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Research Article

Educational Benefits of an International Service-Learning Course in Honduras for Doctor of Physical Therapy Students

Todd Watson*, Jessica Graning and Timothy Eckard

Western Carolina University, Cullowhee, NC, USA

***Corresponding author:** Todd Watson, Western Carolina University, Cullowhee, NC, USA

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Abstract

Background: International service-learning (ISL) activities are academic experiences that encompass participation in organized service activities, practical experiences, and critical reflection. The assessment of physical therapy clinical education is primarily achieved through student performance on the clinical performance instrument (CPI) during clinical education. The CPI assesses a student's performance in all subdomains of professional practice and patient management and is completed during each clinical education experience.

Objective: Within the framework of an ongoing community-based program, the purpose of this study was to determine if there were differences in aggregate and subdomain performance on the CPI between Doctor of Physical Therapy (DPT) students enrolled in an elective ISL course and matched controls.

Methods: Twenty-three DPT students participated in an elective ISL and compared to controls matched on age, gender, cohort and clinical setting utilizing a case-control design. McNemar tests were used to compare the proportion of ISL participants and controls that had each CPI subdomain listed as a strength. A Wilcoxon signed rank test was used to compare the total number of CPI subdomains listed as strengths between ISL participants and their matched controls.

Conclusion: A significantly greater proportion of ISL participants than controls had "communication" listed as a strength in the CPI comments ($p=0.04$). ISL participants also had significantly more subdomains listed as strengths compared to their matched controls ($p < 0.01$). Results suggest that participation in an ISL with an emphasis on clinical care may accelerate DPT student gains in professional communication and overall clinical performance.

Background

International service-learning (ISL) is widespread throughout higher education, with study abroad participation doubling in the years 1999-2014 [1] and no signs of lessening [2]. In the 2018-2019 academic year, 347,099 US students studied abroad, representing an increase of 2% of US students compared to the previous academic year, and an increase of 11% over the previous five years [3]. Physical therapist (PT) education strives to train skilled practitioners for a variety of health care settings, including practicing in a global health care environment [4,5]. ISL is defined [6] as a structured academic experience in another country encompassing the following three aspects in which students.

a) Participate in an organized service activity that addresses identified community needs;

b) Learn from direct interaction, gain from practical experiences and cross-cultural dialogue with others; and

c) Critically reflect on the experiences so as to advance their understanding of course content, of global and intercultural issues, gain a broader appreciation of the host country and the discipline, and an enhanced sense of their own responsibilities as citizens locally and globally.

Community engaged learning is more than simply service in a community that is for learning; but rather is collaborative, i.e., it is service-learning with the community so that all parties (students, faculty, and community members) share decisions in planning and implementation for mutual benefit [7-11]. Previous studies indicate that community engaged ISL projects provide faculty members with an opportunity to conduct clinical and translational research, [12-15] and community benefits can include extension of health care services such as support for ongoing clinics, health education campaigns, and annual health fairs [16]. Student benefits from ISL experience include fostering critical thinking skills, analysis and

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content mastery, [17,18] and in general a greater appreciation of the community [19]. Additionally, ISL has demonstrated positive effects on students communication skills, [20-22] and in the context of globalization, skilled intercultural communication is essential at home and abroad for effective client-centered care [23,24]. Furthermore, previous research has evidenced the enhancements of clinical reasoning (CR) skills of health professions students participating in ISL [25-27].

Purpose

While the intent of the ISL travel course had been to promote critical reflection and CR while offering an immersive global health clinical experience, the present study aimed to measure development of professional behaviors (including communication and CR) in these ISL participating students. Specifically, the purpose of this study was to determine if there were differences in aggregate and subdomain performance on the Physical Therapist Clinical Performance Instrument [28] (CPI) between Doctor of Physical Therapy (DPT) students enrolled in an elective ISL course and controls matched on age, gender, and cohort. The ISL took place in Honduras with an established community engaged program which occurred during a two-year time span. The value of the community engaged ISL experience had been recognized by students for several years prior to this study. In exit interviews, several students stated that participation in a ISL had greatly improved their professional development. These student reflections were reinforced by clinical instructor feedback during formative and summative assessments throughout the internships immediately following the ISL experiences. In years prior to the study, clinical instructors commented on superior levels of clinical reasoning, communication, and other professional aspects of clinical performance for the students that had participated in the ISL. It was these commentaries that were the impetus for the present study. An analysis of the present study's participants evaluating their ISL course Reflection Papers were found to be at the highest Kember Scale level of reflection [26]. In that study, participants' response to the ISL was limited to a consideration of reflective thinking undertaken after their return. The current study expands on this to examine how ISL participation impacts several facets of clinical performance, such as clinical reasoning and communication skills, as assessed by a student's Clinical Instructor (CI). We hypothesized that a greater proportion of ISL participants would have the specific subdomains of communication and clinical reasoning listed as strengths in the comments section of the CPI and that ISL participants would have a greater total number of CPI subdomains listed as strengths compared to their matched controls.

Methods

Participants

Over the course of two years, 23 students across three cohorts enrolled in a cultural immersion study abroad ISL travel course led by the first author, offered as an elective through the Department of Physical Therapy a public, Carnegie classified Community Engaged, Regional Comprehensive state university in the southern United States. Participants in this study were graduate students enrolled in the DPT program which consists of a 33-month, traditional curriculum. The clinical education (CE) curriculum includes four full-time, clinical education experiences for a total of 34 weeks (two six-week experiences, one 10-week experience, and a 12-week terminal CE) with a full-time CE occurring every other semester throughout the curriculum. Participants in cohort 1 were 26 months into the curriculum and experienced the ISL course prior to their final CE. Participants in cohort 2 and 3 were 13 months into the curriculum and experienced the ISL course prior to their second CE. These three separate cohorts' courses occurred during three recent academic years. Each of the 23 study participants that participated in the ISL were matched with a control participant who did not attend the ISL. Participants were matched on gender, age, and cohort (graduation year). Differences in CPI change scores from pre-ISL date to post-ISL date were compared within each pair in the CPI clinical performance subdomains of safety, professional behavior, accountability, communication, cultural competence, professional development and CR. The study was approved by the Institutional Review Board.

Program description

The ISL study abroad course was developed from a sustained, long-term (eight year) relationship between the primary author and local community leaders in Honduras to provide pro bono PT services in an impoverished rural region of Honduras, where no such services exist. The program was initially developed with a local Taulabé NGO Fuente de Vida in 2011 as a medical mission, and in 2013 began as a community engaged ISL course. Since then, clinics Hospital Evengélico in Siquatepeque (in 2016) and Centro Integral de Salud in Taulabé (in 2018) have joined the partnership. Leaders from each organization participated in needs assessments for the projects' objectives, which developed into a program that not only provides annual in-country pro-bono services during the ISL, but provides health literacy education videos and pamphlets on topics chosen by the partner leaders for sustainable outcomes. These partners participated directly with study implementation, but declined to be involved in manuscript preparation due to either time commitments with their work or reported discomfort with English language writing. The community-based project is ongoing. ISL course objectives focused on students developing an understanding of

a) Typical struggles faced in the developing world (both material and non-material),

b) Global health issues typically encountered,

c) How a multifaceted, evidence-based health promotion program with community participation, can positively modify the complex socioeconomic determinants of health,

d) And the ability to communicate effectively with others from another culture.

The overarching purpose of the ISL travel course is to promote critical reflection and develop CR via the clinical experience with cross-cultural dialogue, while broadening the students' understanding of global citizenship [10].

Four 2-hour intensive pre-departure training class sessions were held, in addition to required journal article topic readings on ISL and global health issues. The in-country program included a 10-day immersion in Honduras in which students provided four days of intensive, full-time supervised pro-bono outpatient PT services in Taulabé set in a school setting, and one day of supervised pro-bono outpatient PT services in Siquatepeque in a hospital setting (Hospital Evangélico). Clinical care was given across a wide range of neuromusculoskeletal and other conditions. The in-country pro-bono clinic utilized a punctuated vertical mentoring model, where teams of two or three DPT students utilized a 3-point teaching time-out:

a) perform a focused history to develop an initial clinical hypothesis,

b) then the physical exam, and finally

c) developed a clinical impression (assessment) and intervention plan (Figure 1).

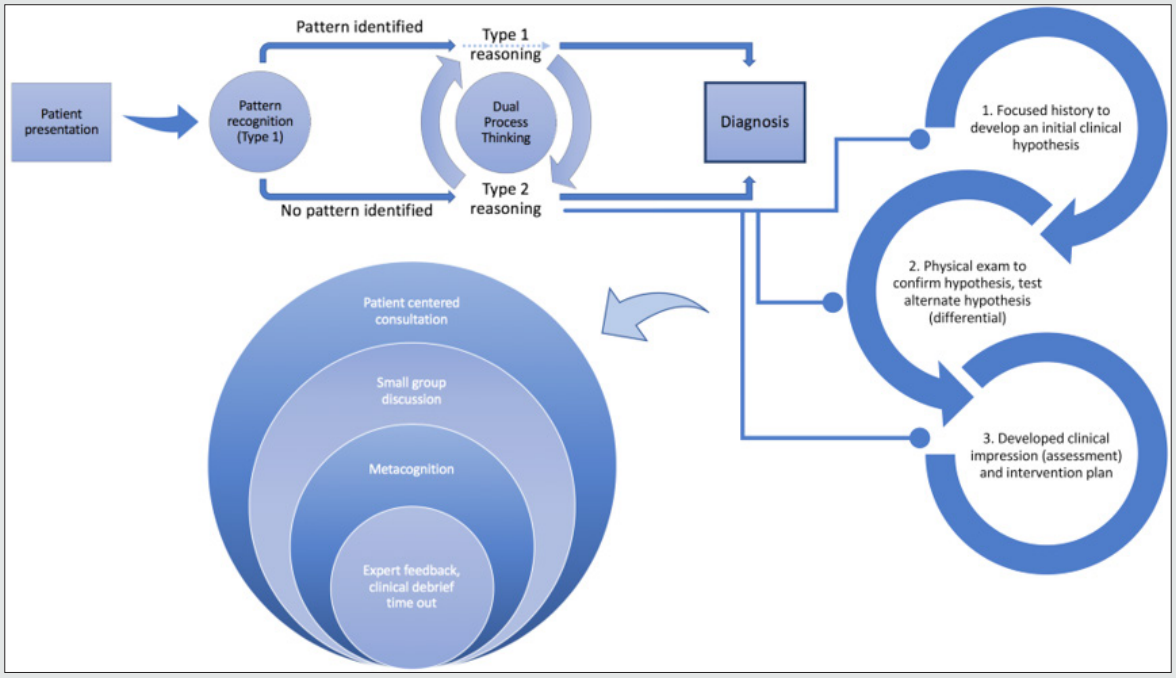

Figure 1: Punctuated mentoring model for communicating clinical reasoning during ISL pro-bono clinic: Application of the Dual Process Thinking model of clinical reasoning in a diagnostic situation. Adapted from Croskerry, P. A universal model of diagnostic reasoning. Acad Med 2009 84(8): 1022–8 [31] and Guraya SY. The pedagogy of teaching and assessing clinical reasoning for enhancing the professional competence: a systematic review. Biotech Res Asia, 2016. 13(3): 1859-1866 [29].

This mentoring model was developed for empowering the student clinician from being collectors and reporters of information to being cultivated interpreters of knowledge [29]. Two US-licensed PTs, including one full-time faculty member in the DPT program mentored as attending PTs. Teams communicated their CR to a supervising physical therapist together at each time-out stage for mentoring, feedback and direction in accordance with the 'Making Thinking Visible' approach [30]. During the patient visit, wait times were used for a broad array of health education and promotion, linking patients with community resources and educating patients and family members on topics that included hypertension, obesity, nutrition and exercise. Each evening while in-country, students would gather for daily 360° cohort peer assessment feedback (assessments from others on the team) to discuss the cases and lived experiences of the day. The 360° feedback provided additional opportunity for communication of CR utilized during the day, fostering articulation of cognitive and metacognitive processes [31] These structured sessions encouraged reflective thinking processes described by Schön [32] as reflection in action and reflection on action. The daily 360-feedback practice was implemented to maximize student learning and minimize ethical and safety risks [33,34]. Students were encouraged to do daily individual journaling regarding their experiences that facilitated the writing of their assigned reflection paper.

Measurement: Physical Therapist Clinical Performance Instrument

As CR is a highly complex construct [35] it has no direct measure; therefore, we depend on indirect measures and their interpretations. As no single definition or single instrument has been agreed upon as the 'gold standard' for assessing CR, [36,37] and as no one strategy exists for developing CR, similarly assessing CR by DPT students also poses a challenge [38]. A recent study aimed at exploring the definition, teaching and assessment of CR identified that PT educators utilized various methods when assessing CR skills, including practical examinations, clinical affiliations or fieldwork, written exams and assignments [39]. The same study also revealed that over 92% of respondents reported using the CPI, as the primary clinical performance assessment tool (CPAT) to assess CR skills in the context of clinical practice [39]. The

CPI is an 18-item assessment tool used to provide documentation of student clinical performance based on direct observation by the clinical instructor. It is organized into 6 areas of professional practice (safety, professional behavior, accountability, communication, cultural competence and professional development) and 12 areas of patient management (which includes CR). The CPI uses a VAS ordinal scale with end-point anchors to range from "novice level performance" to "entry-level performance" across the items assessed [28,40].

Analysis of longitudinal data from the CPI is uncommon. Significant score changes from midterm to final evaluations for students on successive levels of clinical placements have been shown to support the construct validity of the CPI, reflecting an incremental acquisition of clinical competencies [41,42]. A recent systematic review of multiple (14) CPATs used worldwide included the CPI in its assessment. In this review, O'Conner et al. [43] stated the CPI (version 2006) had moderate content and construct validity evidence (validity grade of B), without having identified studies examining inter-rater reliability or test-retest reliability (overall evidence grade of C). While the CPI has demonstrated fair to moderate construct validity in assessing changes in student performance from midterm to final evaluations and associations between CPI assessment and subsequent academic coursework, [41] there remain substantial concerns and challenges with the instrument. O'Conner et al [43] noted the instrument lacks inter-rater and test-retest reliability, and no study has yet examined metrics of reliability or validity of CPI subscale change scores, such as the minimum detectable change (MDC) or minimum important difference (MID). Without these values, it is not possible to determine if observed changes in subscale scores represent a true change in a student's clinical performance. For these reasons, we elected to utilize the comments section of the CPI instead of subscale scores in all analyses.

Statistical analysis

Descriptive statistics were calculated for all participant demographic characteristics. To test our hypotheses, data from the "strengths" comment section of the CPI provided by CI's were analyzed. Student strengths on each subdomain listed in the comments section of the CPI were coded as "present" if there were one or more comments on a particular subdomain being a strength of a student on the CPI and "absent" if there was no mention of a particular subdomain as a strength. The proportion of participants with each subdomain listed as a strength was compared between the ISL and matched control groups utilizing a McNemar or exact McNemar test, as appropriate. In the event that the expected frequencies in the discordant cells summed to less than 10, an exact McNemar test was used. A Wilcoxon signed rank test was used to determine if there was a significant difference between the groups in total number of CPI subdomains listed as strengths. The study data analyst was blinded to group allocation throughout data formatting, analysis, and interpretation of results. All analyses were completed using SAS 9.4 software (SAS Institute Inc., Cary, NC).

Results

Overall, 28 females (60.9%) and 18 males (39.1%) participated in the study. The sample had similar representation among the cohorts (Cohort 1: n=12, 26.1%; Cohort 2: n=18, 39.1%; Cohort 3: n=16, 34.8%) the mean age of participants was 25.13 years with a standard deviation of 2.20 years. Complete demographic information is presented in Table 1. Each subdomain had expected discordant cell frequencies that summed to less than 10.0. Thus, exact McNemar tests were used to examine the difference in proportion of participants with each CPI subdomain listed as a strength. A significant difference was found in the proportion of participants with communication listed as a strength (p=0.04), with no other subdomains demonstrating a difference. Complete subdomain analyses are presented in Table 2. An exact Wilcoxon signed rank test comparing the number of subdomains listed as "strengths" for ISL participants compared to their matched controls yielded statistically significant results ($p < 0.01$). An exact Wilcoxon signed rank test was utilized because several cells had expected counts < 5.0.

Table 1: Participant Demographic Information.

Sex	**n**	**%**
Female	28	60.90%
Male	18	39.10%
Cohort year	**n**	**%**
2019	12	26.10%
2020	18	39.10%
2021	16	34.80%
Year in curriculum	**n**	**%**
2	34	
3	12	
Setting homogeneity[a]	**n**	**%**
Yes	35	76.10%
No	11	23.90%

Mean age[b,c]	1	< 0.1
25.13 (2.20)	---	---

Table 2: CPI Strength Comments.

Safety				
	Absent[a]	**Present[a]**	**Total**	**p-value[b]**
ISL	20	3	23	---
Control	22	1	23	---
Total	42	4	46	0.63
Professional Behavior				
	Present	**Absent**		**p-value**
ISL	14	9	23	---
Control	7	16	23	---
Total	21	25	46	0.77
Accountability				
	Present	**Absent**		**p-value**
ISL	3	20	23	---
Control	0	23	23	---
Total	3	43	46	1
Communication				
	Present	**Absent**		**p-value**
ISL	9	14	23	---
Control	6	17	23	---
Total	15	31	46	0.04
Cultural Competence				
	Present	**Absent**		**p-value**
ISL	1	22	23	---
Control	1	22	23	---
Total	2	44	46	1
Professional Development				
	Present	**Absent**		**p-value**
ISL	9	14	23	---
Control	5	18	23	---
Total	14	32	46	0.34
Clinical Reasoning				
	Present	**Absent**		**p-value**
ISL	3	20	23	---
Control	0	23	23	---
Total	3	43	46	1

a. Represents inclusion of CPI subdomain in the strengths in CPI comments section.

b. McNemar's exact test.

Discussion

To the best of the authors' knowledge, this is the first study to examine CPI ratings pre- and post an ISL study abroad course. This study was undertaken with the goal of determining if an intense, structured mentoring ISL improved communication and/or CR in entry-level students as measured by the CPI compared to case-matched control subjects. Our results confirm our hypothesis that ISL participants would demonstrate a greater number of subdomain strengths. Additionally, ISL participants were significantly more likely to exhibit communication as a strength compared to their matched controls. Taken together, these findings indicate that an intensive ISL experience may serve as an accelerant to the development of clinical skills in DPT students. As mentioned above, results of analysis of the students' reflection papers submitted for course credit revealed students reflection occurring at high levels, either a reflection regarding circumstances encountered through personal values or insights, or a change in perspective suggestive of a critical level of reflection that may have a bearing on their future PT practice [26]. Table 3 provides examples of the positive impact of the ISL travel course on student's CR, communication, professional behaviors and professional development.

Table 3: Positive Impact of ISL: Examples of ISL benefits and reflections.

Evaluator	Clinical Reasoning	Communication	Professional Behaviors	Personal Growth / Professional Development
Clinical faculty (CI and DCE) written feedback from midterm and final evaluation of students participating in ISL	Areas of strength as indicated by CPI and CI interview - clinical reasoning skills, development and progression of plan of care (POC), differential diagnosis, analyzing exam data and utilizing research when developing POC	Areas of strength as indicated by CPI and CI interview - insight into teaching approaches for patients and family, well spoken, written documentation, communication with patients and caregivers, communication with health care providers	Areas of strength as indicated by CPI and CI interview - professionalism, accountability, compassion, leadership, flexibility, kind and non-judgmental, building rapport with patients, maturity in handling stress	Areas of strength as indicated by CPI and CI interview - initiative, excellent work ethic, thrives on constructive feedback, pursuance to further education and knowledge base, understands strengths and weaknesses, self-motivated, seeks and receives feedback well, obvious desire to learn and improve clinical skills, seeks out learning opportunities, willingness to learn and accept challenges
Student self-assessment from written reflection papers	"I cultivated a more holistic approach to each patient's case and can better appreciate the resources we can utilize with patients in the United States." "I was challenged to use my skills and think quickly when presented with scenarios and patient conditions and was forced to prioritize my examination and interventions, which is a valuable clinical skill. Additionally, the lack of supplies and resources forced me to be creative and flexible." "The complex medical histories of each patient further challenged both my Spanish vocabulary and my clinical reasoning skills."	"Improved patient communication skills by learning to intentionally work through being in an uncomfortable environment with a language barrier." "I learned that I was able to communicate via nonverbals much better than I would have imagined." "While I have always felt confident in my ability to connect with patients and enjoy explaining and educating patients on the rational for treatment, I grew in my ability to organize my explanations." "Not only did streamlining my evaluations help in my professional ability to clinically reason but, also helped me streamline my communication with the patient."	"Professional development and cultural competence are the areas of the CPI where she has excelled over entry level" "I was impacted by how we were faced with the responsibility of changing some beliefs, ideas or perceptions about health conditions." "I enjoyed collaborating with classmates that I often don't work with, and I gained respect for them as I watched each succeed so beautifully under circumstances that I knew were challenging."	"I am leaving this trip more grateful, with more global perspective, and with an increased appreciation for the power of human connection." "I believe one of my greatest pieces of personal growth was a new desire to collaborate with others for the betterment of individuals in the community. It is through partnerships that we can start to be sustainable, even if we as individuals are not necessarily a part of the future." "There was no shortage of learning when treating patients each day. It challenged me to empower patients to take the lead in their progress."

Verbal student reflection during video recorded daily reports	"My clinical reasoning was challenged as patients would give you their chief complaint which you would address and then they wanted to take the opportunity to tell you about another issue, my mind was solving so many problems!"	"I found you can communicate to your patient that you care about them and you want them to feel better, without knowing a word of Spanish."	"Physical Therapy is important, and Medicine is important but even more important is for people to have dignity and a sense that other people care about them."	"When you get thrown into uncomfortable situations, I feel that's when you get to know people the most." "On our first day or two of clinic, I found myself frustrated at my fear of treating patients. I felt that compared to my classmates I didn't have as much to offer because I am always nervous/questioning myself and rarely will take charge in situations. The last two clinic days, I mustered myself up every morning while we were getting the clinic ready and told myself to just do my best, love on the patients and use what I knew."
Course instructor	"I could see students becoming more efficient with hypothesis formulation for the physical exam and alternate hypotheses for the differential."	"Students honed their history taking process rapidly in the face of communication barriers, even with translators present."	"The students left Honduras with a greater holistic view of their patients."	"It was a privilege to lead students in such a powerful learning experience for both clinic and life."
Community partner interview	"In clinic students were able to demonstrate that they could work from theoretical to practical capacity of the topics [conditions] addressed, performing with efficiency and quality."	"The students are very well prepared to deal with the Honduran population." Despite the language barrier, students were able to communicate effectively in a practical way to make the activity impactful."	"Students demonstrated that they know their professional career well and in the same way they can train and instruct [patients] on the solution to the problems detected."	"Patients are satisfied with this intervention [physical therapy]. Another impact is that patients recognize that they do very little to maintain their health, and that following an exercise routine according to our health problem is of great help to feel better."

Previous research has demonstrated study abroad/international internships improve key transferable skills, specifically among them communication skills [21,44]. Communication is an important part of entry-level PT education curricula, as it is intrinsic to professional practice. Yet communication is also inherent in the CR process, irrespective of which mode of reasoning one employs (Table 4), as CR is communicated in a multifaceted way. CR is communicated first to oneself to check for reasoning errors; with colleagues to explain decision logic; and to involve and educate patients in decision-making. Sound communication of CR is essential to meet legal requirements of informed consent and for legal documentation of patient encounters [45]. Further, communication skills are necessary for conducting the patient interview, building empathy with patients and eliciting patients' concerns and expectations [46,47]. Interestingly, communicating CR does not necessarily echo the actual reasoning process as reasoning is very quick and encompasses implicit knowledge [48]. Rather, communication of CR embodies a reconstruction of the processes believed as most applicable to the listener, constructed and conveyed to fit the listener [45]. Results from 'Making Thinking Visible' [30] methods of the reasoning reconstruction and communication have demonstrated useful for health professional students, educators and practitioners CR development.

Table 4: Clinical reasoning: A comparison of characteristics of Type 1 and Type 2 modes of 'Dual Process Thinking' clinical reasoning. Adapted from: Croskerry P. Clinical cognition and diagnostic error: applications of a dual process model of reasoning. Adv Health Sci Educ Theory Pract. 2009; 14:27-35 [48].

Clinical Reasoning Classification	Type 1/Intuitive/Forward reasoning	Type 2/Analytical/Backward reasoning
Strategies/Modes of reasoning	Heuristics	Normative
	Pattern recognition	Hypthetico-deductive
Characteristics	Fast, unconscious, intuitive	Slow, analytical, abstract
Dimensions	Memory structure	Flexibility in thinking
	Context dependent	Education dependent
Strengths	Fast	Scientific
	Efficient	Analytical
Limitations/Sources of error	Cognitive biases	Working memory overload
	Emotional influence	Lack of knowledge

A unique feature of this ISL course was the interaction and collaboration among students and supervising PTs for communicating reasoning as well as structured reflection (360° feedback) for self, peer and mentor feedback. In addition to students explaining their own CR for cases at each time-out stage, the supervising PT guided students as they developed hypotheses and plans for case management. Development of communicative skills is well supported in literature among the major student learning outcomes commonly demonstrated from ISL courses [49,50]. An interpretation of our findings could infer that professional educational growth failed to occur for these participants across six of the seven CPI dimensions studied as a result of this intense, highly structured, reflection-oriented mentored ISL. This inference would stand in contrast with considerable research noting the high-impact practice of study abroad experiences in a diverse environment with abundant feedback from peers and professors [51,52]. Finally, there exists a strong impetus for improvement of the CPI or the development of viable alternatives, primarily driven by the need for a reliable and valid clinical assessment tool [43,53-59]. We encourage future research to calculate vital metrics of assessment tool performance, such as the minimum detectable difference and minimum important difference, for the current CPI and its subscales, as well as continued work to develop alternative assessments of student clinical performance. Although we recognize the challenges involved in assessing complex, multifaceted phenomena such as clinical performance and, like many DPT programs, continue to utilize the CPI in the absence of a clear alternative.

Conclusion

This study is the first to examine CPI performance pre-post ISL experience. Our results support our hypothesis that participating in an ISL course experience aids the development of overall clinical performance and communication skills, but failed to show an improvement in other subdomains of clinical performance, most notably clinical reasoning.

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Conflict of Interests

The authors have no conflicts of interest.

Ethical Approval

Western Carolina University IRB: approval #1537513-1.

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