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## Effectiveness of Interprofessional Education Modules on Cultural Competency of Physical Therapy and Occupational Therapy Students

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# Effectiveness of Interprofessional Education Modules on Cultural Competency of Physical Therapy and Occupational Therapy Students

## Abstract

**Purpose:** The United States is a melting pot of diverse ethnicities and cultures. Graduate-level teaching methods must prepare students to work with diverse populations and in various contexts. The outcome of instruction should be technically competent and culturally humble health care providers. The purpose of this study was to investigate the effectiveness of collaborative interprofessional instruction on cultural competency levels of Doctor of Physical Therapy Program (DPT) and Master of Science Occupational Therapy Program (MSOT) students. **Methods:** This was a pre-posttest quasi experimental study. A total 58 students from the DPT (28) and MSOT (30) programs participated and provided demographic information for this study. Cultural competency levels of the students were determined at the beginning of their first year and prior to graduation. The paper version of the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised (IAPCC-R) was used to assess cultural awareness, cultural knowledge, cultural skill, cultural encounters, and cultural desire. Instructional methods included: webinars, implicit bias assessments, self-reflection, class interactions, and an interprofessional student panel discussion. Paired *t* and Multiple mixed-design ANOVA tests were used to compare the pre-instruction and post-instruction cultural competency scores and to compare key demographic characteristics. **Results:** Post-instruction cultural awareness, knowledge, skill, and total scores of the IAPCC-R were statistically significantly higher than pre-instruction scores ( $p < 0.05$ ). Between group comparisons revealed that female and male students showed similar improvements on total and all subscales of the survey ( $p > 0.05$ ). Caucasian students showed greater improvements on cultural skills and encounters subscales than minority students ( $p < 0.05$ ). **Conclusion:** Collaborative interprofessional cultural competency focused instruction is effective in improving cultural competency levels of healthcare DPT and MSOT students. Healthcare professional programs should consider the benefits of interprofessional education in areas such as cultural competency/humility. The efficacy of the instruction on a topic such as cultural awareness/humility/competence should have quantifiable and qualitative outcome measures to determine the benefits of the instruction, monitor students' progress, and provide a rationale for content inclusion in curricula.

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## The Effectiveness of Interprofessional Education Modules on Cultural Competency of Physical Therapy and Occupational Therapy Students

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### ABSTRACT

**Purpose:** The United States is a melting pot of diverse ethnicities and cultures. Graduate-level teaching methods must prepare students to work with diverse populations and in various contexts. The outcome of instruction should be technically competent and culturally humble health care providers. The purpose of this study was to investigate the effectiveness of collaborative interprofessional instruction on cultural competency levels of Doctor of Physical Therapy Program (DPT) and Master of Science Occupational Therapy Program (MSOT) students. **Methods:** This was a pre-posttest quasi experimental study. A total 58 students from the DPT (28) and MSOT (30) programs participated and provided demographic information for this study. Cultural competency levels of the students were determined at the beginning of their first year and prior to graduation. The paper version of the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised (IAPCC-R) was used to assess cultural awareness, cultural knowledge, cultural skill, cultural encounters, and cultural desire. Instructional methods included: webinars, implicit bias assessments, self-reflection, class interactions, and an interprofessional student panel discussion. Paired *t* and Multiple mixed-design ANOVA tests were used to compare the pre-instruction and post-instruction cultural competency scores and to compare key demographic characteristics. **Results:** Post-instruction cultural awareness, knowledge, skill, and total scores of the IAPCC-R were statistically significantly higher than pre-instruction scores ( $p < 0.05$ ). There were no statistically significant differences on encounters and desire scores ( $p > 0.05$ ). Between group comparisons revealed that female and male students showed similar improvements on total and all subscales of the survey ( $p > 0.05$ ). Caucasian students showed greater improvements on cultural skills and encounters subscales than minority students ( $p < 0.05$ ), while total and other subscales were similar between Caucasian and minority students ( $p > 0.05$ ). **Conclusion:** Collaborative interprofessional cultural competency focused instruction is effective in improving cultural competency levels of healthcare DPT and MSOT students. Healthcare professional programs should consider the benefits of interprofessional education in areas such as cultural competency/humility. The efficacy of the instruction on a topic such as cultural awareness/humility/competence should have quantifiable and qualitative outcome measures to determine the benefits of the instruction, monitor students' progress, and provide a rationale for content inclusion in curricula.

**Keywords:** interprofessional, occupational therapy, physical therapy, cultural competency, education

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## INTRODUCTION

Healthcare professionals in the United States work in a multicultural diverse society. Entry level practitioners encounter a growing population of diversity, and they should have the tools and confidence to engage with all clients as well as the interprofessional healthcare team in a knowledgeable, respectful, and insightful manner. To appropriately support the education of competent and empowered healthcare practitioners in meeting the needs of the 21<sup>st</sup> century, the American Occupational Therapy Association (AOTA) and the American Physical Therapy Association (APTA) have initiated steps toward practice guidelines that serve all clients in an inclusive manner.<sup>1,2</sup> The strategic plan and educational guidelines of these organizations have made diversity, equity, and inclusion a priority, and embrace cultural competence as a necessary skill and best practice. Guidelines for educators encourage addressing cultural awareness, humility, and dexterity in curricula with intentionality, using different teaching perspectives for delivery of curriculum, and focusing on application of culture-related concepts strategically throughout the curriculum and not just in a single course.<sup>3,4</sup>

The code of ethics for both professions have high quality care to all clients at its core. Health profession accrediting agencies provide educational standards, which are wide ranging and frequently update the direction and focus for curricula development, instructional methods, and curricula design. These educational standards however do not explicitly include cultural humility as a required standard.<sup>4,5</sup> On an international level, there is an effort to focus on human rights in pedagogy.<sup>6</sup> A study by Brown and Stav found that hands-on experiential learning opportunities contributed to increased cultural competency and critical thinking skills for students engaged in servant leadership opportunities.<sup>7</sup> Education should move toward an equal emphasis on social approaches that provides students with skills to work with individuals, groups, and populations.<sup>8</sup> This requires education to focus on social responsibility and responsiveness to contextual determinants of occupational performance.<sup>9,10</sup> To provide client-centered care, healthcare education must prepare students to provide equal and high-quality care to everyone considering all aspects of life.<sup>11</sup>

As future healthcare practitioners, students need to understand the importance of cultural differences by valuing, incorporating, and examining their own health-related values and beliefs. To provide optimal care within multicultural communities, it is vital that healthcare practitioners reflect the racial, ethnic, gender, sexual orientation, immigration status, physical ability, and socioeconomic status of the community.<sup>11</sup> Purden asserts that promoting cultural competence and cultural humility in health care can be achieved from two perspectives: creating practice environments that support culturally humble and competent care, and developing educational programs that foster cultural awareness and sensitivity among students in the health care professions.<sup>12</sup> Healthcare professional students should be prepared for interprofessional collaborative practice. Bezner emphasizes that all healthcare practitioners collaborate so that health-promoting interventions are coordinated and reinforced across all healthcare encounters, the patient or client feel supported, and care is coordinated instead of disjointed or worse, contradictory.<sup>13</sup> Ondasen and Reeves recommend early interprofessional education to help shape knowledge of one's own and other professions.<sup>14</sup> Both quantitative and qualitative data show that a half day interprofessional education event is beneficial, satisfying, and a source of new learning.<sup>15</sup>

The focus on culturally humble, competent, and collaborative interprofessional care is critical to the trajectory and growth of healthcare professions. A culturally relevant workforce and the implementation of a plan of care that is meaningful and compatible with the values and traditions of clients and communities will improve the effectiveness and quality of services.<sup>16,17,18</sup> Despite the emphasis on the importance of cultural competency in occupational and physical therapy education literature, there has been little published on the effect of interprofessional instruction on students' cultural competency levels as assessed by a reliable assessment tool. Most published studies address cultural competency within the curricula and focus on student satisfaction with a course or students' self-perceived level of cultural competency.<sup>11,17,19</sup>

The objectives of this study were to assess the level of cultural competency among Master of Science Occupational Therapy (MSOT) and Doctor of Physical Therapy (DPT) students in a non-traditional weekend program, and to describe and assess the impact and efficacy of collaborative interprofessional instruction on cultural competency using the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised (IAPCC-R).<sup>20</sup>

## METHOD

A total of 58 students from the DPT (28 students) and MSOT (30 students) programs participated in the study. This was a quasi-experimental pretest-posttest design study. The study was approved by the Dominican College Institutional Review Board as an exempt study.

DPT and MSOT students in their first semester at Dominican College were invited to participate in the study. The students who agreed to participate signed an informed consent form and completed an online demographic information survey as well as the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised (IAPCC-R)<sup>20</sup>. The IAPCC-

R© is a pencil/paper self-assessment tool that measures one's level of cultural competence in healthcare delivery. It consists of 25 items that measure the five cultural constructs of desire, awareness, knowledge, skill and encounters. There are 5 items that address each construct. The IAPCC-R© uses a 4-point likert scale reflecting the response categories of strongly agree, agree, disagree, strongly disagree; very aware, aware, somewhat aware, not aware; very knowledgeable, knowledgeable, somewhat knowledgeable, not knowledgeable; very comfortable, comfortable, somewhat comfortable, not comfortable; and very involved, involved, somewhat involved, not involved. Completion time is approximately 10 -15 minutes. Scores range from 25 -100 and indicate whether a healthcare professional is operating at a level of cultural proficiency, cultural competence, cultural awareness or cultural incompetence. Higher scores depict a higher level of cultural competence.

Students provided the following information for the non-identifiable demographic survey: age, gender, nationality, citizenship status, primary language, area in which they grew up, and if they had received prior cultural competency training.

Once the data from the surveys were collected, a targeted series of 6 collaborative instructional sessions were designed, developed, and administered to DPT and MSOT students requiring interaction between the two student groups. In their last semester students repeated the IAPCC-R survey to determine if their cultural competency levels had improved. The total duration of the study was 3 years. Following the final survey, the students participated in an information session to provide details regarding the results and outcomes of the educational intervention. The change in the total and subscale scores of the IAPCC-R between the initial and final survey were shared with the participants.

### **Outcome Measures**

A Paper version of the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised (IAPCC-R) was used to assess the cultural competency levels of the students as a pre-post-instruction assessment. The IAPCC-R is a self-assessment tool designed for use among healthcare professionals. The IAPCC-R consists of 25 questions related to five cultural themes: awareness, knowledge, skill, encounters, and desire. The IAPCC-R uses a four-point grading scale (strongly agree, agree, disagree, and strongly disagree). Scores range from 25 to 100 and indicate whether a healthcare professional is performing at a level of cultural proficiency, cultural competence, cultural awareness, or cultural incompetence. Higher scores depict a higher level of cultural proficiency. The IAPCC-R scores are categorized as culturally proficient (91-100), culturally competent (75-90), culturally aware (51-74) and cultural incompetent (25-50) in keeping with subscale domains.<sup>20</sup> The assessment takes 10-15 minutes to complete. The IAPCC-R is rated to have good reliability across most respondents, having a Cronbach's alpha of .81.<sup>21</sup> In efforts to test for construct validity, Mesler proposed that there be a direct relationship between a student's level of cultural competence and his or her level of confidence in performing general transcultural skills.<sup>21</sup> Content validity of the IAPCC-R tool has been established, and the items used reflect the literature review on cultural competence in healthcare delivery relating to awareness/attitudes, skill, and knowledge in cultural competence.<sup>22</sup> The test of reliability of the IAPCC-R demonstrated good to excellent reliability with the Cronbach's alpha of .78 when it is used with physical therapy students.<sup>23</sup>

The following is a summarized breakdown of the instructional and reflective opportunities provided to the students during the training/intervention period.

### **Instructional Activities**

#### ***First Year***

A webinar introduced key terms and definitions that would be frequently encountered during the training. Examples of a few terms are culture, ethnicity, race, disparities, competencies, and social determinants of health. The webinar introduced evidence of health disparities and the importance of communication with culturally diverse client populations, as well as the relationship between cultural competence and client-centered care. The students submitted a self-reflection paper through Discussion Board on Blackboard regarding their readiness for multicultural work in healthcare, areas for self-improvement, and the importance of identifying their own belief systems as well as those of others and identified and anticipated potential communication issues. To facilitate group interaction, critical thinking, and reasoning the students were encouraged to respond to each other's self-reflection submissions across the disciplines of occupational and physical therapy.

The students were required to take a test and submit certificates of completion of the following three online modules: Fundamentals of Culturally and Linguistically Appropriate Services, Ensuring Communication and Language Assistance, and Engagement, Continuous Improvement, and Accountability Assessment.<sup>24</sup>

### Second Year

DPT and MSOT students engaged in a one-hour in person interprofessional class activity. The students were encouraged to ask each other questions about their culture, religion or beliefs, gender, race, social status, and professional status to determine commonalities and differences. Following these activities, the instructors led a discussion on culture, beliefs, inclusion, and health. Students submitted written reflections related to an area of newly acquired knowledge, interest, concern, or change of opinion related to their interactions, as well as any discomfort experienced while taking part in the workshop.

On completion of their first in-person clinical experience/fieldwork, students submitted a post-clinical/fieldwork self-reflection highlighting their experiences. Students responded to the following questions or prompts: describe aspects of cultural competence required of you during your clinical/fieldwork experience, describe the cultural environment of your fieldwork site to include the organization's focus, values, beliefs, mission, rules of engagement and the impact on therapeutic interactions between you, your educator and client/patient.

### Third Year

In their final year, students participated in a faculty-moderated student panel discussion entitled Understanding I.D.E.A (Inclusion, Diversity, Equality and Awareness) in Healthcare Education and Practice. This discussion was co-hosted by the occupational and physical therapy programs. All college students (undergraduate and graduate) and faculty were invited to be the audience. Students completed a discussion board reflection of their experience and were asked to indicate two new concepts or insights gleaned and their thoughts about learning/instruction through an interactive discussion with diverse backgrounds and perspectives.

In their last semester, the students took the Implicit Association Test (IAT).<sup>25</sup> The IAT measures the strength of associations between concepts (e.g., black people, gay people) and evaluations (e.g., good, bad) as well as stereotypes (e.g., athletic, clumsy). Each student was required to take a minimum of three tests and provide feedback regarding his or her experience and reflect on belief association and implicit stereotypes.

### Data Analysis

A total of 58 students (28 DPT students, 30 MSOT students) participated in the study. Eighteen (18) students' data was excluded from the statistical analysis because the post-instruction data on the surveys was missing. The data of 40 students (22 PT students, 18 OT students) was used for statistical analysis. Based on the IAPCC-R scoring criteria, questions were scored from 1 to 4. A score of 4 was given if the most positive option was selected. Survey item scores were summed to generate the 5 subscale scores of cultural awareness, cultural knowledge, cultural skill, cultural encounters, and cultural desire, as well as an overall competency score for each respondent.

The 5 subscale and total scores of IAPCC-R were used for the statistical analysis. The Statistical Package for the Social Sciences (SPSS version 27) was used for the statistical analysis. The pre-set alpha level was set as 0.05. Paired t test and multiple mixed design ANOVA tests were used to compare: (i) first and last semester survey data of DPT and MSOT students, (ii) female and male students and (iii) Caucasian and minority students.

## RESULTS

The average age of the participants was 26.3+5.8 years. Table 1 includes the demographic characteristics of the participants.

**Table 1.** Demographics of the participants

	n	%
Gender (Females/males)	27/13	65/35
Ethnicity (Caucasians/minorities)	23/17	56/44
Citizenship status (Minority-US born parents/ Foreign born parents/ US parents)	15/16/9	37/40/22
Language (native English/non-native English)	37/7	84/16
Living status (suburban/urban/rural)	29/9/2	75/22/3
Prior cultural training (yes/no)	27/13	65/35

The paired sample t test analysis showed that post-training awareness, knowledge, skill, and total scores of the IAPCC-R were statistically significantly higher than pre-training scores ( $p < 0.05$ ). The differences in the encounter and desire scores between pre- and post-instructions were not statistically significant ( $p > 0.05$ )

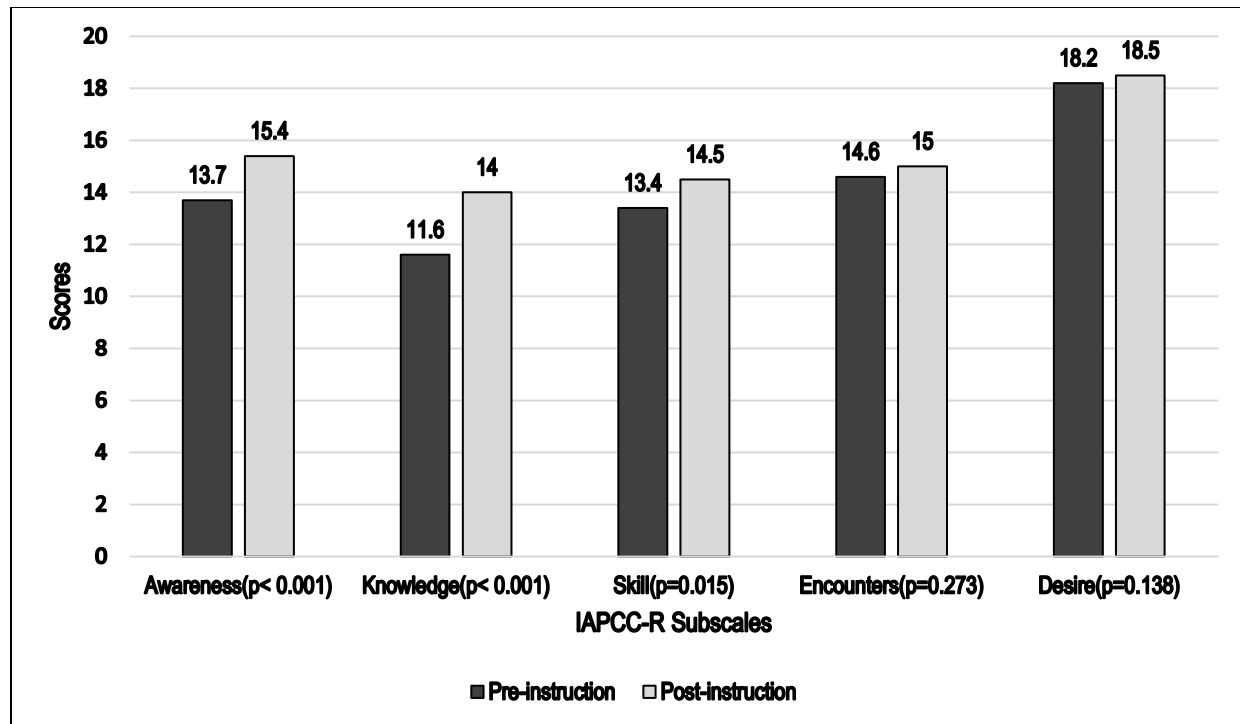


Figure. Pre- and post-instruction comparisons of total and subscales of the IAPCC-R survey

Total scores of IAPCC-R improved from 71 to 77, indicating that competency levels of the students improved from culturally aware to culturally competent. Pre-instruction scores indicate 29 (72%) students were culturally aware, and 11 (28%) students were culturally competent. After the instruction, 15 (37%) students were culturally aware, and 23 (57%) students were culturally competent, and 2 (6%) students were culturally proficient (Table 2).

Table 2. Pre- and post-instruction cultural competency levels of the students

	Pre-instruction N (%)	Post-instruction N (%)
Culturally proficient	0 (0%)	2 (6%)
Culturally competent	11 (28%)	23 (57%)
Culturally aware	29 (72%)	15 (37%)
Culturally incompetent	0 (0%)	0 (0)

The mixed-design ANOVA analyses showed that post-training awareness, knowledge, skill, and total scores of the IAPCC-R were statistically significantly higher than pre-instruction scores ( $p < 0.05$ ). However, there were no statistically significant differences between pre-instruction and post-instruction encounters and desire scores ( $p > 0.05$ ). Additionally, there were no statistically significant time X group interactions indicating that there were no differences between female and male students pre and post-instructions ( $p > 0.05$ ) and both female and male students showed similar changes (Table 3).

**Table 3.** Pre- and post-instruction comparisons of total and subscales of the IAPCC-R survey of female and male students

	Gender	Pre-instruction Mean $\pm$ SD	Post-instruction Mean $\pm$ SD	Pre- vs post-instruction comparisons p	Time X Group interactions Female vs male p
Awareness	Females	13.8 $\pm$ 2.0	15.5 $\pm$ 1.8	< 0.001*	0.941
	Males	13.2 $\pm$ 1.7	14.6 $\pm$ 1.3		
Knowledge	Females	11.4 $\pm$ 2.7	13.8 $\pm$ 2.0	< 0.001*	0.502
	Males	12.0 $\pm$ 2.3	14.5 $\pm$ 1.9		
Skill	Females	13.4 $\pm$ 2.2	14.8 $\pm$ 2.3	0.045*	0.317
	Males	13.5 $\pm$ 1.9	14.3 $\pm$ 1.3		
Encounters	Females	14.6 $\pm$ 1.9	15.4 $\pm$ 2.3	0.617	0.147
	Males	14.5 $\pm$ 1.5	14.1 $\pm$ 0.8		
Desire	Females	18.5 $\pm$ 1.7	18.9 $\pm$ 1.3	0.205	0.915
	Males	17.4 $\pm$ 1.9	17.9 $\pm$ 1.4		
TOTAL	Females	71.6 $\pm$ 7.8	78.0 $\pm$ 6.4	.001*	0.401
	Males	70.9 $\pm$ 5.9	74.8 $\pm$ 4.2		

SD: standard deviation, \*: statistically significant

For comparisons of Caucasian versus minority students, a mixed-design ANOVA revealed similar findings. Post-training awareness, knowledge, skill, and total scores of the IAPCC-R were statistically significantly higher than pre-instruction scores ( $p < 0.05$ ). With regard to skill, encounters, and total score, there were statistical differences between minority and Caucasian students ( $p < 0.05$ ). Pre-test scores of the Caucasian students' skill, encounters and total scores were lower than the minority students' scores ( $p < 0.05$ ). However, there was a time vs group interaction indicating that the Caucasian students showed improvements in these subcategories, whereas minority students' scores did not change (Table 4).

**Table 4.** Pre- and post-instruction comparisons of total and subscales of the IAPCC-R survey of Caucasian and minority students

	Race	Pre-instruction Mean $\pm$ SD	Post-instruction Mean $\pm$ SD	Pre- vs post-instruction comparisons p	Time X group interactions Caucasian vs minority p
Awareness	Caucasians	12.9 $\pm$ 1.4	14.9 $\pm$ 1.3	< 0.001*	0.119
	Minorities	14.7 $\pm$ 2.0	15.7 $\pm$ 2.0		
Knowledge	Caucasians	10.9 $\pm$ 2.1	13.8 $\pm$ 2.0	< 0.001*	0.255
	Minorities	12.6 $\pm$ 2.3	14.4 $\pm$ 1.8		
Skill	Caucasians	12.5 $\pm$ 2.0	14.5 $\pm$ 2.3	0.040*	0.015*
	Minorities	14.7 $\pm$ 1.9	14.5 $\pm$ 1.8		
Encounters	Caucasians	13.9 $\pm$ 1.5	15.0 $\pm$ 1.8	0.420	0.042*
	Minorities	15.4 $\pm$ 2.2	14.9 $\pm$ 2.4		
Desire	Caucasians	17.7 $\pm$ 1.9	18.5 $\pm$ 1.4	0.258	0.189
	Minorities	18.5 $\pm$ 1.4	18.7 $\pm$ 1.4		
TOTAL	Caucasians	67.9 $\pm$ 5.7	76.7 $\pm$ 6.0	.001*	0.006*
	Minorities	76.1 $\pm$ 6.4	77.0 $\pm$ 5.9		

SD: standard deviation, \*: statistically significant

## DISCUSSION

The results of this study revealed that addressing cultural competence through a collaborative interprofessional 3-year instruction program has a positive effect. There were overall improvements after the six instructional sessions of varied strategies and learning activities. A statistically significant increase ( $p = .001$ ; from 71 to 77) was found in the cultural competency scores of physical therapy and occupational therapy students, resulting in an increase in the cultural competency levels in a majority of the students.



At the end of these interprofessional instructions, two students (6%) scored in the culturally proficient range and 23 students (57%) scored as culturally competent. The results show that not all of the students reached the level of culturally competent or culturally proficient after the instruction as 15 students (37%) remained at the culturally aware level. Haack and Philips reported the IAPCC-R scores as 69.7 and 71.5 for two cohorts (n=135) in pharmacy students after a cultural competency course series.<sup>26</sup> An additional study of pharmacy students (n = 72) by Poirier et al reported significant improvements of the total and all 5 subscales of the IAPCC-R after implementing a cultural competency course; more specifically, a pre-lecture score of 67.2 and a post-lecture score of 80.2 (n=72).<sup>27</sup> These cultural competence levels have been considered acceptable for graduating students. However, the researchers involved in this study believe it is necessary in the current social and political climate that there be a greater focus on the social context and a more focused effort to educate students on issues related to diversity, equity, inclusion, justice, and culture. We believe that entry-level healthcare graduate practitioners should demonstrate high scores on cultural competency tests to be ready to serve the diverse population of the United States.

Healthcare practitioners' cultural competency skills have tended to lag behind their clinical skills.<sup>12</sup> This draws attention to the need for additional changes to the existing curriculum as well as the need to modify the instructions provided in this study to achieve higher levels of cultural competence and proficiency in students. On examining the IAPCC-R subscale scores, the 3 pre-instruction areas of awareness, knowledge and skill had low sub scores and improved significantly after instructions. The students had lower levels of cultural awareness, cultural knowledge, and cultural skills prior to the instruction. It is possible that the content and instructional method contributed more to the improvement of these 3 subscales (awareness, knowledge, and skill) scores than to the improvement of the other two subscales (encounters and desire). It is possible that the students had difficulties with client interactions due to the 2019 Corona virus (COVID-19) pandemic during our study, which may explain the lack of a significant change in encounter scores in our students. Students scored the highest on the IAPCC-R subscale for cultural desire, both before and after instructions (pre:18.2- post:18.5). These high scores suggest that the students have a strong commitment to the process of becoming culturally competent and are motivated to participate. We believe that instructional content did not significantly improve the score on cultural desire due to high scores before instructions.

The students had lowest scores on cultural knowledge (pre: 11.6-post: 14.0) in our study. It is important to note that two research studies had similar findings, indicating cultural desire to have the highest subscale score and cultural knowledge to have the lowest subscale score.<sup>26,27</sup> Both these research studies and our own research found that despite graduate healthcare students having limited knowledge, they are motivated to learn, focus on self-reflection, and acknowledge their own biases to improve their cultural competency.

Students from minority groups performed better than Caucasians on pre-instruction cultural skills, cultural encounters, and total scores of the IAPCC-R in our study. There were minimal changes in scores for the minority group post-instructions. It is likely that the higher pre-instruction scores placed minority students at a culturally competent level at the start of the study. Caucasian students showed improvements in all subcategories except cultural desire. Minority students had overall higher scores bringing into question the value and benefit of the instructional content and techniques used in this study to benefit all students including those with a higher beginning competency level.

The literature and other research studies addressing cultural competence and humility have similar key elements of instructional methods used in this study, which included using varied activities and case studies, focusing on self-awareness and assessment, discussions and reflection.<sup>3,26</sup> The journey of cultural competence is a lifelong process to be approached with humility and acceptance that we do not know everything.<sup>28</sup> This study adopted a long-term approach with instruction provided throughout the students' 3-year graduate program, with opportunity for self-reflection and examination of their beliefs.

The instructional delivery methods were tailored to meet the unique needs of the weekend nontraditional OT and PT programs in this study. Instructions were provided in-person as well as via synchronous and asynchronous methods using the Blackboard platform. Students were already familiar with the delivery platform which provided the opportunity for interaction via Discussion Board. This unique opportunity to collaborate with different healthcare profession students, the varied format of instructional delivery, the inclusion of an outcome measure to measure success of the instruction, and the ability to compare results across time, make this a distinctive and valuable study. The development and implementation of the interprofessional cultural competency course content presented challenges for faculty. It was particularly difficult for faculty from the two different programs to plan in-person class activities and to prepare a professional knowledge-based course of which the content could be perceived as subjective and controversial. The researchers themselves have embraced the ideology of lifelong learning in the area of cultural knowledge and a commitment to being humble practitioners and educators.

The IAPCC-R results of this study show the total scores improved significantly after implementation of 3-year collaborative interprofessional cultural competency instructions for DPT and MSOT students. Not all students achieved cultural proficiency, which is consistent with the view that developing cultural competence is a journey that continues as students interact with patients from diverse backgrounds and that lifelong learning is a key to cultural competence.

This study allowed (a) the physical and occupational therapy students in graduate DPT and MSOT programs to self-assess their level of cultural competency, (b) the health care graduate education programs to implement online and in-person collaborative instruction, (c) programs to assess the effectiveness of instruction provided on the topic of cultural competency/humility, (d) the researchers to provide feedback to the students regarding their cultural competency levels with identifiable areas of strengths and improvement, (e) the researchers to provide feedback to both program directors and faculty regarding students' cultural competency levels to facilitate the necessary changes with regard to faculty training, curricula revisions, as well as justification to create a new course related to an interprofessional approach to cultural competency.

The instructional provided the opportunity for reflection on the topic of cultural competence and humility and allowed the two health-related programs to work together. It also provided opportunities to explore the perspective of culture from varied frames and practice models. This is the first research study that assesses the cultural competencies of physical therapy and occupational therapy students over three years. The authors used this study as a pilot to examine how to improve the content and methods of instruction for future student training. As an outcome of this study, Dominican College Allied Health Division has adopted the interprofessional cultural competence instructional modules to be implemented over the duration of the education of incoming MSOT and DPT students.

### Limitations

There were several limitations to the study. It was completed at one university between 2 non-traditional weekend programs. The outcomes may not be generalizable to more traditional graduate programs and institutes.

In this study, the educational collaboration was between 2 closely related health care professions with similar professional accrediting requirements. For future research, it would be beneficial to include a broader pool of healthcare related disciplines, so that interprofessional cultural competence can be taught under allied health programs.

Another limitation was the low response to the post-instruction survey resulting in a smaller sample size. It is possible that students lost interest or did not feel comfortable with the instructional content resulting in a lower post instruction survey response rate. Therefore, consideration should be given to strategically incorporating instruction into most course work to have a better understanding of the value of cultural competence in providing client-centered care. A post-graduation assessment of cultural competency would also be beneficial to assess long-term effects of the instruction.

### CONCLUSION

Collaborative interprofessional cultural competency instruction is effective in improving cultural competence levels of the DPT and MSOT students. Using the IAPCC-R as a measure provides essential information related to students' cultural competence levels and development as they advance through their professional education. It measures students' cultural competence levels and development in five areas: awareness, knowledge, skill, encounters, and desire. A variety of educational instructional methods and activities, such as panel discussions, self-reflection, lecture, and discussion board, were effective in improving certain areas of cultural competence. Physical and occupational therapy programs must incorporate cultural competency/humility trainings into curricula and monitor outcomes and progress in their quest to prepare culturally competent health care professionals with the desire, confidence, and ability to care for diverse populations within the United States.

### REFERENCES

1. American Occupational Therapy Association. Vision 2025. *American Journal of Occupational Therapy*. 2017;71, 7103420010. <https://doi.org/10.5014/ajot.2017.713002>.
2. American Physical Therapy Association. Diversity, Equity and Inclusion. 2020. Retrieved from <https://www.apta.org/siteassets/pdfs/policies/codeofethicshods06-20-28-25.pdf>.
3. American Occupational Therapy Association. Educator's guide for addressing cultural awareness, humility, and dexterity in occupational therapy curricula. *American Journal of Occupational Therapy*. 2020;74(Supplement 3), 7413420003. <https://doi.org/10.5014/ajot.2020.74S3005>.
4. American Occupational Therapy Association. Occupational therapy code of ethics (2015). *American Journal of Occupational Therapy*. 2015; 69(Suppl. 3), 6913410030. <https://doi.org/10.5014/ajot.2015.69S03>.

5. Commission on Accreditation of Physical Therapy Education, revised in 2020. <https://www.capteonline.org/globalassets/capte-docs/capte-pt-standards-required-elements.pdf>
6. World Federation of Occupational Therapists – WFOT. Minimum standards for the education of occupational therapists: revised 2016. London: WFOT. Retrieved in 2021 November 10, from <https://wfot.org/resources/new-minimum-standards-for-the-education-of-occupational-therapists-2016-e-copy>.
7. Brown J, Stav W. International Fieldwork: A Qualitative Analysis of the Lived Experiences of OT Students in Ecuador. *American Journal of Occupational Therapy*. 2020;74(S1). <https://doi.org/10.5014/ajot.2020.74S1-PO4025>
8. Irvine-Brown L, Di Tommaso A, Mafitano APS, Molineux M. Experiences of occupational therapy education: contexts, communities and social occupational therapy. *Cad Bras Ter Ocup. Jan-Mar 2020*;28 (1) <https://doi.org/10.4322/2526-8910.ctoARF1931>
9. Pollard N, Sakellariou D. The occupational therapist as a political being. *Cadernos de Terapia Ocupacional da UFSCar*, 2014;22(3), 643-652.
10. Townsend E, Marval R. Can professionals actually enable occupational justice? *Cadernos de Terapia Ocupacional da UFSCar*. 2013;20(2), 215-228.
11. Suarez-Balcazar Y, Rodawoski J, Balcazar F, et al. Perceived levels of cultural competence among occupational therapists. *Am J Occup Ther*. 2009;63(4):498-505. doi:10.5014/ajot.63.4.498. [PMID: 19708479]
12. Purden M. Cultural considerations in interprofessional education and practice. *J Interprof Care*. 2005;19 Suppl 1:224-234. doi:10.1080/13561820500083238. [PMID: 16096157]
13. Bezner JR. Promoting Health and Wellness: Implications for Physical Therapist Practice [published correction appears in *Phys Ther*. 2016 Jan;96(1):123]. *Phys Ther*. 2015;95(10):1433-1444. doi:10.2522/ptj.20140271. [PMID: 25908523]
14. Oandasan I, Reeves S. Key elements of interprofessional education. Part 2: factors, processes and outcomes. *J Interprof Care*. 2005;19 Suppl 1:39-48. doi:10.1080/13561820500081703. [PMID: 16096144]
15. Knecht-Sabres LJ, Gunn JF, Conroy C, Getch SE, Cahill SM, Lee MM, Ciancio MJ, Jaskolski J, Palmisano L, Kristjansdottir K. Effectiveness of an Interprofessional Education Event for Graduate Health Professional Students. *The Internet Journal of Allied Health Sciences and Practice*. 2016 Jan 01;14(4), Article 2
16. Stanford FC. The Importance of Diversity and Inclusion in the Healthcare Workforce. *J Natl Med Assoc*. 2020;112(3):247-249. doi:10.1016/j.jnma.2020.03.014 [PMID: 32336480]
17. Ekelman B, Bello-Haas VD, Bazyk J, Bazyk S. Developing cultural competence in occupational therapy and physical therapy education: a field immersion approach. *J Allied Health*. 2003;32(2):131-137. PMID: [12801027]
18. Greene-Moton E, Minkler M. Cultural Competence or Cultural Humility? Moving Beyond the Debate. *Health Promot Pract*. 2020;21(1):142-145. doi:10.1177/1524839919884912
19. Jackson V. Cultural competence in physical therapy education: student perceptions on the effectiveness of cultural competence education methodology. *Journal of the National Society of Allied Health*. 2011;8(9):31. <https://link.gale.com/apps/doc/A263993348/AONE?u=anon~c1644eb1&sid=googleScholar&xid=6d17df0b>
20. The IAPCC-R. Available from <http://transculturalcare.net/iapcc-r/>
21. Mesler, D. 2013. A Comparative Study of Cultural Competence Curricula in Baccalaureate Nursing Programs. Dissertation. Seton Hall University, NJ.
22. Capell J, Veenstra G, Dean E. Cultural Competence in Healthcare: Critical Analysis of the Construct, Its Assessment and Implications. *Journal of Theory Construction & Testing*. Spring/Summer 2007;11(1):30-37.
23. Gulas C. Establishing the Reliability of Using the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals with Physical Therapy Students. Dissertation, Saint Louis University, Saint Louis, MO, 2005.
24. US Department of Health & Human Services. Think Cultural Health. Available from <https://cccm.thinkculturalhealth.hhs.gov/>
25. Harvard University the Implicit Association test. Available from. <https://implicit.harvard.edu/implicit/takeatest.html>
26. Haack S, Phillips C. Teaching cultural competency through a pharmacy skills and applications course series. *Am J Pharm Educ*. 2012;76(2):27. doi:10.5688/ajpe76227. [PMID: 22438599]
27. Poirier TI, Butler LM, Devraj R, Gupchup GV, Santanello C, Lynch JC. A cultural competency course for pharmacy students. *Am J Pharm Educ*. 2009;73(5):81. doi:10.5688/aj730581. [PMID: 19777096]
28. Khan, S. (2021). Cultural Humility vs. Cultural Competence- and Why Providers Need Both. Available from <https://www.bmc.org/healthcity/policy-and-industry/cultural-humility-vs-cultural-competence-providers-need-both>