ORIGINAL RESEARCH ARTICLE

Impact of In-class Patient and Integrated Clinical Experiences on Physical Therapist Students' Clinical Performance

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Abstract

Rationale: A variety of clinical education (CE) exist. Models emphasizing full-time clinical experiences (FTCE) have higher number of full-time hours (high-hours) with less prior didactic preparation and integration with the curriculum. Models including integrated clinical experiences (ICE), part-time ICE (PTICE), and in-class patient experiences (IcPE) integrate experiences with didactic content but include a lower number of full-time hours (low-hours). The purpose of this study is to determine if a re-designed CE curricular model that emphasized IcPEs and ICE with low-hours better prepares students than a version that emphasized FTCEs with high-hours as measured by scores on the Clinical Performance Instrument (CPI).
Methods: A retrospective cohort study was conducted on a data set of 183 Doctor of Physical Therapy students who participated in an initial and final terminal CE experience. Data included student pre-admission data, demographics, and evaluation type, period, and rating for all 18 CPI criteria for the initial and final terminal CE experiences. Data were analyzed using SPSS Statistics.
Results: A statistically significant difference was found between cohorts for the initial terminal CE experience midterm assessment. One CPI factor was significant on the initial terminal CE experience final assessment and the final terminal CE experience midterm assessment ($p < .05$). Within cohort analysis for all three CPI factors at all assessment periods were statistically significant.
Conclusion: All students significantly improved from midterm to final assessment periods of the initial and final terminal CE experiences. Therefore, IcPE, allowing faculty to mentor and provide feedback to students should be considered an alternative to FTCE prior to students' initial terminal CE experience.

Keywords: *clinical education*; *integrated clinical education*; *alternative clinical education model*

MeSH Terms: curriculum, education, students

Clinical education (CE) is an essential component of entry-level physical therapist (PT) education programs, comprising nearly one-third of most curricula.[1] Reliance on clinical sites for placements has increased due to expansion in the number of PT programs, program cohort sizes, and the number of full-time CE (FTCE) weeks per program, resulting in escalating stress for the clinical environment.[2,3]

Clinical facilities have been plagued with reduced staffing and raised expectations related to administrative policies and productivity,[3,4] reducing the amount of time for provision of CE and supervision of students placed prior to terminal experiences.[3,5,6] It has been intimated that students on early clinical experiences require a greater time commitment due to less didactic and skills preparation.[6] As such, facilities more willingly accept students for final terminal experiences, as they require less supervision and provide greater patient care.[4,5]

A key component of Doctor of Physical Therapy (DPT) programs is student preparation for entry into the CE environment.[3–8] A variety of CE models exist across the United States to achieve this aim. In-class patient experiences (IcPEs), organized and overseen by core DPT faculty, whereby students evaluate and treat volunteers in pairs or triads, under the supervision of PT program and adjunct faculty, are used to reinforce concepts learned in the classroom. Students receive formal and informal feedback from faculty, peers, and volunteers. Integrated

clinical education (ICE) experiences are encounters purposefully organized within a curriculum, allowing for exploration of and participation in authentic PT clinical practice.[9] These occur prior to terminal experiences and may be part-time (PTICE) or full-time CE (FTICE).

Models that emphasize early FTCE experiences often include a high number of full-time hours (high-hours) with incomplete didactic preparation. Models that include FTICE, PTICE, and/or IcPE integrate experiences synchronously or asynchronously with didactic coursework, defined by a lower number of full-time hours (low-hours) of CE experiences. The low-hours model delays FTCE experiences until the end of the curriculum, with the majority of didactic coursework completed prior to clinical entry.[8] As such, academic programs must implement alternative strategies to ensure clinical readiness for terminal experiences.[1,3,10–12]

An alternative model: Integrated clinical and patient experiences

It has been suggested that ICE can assist academic faculty in determining student readiness for CE experiences. A curriculum with ICE allows academic faculty to assist students with transferring knowledge into clinical application in the cognitive, affective, and psychomotor domains.[11,25]

Integrated experiences are quite variable. Wilson[1] described an ICE schematic at an on-campus clinic under the observation of academic faculty. Additional ICE experiences for first- and second-year students have been held in clinical settings, with and without faculty as clinical instructors (CIs).[6,13] Integrated experiences have been overseen by core faculty in clinics off and on campus in a 7–8:1 model (faculty : students)[6,14] with focus on clinical skills practice concurrent with coursework.[14]

Pedagogically, integrated experiences assist students in translating knowledge through abstract conceptualization.[11,12] Benson et al.[15] embedded an experiential lab into a didactic course, drawing connections between the curricular content and clinical practice, developing psychomotor skills, reinforcing concepts, facilitating clinical reasoning, and promoting student confidence.

Challenges with classroom to clinic transitions also support the need for integrated experiences,[11] with high levels of anxiety, leading to poor communication and difficulty building rapport,[6] underdeveloped affective behaviors, and inexperience being reported challenges.[6,16] Students who participate in integrated experiences where academic faculty are CIs are more confident in familiar environments.[11,16] Therefore, ICE experiences and IcPEs should be considered in lieu of early traditional CE.

While most DPT curricula employ one or more approaches,[14,17] one model is not superior to another.[18] The purpose of this study was to determine whether a re-designed CE curricular model, emphasizing IcPEs

and FTICE experiences with low hours, better prepared students for terminal experiences than a high-hours version as measured by Clinical Performance Instrument (CPI) scores. The study aimed at determining whether (1) there is a significant difference in CPI scores between students who participated in low-hours model of FTICE/IcPE and those who participated in the high-hours model at the midterm assessment of an initial terminal experience; (2) CPI scores between curricular cohorts were significantly different at follow-up assessment periods; (3) CPI scores within curricular cohorts changed significantly over time; and (4) the amount of change in CPI scores between curricular cohorts were significantly different. It was hypothesized that students in the low-hours cohort would achieve higher scores on the initial terminal experience final CPI as a result of FTICE/IcPEs; however, cohorts would demonstrate a similar change over time.

Mount St. Joseph University's curriculum

The initial DPT curriculum of Mount St. Joseph University (MSJU) (Table 1) emphasized early PTICE and FTCE experiences, with fewer terminal experience weeks (high-hours model). In 2013, a curricular revision moved the majority of CE experiences to the terminal CE model, shifting to a low-hours model.

The shift allowed for investigation of two CE models: early (2010) and mid-cohorts (2012) as the high-hours model and 2013–2016 cohorts as the low-hours model. Early cohort (2010) CE included PTICE followed by a 10-week FTCE experience (semester VI). Semester VII included a second 10-week FTCE experience followed by two terminal experiences (semester IX). The 2012 cohort had one FTCE experience (semester V), two PTICE experiences in semesters IV and VI, and three terminal experiences prior to program completion. Later cohorts completed the low-hours model with two, 2-week FTICE experiences; multiple course-based IcPEs during curricular year 2; and four terminal experiences.

The IcPEs take place during the orthopedics, pediatrics, geriatrics, and neuro rehabilitation courses. The IcPE quantity and diversity were intentionally embedded into patient management courses to expose students to patient populations concurrently introduced in the classroom. While IcPE has not been defined or described in the literature, a similar experience, experiential learning, has been described.[15,19,20]

Instrumentation

The assessment tool used in this study was PT CPI, version 2006, which has been described previously.[21,22] Roach et al.[21] reported this CPI version to have an excellent internal consistency (Cronbach's alpha = 0.99). Construct validity showed differences in CPI scores on early compared with final clinical experiences, as well as significant

Table 1. Mount St. Joseph University clinical education timeline

Program semester	High-hours[a] – 2010, 2012						Low-hours[b] – 2013–2016					
	IV	V	VI	VII	VIII	IX	IV	V	VI	VII	VIII	IX
Type of experience and assessment tool completed	PTICE[c]	FTCE[d] – CPI[e] Completed at midterm and final	PTICE	FTCE – CPI c/o 2010 Initial terminal FTCE – CPI c/o 2012 Completed at midterm and final	PTICE	Initial terminal FTCE – CPI c/o 2010 Completed at midterm and final · Final terminal FTCE – CPI c/o 2010 & 2012 Completed at midterm and final	FTICE (modified CPI)	IcPE[f]	IcPE	Initial terminal FTCE – CPI (begins end of term) Completed at midterm and final	Terminal FTCE – CPI Completed at midterm and final	Terminal FTCE – CPI Completed at midterm and final · Final terminal FTCE – CPI Completed at midterm and final

High-hours: Distance between initial terminal midterm assessment and final terminal final assessment – 18 to 25 weeks
PTICE: 38 h
FTCE: 480–880 h

Low-hours: Distance between Initial terminal midterm assessment and Final terminal final assessment – 33 weeks
PTICE: 30 h
IcPE: 21.5–24.5 h
FTICE[g] 160 h

[a]High-hours – curricular model with >480 h of full-time clinical experiences.
[b]Low-hours – curricular model with 160 h of full-time clinical experiences.
[c]PTICE – (part-time integrated clinical education) a part-time clinical education experience during an academic term in a coordinated fashion with concurrent academic course work.
[d]FTCE- (full-time clinical education) a full-time clinical education experience in the clinical environment a minimum of 35 h/week following which the student returns for more didactic education.
[e]CPI = CPI assessment tool scores.
[f]IcPE – (in-class patient experience) an experience on campus and held within patient care management course class/lab sessions.
Terminal FTCE – (terminal full-time clinical education experience) extended full-time clinical education experience following completion of all didactic coursework.
[g]FTICE – (full-time integrated clinical education) a full-time clinical education experience allowing students to explore authentic physical therapist roles and responsibilities that occur prior to terminal full-time clinical education experiences.

changes in Likert scale ratings from midterm to final assessments on early and final experiences. There was, however, only a fair-to-moderate correlation between the prior clinical experience and remaining coursework.[21]

Method

Study design
A retrospective cohort study, conducted from January 1, 2016 to August 3, 2016, was approved by the Institutional Review Boards at MSJU and the University of Indianapolis.

Data set
The data set represents students enrolled in two versions of MSJU's DPT curriculum: high-hours (2010, 2012) and low-hours (2013–2016) cohorts who completed an initial and final terminal experience. Student data were excluded if they matriculated into the one of those cohorts but did not complete all required CE experiences. Data for 183 students were included.

Data collection
Student demographic, preadmission, and CE data were collected by an assistant under the primary investigator's (J.B.) direction. The CPI data were exported as a Microsoft® Excel spreadsheet from the APTA CPI online portal following each CE experience. The primary investigator received a copy of the de-identified raw data.

The data collected and analyzed included student admission data, including the overall and science undergraduate grade point average (GPA), and demographic information, including age, gender, and ethnicity or race, cohort year, evaluation type, and evaluation period. All CPI data collected included CI Likert scale ratings for CPI performance criteria for initial and final terminal experiences. To compare CE curricular models, the primary investigator collected minutes from faculty curricular meetings. Student data were categorized into one of two groups, low-hours or high-hours, based on the CE curricular model the students completed.

Data analysis
Quantitative analyses were used to address the aims. Data were analyzed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY). Clinical instructor Likert scale ratings for all 18 CPI performance criteria were analyzed. However, student generated CPI data were not included.

Demographic data set
Descriptive statistics were conducted on the total sample and both CE models. Nominal data are presented as frequencies and percentages, and ordinal data as medians and 25th and 75th percentiles. Individual student preadmission data were compared between cohorts using an independent t-test to determine whether differences in academic performance (pre-matriculation) existed. A Fisher's exact test was used to assess differences in gender between cohorts.

Factor analysis
Analysis of the 18 CPI performance criteria ratings for 183 students ($n = 183$) was impractical; therefore, a factor analysis was conducted. Roach et al.[21] ran a confirmatory principle component factor analysis with varimax rotation, which produced a three-factor solution. Using a similar approach to Roach et al that included Kaiser normalization, analysis was conducted, which reported similar results,[21] categorizing performance criteria into three factors- Clinical Skills (CS): Clinical Reasoning, Examination, Evaluation, Diagnosis and Prognosis, Plan of Care, Procedural Interventions, Educational Interventions, Documentation, Financial Resources, Direction and Supervision of Personnel; Affective/Professional Behaviors (A/PB): Safety, Professional Behavior, Accountability, Communication, Cultural Competence, Professional Development; and Outcomes/Assessment (O/A): Screening, Outcomes Assessment. The factor analysis reported eigenvalues of 7.10 for CS, 6.36 for A/PB, and 2.74 for O/A, with all three factors accounting for 89.99% of the variance (Table 2).

Comparison of outcomes
Prior to analysis, student performance ratings within each respective factor (CS, A/PB, and O/A) were summed for each assessment period and used for all subsequent analyses. The initial terminal experience data (semester VII for the 2012 and 2013–2016 cohorts; semester IX for the 2010 cohort) and final terminal experience data (semester IX for all cohorts) were used for comparison and analysis, including midterm and final CPI assessments.

The Mann–Whitney U tests were run to compare scores in clinical performance between cohorts for each factor at each assessment period (aims 1 and 2). To determine whether each factor's CPI scores within each cohort changed significantly over time, separate Friedman's ANOVA tests were conducted (aim 3). Post hoc Wilcoxon signed-rank tests identified where significant differences between groups occurred using a Bonferroni correction ($p < 0.013$). Change scores, the amount of change from one assessment period to the next, were compared for each factor between cohorts using the Mann–Whitney U test (aim 4).

Results

Data for 183 students were included in the study; 50 (27.3%) in the high-hours cohort and 133 (72.7%)

Table 2. Factor analysis factor components compared with Roach et al.[21]

Clinical skills	MSJU[a]	Roach et al.[b]	Affective/professional behaviors	MSJU	Roach et al.	Outcomes/ assessments	MSJU	Roach et al.
Clinical reasoning	0.70	0.71	Safety	0.82	0.70	Screening*	0.73	
Examination	0.76	0.77	Professional behavior	0.85	0.75	Outcomes assessment*	0.54	
Evaluation	0.77	0.79	Accountability	0.81	0.77			
Diagnosis and prognosis	0.76	0.75	Communication	0.74	0.65			
Plan of care	0.74	0.68	Cultural competence	0.76	0.68			
Procedural Interventions	0.68	0.79	Professional development	0.61	0.60			
Educational Interventions	0.75	0.59						
Documentation	0.66	0.56						
Financial resources*	0.74	0.56						
Direction and supervision of personnel	0.67							
Initial eigenvaluesc	7.1	6.4		6.36	5.9		2.34	2.6
Percentage of variance explained (%)	39.45	43		35.32	35		15.21	17

[a]Factor loading score.
[b]Roach et al. data adopted from Factor Analysis, Roach et al.[21]
[c]Prerotation column sums of squared loadings.
*Differences in factor components between MSJU results and Roach et al.[21]

in the low-hours cohort. Race or ethnicity for each cohort was homogeneous, with 98–99% of students being Caucasian. The mean cohort age was also similar ($M = 25$). Undergraduate ($M = 3.4/4.0$) and science GPA ($M = 3.0/4.0$) were not statistically different. Gender between cohorts was statistically different (male-to-female ratio: low-hours cohort 1:3, high-hours cohort 1:4; $p < 0.001$). A Mann–Whitney U test, conducted to compare factor scores between cohorts for the initial midterm assessment, to determine whether gender influenced performance, indicated no statistical difference as a result of gender (CS: $p = 0.072$, A/PB: $p = 0.118$, and O/A: $p = 0.437$).

Aims 1 and 2: Comparison of scores between cohorts at multiple assessment periods
Clinical performance was statistically different across factor scores between curricular groups for the initial midterm assessment (Table 3). Factor scores between cohorts for all other assessment periods (initial terminal experience final, final terminal experience midterm, and final terminal experience final) were compared (Table 4). A statistically significant difference was observed for A/PB performance in the initial terminal experience final assessment ($p = 0.008$) and for CS performance in the final terminal experience midterm assessment ($p = 0.044$).

Aim 3: Comparison of scores within each cohort across assessment periods
There was a statistically significant increase in the high-hours cohort scores for each factor across time (Table 5). Post hoc tests showed significant differences in CS

Table 3. Comparison of initial midterm assessment scores by curricular cohort

Performance indicator	High-hours[a] (n = 50) Mdn[c] (25, 75)	Low-hours[b] (n = 133) Mdn (25, 75)	p
Clinical skills	81.5 (66.8, 94.3)	73 (57, 87.5)	0.038
Affective or professional behaviors	110 (93.3, 97)	98 (76, 116)	0.001
Outcomes or assessment	22 (18, 27)	19 (14, 24)	0.001

[a]High-hours – > 480 h of full-time clinical experiences.
[b]Low-hours – 160 h of full-time clinical experiences.
[c]Mdn – median.

performance for the initial and final terminal experiences midterm to final assessments and initial terminal experience midterm to final terminal experience final assessment ($p < 0.001$). Results for A/PB and O/A performance for the same time frames were also statistically significant ($p < 0.001$).

The low-hours cohort also had a statistically significant increase in scores for each factor across time (Table 5). Post hoc tests showed significant differences for all factors from each assessment period to the next, including the initial terminal experience midterm assessment to the final terminal experience final assessment ($p < 0.001$). As hypothesized, each cohort demonstrated a similar change over time.

Aim 4: Comparison of change scores between curricular cohorts
Comparison of each factor's change scores between cohorts was only statistically different between the initial

Table 4. Comparison of scores by assessment period between curricular cohorts

Performance indicator	Initial final[a]			Final midterm[b]			Final final[c]		
	High-hours[d] (n = 50) Mdn (25, 75)	Low-hours[e] (n = 133) Mdn (25, 75)	P[f]	High-hours (n = 50) Mdn (25, 75)	Low-hours (n = 133) Mdn (25, 75)	P	High-hours (n = 50) Mdn (25, 75)	Low-hours (n = 133) Mdn (25, 75)	P
Clinical skills	100 (88.8, 102.5)	96 (79.5, 102)	0.115	101 (95, 105.3)	99 (94, 102)	0.044	112 (105.8, 121)	108 (104, 115)	0.059
Affective/ professional behaviors	157 (136, 166)	141 (116, 161.5)	0.008	154 (145, 166.3)	152 (139.5, 164)	0.265	175 (170, 188.5)	174 (170, 183)	0.361
Outcomes/ assessment	29.5 (26, 32)	28 (23, 32.5)	0.161	31 (28, 34)	30 (28, 33)	0.549	35 (34, 38)	34 (34, 36)	0.290

[a]Initial final = initial clinical education experience final assessment period.
[b]Final midterm = final clinical education experience midterm assessment period.
[c]Final final = final clinical education experience final assessment period.
[d]High-hours – curricular model with > 480 hours of full-time clinical experiences.
[e]Low-hours – curricular model with – 160 hours of full-time clinical experiences.
[f]Mdn – median.

Table 5. Friedman's ANOVA results for four assessment periods

	Initial midterm[a]	Initial final[b]	Final midterm[c]	Final final[d]	
High-hours[e] (n = 50)	Mdn[f] (25, 75)	Mdn (25, 75)	Mdn (25, 75)	Mdn (25, 75)	p
Clinical skills	81.5 (66.8, 94.3)	100 (88.8, 102.5)	101 (95, 105.3)	112 (105.8, 121)	<0.001
Affective/professional behaviors	110 (93.3)	157 (136, 166)	154 (145, 166.3)	175 (170, 188.5)	<0.001
Outcomes/assessment	22 (18, 27)	29.5 (26, 32)	31 (28, 34)	35 (34, 38)	<0.001
Low-hours[g] (n = 133)	Mdn (25, 75)	Mdn (25, 75)	Mdn (25, 75)	Mdn (25, 75)	p
Clinical skills	73 (57, 87.5)	96 (79.5, 102)	99 (94, 102)	108 (104, 115)	<0.001
Affective/professional behaviors	98 (76, 116)	141 (116, 161.5)	152 (139.5, 164)	174 (170, 183)	<0.001
Outcomes/assessment	19 (14, 24)	28 (23, 32.5)	30 (28, 33)	34 (34, 36)	<0.001

[a]Initial midterm = initial clinical education experience midterm assessment period.
[b]Initial final = initial clinical education experience final assessment period.
[c]Final midterm = final clinical education experience midterm assessment period.
[d]Final final = final clinical education experience final assessment period.
[e]High-hours – curricular model with > 480 h of full-time clinical experiences.
[f]Mdn – median.
[g]Low-hours – curricular model with – 160 h of full-time clinical experiences.

terminal experience midterm assessment and the final terminal experience final assessment (Table 5), negating the hypothesis that the low-hours cohort would achieve higher scores on the initial terminal experience final CPI.

Discussion

This study was conducted to determine how two CE curricular models (low-hours and high-hours) influenced student performance during an initial and final terminal experience. Comparison of cohort demographic information revealed no significant differences in age, race or ethnicity, and GPA. Gender, although statistically different between cohorts, did not impact student performance for the initial terminal experience midterm assessment. This is congruent with Naylor et al.'s study[23] who found gender to be insignificant (p = 0.355) when considering predictors of clinical

performance. Therefore, it was assumed that cohort gender differences did not significantly affect performance within the cohorts.

Student performance between cohorts was statistically significant for the initial terminal experience midterm assessment for each factor. Further analysis of the assessment period indicated superior performance by the high-hours cohort. Despite some variance in cohort performance during subsequent assessment periods, student performance was not significantly different by the final assessment of the final terminal experience. These findings suggest that students who completed FTCE experiences prior to an initial terminal experience performed better than those who participated in FTICE/IcPE. Although all students participated in direct patient care, regardless of the CE curricular model, the high-hours cohort had more

hours over an extended period earlier in the curriculum and prior to terminal experiences when compared with the low-hours cohort, thereby preparing students to be more independent by midterm of the initial terminal experience.

Despite these differences, students within each cohort performed similarly, meeting expectations for CS and O/A on the final assessment of that terminal experience. Student A/PB performance was significantly different with the high-hours cohort earning higher ratings. The difference may be resultant of the low-hours cohort focusing on CS proficiency through psychomotor and cognitive skill performance as opposed to A/PB during an initial terminal experience.

When comparing medians, CS performance on the final terminal midterm assessment was also statistically significant. The difference may be due to a greater variance of scores within the high-hours cohort compared with the low-hours cohort, as the 2012 cohort had more direct patient care exposure with explicit performance goals when compared with the 2010's part-time experiences during semester IX.

Student CS performance between the initial terminal experience midterm assessment and the final terminal experience final assessment was not statistically significant between cohorts. A substantial distinction between curricula that may explain this finding are the CE variances related to placement and number of clinical hours between each experience. Although the amount of time between the midterm and final assessment of each terminal experience is comparable between cohorts, there is a lack of equidistance in the number of weeks between the assessment periods (Table 1), suggesting that A/PB and O/A may be impacted by time as opposed to other curricular differences.

Another consideration for performance differences may be the inclusion of IcPE throughout the low-hours cohort's curriculum. Although IcPEs offered a uniqueness, the cohort's clinical skillset was comparable with the high-hours cohort despite significantly fewer FTCE hours. Therefore, students' performance during CE experiences may not be dependent on the length of FTCE experiences, placement of experiences throughout a curriculum, or the inclusion of IcPE but rather a combination of the aforementioned.

Regardless of curricular model, students should demonstrate consistency and improvement in performance, on midterm and final assessments for each subsequent CE experience. Each cohort's performance change scores were statistically significant for all factors at all four assessment periods; indicating a group effect at these points in time. Although the low-hours cohort's scores were initially lower, they demonstrated more significant growth in performance across assessment periods. Therefore, a curricular model that includes FTICE/IcPE should be considered as an alternative solution for student terminal experience preparation.

Considerations for the Future of CE

As PT education evolves and challenges within healthcare require students to attend to more complex situations, DPT programs must consider ways to ensure student readiness to enter the clinical environment. Integrated clinical experiences can bridge the gap between didactic coursework and clinical practice to achieve the desired pedagogy. Implementation of early experiences should be intentional; balancing student knowledge and contextual opportunities.[10] Considering the reported benefits of experiential learning (e.g. FTICE/IcPE), as well as the comparable student performance between the low and high-hours cohorts, such clinical experiences should be considered.

Limitations

Considerations should be made in generalizing results secondary to the convenience sample. Despite inclusion of undergraduate or science GPA, there was no baseline from which each student's knowledgebase could be determined. Other factors may have also influenced student outcomes such as personal issues, emotional, physical or mental stress, or external commitments. The use of three factors for data analysis enhanced the feasibility of managing and comparing the data; however, this may have limited the identification of specific performance criteria that contributed to the overall results. Aspects of curricular change over time may have contributed to the outcomes, such as changes in faculty members, course content, and course placement within a curriculum. Results can be generalized to DPT programs that employ a similar CE curricular model; however, programs that may not have access to volunteers who can participate in IcPE should proceed cautiously.

Conclusion

While variability in DPT curricula is evident across the nation, ICEs have been utilized in a variety of models.[1,6,10,13,14,24,27] Despite the recognition of ICE in allowing students to link didactic knowledge with clinical application,[10] clinical sites are still burdened. To support our clinical partners, DPT programs must guarantee student readiness to enter CE experiences. Therefore, IcPE and ICE are reasonable alternatives to FTCE experiences prior to student participation in an initial terminal experience as long as student readiness is ensured.

Conflict of interest and funding

The author declares no conflict of interest. The author declares no receipt of funding for this research study.

Ethics statement

The research study was approved by the Institutional Review Board at Mount St. Joseph University and The University of Indianapolis; IRB protocol S116-03.

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