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## Using Professional Core Competencies to Guide and Enhance Course Content for Doctor of Physical Therapy Students

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## ORIGINAL RESEARCH REPORTS

# Using Professional Core Competencies to Guide and Enhance Course Content for Doctor of Physical Therapy Students

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### Abstract

**Purpose:** The acute care environment poses challenges to Doctor of Physical Therapy (DPT) students, faculty, and clinicians. Academic preparation is important for success in acute care clinical education experiences. The *Core Competencies for Entry-Level Practice in Acute Care Physical Therapy* (CCACPT) defines entry-level performance expectations. The purpose of this study was to describe the use of the CCACPT to enhance teaching and assess student confidence in acute care competencies before and after a medical surgical course.

**Methods:** DPT students from three cohorts were recruited. We developed a 52-item survey from the CCACPT. Each item asked about the confidence for a specific acute care task. Educational activities were intentionally enhanced to address the content areas with the lowest confidence identified in the pre-survey of students. Reflective writing assignments and the post-survey were used to assess the influence of teaching enhancements on student confidence in acute care competencies.

**Results:** The total response rate (n = 146) was 85.1%. Students rated six items with the least confidence on the pre-survey that were consistent across cohorts. All six items' scores were significantly improved on the post-survey. Eight themes were identified using qualitative analysis of the reflective assignments.

**Conclusion:** Applying the survey created from the CCACPT prior to teaching the course may help guide the content areas in need of enhancement in order to improve student confidence needed for successful acute care clinical education experiences.

**Keywords:** Acute care, Competencies, Physical therapist education, Reflective writing

## 1. Introduction

The dynamic acute care environment poses challenges to physical therapy (PT) students, faculty, and clinicians. Academic preparation is important to the success of acute care clinical education, and the acute care setting has been identified as having the greatest number of incidence of clinical difficulties [1]. In 2017, The Academy of Acute Care Physical Therapy task force developed and published the *Core Competencies for Entry-Level Practice in Acute Care Physical Therapy* (CCACPT) [2,3]. These competencies were defined to clarify the

entry-level performance expectations to both academic and clinical faculty [2,3]. Prior to the publication of CCACPT, there were no specific entry-level guidelines for acute care for faculty, clinical instructors, as well as students to use [2–4].

Acute care therapists need to have the knowledge, skills, and abilities to manage the complex environment and the fluctuating physiologic status of patients from multiple clinical practice areas [5]. Acute care didactic education is necessary to provide students with the competencies essential to enter into the dynamic acute care clinical education experiences and for future clinical practice [6,7]. The

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use of simulation-based learning experiences (SBLE) has been found to be an effective learning strategy for improving student confidence with acute care skills; however, there is limited evidence that student confidence translates to improve clinical performance [8–10]. Miale et al. found that SBLE provided the students with realistic exposure to acute care environments to promote clinical reasoning for both participants and observers, as well as encouraging self-reflection and observational learning [11]. Additionally, reflective writing assignments allow students to advance their clinical reasoning and clinical decision-making skills. By reflecting on an experience, students use an active and deliberate thought process to explore the experience, which allows them to describe and explore their personal feelings in regard to the experience [12].

There is an existing gap in the literature on how to best provide acute care content instruction that utilizes the CCACPT. The CCACPT outlines specific tasks that are needed to achieve entry-level competency in acute care physical therapy [2,3]. Knowing specifically what tasks a student or new graduate is struggling with can assist in developing learning plans. A key component to professional development is building and expanding task specific confidence in health care professional students [13–15]. Costello and Maring described using the CCACPT to map the acute care curriculum at their institution [16]. The authors developed a 20-item survey to assess student self-efficacy and confidence between two semesters and found that students had a significant improvement in self-efficacy relating to acute care competencies [16]. These findings support the utility of applying a survey based on the CCACPT to assess student confidence in the content area before and after a course.

The Acute Care Confidence Survey (ACCS) is a questionnaire published in 2014 [17], prior to the development of the CCACPT. The ACCS evaluates four essential skills required for acute care success using 15 items. It was validated to assess students' self-confidence in the acute care setting and to predict student performance in these settings [17,18]. Despite being a valid acute care survey tool, the ACCS does not specifically evaluate confidence on all the sub-skills listed in the CCACPT. For example, the ACCS has two questions related to discharge planning, asking student confidence in determining if patients are safe to go home or if subacute rehabilitation is needed [17]. However, within the CCACPT, there are expectations beyond just safety and discharge destinations, such as determining equipment needs, transportation

needs, rehospitalization risks, caregiver needs, regulations of payers, and the expectations and desires of stakeholders [3]. This limitation in the ASCC highlights the need to expand the assessment tool for student confidence in acute care practice. A more comprehensive tool can identify tasks that are not included in the ASCC but expected for entry-level PT in the CCACPT. These assessment results will bring insight into the design of acute care course content to meet the expectation in the CCACPT.

The purpose of this study was to describe how the results of a survey developed from the CCACPT completed by student PT prior to a medical surgical course were used in order to enhance teaching content specifically targeting the acute care areas of lowest confidence identified by the students. The objectives were to: (1) create a survey from the CCACPT to assess student PT confidence in acute care competencies, (2) enhance the content areas with lower confidence identified in the pre-survey by utilizing simulation and reflective writing assignments, and (3) evaluate the impact of enhanced teaching on student PT confidence in acute care competencies after completing the course.

## 2. Methods

### 2.1. Participants

A convenience sample of Doctor of Physical Therapy (DPT) students in three consecutive cohorts from 2017 to 2019 were used for this study. Students were in their final didactic semester and registered for a medical surgical course that primarily focused on PT management in the acute care setting. All students enrolled in the class were asked to participate in the survey, however, participation was voluntary and students electronically signed consent. The Institutional Review Board for the university approved this study and granted exempt status (HUM00148660).

### 2.2. Survey tool and procedure

A 52-item survey was developed from the CCACPT using the items listed from each domain (See [Appendix A](#) for a sample of this survey). The questions were pulled from the competencies and then placed in a statement asking the students to rate their confidence with each item. Once the survey was developed it was reviewed by two physical therapists with acute care experience [3]. The survey was divided into five domains: clinical reasoning (eleven items), communication (eight items), safety

(twelve items), patient management (fifteen items), and discharge planning (six items). Each item was scored on a 5-point Likert scale (1 = A little confident, 2 = Somewhat confident, 3 = Mostly confident, 4 = Very confident, 5 = most confident). Total score on the survey was the sum of all item scores and ranged from 52 points to 260 points. The score for each survey domain was the average score of all items within that domain. The survey also included demographic information for age and gender identity. On the first day of class, the students were asked to complete the survey (pre-survey) using Qualtrics® (Qualtrics: Provo, UT). The survey (post-survey) was distributed again after the final day of class. When completing the survey, the students were asked to provide a unique anonymous participant code to allow matching of their pre-survey and post-survey responses.

### 2.3. Designed teaching experiences

We identified six items with the lowest confidence ratings reported by the students in the pre-survey. We redesigned the course specifically to address the competencies relating to these six items.

### 2.4. Qualitative data analysis

Qualitative review of the HEROS reflection papers from Cohort 1 was performed. Three reviewers coded the main themes independently and discussed to resolve any disagreements on the coded items to reach consensus. The main themes were identified during the review. If a theme had more than 20% of the students expressing the same or similar reflective thoughts, it was included for further analysis.

### 2.5. Quantitative data analysis

IBM SPSS Version 26.0® (Armonk, NY: IBM Corporation) was utilized to analyze the survey data. We calculated the descriptive statistics of the demographic information the total scores of the survey, the scores of each survey domain, and the mean scores of each survey item. We evaluated reliability of the survey by examining its internal consistency. For this analysis, we obtained Cronbach's alpha from the item–total correlations of (1) the scores of all items within each domain and the total score of that domain, and (2) the scores of all items in the survey and the total score of the survey. A Cronbach's alpha  $>0.7$  indicates that the survey demonstrates high consistency and is considered reliable [19]. To analyze the impact of enhanced

teaching on student PT confidence, we used paired t-tests to examine (1) changes in the mean scores of the six items with the lowest confidence before and after the course, and (2) changes in the mean scores for each domain before and after the course. A two tailed significance level was  $p < 0.05$  for all analyses.

### 2.6. Designed teaching experiences

Prior to this study, students in the medical surgical course participated in weekly face-to-face lectures and lab sessions. Following the pre-survey, activities were designed to address the areas of the pre-survey where the students had the lowest confidence. Classroom enhancements included the use of SBLE during lab sessions, three interprofessional education (IPE) experiences, and supplemental online activities such as videos or recorded lecture content. Please refer to Table 1 for the teaching and learning enhancements used during this study.

Each student independently completed an acute care evaluation during a SBLE using a standardized patient (SP) playing the role of the patient. This unique experience was called HEROS (Helping Everyone Remember Our Stuff). The simulations were designed using International Nursing Association of Clinical and Simulation Learning Standards of Best Practice: Simulation Design [20]. A total of fourteen cases were developed and four or six students were assigned as HEROS for each case. The HEROS were responsible for reviewing the electronic medical record, submitting a pre-simulation worksheet, communicating with nurses or social workers (the instructors played the role of the other health care providers), and completing an initial physical therapy evaluation while an instructor and a small group of their classmates observed. The SBLE were performed with one or more medical equipment lines that students needed to manage, such as supplemental oxygen (via nasal cannula or mask), nasogastric tubing, peripheral intravenous lines, chest tubes, drainage tubes, intermittent compression devices, Foley catheters, arterial lines, and/or mechanical ventilation. The HEROS' SBLE was videotaped and made available for self-reflection. Following the SBLE, debriefing occurred using the Plus-Delta method [21]. The Plus-Delta method of debriefing highlights the things that went well during the SBLE and areas that need improvement [21]. Students who were observing used a peer observation worksheet to improve their engagement during their peer's individual SBLE and to assist with debriefing. These peer observation worksheets were handed to the instructor, who then summarized feedback for the HEROS along with the

Table 1. Teaching enhancements used to address student's low confidence items from the pre-survey.

Items with lowest confidence on Pre-survey (Domain)	Teaching and learning enhancements
Demonstrating basic understanding of ventilator settings and equipment as they impact the patient's physical therapy plan of care, and have the didactic knowledge appropriate for additional clinical training (Safety).	<ul style="list-style-type: none"> <li>• A mechanical ventilator lecture with an emphasis on the types of mechanical ventilation, modes, settings, and weaning parameters.</li> <li>• Cohort 3 had a simulation using a real ventilator and attachments to the SP</li> </ul>
Understanding regulations imposed by the healthcare systems and payers (Discharge Planning).	<ul style="list-style-type: none"> <li>• IPE discharge planning simulation, and in a home health care telehealth IPE simulation.</li> <li>• The students were responsible for assigning CPT codes for billing in a documentation assignment</li> </ul>
Utilizing evidence-based practice to predict the patient's expected level of improvement in order to accurately determine goals, discharge needs and rehab prognosis (Clinical Reasoning).	<ul style="list-style-type: none"> <li>• Students independently performed an acute care simulation using a paid SP playing the role of the patient.</li> <li>• Self-reflection assignments were included for the student to reflect on their decision making for the enhancement of clinical reasoning and decision making skills.</li> </ul>
Consider, anticipate and plan for the possibilities whereby movement might compromise medical stability, or how medical conditions or medications might affect the patient's physiological responses to movement or compound safety issues (Safety).	<ul style="list-style-type: none"> <li>• Prior to their independent simulation, the students were responsible for reviewing the EMR and submitting a pre-simulation worksheet 24-h prior to their simulation to assist in their confidence with consider, anticipate and plan. They received instructor feedback prior to their simulation</li> </ul>
Identifying what role the line/tube is serving for the patient, specific precautions related to it, and pre-position the patient/environment to manage it during mobility without disruption of the line/tube and with minimal effect on the patient's mobility (Safety).	<ul style="list-style-type: none"> <li>• Simulations were designed for SPs to be connected to one or more medical equipment lines that students needed to manage.</li> <li>• Self-reflection assignments were included for the student to reflect on line management and patient safety.</li> </ul>
Predict patient presentation and anticipate needed resources (Clinical Reasoning).	<ul style="list-style-type: none"> <li>• Students were responsible for reviewing the EMR and submitting a pre-simulation worksheet 24-h prior to their simulation to assist in their confidence with predicting patient presentation.</li> </ul>

IPE=Interprofessional education; SP = standardized participant; CPT=Current Procedural Terminology; EMR = Electronic medical record.

instructor's feedback. Following their SBLE, the HEROS were responsible for documenting the initial evaluation and completing a self-reflection assignment.

During the semester all students participated in three IPE experiences. First, the DPT students participated in a cardiac IPE simulation (Sim-IPE) with entry-level nursing students and acute care Nurse Practitioner students. Next, the DPT students were part of an interprofessional team along with nursing and social work students during a discharge planning Sim-IPE [22,23]. Lastly, the DPT students participated in a home health Sim-IPE with nursing students and used telehealth to contact a Nurse Practitioner student.

Using peer and instructor feedback, as well as reviewing their performance on video, the HEROS completed a reflection paper using the Gibbs' Six Stages of Reflection [24]. The reflective assignment is in [Appendix B](#).

### 3. Results

All students enrolled (n = 174) in the medical surgical course for three consecutive cohorts were asked to participate in this study. A total of 146 students consented to be a part of the study and

completed all survey items for both the pre-survey and post-survey. The response rate for all three cohorts together was 83.9%. The average age of the participants was 25.6 (2.4) years and 89 (61.0%) identified as female. In Cohort 1, 49 (87.5%) students consented for their reflective writing assignments to be used for qualitative analysis.

#### 3.1. Reliability

As shown in [Table 2](#), the Cronbach's alphas for the item–total correlations for each domain and the entire survey were >0.7. These results supported a high degree of consistency among the items within the same domain and the entire survey across all three cohorts.

Table 2. Internal consistency of the survey using Cronbach's alpha from the item–total correlations for each domain.

Survey Domain	Cohort 1	Cohort 2	Cohort 3
Clinical reasoning	0.901	0.857	0.919
Communication	0.866	0.885	0.906
Safety	0.914	0.897	0.940
Patient management	0.931	0.926	0.935
Discharge planning	0.869	0.738	0.894
All Domains	0.973	0.967	0.980

### 3.2. Comparison of pre- and post-survey student confidence

The pre-survey items identified by the students as least confident were consistent across all three cohorts with six items identified as low confidence. Demonstrating basic understanding of ventilator settings from the safety domain was the lowest item every year. These items with the lowest confidence ratings are listed in [Tables 1 and 3](#). The average pre-survey total score was 180.8 (SD = 22.2) points. The average post-survey total score was 214.0 (SD = 21.5) points. The difference between the pre- and post-survey total scores was significant ( $p < .001$ ). Each domain of the survey demonstrated a significant improvement ( $p < .001$ ) from pre-survey to post-survey responses ([Table 4](#)). The items with the lowest scores on the pre-survey all improved significantly on the post-survey ( $p < .001$ ).

### 3.3. Reflective papers

Reflective papers for Cohort 1 PT students ( $n = 49$ ) were used for qualitative analysis. Eight main themes emerged as follows: (1) the students' perceived value of having a previous acute care experience; (2) nervousness described during their HEROS experience; (3) the knowledge, abilities, and skills of managing medical lines; (4) managing the patient's pain during functional mobility; (5) skill of adaptability required for acute care; (6) communication skills when interacting with the patient and other healthcare providers; (7) time management; and (8) the students believed that the HEROS experience was helpful in improving their confidence, knowledge, and skills for the acute care

setting. [Table 5](#) presents the main themes and the example quotes from the students' reflective papers that were used to develop the themes.

## 4. Discussion and conclusion

This study demonstrated the reliability and utility of a new survey tool that was designed from the CCACPT to evaluate student PT confidence in acute care competencies. The pre-survey results informed the redesign of learning activities to target the content areas with lowest confidence identified by students. The enhanced teaching led to significant improvements of confidence in acute care competencies at the end of the course. Additionally qualitative analyses identified themes that can be used to guide future instructional designs for acute care courses.

The use of the survey developed from the CCACPT allowed the instructors to focus direct attention on the items where confidence was lowest. As a result, the instructor was able to fill in the gap of knowledge and improve students' acute care confidence prior to their entering full-time clinical education. The CCACPT were designed for competency at entry-level and therefore it is necessary for novice PT to continue lifelong learning. Students in this study reflected that having previous acute care experience helped them during their HEROS experience, and a lack of experience added to the value of the HEROS experience in preparing them for clinical rotations.

Nursing literature has shown that student confidence can affect clinical performance and subsequently influence the quality of patient care [[25,26](#)]. Rosenfeldt et al. found, when using the ACCS, there

Table 3. Comparison of the scores of items with lowest confidence from the pre-survey with the scores in the post-surveys ( $N = 146$ ).

Items with lowest confidence on pre-survey (Domain)	Pre-Survey mean (SD)	Post-survey mean (SD)	p-value
Demonstrating basic understanding of ventilator settings and equipment as they impact the patient's physical therapy plan of care, and have the didactic knowledge appropriate for additional clinical training (Safety).	2.47 (0.77)	3.25 (0.82)	<0.001*
Understanding regulations imposed by the healthcare systems and payers (Discharge Planning).	2.84 (0.79)	3.60 (0.76)	<0.001*
Utilizing evidence-based practice to predict the patient's expected level of improvement in order to accurately determine goals, discharge needs and rehab prognosis (Clinical Reasoning).	2.95 (0.70)	3.58 (0.63)	<0.001*
Consider, anticipate and plan for the possibilities whereby movement might compromise medical stability, or how medical conditions or medications might affect the patient's physiological responses to movement or compound safety issues (Safety).	3.03 (0.71)	3.71 (0.59)	<0.001*
Identifying what role the line/tube is serving for the patient, specific precautions related to it, and pre-position the patient/environment to manage it during mobility without disruption of the line/tube and with minimal effect on the patient's mobility (Safety).	3.03 (0.83)	4.31 (0.62)	<0.001*
Predict patient presentation and anticipate needed resources (Clinical Reasoning).	2.99 (0.72)	3.67 (0.62)	<0.001*

\* Significant difference with  $p < .05$  from paired t-test; SD=Standard deviation.

Table 4. Comparisons of the total survey scores, the total domain scores, and the mean item scores within the entire survey or each domain between pre-survey and post-survey.

Questions	Total Scores (SD)		Item Score (SD)		p-value
	Pre-survey	Post-survey	Pre-survey	Post-survey	
Total Survey	180.8 (22.2)	214.0 (21.5)	3.48 (0.43)	4.11 (0.41)	<0.001*
Clinical Reasoning	36.3 (4.8)	42.5 (4.6)	3.30 (0.43)	3.86 (0.42)	<0.001*
Communication	28.5 (3.9)	32.8 (3.8)	3.56 (0.49)	4.10 (0.47)	<0.001*
Safety	39.1 (6.4)	50.9 (6.5)	3.26 (0.53)	4.24 (0.54)	<0.001*
Patient Management	56.4 (7.2)	63.7 (6.4)	3.76 (0.48)	4.25 (0.42)	<0.001*
Discharge Planning	20.4 (3.3)	24.0 (2.9)	3.41 (0.54)	4.00 (0.48)	<0.001*

\* Significant difference with *p* value < 0.05 from paired t-test; SD=Standard deviation.

Table 5. Main themes and example of quotes used to develop the themes.

Theme	Quotes
1: Value of previous acute care experiences	<p>“I wouldn't say that I was necessarily challenged during this experience. This is not to say that this was easy, but more has to do with the overall comfort. I have had previous experience in the acute care setting ... that may have contributed to this.”</p> <p>“Based on my previous clinical experience and my education, I think I am proficient in acute patient management. I am comfortable doing examinations for almost all acute patients except for the ICU.”</p>
2: Nervousness described during HEROS experience	<p>“At the beginning of the simulation, I felt pretty nervous. I was nervous that I would forget the gait belt or the socks on the patient ... I was more nervous about that and being disappointed with myself than I was about my grade or about my classmates watching me.”</p> <p>“I was very nervous at the beginning of the simulation ... The thing I was most nervous about was performing in front of my peers, knowing that they would be watching me the whole time. My feelings of nervousness gradually faded throughout the simulation.”</p>
3: Managing medical lines and equipment	<p>“I also felt uncomfortable/awkward with line management throughout the session. Luckily, I did not pull any lines out and he did not sit on any lines, but had he been more unstable and needed more assistance I likely would have had even more trouble.”</p> <p>“I also learned how important line management can be for the safety of the patient and that this may take practice to be comfortable with.”</p>
4: Managing the patient's pain during functional mobility	<p>“There were multiple challenging moments during my HEROS experience. It was hard to work with a patient who was in obvious pain, especially when the tasks I wanted them to perform increased their pain.”</p> <p>“Empathy goes beyond listening to the patient about what hurts and what doesn't. Taking into account many different factors including loved ones ... physical pain, emotional pain, and other sources of stress.”</p>
5: Adaptability required for acute care	<p>“While I had the entire evaluation planned out and prepared in my head and on paper prior to entering the room, I decided to change aspects of my evaluation multiple times throughout treatment due to my patient's true condition and level of functioning.”</p> <p>“I believe my skills in acute care are requiring more practice. I think with time and experience, I'll be able to quickly adapt and recognize instances that may be problematic.”</p>
6: Communication	<p>“I believe that communication in physical therapy is one of my strong suits, and I felt that communication overall went very well during my simulation. To ensure that my communication ... was clear, I made sure to not only ask each of them whether they understood what I was telling them, but gave them chances to ask questions as well.”</p> <p>“With my interactions with the patient, I made sure my communication with her was clear and appropriate ... I admit though that not all my verbal communications were as crystal clear with her as I would have liked.”</p>
7: Time Management	<p>“Another challenging portion ... time management. I also found it challenging to keep track of time since I wanted to make sure I gave my patient the best care by answering questions, but I also wanted to get through more of my evaluation I had set for my patient.”</p> <p>“There are some aspects I would change including having a plan to get the patient back in bed more efficiently and improving my time management. I had forgotten to look at the time when I started my evaluation and as such, I did not wrap up my session in a timely manner. More practice in general will improve my execution of acute care evaluations.”</p>
8: HEROS Helpful	<p>“... this sim was important for me as it allowed me to get more comfortable working in front of others ... it's important for me to get more comfortable with this as I will be performing in front of my CI during my clinicals and I may have to perform in front of family/friends of the patient”</p> <p>“I think that the entirety of the HEROS experience is a great idea. While it creates an enormous amount of stress for us as students, it is also an opportunity that I believe many students appreciate. For me personally, I enjoyed having the opportunity to see where I stand in terms of acute care treatment in a one-on-one situation. I also believe that a certain level of stress is necessary in order to do your best work. I now have a better idea of my own skills in the acute care setting, and also where I need to improve before my first acute care clinical rotation”</p>

HEROS: Helping Everyone Remember Our Stuff; CI: Clinical Instructor; ICU: Intensive Care Unit.

was low to moderate correlation between the clinical performance instrument and the student score on the ACCS, suggesting that improving confidence may not be enough to improve student clinical performance [18]. It may be possible that the ACCS is not specific for confidence data of all the individual skills needed to be successful in clinical education, and a more comprehensive tool may be required. Our new survey, despite being lengthy, covers a large number of specific skills. It evaluates confidence on individual areas of acute care practice and overall confidence within the acute care domains as described in the CCACPT. Future research linking our survey results to clinical education outcomes may expand the validity of this tool. Black et al. reported that improving student self-efficacy in a specific clinical area is a key criterion for improving function for those specific tasks [13]. A detailed and specific survey developed in this study helped determine the acute care skills where the students had the lowest confidence and guide the enhanced teaching interventions directly. For example, when our students identified low confidence in the item line and tube management during patient mobility, we added additional lines to allow the students to practice this specific skill. Students reflected on their ability, and lack of ability to manage one or more lines and how this practice contributed to their confidence or lack of confidence. Students also reflected that their HEROS experiences contributed to their skills for line management.

Confidence on all items on the survey improved with the medical surgical course as expected as part of the course objectives. However, enhancements in areas of lowest confidence ensured those items improved as well. One of the enhancements was the addition of a self-reflection assignment. Rosenfeldt et al. further suggested that opportunity exists for students to self-reflect on their skills prior to their acute care clinicals [18]. The reflective paper assignment was formatted to reflect on all the domains of the CCACPT. We believe that our students' improved confidence and their learning was enhanced by SBLE and self-reflection. However, how that gain in learning will translate to clinical performance remains to be investigated.

The nursing and medical professions have been using SBLE in education to fill gaps in student acute care skills and knowledge for many years [27]. Simulation-based learning, which was a primary teaching method used in the course, has been shown to be a valuable addition to skill development and can enhance confidence [28–30]. Best practices for teaching acute care content in physical

therapy has not been fully established; however, the use of SBLE has been increasing in physical therapy curriculum [10,31,32]. This pedagogical approach allows the student physical therapist to practice acute care skills in a safe environment and, with directed debriefing, improves both the attainment and retention of acute care knowledge and skills [33,34]. Simulation also allows for direct planning to a specific skill and clinical reasoning necessary to fill gaps in students' knowledge prior to entering their clinical educational experience. With the use of our survey, we were able to determine the areas in which students lacked confidence and attempted to fill those gaps using structured and planned SBLE.

Black et al. stated that self-efficacy is clinical case dependent and in order to improve skills in one area of clinical practice, cases need to be developed for that specific area [12]. Our survey allowed for specific assignments to be developed in a variety of acute care situations to add to the depth and breadth of acute care practice. For example, the students in our study consistently rated low confidence in predicting the patient's expected level of improvement to determine goals, discharge needs and prognosis; therefore, a documentation assignment was included as part of their simulation to specifically address patient specific goals, discharge needs, recommendations, risk assessments, and patient prognosis. This documentation assignment was graded and students were provided with instructor feedback. In addition, the students reflected on their documentation as part of the self-reflection assignment in attempt to close the loop of their learning.

This survey was conducted at one institution and cannot be generalized across institutions. Further studies looking at multiple institutions would assist in establishing the generalizability of our survey. Our survey is lengthy with 52 items, and while it may add to depth and breadth of understanding of the student's confidence over many items, there may be a survey fatigue effect reducing the students' interest in completing a survey or completing the post-survey [35]. Future research should include conducting item factor analysis in attempt to reduce the number of items to manage survey fatigue. Finally, all patient interactions during class were with standardized patients during simulation and not during real life clinical situations.

The use of our survey developed from the CCACPT may be valuable to evaluate student confidence in the skills needed to be successful in acute care clinical education and assist the faculty in directing the enhanced teaching to specific areas of low confidence within acute care domains. The



benefits of this enhanced teaching was supported by the findings of significant improvements in student confidence in most items assessed after the course.

### Ethical approval

The Institutional Review Board for the University of Michigan Flint approved this study and granted exempt status (HUM00148660, on May 8, 2019).

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None.

### Conflict of interest

None declared.

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### Appendix A.

#### *Example items in the Acute Competencies Survey*

Please answer the following questions by selecting the level that most accurately reflects your confidence for each of the statements. Questions were developed directly from the *CCACPT for Entry-Level Practice in Acute Care Physical Therapy* [2].

	Not confident 1	A little confident 2	Somewhat confident 3	Mostly confident 4	Very confident 5
<b>Clinical Reasoning Domain</b>					
Screen the medical record to determine whether the patient will benefit from physical therapy services.					
Choose appropriate examination and intervention elements at onset and throughout the session.					
<b>Communication Domain</b>					
Clearly communicate the PT's clinical decisions, with supporting data as available, in regard to: the patient's safe mobility status.					
Collaborate with the interprofessional team to create an environment that eliminates barriers to the patient accessing physical therapy services and promotes safe and effective care.					
<b>Safety Domain</b>					
Independently and safely manage the patient's lines and tubes, seeking assistance when needed.					
Demonstrate basic understanding of ventilator settings and equipment as they impact the patient's physical therapy plan of care.					
<b>Patient Management Domain</b>					
Gather and interpret medical information to determine the appropriateness of therapy in the context of potential medical instability and unpredictability.					
Analyze medical information to formulate an initial image of patient presentation to prognosticate an appropriate management strategy.					
<b>Discharge Planning Domain</b>					
Determine destination, level of support, need for continuity of care in post-acute settings additional services, and follow-up needs.					
Understand regulations imposed by the healthcare systems and payers.					

## Appendix B.

### *Self-Reflection Assignment for HEROS Simulation*

“We do not learn from experience ... we learn from reflecting on experience.” -John Dewey.

Complete your HEROS reflection using Gibbs 6 Stages of Reflection [1].

#### 1. Description

- Briefly describe what happened during your HEROS simulation (less than 100 words). Not wanting the step by step, but your overall impressions.

#### 2. Feelings

- How were you feeling at the beginning of the simulation, and how did your feelings evolve throughout the simulation?

#### 3. Evaluation

- What was important to you about the HEROS experience?
- What was challenging during the HEROS experience?

#### 4. Analysis

- Think about what happened. What choices did you make and what effect did they have for the acute care CCACPT? [2]
  - Describe how you made sound clinical reasoning.
  - How did you ensure that your verbal, non-verbal, and written communication with the patient and the interprofessional team was clear and appropriate?
  - Describe what you did to keep your patient and yourself safe.
- Could you have improved safety for the patient and/or yourself? If yes please describe.
  - What is your strongest acute patient management skill? Please describe
  - What is your weakest acute patient management skill? Please describe
  - What factors (i.e. environmental and personal) and examination results did you consider in making a discharge recommendation? Please describe

#### 5. Conclusion

- What have you learned that you can apply to future clinical practice?

#### 6. Action plan

- If you were faced with a similar case again, would you do things differently?
- Why or why not?

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