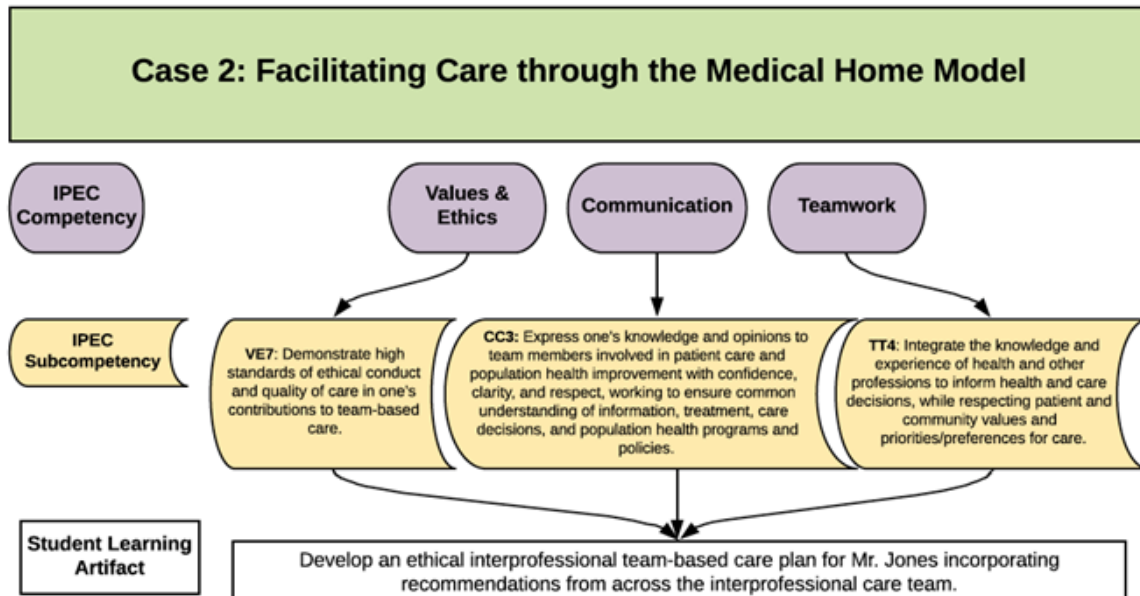


Figure 7. Assessment Map for Case 2 Linking IPE Core & Sub-competencies Competencies