

Does the Length of Student Physical Therapists' Clinical Educational Experiences Matter?

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Introduction/Review of Literature.

Clinical educational experiences (CEEs) comprise approximately 30% of the total credit hours in the Doctor of Physical Therapy (DPT) curriculum and are essential to the clinical learning and performance of DPT students to achieve entry-level competence. There are no established standards in DPT education for the length and timing of CEEs to optimize students' clinical learning and performance. The purpose of our investigation was to assess the development of DPT students' clinical learning and performance at 3 DPT programs during 6-, 8-, 9-, and 16-week CEEs.

Methods. An analysis of variance was conducted to assess the changes in DPT students' clinical learning and

performance based on the following: (1) the length of CEEs, (2) the effect of the length and timing of CEEs, and (3) the length of the final CEEs.

Subjects. Midterm and final evaluation Physical Therapist Clinical Performance Instrument data were analyzed from 707 DPT students' CEEs.

Results. The average change in DPT students' clinical learning and performance during CEEs was as follows: 6 weeks = 3.13 (SD = 2.3), 8 weeks = 3.20 (SD = 2.6), 9-weeks = 3.30 (SD = 2.5), and 16 weeks = 2.56. Significant difference in DPT students' clinical learning occurred during the 8-week ($P = .03$; $P = .04$) and 9-week ($P = .04$; $P = .01$) CEEs compared with the early 6-week CEEs and 16-week CEEs, respectively.

Discussion and Conclusion. The greatest change in DPT students' clinical learning and performance occurred during 8- and 9-week CEEs and between the first and third full-time CEEs. Given the increasing costs of DPT education and student debt, the length of CEEs required to meet CAPTE standards and program goals should be further investigated.

Key Words: Clinical educational experiences, Length of clinical educational experiences, Timing of clinical educational experiences, Physical therapist clinical performance instrument, Clinical learning, Clinical performance scores.

among DPT programs in the range of the (1) total number of weeks in full-time CEEs (range 30–56.6), (2) timing of full-time CEEs, (3) weeks allocated to each full-time CEE, (4) weeks allocated for the terminal full-time CEE (range 4–50), and (5) total number of weeks in the DPT curriculum (range 69–180).^{2,4}

Currently, there are no established standards in DPT education for the length and timing of full-time CEEs to optimize the students' clinical learning and performance. The absence of established standards is not unique to DPT education. Although the American Occupational Therapy Association requires occupational therapy students to complete a total of 24 weeks of full-time level II fieldwork before graduation, there are no standards as to how that fieldwork is to be completed.⁵ The American Speech-Language-Hearing Association requires speech-language pathology students to complete a minimum of 400 hours of supervised CEEs that are interspersed throughout the curriculum and unique to each program.⁶ By contrast, CEEs for medical students occur in the final 2 years of the doctor of medicine curriculum, across diverse practice settings, and are the same length of time in each practice setting.⁷

Assessing the development of DPT students' knowledge, skills, and behaviors at varying lengths and timing of full-time CEEs would provide much needed evidence to determine the optimal length of CEEs to maximize the students' clinical learning and performance.

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INTRODUCTION

As part of the Commission on Accreditation in Physical Therapy Education (CAPTE) requirements, Doctor of Physical Therapy (DPT) students are required to complete a minimum of 30 weeks of full-time clinical educational experiences (CEEs).¹ Full-time CEEs comprise approximately 30% of the total credit hours and are essential to the development of DPT students' knowledge, skills, and behaviors needed to achieve entry-level competence.^{2,3}

Although CAPTE mandates 30 weeks of full-time CEEs, there is considerable variation

REVIEW OF LITERATURE

The Physical Therapist Clinical Performance Instrument (PT CPI) has long (1997) been used as physical therapy education instrument of choice for assessing students clinical learning and performance.^{8,9} As physical therapy education transitioned from a Masters degree to a Doctorate degree (DPT), the number of total weeks of CEEs increased. In 2004–2005, students in Masters of Physical Therapy programs completed an average of 27.9 weeks of full-time CEEs, compared with 35.7 weeks of full-time CEEs in DPT

programs.¹⁰ In 2019, DPT programs completed an average of 35.8 weeks of full-time CEEs.²

In 2005, students in Masters of Physical Therapy programs completed an average of 15.1 weeks in their terminal CEEs, compared with 21.3 weeks in DPT programs.¹⁰ In 2019, the average length of DPT students terminal CEEs was 21.6 weeks.² The transition to a DPT degree has led to an increase in the total number of weeks of CEEs and in the total number of weeks allocated to DPT students terminal CEEs. Different approaches have been used to investigate the benefits of increasing the length of full-time CEEs, including: (1) a year-long internship model, (2) clinical instructors (CIs) perspectives, (3) students clinical performance, and (4) performance on the National Physical Therapy Examination (NPTE).

Year-Long Internship Model

In 2001, Portney and Knab¹¹ presented the model of a year-long paid clinical internship during the students' final year in a physical therapy program. It was hypothesized that the year-long clinical internship would provide students an opportunity to become an entry level physical therapist while continuing their professional development with structured mentorship. As part of the year-long clinical internship, students graduated from the physical therapy program after the first 4 months of the clinical internship, passed the NPTE, and then continued the remainder of the clinical internship (6–8 months) as a licensed physical therapist. The newly licensed physical therapists were consistently rated by their employers as the same or better in professionalism, responsibility, problem solving, and critical thinking, when compared with other newly licensed physical therapists.¹¹

Supporting the year-long internship model, Rapport et al¹² proposed that a year-long clinical internship would "...push students to achieve performance expectations beyond entry level..." Additional benefits of a year-long clinical internship were a smoother transition for DPT students to develop into entry-level clinicians and an improved ability for DPT programs to offer cohesive CEEs to their students.¹² Consistent with the proposed benefits of a year-long internship, a qualitative assessment of DPT students with focus group interviews reported that DPT students who completed a year-long internship supported the year-long model.¹³

Clinical Instructor Perspectives

Clinical instructors supported longer terminal full-time CEEs, but not the year-long internship.^{13–16} In 2006, Martorello¹⁴ investigated

CIs perspectives regarding the optimal length of CEEs and identified that CIs suggested an average length of the first full-time and terminal full-time CEEs of 7.3 weeks and 9.1 weeks, respectively. Support for longer terminal full-time CEEs were reported from an independent focus group analysis and a consensus conference. Most CIs in the focus group indicated that more than 8–10 weeks would be required for DPT students to achieve entry-level competence in the terminal CEEs.¹⁵ Similar results were reported following a consensus conference in 2010 as CIs proposed CEEs of 10–12 weeks would be required for DPT students.¹⁶ Furthermore, a qualitative study by Wetherbee et al reported that full-time CEEs should be longer than 8 weeks.¹³

Student Clinical Performance

Only one study¹⁷ has investigated the improvement in physical therapist student performance during CEEs of varying lengths. Graham et al¹⁷ compared CEEs that were full time for 5 weeks with CEEs that were full time for 1 week or part time 1 d/wk and reported a significant increase in student clinical performance with longer CEEs. When interpreting these results, it is important to consider that the maximum length of the CEEs from the study of Graham et al in 1991 was 5 weeks. In 2019, the average length of terminal CEEs was 21.6 weeks², making it difficult to generalize the findings of Graham et al to clinical education today.

National Physical Therapy Examination

Only one study has investigated the relationship between the length of CEEs and DPT students' first-attempt NPTE performance. Mohr et al¹⁸ reviewed 132 survey responses from CAPTE accredited physical therapy programs and reported a nonsignificant correlation ($r = 0.01$) between the total number of weeks of CEEs and students first attempt performance on the NPTE.

Purpose of Investigation

The purpose of our investigation was to assess, compare, and determine the clinical development of DPT students' knowledge, skills, and behaviors at 3 DPT programs during 6-, 8-, 9-, and 16-week full-time CEEs.

METHODS

Our study was approved by the institutional review board at each participating institution. All DPT students' clinical learning was assessed by the PT CPI.¹⁹ The PT CPI differentiates among DPT students' CEEs, has high

internal reliability, and has good discriminant and convergent validity.^{8,9,20}

Doctor of Physical Therapy student PT CPI midterm and final ratings by the CI from all full-time CEEs were analyzed from the graduating cohorts of 2016–2021 from 3 DPT programs: program 1, program 2, and program 3. The curriculum length of each DPT program spanned a total of 8 (program 2 and program 3) or 9 (program 1) semesters with a range of 116–126 weeks. The 3 DPT programs were selected as a convenience sample. The 3 DPT programs had differences in the: (1) type of institution (public or private), (2) institutional enrollment, (3) CAPTE region of the United States, (4) cohort size, (5) curriculum length, and (6) weeks of required full-time CEEs, timing, and length of full-time CEEs (Table 1).

Doctor of Physical Therapy Programs

The program 1 is a private university in the South Atlantic region with an institutional enrollment of 17,331 students.²¹ The program 1 has an annual cohort size of 60 DPT students and requires 32 weeks of full-time CEEs that are completed during 4–8 week CEEs (Table 1). The program 2 is a private university in the West North Central that has an institutional enrollment of 1,000 students.²² The program 2 has an annual cohort size of 36 DPT students and requires 34 weeks of full-time CEEs, completed over the course of 3–6 week CEEs and either one 16-week terminal CEE or 2, 8-week terminal CEEs (Table 1). The program 3 is a public university in the West North Central region with an institutional enrollment of 13,581 students.²³ The program 3 has an annual cohort size of 52 DPT students and requires 36 weeks of full-time CEEs that are completed during 4 9-week CEEs (Table 1). Supplemental Digital Content 1 (Appendix 1, <http://links.lww.com/JOPTE/A110>) outlines where full-time CEEs were embedded within each DPT program.

Subjects

A deidentified educational data set of DPT students from the 3 CAPTE-accredited programs who completed 4 or 5 full-time CEEs were analyzed. The midterm and final PT CPI records of the CI ratings for 707 DPT students from the 3 DPT programs (program 1, $n = 234$; program 2, $n = 215$; and program 3, $n = 258$) spanning 2016 to 2021 were analyzed. The PT CPI records were reviewed for missing data in either the CI midterm or CI final ratings. Supplemental Digital Content 2 (Appendix 2, <http://links.lww.com/JOPTE/A111>) for the total sample size for each CEE.

Table 1. Summary of Participating DPT Programs

	Program 1	Program 2	Program 3
Institution	Private	Private	Public
Institutional enrollment	17,331	1,000	13,847
Region	South Atlantic	West North Central	West North Central
DPT cohort size/year	60	36	52
Curriculum length in weeks	126	120	116
Weeks of required full-time CEEs	32	34	36
Number of full-time CEEs	4	4/5	4

Abbreviations: CEE = clinical Educational Experience; DPT = Doctor of Physical Therapy.

Data Analysis

Data were analyzed with Stata 16.0.²⁴ Each DPT student’s change in their clinical performance criteria was calculated as the difference from the midterm to the final PT CPI ratings for all 18 clinical performance criteria: Safety, Professional Behavior, Accountability, Communication, Cultural Competence, Professional Development, Clinical Reasoning,

Screening, Examination, Evaluation, Diagnosis and Prognosis, Plan of Care, Procedural Interventions, Educational Interventions, Documentation, Outcomes Assessment, Financial Resources, and Direction and Supervision. Abbreviations for all PT CPI clinical performance criteria and the average change in clinical performance criteria are listed in Supplemental Digital

Content 3 (Appendix 3, <http://links.lww.com/JPOTE/A112>). The mean and SD were calculated for all clinical performance criteria and for the average change in the clinical performance criteria for each full-time CEE.

A 1-factor between subjects analysis of variance (ANOVA) was performed to determine significant differences among the

Figure 1. Average Change in Clinical Performance by Length of Clinical Educational Experience

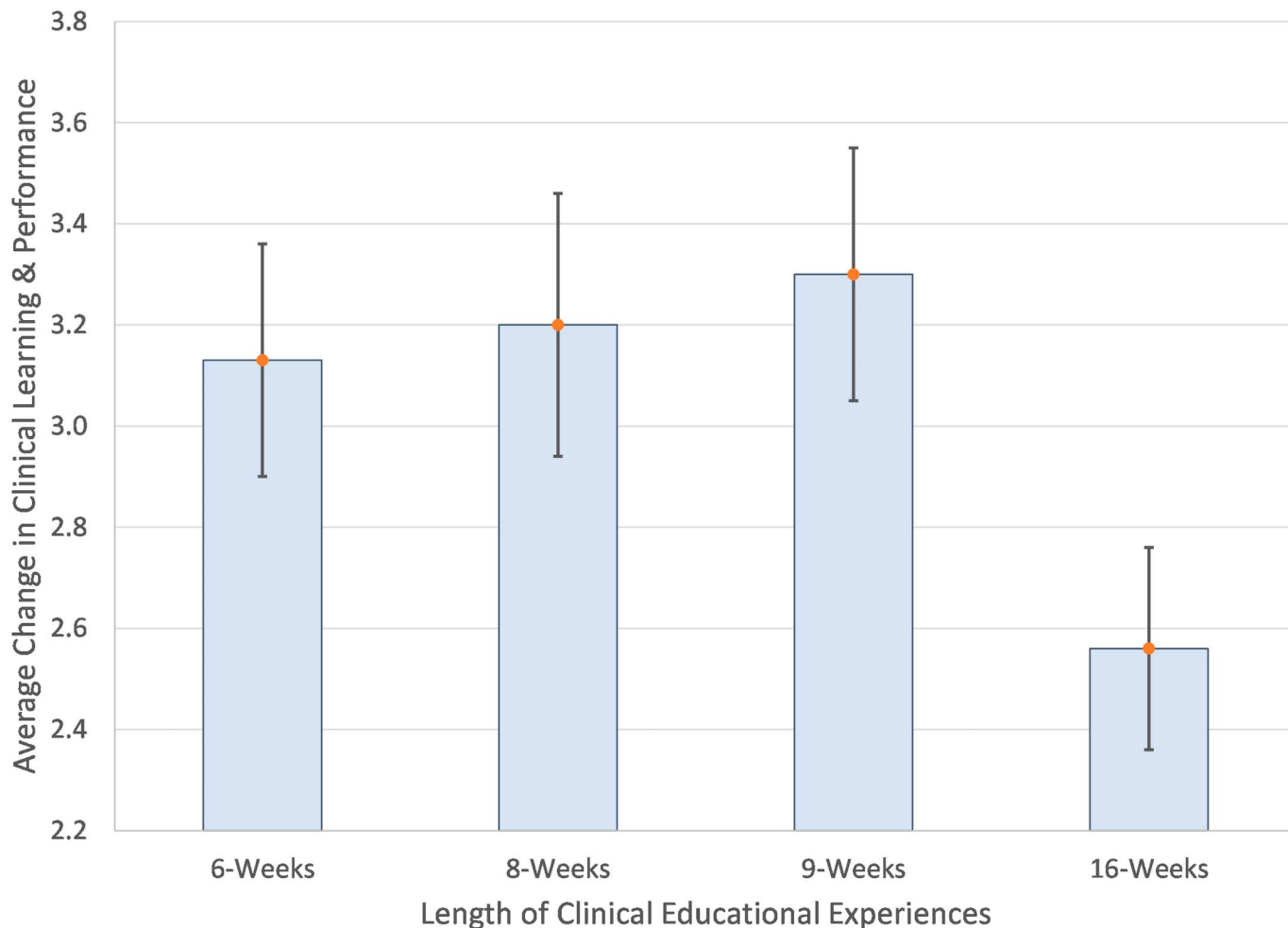


Table 2. Change in Clinical Performance Criteria (Between Midterm and Final Ratings) by Length of CEEs

Length of CEEs	Change in Clinical Performance Rating (Mean and SD)																		
	Safety	Prof Behav	Account	Comm	Cult Comp	Prof Devel	Clin Reas	Screen	Exam	Eval	Diag Prog	POC	Proc Inter	Educ Inter	Doc	Out Asse	Finan Res	Dirac Sup	Avg Chang
6-weeks	2.85 (2.3)	2.48 (2.4)	2.64 (2.3)	2.96 (2.3)	2.70 (2.4)	2.93 (2.2)	3.28 (2.2)	3.24 (2.1)	3.42 (2.3)	3.44 (2.3)	3.44 (2.3)	3.43 (2.3)	3.13 (2.1)	3.33 (2.3)	3.28 (2.3)	3.21 (2.2)	3.17 (2.2)	3.39 (2.5)	3.13 (2.3)
8-weeks	3.03 (2.7)	2.61 (2.7)	2.64 (2.6)	3.20 (2.7)	2.50 (2.6)	3.00 (2.6)	3.41 (2.5)	3.34 (2.6)	3.51 (2.6)	3.56 (2.5)	3.50 (2.5)	3.48 (2.5)	3.34 (2.5)	3.39 (2.6)	3.27 (2.6)	3.24 (2.5)	3.22 (2.7)	3.37 (2.8)	3.20 (2.6)
9-weeks	3.11 (2.5)	2.69 (2.5)	2.73 (2.4)	3.3 (2.4)	2.74 (2.6)	3.07 (2.4)	3.58 (2.3)	3.50 (2.4)	3.57 (2.2)	3.60 (2.3)	3.61 (2.4)	3.60 (2.3)	3.37 (2.3)	3.49 (2.5)	3.28 (2.4)	3.38 (2.5)	3.29 (2.5)	3.47 (2.9)	3.30 (2.5)
16-weeks	2.24 (1.8)	2.34 (2.0)	2.10 (1.9)	2.47 (1.8)	1.75 (1.5)	2.60 (1.7)	2.90 (1.8)	2.88 (2.6)	2.82 (1.9)	2.80 (1.8)	2.67 (2.0)	2.86 (1.8)	2.87 (2.0)	2.70 (1.8)	2.65 (2.1)	2.45 (2.2)	2.29 (2.2)	2.67 (2.9)	2.56 (2.0)

Abbreviation: CEE = Clinical educational experience.

change in each clinical performance criteria based on the required length of the CEEs: 6-, 8-, 9-, or 16-weeks. A 2-factor between subjects' ANOVA was performed to determine whether the length of a full-time CEE (6-, 8-, or 9-weeks) and the timing within the curriculum of a full-time CEE (first, second, or third CEE) interact to increase the change in DPT students' clinical performance scores. A 16-week CEE was completed only with DPT students at the program 2 during the fourth CEE. Accordingly, a 1-factor between subjects ANOVA was performed to assess differences in the change in DPT students' clinical performance criteria based on the length of DPT students' fourth CEE (8-, 9-, and 16-weeks). As the program 2 was the only DPT program to have the option of a fifth full-time CEE (option of 2, 8-week CEEs vs one 16-week CEE); no statistical analysis was performed on DPT students' fifth CEE (8-weeks; n = 56). Post hoc analyses were performed using the Sidak adjustment method to control for the type I error rate, and a P value of less than .05 was considered a significant difference for all analyses.

RESULTS

Length of Clinical Educational Experiences

The average change in DPT students' overall clinical performance criteria for a: 6-week CEE was 3.13 (SD = 2.3), 8-week CEE was 3.20 (SD = 2.6), 9-week CEE was 3.30 (SD = 2.5), and 16-week CEE was 2.56 (2.0) (Figure 1). See Table 2 for the mean and SD for each clinical performance criteria.

From the 1-factor ANOVA analysis, significant differences resulted from the length of a CEE for the clinical performance criteria of: Safety ($P = .01$), Communication ($P < .01$), Cultural Competence ($P < .01$), Clinical Reasoning ($P = .02$), Examination ($P = .04$), Evaluation ($P = .02$), Diagnosis and Prognosis ($P < .01$), Plan of Care ($P = .04$), Educational Interventions ($P = .04$), Outcomes Assessment ($P < .01$), Financial Resources ($P < .01$), and Average change in clinical performance criteria ($P = .01$). Post hoc analysis identified significant changes in clinical performance between the length of CEEs for 8 weeks versus 16 weeks ($P = .04$) and 9 weeks versus 16 weeks ($P = .01$). Complete results of the post hoc analyses Sidak adjustment method are presented in Table 3.

First and Intermediate (Second and Third) Clinical Educational Experiences

The 2-factor (length of CEE and timing of CEE) between subjects' ANOVA resulted in no significant difference for the interaction

effects of length and timing of CEEs within the curriculum for all 18 PT CPI clinical performance criteria. For the main effect of length of CEEs, there were significant differences among DPT students' change in PT CPI ratings for the clinical performance criteria of: Safety ($P = .01$), Communication ($P < .01$), Clinical Reasoning ($P = .01$), Screening ($P = .02$), Evaluation ($P = .02$), Procedural Interventions ($P < .01$), Outcomes Assessment ($P = .04$), Financial Resources ($P = .02$), and Average Change in clinical performance criteria ($P = .02$). Post hoc analyses (Sidak adjustment method) are reported for the main effect (length of a CEE for each clinical performance criteria) in Table 4.

With 2 exceptions (Examination [$P = .09$] and Diagnosis and Prognosis [$P = .12$]), there were significant differences among DPT students' change in PT CPI ratings for the main effect of the timing of the CEE for all other (n = 16) PT CPI clinical performance criteria. On average, there was a significant difference in DPT students' change in PT CPI ratings between the first and third ($P < .01$) CEEs and the second and third ($P < .01$) CEEs. There was no significant difference between the first and second ($P = .70$) CEEs. Post hoc analyses (Sidak adjustment method) are reported for the main effect (time of the CEE for each clinical performance criteria) in Supplemental Digital Content 4 (Appendix 4, <http://links.lww.com/JOPTE/A113>).

Terminal Full-Time Clinical Educational Experiences

Using a 1-factor between subjects' ANOVA, for all clinical performance criteria, there were no significant differences among the change in DPT students' PT CPI ratings based on the length of DPT students' fourth CEE (Table 5).

DISCUSSION

To improve the quality in DPT clinical education, Jette et al²⁵ recommended standardizing the number and duration of full-time CEEs across accredited DPT programs. Currently, there are no established standards for the length and timing of each full-time CEEs to optimize DPT students' clinical learning and performance. Our study provides evidence to support DPT programs' clinical education curriculum decisions regarding the number of weeks and timing within the total DPT curriculum of full-time CEEs.

To our knowledge, this is the first multi-institutional study that has investigated the change in DPT students' PT CPI ratings with varying lengths and timing of CEEs. Our results suggest that 8-week and 9-week full-time CEEs are associated with the greatest change

Table 3. Length of CEEs Post hoc Analyses

Length of CEEs	Post hoc Analysis: Mean Difference (P)																		
	Safety	Prof Behav	Account	Comm	Cult Comp	Prof Devel	Clin Reas	Screen	Exam	Eval	Diag Prog	POC	Proc Inter	Educ Inter	Doc	Out Asse	Finan Res	Direc Sup	Avg Chang
6- versus 8-weeks	0.18 (.71)	0.13 (.91)	-0.01 (1.0)	0.24 (.91)	-0.20 (.59)	0.07 (.99)	0.13 (.89)	0.10 (.97)	0.09 (.98)	0.13 (.91)	0.06 (.99)	0.06 (.99)	0.21 (.43)	0.06 (.99)	-0.01 (1.0)	0.04 (1.0)	0.05 (1.0)	-0.02 (1.0)	0.07 (.99)
6- versus 9-weeks	0.25 (.33)	0.21 (.58)	0.09 (.99)	0.30 (.16)	0.04 (1.0)	0.14 (.88)	0.31 (.10)	0.26 (.29)	0.14 (.85)	0.16 (.79)	0.17 (.73)	0.18 (.69)	0.24 (.33)	0.16 (.81)	0.01 (1.0)	0.17 (.74)	0.11 (.96)	0.09 (.99)	0.17 (.59)
6- versus 16-weeks	-0.61 (.22)	-0.14 (.99)	-0.55 (.31)	-0.49 (.44)	-0.95 (<.01)	-0.32 (.84)	-	0.36 (.76)	-0.60 (.17)	-0.64 (.14)	-0.76 (<.05)	-0.57 (.24)	-0.26 (.92)	-0.63 (.17)	-0.63 (.16)	-0.76 (<.05)	-0.89 (.02)	-0.71 (.17)	-0.57 (.11)
8- versus 9-weeks	0.08 (.99)	0.07 (.99)	0.09 (.95)	0.06 (.99)	0.24 (.21)	0.07 (.99)	0.18 (.48)	0.15 (.66)	0.05 (.99)	0.03 (1.0)	0.11 (.91)	0.12 (.85)	0.02 (1.0)	0.10 (.93)	0.01 (1.0)	0.14 (.73)	0.07 (.99)	0.11 (.95)	0.10 (.89)
8- versus 16-weeks	-0.79 (.04)	-0.27 (.92)	-0.54 (.28)	-0.73 (.06)	-0.75 (.06)	-0.39 (.64)	-	-0.46 (.46)	-0.69 (.60)	-0.77 (.03)	-0.83 (.02)	-0.63 (.13)	-0.48 (.38)	-0.69 (.09)	-0.62 (.15)	-0.80 (.03)	-0.93 (<.01)	-0.69 (.17)	-0.64 (.04)
9- versus 16-weeks	-0.87 (.02)	-0.35 (.79)	-0.64 (.14)	-0.79 (.03)	-0.99 (<.01)	-0.46 (.46)	-	-0.62 (.16)	-0.75 (.04)	-0.80 (.02)	-0.93 (<.01)	-0.75 (.04)	-0.50 (.33)	-0.79 (.03)	-0.63 (.14)	-0.93 (<.01)	-1.00 (<.01)	-0.80 (.08)	-0.74 (.01)

Abbreviation: CEE = clinical educational experience. P-values adjusted with the Sidak method. Bold and italicized indicates a P < 0.05

in DPT students' clinical learning, when compared with 6-week and 16-week CEEs.

In health professions, the development of clinical competence is reported to occur during 2 phases—a period of rapid clinical learning that is often followed by a period of stable clinical learning.²⁶ These periods may partially explain our results of significantly more improvement in DPT students' clinical learning during 8- and 9-week CEEs when compared with the longer 16-week CEEs. Our results are consistent with the results of others¹⁴⁻¹⁶ that 8–10 week full-time CEEs are an optimal length, compared with shorter full-time CEEs (less than 5-weeks). However, some investigators recommend that the length of first and intermediate (second and third) full-time CEEs should be significantly longer than 8–10 weeks.¹¹⁻¹³

About how the timing of CEEs affects DPT students' clinical learning and performance, there was significantly more improvement in DPT students' PT CPI ratings between the first and third full-time CEEs and the second and third CEEs. The lack of a significant change in DPT students' clinical learning and performance between the first and second full-time CEEs may be due to the limited length of time between those CEEs. For the program 3 and program 2, the first and second full-time CEEs occurred in the same semester (semester 4) or in subsequent semesters (semesters 3 and 4), respectively. For each of the 3 DPT programs, the third full-time CEEs occurred during the latter half of the DPT curriculum (within 10 months of DPT students' graduation). The placement of the third full-time CEEs was after the DPT students had completed more than 80% of the didactic curriculum at program 2 and 100% of the didactic curriculum at program 1 and program 3. Having completed at least 80% of the didactic curriculum, it is possible that DPT programs, students, and CIs expectations for clinical learning and performance were higher for the third full-time CEEs, which could significantly influence DPT students PT CPI ratings.

Beyond the length and timing of CEEs, there are other differences among the studied DPT programs that could influence students clinical learning and performance, including didactic content completed before each CEE, teaching and learning strategies implemented to promote students learning, and diversity within and outside of each DPT program. Although we did not expect DPT program differences to affect our results, studying the effects of these differences on DPT students clinical learning and performance should be investigated in the future.

Table 4. Length of First and Intermediate (Second and Third) CEEs Post hoc Analyses

Length of CEEs	Post-Hoc Analysis: Mean Difference (P)														Avg Chang				
	Safety	Prof Behav	Account	Comm	Cult Comp	Prof Devel	Clin Reas	Screen	Exam	Eval	Diag Prog	POC	Proc Inter	Educ Inter		Doc	Out Asse	Finan Res	Direc Sup
6- versus 8-weeks	0.41 (.02)	0.29 (.17)	0.21 (.41)	0.42 (.01)	-0.12 (.79)	0.01 (1.0)	0.34 (.05)	0.31 (.09)	0.32 (.07)	0.41 (.02)	0.28 (.16)	0.32 (.08)	0.48 (<.01)	0.33 (.08)	0.28 (.15)	0.32 (.08)	0.44 (.01)	0.30 (.20)	0.32 (.03)
6- versus 9-weeks	0.40 (.02)	0.33 (.09)	0.23 (.31)	0.42 (.01)	-0.71 (<.01)	-0.53 (<.01)	0.41 (.01)	0.37 (.03)	0.21 (.36)	0.27 (.17)	0.29 (.12)	0.30 (.10)	0.34 (0.05)	0.31 (.10)	0.18 (.52)	0.35 (.05)	0.28 (.18)	0.25 (.36)	0.31 (.04)
8- versus 9-weeks	-0.01 (1.0)	0.04 (.99)	0.02 (.99)	-0.00 (1.0)	-0.59 (<.01)	-0.54 (<.01)	0.07 (.94)	0.07 (.95)	-0.11 (.77)	-0.13 (.68)	0.01 (1.0)	-0.02 (1.0)	-0.14 (.67)	-0.02 (1.0)	-0.10 (.83)	0.03 (1.0)	-0.16 (.59)	-0.06 (.98)	-0.02 (.99)

Abbreviation: CEE = clinical educational experience. P-values adjusted with the Sidak method. Bold and italicized indicates a P < 0.05

Clinical Learning and Performance in the Terminal Full-Time Clinical Educational Experiences

One common goal of DPT education was to prepare students for entry into the profession. Our results of no significant difference among 8-, 9-, and 16-week terminal full-time CEEs in DPT students' clinical learning and performance are consistent with CIs recommendation that terminal full-time CEEs should be 8–10 weeks.¹⁴⁻¹⁶ By contrast, others¹¹⁻¹³ reported that longer CEEs are better for DPT students' clinical development into entry-level physical therapists.

For the 3 DPT programs, there was no significant difference among the length of DPT students terminal full-time CEEs and their PT CPI ratings, which may be partially explained by the documented ceiling effect of the PT CPI.^{8,27} The PT CPI assesses DPT students' clinical learning and performance to entry-level clinical competence; however, the ceiling effect associated with the PT CPI is an indication that the instrument may not fully assess DPT students clinical learning and performance beyond entry-level competence. Longer (16-week) full-time CEEs may have additional benefits that are not being measured by the PT CPI, including DPT students' continuity of patient care, continuity of supervision, sense of belongingness, clinical learning beyond entry-level, and the increased potential to secure employment at the clinical education site.^{28,29}

Considering DPT students' clinical learning and performance plateaus during the terminal full-time CEEs, as assessed by the PT CPI, DPT programs should consider new methods or instruments to further assess students clinical learning and performance that occurs beyond entry-level during the terminal full-time CEEs.

Doctor of Physical Therapy Program Costs, Student Debt, and Length of Clinical Education Experiences

Entry-level physical therapists have been reported to have a 197% debt-to-income ratio. The increasing costs of DPT education and student debt has economic (ie, buying a house, getting married, and choice of practice setting) and professional (reduced diversity) consequences that may contribute to burnout and attrition.^{2,30-33}

The present study has identified peak clinical learning and performance gains occurred between 8- and 9-week CEEs. Longer full-time CEEs without DPT students' gains in clinical learning and performance may contribute to increased DPT curriculum length and increased DPT student debt on graduation.

One strategy, the paid year-long internship model, was designed to enhance DPT students' clinical learning and performance beyond entry-level and mitigate the increasing costs of DPT education and student debt.³⁴ Today, there is minimal evidence on the impact the paid internship model has on DPT students' clinical learning and performance, program costs, and student debt.

Limitations

There are limitations to our study that should be considered when interpreting our results. (1) Although we had a large sample size, the data were gathered from only 3 DPT programs in the United States. (2) For the first and intermediate (second and third) full-time CEEs, our study did not investigate the changes in DPT students' clinical learning and performance for full-time CEEs longer than 9 weeks. Future research should investigate the impact of first and intermediate (second and third) CEEs longer than 9 weeks on DPT students' clinical learning and performance. (3) There was variability among the participating DPT programs clinical education curriculum. Future research should investigate why there was more improvement in DPT students' clinical learning and performance during the third full-time CEEs, compared with the first or second CEEs. (4) The 16-week full-time CEEs only occurred during students' terminal full-time CEEs. (5) Because the program 2 was the only studied DPT program to offer a fifth full-time CEE, we chose *a priori* not to compare DPT students (n = 56) fifth full-time CEE (8-week) with those DPT students who did not have a fifth full-time CEE. Removing the fifth full-time CEE from our analysis decreased the overall sample size and the sample size of students who completed an 8-week CEE. Including the fifth full-time CEE in our analysis may have confounded the results because some DPT students would have an additional CEE compared with others. (6) Although beyond the scope of our study, there are other documented factors that may affect DPT students' PT CPI ratings that should be considered, including the relationship between the CI and the student, student case-load, student interest in the clinical setting, and the complexity or type of the clinical setting.³⁵⁻³⁸

CONCLUSION

Clinical education comprises a significant portion of a DPT curriculum. From an evaluation of 707 DPT students from 3 accredited DPT programs, the greatest change in DPT students' clinical learning and performance occurred during 8- and 9-week full-time CEEs and between the first and third full-time

Table 5. Difference in Length of Terminal CEEs Clinical Performance Criteria

Difference in Final CEEs Clinical Performance Rating by Length: F-value (P)																		
Safety	Prof Behav	Account	Comm	Cult Comp	Prof Devel	Clin Reas	Screen	Exam	Eval	Diag Prog	POC	Proc Inter	Educ Inter	Doc	Out Asse	Finan Res	Direc Sup	Avg
1.40 (.25)	0.35 (.71)	0.58 (.56)	1.15 (.32)	1.26 (.29)	0.02 (.98)	0.81 (.45)	0.14 (.87)	1.45 (.24)	1.17 (.31)	1.66 (.19)	0.56 (.57)	0.10 (.90)	0.38 (.68)	0.35 (.70)	0.91 (.40)	0.70 (.50)	0.31 (.73)	0.63 (.53)

Abbreviation: CEE = clinical educational experience.

CEEs. Our study provides much needed evidence to support DPT programs clinical education curriculum decisions regarding the length and timing of full-time CEEs. The results of our study suggest that 8- to 9-week CEEs may be optimal for the development of clinical learning and performance in DPT students. Given the increasing costs of DPT education and increasing student debt, the length of full-time CEEs required to meet CAPTE clinical learning standards and program goals should be further investigated.

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