JOTE Journal of Occupational Therapy Education

Volume 8 | Issue 2 Article 19

2024

Utilizing the NANT Core Competencies to Guide the Occupational Therapy Doctoral Capstone Experience and Project in the NICU

Kate N. de Castro Mehrkens
Atrium Health Floyd

Taylor N. Bateman
Brenau University

Utilizing the NANT Core Competencies to Guide the Occupational Therapy Doctoral Capstone Experience and Project in the NICU

Abstract

The occupational therapy doctorate degree requires a capstone experience and project to be completed within a specific occupational therapy (OT)-related setting. The doctoral capstone experience and project can be difficult to complete in the highly specialized Neonatal Intensive Care Unit (NICU). This paper provides a sample outline of the doctoral capstone experience and project in the NICU. The NANT Core Competencies, written by the National Association of Neonatal Therapists Professional Collaborative, were utilized as a guideline to track student progress and ensure understanding of neonatal therapy topics. This paper follows one student's doctoral capstone experience and project in the NICU while mentored by an occupational therapist. Learning objectives related to utilizing the NANT Core Competencies, gaining clinical skills, and participating in program development were created. The site mentor trained, supported, and educated the student in the NICU while monitoring her progress during the fourteen weeks. Overall, the student successfully completed all objectives. This paper provides an example of the doctoral capstone experience and project in the NICU utilizing the NANT Core Competencies to support the mentor-student relationship and student learning with educational topics provided in the competencies guiding the capstone experience. With details including student progress, weekly mentor-student meetings, and roles/responsibilities of the student and mentor, this paper serves as a resource and guideline for OT faculty as well as potential mentors of occupational therapy doctorate students in the NICU setting. Additionally, this paper highlights the feasibility of the completion of the OT doctoral capstone in the NICU.

Keywords

Occupational therapy doctorate, capstone project, NICU, neonatal intensive care unit, competencies

Acknowledgements

We would like to acknowledge Dr. Irma Alvarado, Dr. Bridgette Dingle, Dr. Edwin Clark Montague, and Karen Sablon for their support in making this doctoral capstone experience and project possible.

JOTE
Journal of Occupational Therapy Education

Volume 8, Issue 2

Utilizing the NANT Core Competencies to Guide the Occupational Therapy Doctoral Capstone Experience and Project in the NICU

Kate N. de Castro Mehrkens, OTD[1]

Taylor Bateman, OTD[2]

Atrium Health Floyd[1]

Brenau University[2]

United States

ABSTRACT

The occupational therapy doctorate degree requires a capstone experience and project to be completed within a specific occupational therapy (OT)-related setting. The doctoral capstone experience and project can be difficult to complete in the highly specialized Neonatal Intensive Care Unit (NICU). This paper provides a sample outline of the doctoral capstone experience and project in the NICU. The NANT Core Competencies, written by the National Association of Neonatal Therapists Professional Collaborative, were utilized as a guideline to track student progress and ensure understanding of neonatal therapy topics. This paper follows one student's doctoral capstone experience and project in the NICU while mentored by an occupational therapist. Learning objectives related to utilizing the NANT Core Competencies, gaining clinical skills, and participating in program development were created. The site mentor trained, supported, and educated the student in the NICU while monitoring her progress during the fourteen weeks. Overall, the student successfully completed all objectives. This paper provides an example of the doctoral capstone experience and project in the NICU utilizing the NANT Core Competencies to support the mentor-student relationship and student learning with educational topics provided in the competencies guiding the capstone experience. With details including student progress, weekly mentor-student meetings, and roles/responsibilities of the student and mentor, this paper serves as a resource and guideline for OT faculty as well as potential mentors of occupational therapy doctorate students in the NICU setting. Additionally, this paper highlights the feasibility of the completion of the OT doctoral capstone in the NICU.

Introduction

The occupational therapy doctorate (OTD) degree is becoming increasingly popular among occupational therapy (OT) students nationwide. The goal of the doctoral degree is to offer OT students the opportunity to refine certain skills through a capstone experience and associated project within a population, or setting, of interest (Accreditation Council for Occupational Therapy Education [ACOTE], 2018). After successfully completing fieldwork experiences, OTD students collaborate with their school program to select a setting that relates to OT in which to complete their doctoral capstone experience and project.

There are many variables that may influence the process of matching a student to an individualized site for completion of the doctoral experience and project. These variables include consideration of student interest in specific populations, availability of mentor(s) at the site, ability of student to achieve program objectives within the parameters of the site, and opportunity to complete a project related to the site during the experience. The doctoral capstone experience lasts fourteen weeks and includes on-site experience in the setting where the student was matched with a mentor, as well as a project completed by the student with guidance from the mentor(s). With a wide variety of potential settings for the doctoral capstone experience, the project and experience can vary greatly among OTD students, but must still meet certain requirements.

The requirements for this degree are outlined by ACOTE (2018). Further direction regarding the doctoral capstone process can be found from the American Occupational Therapy Association (AOTA) in their recent position statement which detailed the doctoral capstone (AOTA, 2022). The paper outlined specific components of the OTD capstone including the student-centered and self-directed learning approach, mentorship process, and backward design of the degree (AOTA, 2022). With opportunities for self-directed learning, OTD program graduates should have increased autonomy, initiation, and independence which are useful skills when entering the workforce (AOTA, 2022). Mentorship during the OTD capstone has mutual benefits and supports student professionalism and personal growth (AOTA, 2022). The backward design involves first forming the student's goals related to learning topics and experiences and then matching the appropriate mentor and setting to promote an individualized learning experience (AOTA, 2022). These methods and guidelines can be applied to any doctoral capstone setting.

One setting of interest for many OTD students is the Neonatal Intensive Care Unit (NICU); however, this setting has long been recognized as a challenging environment and is considered highly specialized (AOTA, 2018). As a result, there are currently no guidelines for OTD students who are striving to gain clinical skills in the NICU for their capstone experience. Neonatal physical therapy competencies have stated in the past that students should have an observational role in the NICU and should practice hands-on skills in pediatric units and NICU follow up clinics (Rapport et al., 2010). Options for OTD students who are looking to gain neonatal therapy experience, therefore, remain limited. Some NICU facilities, however, do offer opportunities for students and allow

varying degrees of supervised hands-on experiences. For example, de Castro et al. (2023) outlined a feasibility study completed by an OTD student in a level III NICU. Overall, the guidelines created for the OTD degree by ACOTE and detailed further in the AOTA's (2022) recent position paper can align well with a NICU-based OTD capstone experience and project. The student discussed in this paper had a deep passion for gaining clinical experience in the NICU setting (student-centered), a strong mentoring relationship was built, and the process of forming this experience paralleled the backward design outlined by the AOTA (AOTA, 2022). While the AOTA and ACOTE sources were helpful in guiding the formation of this doctoral capstone experience and project, there remains minimal direction in the literature related to student participation in the NICU, specifically from the perspective of OT.

The purpose of this paper is to (1) provide an example of a successful doctoral capstone experience and project in the NICU setting and (2) demonstrate how recently published neonatal therapy practice competencies can mitigate the challenges associated with NICU doctoral capstone experiences by providing structure and guidance for both the student and mentor.

Doctoral Capstone Experience and Project Description

The doctoral capstone experience and project described in this manuscript was completed in a 23-bed level III NICU that was staffed with one full time OT (author). There was no physical therapist or speech-language pathologist present in the unit. The OT was present Monday through Friday during daytime hours (approximately 7:30-3:30). Infants receiving therapy were treated by the OT three to five times per week and the typical therapy caseload ranged from four to twenty patients. The OT's daily routine included treating patients, participating in daily morning rounds, educating caregivers, and facilitating program development and implementation.

Approximately one year prior to the anticipated OTD capstone experience and project, the OT was contacted by a nearby university about this student who was interested in the NICU setting. The site mentor for the OTD capstone experience is not required to be an OT, but the individual must be considered an expert in their field (ACOTE, 2018). This student wanted to gain hands-on experience in the NICU setting and the OT was the best fit to offer that experience from the perspective of neonatal therapy. Since there were no physical therapists or speech-language pathologists employed in this NICU to consider, the OT was determined to be the most appropriate match for this student to achieve her goals. After developing a contract with the school, the OT was able to accept the student for a fourteen-week doctoral capstone experience and serve as the site mentor.

Preparation for the NICU Doctoral Capstone Experience and Project

Prior to the fourteen-week doctoral capstone experience and project, the OTD student had successfully completed Level I and Level II fieldwork experiences. The student completed her Level II fieldwork experiences in outpatient pediatric and adult intensive care unit settings. The OTD student then began collaboration with her faculty mentor

from her school as well as a site mentor in the NICU. Initial collaboration and preparation for the doctoral capstone experience and project involved the student completing a needs assessment and literature review (AOTA, 2018).

Needs Assessment and Literature Review

The needs assessment for the doctoral capstone can vary across different academic programs, but may involve on-site observational visits, interviews with key players (i.e., site mentor, staff at the site, etc.), surveys, or other methods of data collection (ACOTE, 2018). This student completed interviews and observational visits in preparation for her capstone. Interviews were led by the student and took place via phone calls with the site and faculty mentor. The observational visits took place four months prior to the start of the capstone experience.

Furthermore, the literature review encourages students to utilize evidence-based practice as it typically involves independent research related to the setting to adequately prepare for the doctoral capstone experience and project. In alignment with AOTA, this process encourages self-directed learning and independence (AOTA, 2022). The literature review allowed the OTD student to develop an understanding of best practice in the NICU, explore effects of prematurity and the NICU environment on infant development, and identify existing gaps in the literature that this doctoral capstone would seek to address. In addition, the student utilized a more in-depth literature review in order to develop educational material for nursing staff as described later in this manuscript.

Together, the needs assessment and literature review informed the student's capstone project and experience in the NICU. Needs identified for this project included expanding staff education and training. These needs were supported by the literature which described inconsistencies in carryover of neuroprotective care across disciplines as well as encourages parent presence within the NICU (de Castro et al., 2023; Milette et al., 2017).

Creation of Learning Objectives

OTD students collaborate with their mentor(s) to narrow down the focus areas of the capstone project, as outlined by ACOTE, and select two to three specific focus areas for the doctoral capstone experience and project. These focus areas may include leadership, advocacy, education, research, theory development, administration, program and policy development, and/or clinical practice (ACOTE, 2018). The focus areas for this capstone project were program development and clinical practice. Once the focus areas were selected, the student and mentor collaborated to write objectives to support the student in gaining these skills through participation in the capstone experience and project (ACOTE, 2018). Through discussions between the student, site mentor, and faculty mentor, a program enhancement project related to staff education was planned as objective one. This project improved the orientation program for new nursing staff in the unit. Details of the project will be discussed in later sections of this paper. To incorporate the student's expressed interest in gaining clinical skills in the NICU setting, a second objective was created surrounding participation in daily clinical

OT-related tasks in the NICU. Lastly, the National Association of Neonatal Therapists (NANT) Core Competencies were used to guide the student's experiential, or clinical, component of the capstone as objective three. The agreed upon objectives for this doctoral capstone experience and project, along with a detailed description of how each objective was met, is outlined in the sections that follow.

The competency tool used in the second objective was created by the NANT organization's Professional Collaborative team. The competencies, published in 2022, are to be used primarily by neonatal therapists who are mentoring new therapy staff members within the NICU setting. The document is divided into three sections that each contain focus areas related to the role of neonatal therapy and factors that impact developmentally appropriate care in the NICU setting. The Fundamental Knowledge section allows for check-off on background knowledge, theory, and research related to infant development (NANT Professional Collaborative, 2022). The Core Competencies section allows the mentor to score the mentee on a scale from one (beginner); two (advanced beginner); three (independent practice); or four (expert critical appraisal) depending on their ability to identify (score of one), describe (score of two), implement (score of three), and facilitate change (score of four) for various skills related to neonatal therapy (NANT Professional Collaborative, 2022). Lastly, the Interventions section allows the mentor to sign off that certain hands-on skills have been achieved (NANT Professional Collaborative, 2022). While the Core Competencies were originally developed for use with new staff members in training, it had been suggested to the author by a member of the NANT Professional Collaborative that they be used to guide this OTD student in this setting. The document is available for purchase online.

NICU Doctoral Capstone Project (Objective One)

In addition to the capstone experience, a doctoral capstone project must be created (ACOTE, 2018). The student and mentor(s) collaborate to decide on an appropriate project they may be helpful or fill a need within the site. The project serves as a support and reinforcement of the learning that takes place during the experiential component of the capstone experience (AOTA, 2022). This student's project related to her first objective which is stated below.

Objective One

By completion of the doctoral capstone experience, the student will demonstrate an entry-level understanding of neuroprotective and developmentally supportive care through the development of educational material for new staff.

This project related most closely to the category of program development according to the subset skills outlined by ACOTE (ACOTE, 2018). The project enhanced the new staff orientation program by providing increased education with written documents for new nursing staff to review. Typically, new staff shadow the OT for a half day orientation with focus on developmentally appropriate care and feeding interventions. The new staff orientation program would now involve shadowing *and* review of the educational materials created by this student to provide increased detail and a resource for providing developmentally appropriate care. The student's project will be referred to as

program enhancement as the student added concrete education to be used by the OT during the new staff orientation program. The term ‘entry-level understanding’ was defined by the site mentor as understanding consistent with the level that is expected of new nursing staff in the unit after they are educated by the OT. The site mentor expected that the educational material created would include beginner-level detail that could be understood by a staff member who is new to the NICU setting after introductory education from the OT. Additionally, it was expected that the OTD student would have adequate knowledge and understanding of neuroprotective and developmentally supportive care to verbally deliver that information to a staff member.

To achieve the first objective, the student utilized information gathered from the site mentor during the needs assessment regarding needs and areas of growth for the NICU environment. These conversations supported the student in brainstorming the topics for educational materials that could be disseminated to nursing staff at the end of the doctoral capstone experience. The student and mentor agreed that the student would create educational handouts for new staff members in the NICU to educate them on developmentally appropriate care. To create these handouts, the student gathered information via in-depth literature review and research, clinical practice experiences, and conversations with the OT about each of the handout topics. These educational handouts were also shared with the current nursing staff to receive feedback and ensure understanding among nurses while also enabling the student to disseminate her work.

Specifically, the topics of the educational handouts were focused on (1) feeding interventions; (2) neuroprotection; (3) pain and pain management; (4) use of scent cloths; and (5) positioning. This plan was agreed upon by the student and mentor prior to beginning the doctoral capstone experience but was modified throughout the experience as challenges or delays arose. See Table 1 below for an outline of the student’s progression of completing these handouts.

Table 1

Timeline for Creation of Educational Handouts During Doctoral Capstone Experience

Week Number	Accomplishments for Objective 1
1-6	Student worked on drafts of five educational handouts
7	Rough drafts of handouts completed for site mentor to review and provide feedback
8-10	Student edited drafts based on site mentor’s feedback
11	Final drafts of educational handouts completed
12	Site mentor shared drafts of handouts with physician, NICU director and NICU nursing educator for feedback
13-14	Student shared final handouts with nursing staff for feedback and ongoing education

The student completed five educational handouts and compiled them into a packet for new staff to review with the author during their orientation. As noted in the timeline, the mentor provided feedback during the project to ensure clarity and adequate information was included in the materials.

The lead physician, NICU manager, and NICU nurse educator had positive feedback for the student. During the final two weeks of the capstone experience, the student educated current nursing staff about the new addition to their orientation program and provided print outs of the educational handouts for staff feedback. The packets were well-received by nursing staff when shown by the student. 100% of nurses who were shown the handouts during these two weeks had positive feedback for the student.

There were no new nursing staff hired once the educational materials were complete for the remainder of the student's capstone experience. Therefore, she was unable to utilize her program enhancement project to assist with training a new nursing staff member. However, the student demonstrated understanding of the education included in the materials by presenting the materials to small groups of current staff to introduce the new component of orientation and gather their feedback.

Doctoral Capstone Experience (Objectives Two and Three)

Throughout a student's time on-site during the OTD capstone experience, the student can participate in daily activities which vary depending on the setting of their experience. This is the experiential component of the capstone. For this capstone, the student gained clinical skills in the NICU through participation in therapy evaluations and treatments, creation of daily schedule, and participation in interdisciplinary rounds. The NANT Practice Competencies were also incorporated into the experiential component of this capstone.

Objective Two

By completion of the doctoral capstone experience, the student will demonstrate advanced clinical skills through management of a caseload, including documentation, participation in rounds, and hands-on care.

This objective was divided into three sections, including (1) evaluating, treating, and documenting; (2) participating in rounds; and (3) scheduling patients. To achieve this objective, the student was progressively allowed supervised, hands-on time treating infants during OT sessions. Participating in hands-on practice in the NICU was considered advanced clinical skills as the NICU is not considered an entry-level setting. Additionally, it was not expected that the student would be capable of managing a full caseload in the fourteen-week timeframe; rather, she completed a portion of a full caseload by the completion of the fourteen week experience. In this NICU, a full caseload can be as high as twenty patients who each are seen three to five times per week by OT. The site mentor did not plan the weekly capstone experience schedule prior to the student beginning her doctoral capstone experience as the mentor progressively increased student responsibilities based on her performance throughout

each week. During week nine, the student was also required by the hospital to complete an in-service presentation during the monthly OT team meeting. She presented on topics including the OTD degree, NICU program enhancement, and a NICU case study.

Evaluating, Treating, and Documenting. The student began simple hands-on care (i.e., giving infant a pacifier when told to do so, changing a full-term infant's diaper who was not connected to medical equipment, etc.) during week two and progressed to completing supervised therapy treatment sessions with hands-on assistance from the mentor during week three. For the remaining weeks, the mentor progressively increased the number of therapy evaluation and/or treatment sessions the student completed daily. By the final week of this experience, the caseload in this NICU was relatively low (less than ten patients in the unit each day). The student was able to manage this small caseload with low to moderate complexity patients by the end of her experience.

The mentor was slowly able to provide a lesser amount of hands-on assistance during these evaluations and treatments. The student was always supervised during hands on care; however, by the completion of the doctoral capstone experience, the student did not require hands-on or verbal assistance from the mentor for evaluating or treating patients based on the caseload of patients in the NICU at the time of her final week. The mentor was always present at bedside and supervised the student when working with a patient.

Parent presence is often relatively low in this NICU due to low-income families, rural location, and transportation difficulties. To support the student in gaining skills related to caregiver education, the site mentor began acting as a parent by asking typical caregiving-related questions to the student at bedside. This allowed the student opportunities to practice delivering education as this is often a significant portion of a neonatal therapist's daily job (AOTA, 2018). Regarding documentation, the student completed note writing for all therapy sessions that she led with decreasing levels of assistance from the site mentor as she progressed through the doctoral capstone experience.

Participating in Rounds. The student began active participation in interdisciplinary morning rounds during week six and achieved independence in this activity at week fourteen. Participation in rounds included providing an update on each patient from a developmental and feeding perspective to the interdisciplinary care team. The mentor was always present during rounds, so the student had supervision throughout the entire doctoral capstone experience; however, the student independently managed rounds without input from the mentor during her final week, which involved discussion of four to ten patients daily.

Scheduling Patients. The OT saw each infant on her caseload three to five times per week for therapy. These sessions were scheduled with nursing staff throughout the day via a conversation about the infant's medical needs and plan for the day to ensure therapy could take place at an appropriate time. The student began participating in the schedule-making task during week eight and became independent

with this task during week fourteen. The student successfully met each patient's (on her caseload, four to six patients daily) plan of care (three to five times per week) independently during the final week. See Table 2 below for a detailed outline of the progression of student involvement and participation in hands-on skills in the NICU.

Table 2

Progression of Supervised Clinical Skills During Doctoral Capstone Experience

Week Number	Evaluating, Treating & Documenting	Participating in Rounds	Creating Daily Schedule
1	Shadowing	Observation	Observation
2	Shadowing, simple hands-on care		
3-4	1-3 patients daily; maximum to moderate assistance		
5	1-3 patients daily; minimum assistance		
6	2-4 patients daily; moderate assistance	Maximum assistance and verbal cues	
7	4-5 patients daily; moderate assistance		
8	4-5 patients daily; moderate to minimum assistance		Maximum assistance
9	4-5 patients daily; minimum assistance		
10		Moderate to maximum assistance	Minimum to Moderate assistance
11-12	4-6 patients daily with supervision	Moderate assistance	Minimum assistance
13		Minimum assistance	
14		Supervision	Supervision

Note. Maximum assistance is defined as 75% of the task completed by the site mentor. Moderate assistance is defined as 50% of the task completed by the site mentor. Minimal assistance is defined as 25% of the task completed by the site mentor. Supervision is defined as site mentor being near the patient's bedside, but does not provide hands-on assistance.

Objective Three

By completion of the doctoral capstone experience, the student will demonstrate a minimum competency level of beginner/preparatory knowledge on the NANT Practice Competencies for the Neonatal Therapist.

To achieve the third objective, the site mentor collaborated with the student in their first week together to agree upon a schedule for working through all sections of the competencies across the fourteen-week experience. The minimum competency level was chosen as there was minimal opportunity to practice some of the items on the NANT Practice Competencies in this specific NICU due to the role of OT in this unit, as well as the patient population. Therefore, it was expected that the student demonstrate at minimum a beginner level understanding, but she exceeded this level on many competency items. See Table 3 below for the agreed upon schedule.

Table 3

Weekly Schedule for Utilizing NANT Core Competencies

Week Number	Focus Area	Competency Section
1	Theoretical Foundation for Neonatal Therapy	Fundamental Knowledge
2	Medical History, Equipment, Professional Ethics	
3	Assessment Tools, Impact of the NICU Environment on Premature Infant Development, Body Systems	
4	Environment	Core Competencies
5	Family, Sensory System	
6	Neurobehavioral System	
7	Review focus areas from weeks 4 – 6 and score any new skills/experiences gained; midterm evaluation	
8	N/A	Student only on-site 2 days this week
9	Neuromotor & Musculoskeletal Systems,	Core Competencies
10	Oral Feeding & Swallowing	
11	Environmental Management, Diapering, Swaddling, Dressing/Undressing, Positioning	Interventions
12	Non-Pharmacological Pain and Stress Management, Facilitating Movement Patterns, Facilitating Sensory Exposures	
13	Oral Care/Oral Immune Therapy, Non-nutritive sucking on pacifier/finger, Therapeutic Tastes of Milk Drops, Preparation for Breast and Bottle Feeding, Bottle Feeding	
14	Review of all sections and final evaluation	

The mentor (OT) scored the student on the Core Competencies sections of the NANT Core Competencies during the week and reviewed these scores during weekly meetings. The student achieved scores ranging from one (beginner); two (advanced beginner); and three (independent practice) on all items on the NANT Core Competencies by the end of the fourteen weeks. At the midterm and final points of the experience, the mentor reviewed and re-scored the student on competencies as additional progress was made and opportunities arose during hands-on care to demonstrate new skills. Since the competencies were created for new NICU therapy staff, the student met expectations previously agreed upon between the student and mentor that an acceptable score would be one (beginner) or two (advanced beginner) for all items. It was not expected that the student would score a three to four on any of the items since the NICU is not considered an entry level practice setting. If the student were to take a new role in a NICU after graduation with her OTD degree, she would likely go through extensive training and competencies from the unit in which she was hired to equip her with the skills to work in the setting.

Meetings between the site mentor and student took place to review the planned section of the NANT Core Competencies at the end of each week. The student's questions were answered and conversations about scores for that week's competencies took place. The remaining two sections, Fundamental Knowledge and Interventions allowed for discussion-based learning with less opportunity for scoring (NANT Professional Collaborative, 2022).

Over the fourteen weeks, the structure of the meetings evolved from mentor-led discussions to conversational meetings with increased contribution from the student. The mentor led the meetings for weeks one through ten. During week eleven, the student began to engage in more conversationally structured meetings. Meetings took place during thirteen weeks of the fourteen-week experience and ranged from fifteen to sixty minutes in length with an average of thirty minutes each week. The competencies were not used during weeks seven, eight and fourteen due to midterm evaluation (week seven), student on-site only two days (week eight) and final evaluation (week fourteen). See Table 4 below for the weekly details of mentor-student meetings and progression through the NANT Core Competencies.

Table 4

Weekly Mentor-Student Meetings & Tasks to Complete NANT Core Competencies

Week Number	Weekly Competency Tasks	Length of Weekly Meeting	Meeting Details
1	Student: Researched all Fundamental Knowledge topics Mentor: Introduced student to unit	15 minutes	Mentor-led discussion about use of the competencies, plan for capstone project, and timeline of events for capstone experience

2		15 minutes	Mentor-led discussion about the unit and Fundamental Knowledge topics Mentor-led demonstration of environment/equipment in NICU Discussion of assessments used in this NICU
3		15 minutes	Mentor-led discussion on final components from section one
4	Student: Verbal explanation and hands-on demonstration of Environment competency Mentor: Asked relevant questions and provides feedback on hands-on care	45 minutes	Mentor-led discussion including feedback on student's progress with as able (scores ranged from 1-2, some items were not scorable)
5	Student: Verbal explanation and hands-on demonstration of Family and Sensory System competencies Mentor: Asked relevant questions and provides feedback on hands-on care	30 minutes	Mentor-led discussion including feedback on student's progress with scores provided as able (scores ranged from 1-2, some items were not scorable)
6	Student: Verbal explanation and hands-on demonstration of Neurobehavior competency Mentor: Asked relevant questions and provides feedback on hands-on care	30 minutes	
7	Midterm Evaluation	60 minutes	Mentor-led discussion on midterm evaluation and review of all prior competencies with updated scores based on progress and new experiences/opportunities
8	Student on-site only 2 days		No competencies or meeting

9	Student: Verbal explanation and hands-on demonstration of Neuromotor and Musculoskeletal competencies Mentor: Asked relevant questions and provides feedback on hands-on care	45 minutes	Mentor-led discussion including feedback on student's progress with scores provided as able (scores ranged from 1-3, some items were not scorable)
10	Student: Verbal explanation and hands-on demonstration of Oral Feeding and Swallowing competency Mentor: Asked relevant questions and provides feedback on hands-on care	45 minutes	
11	Student reviewed Environmental Management, Diapering, Swaddling, Dressing/Undressing, Positioning interventions independently in preparation for weekly meeting	30 minutes	Student-mentor conversation; discussed plan to increase opportunities to practice dressing & providing education to parents and care team
12	Student reviewed Non-Pharmacological Pain and Stress Management, Facilitating Movement Patterns, Facilitating Sensory Exposures interventions independently in preparation for weekly meeting	15 minutes	Student-mentor conversation; discussed plant to increase opportunities to practice positioning infants and understanding role differentiation in different units
13	Student reviewed Oral Care/Oral Immune Therapy, Non-nutritive sucking on pacifier/finger, Therapeutic Tastes of Milk Drops, Preparation for Breast and Bottle-Feeding, Bottle-Feeding interventions independently in preparation for weekly meeting	15 minutes	Student-mentor conversation; discussed opportunities for feeding and minimal practice with breastfeeding due to role delineation in unit
14	Final Evaluation	30 minutes	Mentor-led discussion on final evaluation and student's progress

Evaluation and Dissemination

During the doctoral capstone experience and project, the site mentor completed an evaluation at the midterm and end. Evaluation formats may vary across the OTD programs, but they must be completed (ACOTE, 2018). The evaluation often includes feedback on the student's ability to complete or perform the objectives they created specific to their capstone experience (ACOTE, 2018). In addition to an evaluation on the student's completion of her specific objectives, the site mentor for this capstone scored this student on skills related to professionalism, communication, participation, and timeliness through an evaluation provided by the student's school.

Lastly, the student is required to complete a form of dissemination to demonstrate the understanding and learning that took place during the doctoral capstone experience (ACOTE, 2018). The dissemination can range from informal to formal methods. This process may include publication of a manuscript, conference presentation, local poster presentation, or presentation at an open house at the school or the site where the project was completed. Specific OTD programs may also have their own assignments and requirements to be completed by the student prior to graduation, such as formal papers or in-class presentations. In addition to school requirements, this student disseminated via an open house presentation at her school prior to graduation.

Discussion

The NICU has long been considered a specialized setting among OTs with need for additional training and education to reach competency (AOTA, 2018; Dewire et al., 1996; Hardy et al., 2021; Vergara et al., 2006). This paper supports completion of the doctoral capstone project and experience in the NICU, while outlining the mentorship process within this setting.

Prior to beginning the capstone experience and project, the student engaged in Level II fieldwork settings that likely supported her in achieving an overall successful NICU OTD capstone experience. A fieldwork placement in the adult intensive care unit likely supported her background understanding of medical interventions and equipment while teaching skills such as monitoring vital signs and collaborating in an interdisciplinary setting with other medical professionals. The fieldwork placement in an outpatient pediatric setting likely supported the student in gaining skills such as monitoring pediatric milestones, writing age-appropriate goals, and educating parents and caregivers on developmentally appropriate care. While there are no requirements for specific fieldwork settings in preparation for a NICU OTD capstone experience, these two settings were likely highly beneficial. Pediatric acute care and early intervention settings would likely also be helpful preparation.

The OTD capstone project completed by this student tied closely to her capstone experience and reinforced the clinical skills she was gaining on-site by having her organize the new knowledge into educational materials that could be shared with new nursing staff. The student also had opportunities to practice interdisciplinary communication and education skills through this project by sharing her educational materials with current staff during her final two weeks of the capstone. The student,

however, did not have an opportunity to provide education to a new nursing staff member as there were not any newly hired nurses during her capstone experience. This opportunity would have further enhanced her communication, education, and interdisciplinary skills in implementing the enhanced orientation program.

In relation to the experiential component, while the student had ample experiences with providing supervised hands-on care in the NICU, there were minimal opportunities to practice delivering caregiver education due to generally low parent presence in the unit. With an unpredictable patient caseload as well as varying degrees of assistance needed from the student each week, the mentor was not able to create a set schedule for progressing hands-on opportunities, rather, the mentor used clinical judgement based on student progress to advance the amount of hands-on time allowed each week. While the student managed a small caseload by the end of her experience, she likely would not have been able to manage a full caseload if the patient census in the unit had been greater.

The NANT Core Competencies were an effective tool used to improve structure and mentorship during this doctoral capstone experience. While these competencies are a new resource within the realm of neonatal therapy, they were appropriate for this specific doctoral capstone experience. One challenge of using the tool was that not all items on the competencies were applicable in this NICU based on role delineation (i.e., the OT does not perform swallow studies in the NICU where this doctoral capstone experience took place).

Moreover, lack of literature related to use of these competencies with student populations also posed challenges. Specifically, it was difficult to determine acceptable scores on the competencies for a student versus a NICU therapy staff member. The fourteen-week capstone experience is likely not sufficient time to achieve competency. For example, OTs in their first year of practice in South Africa achieved competency in the NICU setting after one year of practice in the unit (Hardy et al., 2021). With only fourteen weeks for the capstone experience, only beginner and advanced beginner scores were expected on the NANT Core Competencies for this student. Overall, the use of NANT Practice Competencies for the OTD capstone experience aligned with suggestions from Kemp and colleagues (2020) who stated there were a variety of acceptable methods or tools that can be used for developing, implementing, and evaluating the doctoral capstone experience.

Furthermore, weekly meetings to discuss the competencies, while effective and informative, were time consuming. Some of the meetings were quite draining to the student due to the amount of information being discussed. Finding a way to streamline or better structure these meetings might improve efficiency. Additionally, simplifying, or using only certain portions of the competencies would reduce the amount of information to be covered in these meetings each week.

The paper also provides insights regarding an appropriate timeline of events for a doctoral capstone student in the NICU, as well as appropriate expectations based on this student's performance. The student was eager to gain hands-on experience in the NICU setting during her doctoral capstone experience and was able to achieve at least beginner level competency on the items on the NANT Practice Competencies during her experience. However, the student did not manage a full caseload of patients by the end of the doctoral capstone experience. As evidenced by the literature, these expectations would likely be too high for a student in this setting and were not placed on this student during her experience (AOTA, 2018; Hardy et al., 2021).

The close mentorship provided during this OTD capstone experience and project, coupled with the use of the NANT Core Competencies to guide learning, were helpful in creating a successful experience. Similarly, Stephenson and colleagues (2020) found that effective design of the capstone project curriculum and mentorship are the two main components to a successful doctoral capstone experience and project. The mentorship process for the OTD capstone experience is similar to fieldwork experiences in some ways with opportunities for collaboration, progression of independence and expectations, and similar evaluation processes (AOTA, 2022). However, the doctoral capstone experience and project allows for deeper mentorship opportunity with the project component of the experience as it should be beneficial to both parties (Stephenson et al., 2020). The project allows for increased collaboration with the mentor on topics other than hands-on care such as research, dissemination, education, and program development (AOTA, 2022). The mentor and student can merge their ideas in the creation of the project to ensure the final product is successful for both the student and site (Stephenson et al., 2020).

Occupational therapists are expected to undergo thorough training and mentoring prior to independent practice in the NICU (AOTA, 2018). Additional training, mentoring, and education would likely be required for this student to obtain a full-time position in a NICU setting after graduation. However, with the goal of developing in-depth skills, the OTD degree should support students in obtaining full-time positions in specialized settings based on their focus areas, capstone projects, and capstone experiences.

Future Research

In this paper, the student chose to focus on gaining clinical skills and engaging in program development (program enhancement), which aligned with findings from Kemp and colleagues (2020) whose research demonstrated that these were the two most popular focus areas among OTD students. Future research could include NICU doctoral capstone experiences and projects that focus on different focus areas outlined by ACOTE (leadership, advocacy, education, research, theory development, administration, program, and policy development and/or clinical practice; ACOTE, 2018). Doctoral capstone experiences and projects that are focused on research or administration, for example, may have their own unique structure that differ greatly from the structure outlined in this paper.

While the NANT Core Competencies were beneficial for the experiential component of the doctoral capstone, there were still challenges that arose. Additional research regarding use and effectiveness of the NANT Core Competencies for students, as well as full time NICU staff, would be helpful. For example, exploring adaptations to the document for use with students to simplify could be less overwhelming. This research would provide more direction to current neonatal therapists on how to best use this document, as well as improve understanding of the benefits of using this document for education and training the student populations.

Additional research surrounding student experiences in the NICU from other disciplines (i.e., physical therapy and speech-language pathology) and use of the NANT Core Competencies, as well as student involvement in clinical care, would also be beneficial. Such research would provide broader perspectives from other disciplines on this topic. Furthermore, qualitative research projects regarding perspectives from both students and mentors would provide depth. A project related to student perspectives of completing their doctoral capstone experience in the NICU would likely provide important information for site mentors and OT programs regarding the benefits and challenges of pursuing a capstone experience in this setting. Specifically, this form of research may improve understanding of students' emotional well-being during a NICU capstone experience or mentors' opinions on students' ability to participate in clinical care, for example.

While this paper contributes to the evidence surrounding the doctoral capstone experience and project, a larger scale research project with a greater sample of NICU OTD students would be helpful in gathering ideas for potential projects and how mentors can guide students in the NICU to achieve the skillsets outlined by the ACOTE. A larger project that covers several OTD students in a variety of NICU settings would improve transferability and generalizability of any findings.

Limitations

While this paper is helpful in providing a sample doctoral capstone experience and project in the NICU, as well as insights into use of the recently published NANT Core Competencies, there are some limitations that exist. First, this OTD capstone experience took place in a small NICU (23 beds) where there was only one full time therapist present. This NICU was open to hosting students of all disciplines and encouraged and promoted hands-on learning from students. However, many NICUs are not as openly supportive of students, which may make it difficult to replicate this doctoral capstone experience and project or utilize the NANT Core Competencies with students in other facilities.

There were no formal methods of data collection other than monitoring the timeline of events, recording student competence in clinical skills, and detailing the weekly mentor/mentee meetings during this doctoral capstone experience and project. Structured surveys, interviews, or assessments related to student performance and/or perspectives would add to the depth and impact of this project.

Additionally, the lack of published research on use of the NANT Core Competencies, as well as OTD students in the NICU, posed difficulty in creating an effective project. The mentor consulted available literature as needed, but still faced hurdles related to creating expectation standards, structured timelines, and appropriate progression of clinical skills as described throughout this paper.

The timeline, or progression, of activities described in this paper may not be feasible with all OTD students depending on their background experience and ability to manage the NICU setting. The role of the occupational therapist in the NICU can also vary across units; therefore, certain activities, such as participation in interdisciplinary rounds, as well as items on the NANT Core Competencies may or may not be relevant in other units. However, since capstone experiences and projects are highly individualized, it would be challenging to create a generic timeline for OTD capstone students in the NICU.

Implications for Occupational Therapy Education

Faculty in OT programs should openly consider the NICU setting as a feasible site for completion of the doctoral capstone experience and project. This paper provides a sample timeline of a successful doctoral capstone experience and project as well as suggested resources to guide mentorship in this setting. Additionally, faculty in OT programs should consider finding appropriate fieldwork opportunities that would support an OTD student in preparing for a NICU capstone, such as pediatrics or critical care, if they have expressed interest in this field. When a student is matched with a NICU site, OT faculty or site mentors may choose to recommend the NANT Core Competencies as a method of evaluation and guidance for mentoring a doctoral student who is gaining clinical skills in the NICU setting. OT academic programs should collaborate with and educate NICUs on the details of the OTD capstone experience and project. With increased education and collaboration, OTs who work in the NICU may be more likely to consider offering mentorship services to doctoral capstone students as there can be mutual benefits (i.e., program development, research, policy creation) from mentoring a capstone student.

Conclusion

This capstone experience allowed an OTD student to gain both clinical skills and program development skills related to enhancing/improving an existing orientation process in the NICU setting. The clinical skills, or experiential component, provided the student with opportunities to gain specialized clinical and interdisciplinary skills. While challenges arose with low parent presence, difficulties navigating the NANT Core Competencies, and varying caseloads, the student demonstrated an ability to manage a portion of a full caseload in the NICU setting by the completion of the fourteen-week experience. The program enhancement, or capstone project, supported this student in gaining new skills through researching and learning about developmentally appropriate care. The student then was able to enhance communication skills by teaching current nursing staff about the new staff education program and gathering feedback on the educational materials. Unfortunately, the student did not have opportunity to utilize the

educational materials to orient a new nursing staff member to the unit. The site mentor also benefited from this capstone project as there now exists a succinct document for new staff education that can be utilized to increase carryover of developmentally appropriate care across the interdisciplinary team.

Occupational therapy faculty should support OTD candidates who are interested in pursuing capstone experiences in the NICU setting as this is a unique opportunity to gain highly specialized skills with mentorship. Efforts to match OTD students in the NICU would support students who are interested in pursuing careers in this setting by allowing them to gain related skills before entering the workforce. However, as described in this paper, the capstone experience is likely not sufficient to fully prepare a student for full time practice in the NICU setting. Ongoing education, training and mentoring would be necessary for a new OTD program graduate to attain competency in this setting (AOTA, 2018). Faculty can foster connections with local NICUs by educating NICU healthcare providers on the benefits of mentoring an OTD student (i.e., opportunities for program development, research, theory development, advocacy within the unit). Any of the focus areas may also benefit the NICU in which the capstone experience and project was completed through new programs, practices, or resources. NICU therapists who have the opportunity to partner with OTD students interested in NICU practice should consider doing so to allow students to explore the niche area of neonatal therapy in an environment with mentorship and supervision to support their success and prepare them for future practice. Further, NICU therapists are able to guide and mentor the next generation of neonatal therapists throughout the capstone experience. The NANT Core Competencies can be utilized as a guide to not only assess and quantify student knowledge, but outline the capstone experience.

Overall, by providing information related to potential outcomes of the doctoral capstone experience and project, this paper begins to fill a gap in the literature related to the OTD that was highlighted by Kiraly-Alvarez and colleagues (2022). This paper provides evidence that it is possible to successfully complete a doctoral capstone project and experience in the NICU.

References

Accreditation Council for Occupational Therapy Education. (2018). Accreditation Council for Occupational Therapy Education (ACOTE) standards and interpretive guide. *American Journal of Occupational Therapy, 72,* 1-83. https://acoteonline.org/wp-content/uploads/2020/10/2018-ACOTE-Standards.pdf

American Occupational Therapy Association. (AOTA). (2022*).* Occupational therapy doctoral capstone: Purpose and value. *American Journal of Occupational Therapy*, *76*. ttps://doi.org/10.5014/ajot.2022.76S3004

American Occupational Therapy Association. (AOTA). (2018). *Occupational therapy's role in the neonatal intensive care unit*. https://doi.org/10.5014/ajot.2018.72S204

de Castro, K. N., Benson, J. D., Thomas, H., Manuel, V., & Mitra, S. (2023). Feasibility of implementing a Modified SENSE Program to increase positive sensory experiences for preterm infants in the Neonatal Intensive Care Unit (NICU): A Pilot Study. *Physical & Occupational Therapy In Pediatrics*, *43*(1), 1-20. https://doi.org/10.1080/01942638.2022.2104150

Dewire, A., White, D., Kanny, E., & Glass, R. (1996). Education and training of occupational therapists for neonatal intensive care units. *American Journal of Occupational Therapy*, *50*(7), 486-494. https://doi.org/10.5014/ajot.50.7.486

Hardy, M., Govender, P., & Naidoo, D. (2021). Novice occupational therapist's experience of working in neonatal intensive care units in KwaZulu-Natal. *South African Journal of Occupational Therapy*, *51*(1), 27-35. https://doi.org/10.17159/2310-3833/2021/vol51n1a5

Kemp, E., Domina, A., Delbert, T., Rivera, A., & Navarro-Walker, L. (2020). Development, implementation and evaluation of entry-level occupational therapy doctoral capstones: A national survey. *Journal of Occupational Therapy Education*, *4*(4), 11. https://doi.org/10.26681/jote.2020.040411

Kiraly-Alvarez, A. F., Clegg, A., Lucas Molitor, W., & Friberg, D. (2022). An exploration of the occupational therapy doctoral capstone: Perspectives from capstone coordinators, graduates, and site mentors. *Journal of Occupational Therapy Education*, *6*(1), 14. https://doi.org/10.26681/jote.2022.060114

Milette, I., Martel, M., Ribeiro da Silva, M., & Coughlin McNeil, M. (2017). Guidelines for the institutional implementation of developmental neuroprotective care in the neonatal intensive care unit. Part A. *Canadian Journal of Nursing Research*, *49*(2), 46-62. https://doi.org/10.1177/0844562117706882

NANT Professional Collaborative. (2022). Practice Competencies for the Neonatal Therapist. *National Association of Neonatal Therapists* *https://neonataltherapists.com/competencies/*

Rapport, M. J., Sweeney, J. K., Dannemiller, L., & Heriza, C. B. (2010). Student experiences in the neonatal intensive care unit: Addendum to neonatal physical therapy competencies and clinical training models. *Pediatric Physical Therapy*, *22*(4), 439-440. https://doi.org/10.1097/PEP.0b013e3181fac33e

Stephenson, S., Rogers, O., Ivy, C., Barron, R., & Burke, J. (2020). Designing effective capstone experiences and projects for entry-level doctoral students in occupational therapy: One program's approaches and lessons learned. *Open Journal of Occupational Therapy*, *8*(3), 1. https://doi.org/10.15453/2168-6408.1727

Vergara, E., Anzalone, M., Bigsby, R., & Gorga, D. (2006). Specialized knowledge and skills for occupational therapy practice in the neonatal intensive care unit. *American Journal of Occupational Therapy*, *60*(6), 659. https://doi.org/10.5014/ajot.60.6.659