

PRE-SERVICE TEACHER PERCEPTIONS ON THE EDUCATION OF CHILDREN
WITH CRITICAL ILLNESS AND PREPARATION TO TEACH MATHEMATICS TO
CHILDREN WITH CRITICAL ILLNESS

by

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ABSTRACT

This research study presents data on three pre-service elementary teachers in an ethnographic study outlining the experiences of the pre-service elementary teachers during the semester of their first education internship. During the first internship semester, the three pre-service teachers completed a 12-week internship placement, 6-weeks at a hospital-based school program and 6-weeks at a brick-and-mortar public school, and three co-requisite courses (i.e., elementary mathematics methods, diagnostic and corrective reading, and teaching exceptional students). The data collected includes the pre-service teacher applications to participate in internship at the hospital-based school program, pre-interview questionnaire, end-of-day reflections, post-interview questionnaire, and background information questionnaire. The questions of study were: (1) How prepared do pre-service teachers feel to educate children with critical illness and address the needs of children with critical illness in the classroom as a result of completion of a 6-week internship at a hospital-based school program? (2) How prepared do pre-service teachers feel to teach mathematics to children with critical illness after completing a 6-week internship at a hospital-based school program? The results show that the participants' reported an increase in preparation to teach children with critical illness and teach them mathematics, but their views about the education of children with a critical illness and mathematics remain consistent. Thus, the results illuminated two themes across all participants: 1) children as a homogenous group 2) procedural mathematics. Study implications include the need to add specific professional learning on the educational impacts of a critical illness and the need to involve pre-service teachers in

reflective practices of what they learn and observe and how that informs actions in the classroom.

Key words: critical illness, chronic illness, complex illness, children, illness, illness and school, illness and education, pre-service teachers, teacher preparation program, education internship, teaching mathematics, procedural mathematics, mathematics practices.

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CHAPTER ONE: INTRODUCTION

Critical Illness and Children

Critical illness is best defined as a life-threatening or limiting diagnosis that is coupled with long-term treatment (Hinton & Kirk, 2015; Nabors, Little, Akin-Little, & Iobst, 2008; Nickels & Cullen, 2017). Because of the ambiguity of the definition of a critical illness, studies have reported different percentages of children living with a critical illness in the United States. Hinton and Kirk (2015) and Nabors et al. (2008) reported a prevalence rate of 10% to 20% of children, while Bethell et al. (2011) reported 43% of children with a critical illness. The terms “chronic” and “life-threatening health conditions” have also been used to describe the same population, thus for this paper, all terms (i.e., chronic, critical, and life-threatening illnesses) refer to the same population of children. The critical illnesses most commonly, and historically studied in the scope of education are asthma, type 1 diabetes, and sickle cell disease (e.g., Boyle, Baker, & Kemp, 2004; Cunningham & Wodrich, 2006; Dyson, Atkin, Culley, & Dyson, 2007; Getch & Neuharth-Pritchett, 2007). However, other critical illnesses children may include, but are not limited to arthritis, cancers, cystic fibrosis, and HIV/AIDS (MedlinePlus, 2019).

The needs of children with critical illness vary greatly depending on the type of critical illness and treatments the child is undergoing. A large focus in the literature is on cognitive delays or disabilities related to disease and treatment. Cognitive function and academic abilities are affected by the age of the child at the time of diagnosis, length of treatment, type of treatment, and changes to the brain (Anderson & Kunin-Baston, 2008;

Nickels & Cullen, 2017). Treatments and critical illnesses that deal directly with the brain or spinal cord have the highest risk for latent cognitive effects; these also tend to greatly affect and hinder academic performance, as well as psychosocial skills (Berger, Valenzuela, Tsikis, & Fletcher, 2018; Brown, Bolen, Brinkman, Carreira, & Cole, 2011; Kirkpatrick, 2015; Nickels & Cullen, 2017). In general, children with critical illness do not academically perform as well as their healthy peers. They also tend to experience developmental delays, have lower socioeconomic status, and lower academic achievements as compared to healthy peers (Kirkpatrick, 2015).

Given the many types of critical illness, cognitive delays or disabilities are not necessarily a hallmark of a critical illness. In fact, many children with a critical illness still have the cognitive capacity and abilities of that of a healthy child but still experience lower academic performance (Duggan et al., 2004; Sexson & Madan-Swain, 1995). Adjusting to the lifestyle of a critical illness affects schooling in many ways (Sexson & Madan-Swain, 1995). Critical illness may cause pain, lethargy or fatigue, nausea, or general discomfort which can affect schooling causing a lack of participation in school-related activities (Sexson & Madan-Swain, 1995). On the other hand, returning to and having regular attendance at school aids children in creating normalcy and promoting growth (Brown et al., 2011). Depending on the diagnosis, absenteeism from school is inevitable, and affects children negatively in regards to education (e.g., cancer diagnosis, Brown et al., 2011). Chronic absences are largely correlated with poorer academic performance in comparison to those children with few absences (Balkis, Arslan, & Duru, 2016; McCluskey, Bynum, & Patchin, 2004; Moonie, Sterling, Figgs, & Castro, 2008). However, poorer academic performance is not the only affect absenteeism has on a child.

The absences from school can lead to difficulties building appropriate peer relationships and learning proper social skills (Duggan et al., 2004; Sexson & Madan-Swain, 1995).

Some types of critical illnesses are more prevalent in marginalized populations causing the needs of the child to become two- and three-fold. These marginalized populations discussed in education often refer to those of lower socio-economic status or from minority groups whom likely will be categorized as an at-risk student and begin schooling at an educational disadvantage (Duggan et al., 2004). Common examples of critical illnesses that are more prevalent in marginalized populations include sickle cell anemia which effects only African American and Asian populations, and HIV/AIDS, which disproportionally effects African American and Hispanic populations (Nickels, Cullen, Miller, & Joe, 2017). Eighty-four percent of all new HIV/AIDS diagnoses in the 13-19 age bracket are African American or Hispanic males (Duggan et al., 2004, Nickels et al., 2017).

School Experiences and Outcomes

Historically, there has been minimal research related to schooling and children with critical illness (Irwin & Elam, 2011). However, in the recent few decades, there has been a steady increase of literature on the topic (e.g., Berger et al., 2018; Closs, 2000; Daly, Kral, & Brown, 2008; Forrest, Bevans, Riley, Crespo, & Louis, 2011; Irwin & Elam, 2011; Nickels & Cullen, 2017). This body of research shows that children facing critical illness do not receive adequate education despite the fact that they are legally entitled to an education equal to that of their healthy peers (Gibbon, Cline, Schwilk, Hosfelt, & Bateman, 2016; Irwin & Elam, 2011; Nickels & Cullen, 2017; Sexson &

Madan-Swain, 1995). Irwin and Elam (2011) stated that, “educators are among the group of professionals accountable for ensuring the quality of life experiences for students living with chronic conditions” (p. 67). Nickels et al. (2017) noted that the education received by children with critical illness is still separate (e.g., education through virtual school or other means not with peers) and unequal (e.g., rigor, collaboration) despite the passage of *Brown v. Board of Education* in 1954.

Although it is known that children with critical illness, particularly those spending substantial portions of their time in the hospital, do not often receive an equitable education. Several laws are in place to oversee their educational opportunities (e.g., Every Student Succeeds Act, 2015; Individuals with Disabilities Education Act, 2004; Section 504 of the Rehabilitation Act of 1973; Irwin & Elam, 2011; Nickels & Cullen, 2017). Unfortunately, even when adhered to, the laws protecting children with critical illness fall short of ensuring appropriate education (Nickels & Cullen, 2017). For example, according to Rule: 6A-6.03020 of the Florida Department of Education (2017), a physician from the state of Florida must report that a child will be expected to miss at minimum fifteen consecutive days of school in order to receive hospital homebound educational services. Students experiencing school absences of a duration less than the fifteen consecutive school days, yet recurring, become overlooked. For instance, a student missing 12 consecutive school days, and then another 10 consecutive school days will be neglected by this rule for failing to meet the required 15 consecutive days. Gibbon et al. (2016) identify that children with critical illness have legal access to appropriate educational services through either Section 504 in the Rehabilitation Act or the category of Other Health Impairments in Individuals with Disabilities Education Act (IDEA,

2004). Children may receive services under these categories if they meet all of the following criteria: 1) have an acute or critical illness; 2) the illness causes depressed strength, vitality, or alertness, therefore leading to a lack of alertness in educational environments; 3) the illness causes a decrease in academic performance; and 4) displays a need for services (Grice, 2002). Therefore, children with a critical illness potentially meet all criteria and are eligible for services. Section 504 in the Rehabilitation Act states that children with disabilities are able to have the same rights as those without a disability and they cannot be discriminated against (Gibbon et al., 2016). IDEA is a law that ensures that all children with disabilities have access to a free and public education and also stipulates that children with critical illness must be provided with necessary health-related supports and services by their home school (Duggan et al., 2004). The critical illness a child has may not qualify the child to be designated for special education services, but the school's considerations of the needs of the child is integral to the child's academic success (Sexson & Madan-Swain, 1995). Unfortunately, the education children with critical illness receive is typically sub-par in regards to both the quantity and the quality of the education received by typically developing children (Irwin & Elam, 2011; Tseng & Pluta, 2016).

Children with critical illness often receive education through hospital homebound programs, social services, or local volunteer organizations at the hospital or school (Closs, 2000; Nickels et al., 2017). However, there are some children who do not receive any educational services (Irwin & Elam, 2011). Once a child re-enters school, there is an expectation that the child be on grade-level, however when the education is not equal, that expectation becomes invalid. The education provided in the school setting for

children with critical illness often lacks effectiveness for a variety of reasons. These reasons include the focus on inabilities and limits rather than ability and aspirations, ineffective and inappropriate communications, lack of research on the factors influencing academic and school achievement, disruption and change in peer relationships, and regression in the child's cognitive processes and physical abilities (Closs, 2000). Furthermore, the communication between the child's healthcare providers and the child's respective school and educators is essentially non-existent (Brown et al., 2011; Fellus & Fellus, 2016). It is vital for educators to understand the specific effects the illness and treatments have on the child, and must be prepared to provide necessary accommodations and modifications to ensure success both academically and socially (Fellus & Fellus, 2016). Thus, it is up to the teacher to understand the needs of the child and meet such needs.

Teacher Preparation to Meet the Needs of Children with Critical Illness

Duggan et al., (2004) stated that in the 1990s, research on education and children with critical illness increased, however, the studies were not written for teachers, and therefore not read by them. The authors also found several studies (e.g., Johnson, Lubker, & Fowler, 1988; Irwin, Elam, Merianos, Nabors, & Murphy, 2018) that reported that the results of their surveys led to the conclusion that teachers were not prepared to meet the needs of critically ill children in the classroom (Duggan et al., 2004). Johnson et al. (1988) surveyed more than three hundred public school teachers in North Carolina and found that 76% of the teachers taught at least one child with a critical illness during their career, 36% reported completion of academic coursework preparing them to educate

children with critical illness, and only 7% reported that the requirements to obtain a teaching certification were sufficient to meet the needs of this population of students. Since this study in the late 1980s, Irwin et al. (2018) stated that in 2004, a survey was conducted and found that 59% of teachers reported that they received no academic coursework and 64% reported no professional learning was offered through the schools or district both in regards to children with critical illness. However, nearly 99% of the teachers reported that they knew a student with a critical illness (Irwin et al., 2018). Overall, teachers' perceptions of preparation to educate and care for children with critical illness is that they feel they are not prepared to properly meet the needs of children with critical illness in the classroom due to a lack of proper knowledge.

Attitudes Towards and Teacher Knowledge Necessary for Teaching Mathematics

Research pertaining to pre-service teachers largely focuses on their anxieties, apprehension, negative attitudes, mathematical content knowledge, and pedagogical knowledge, which are explored in this section. A teacher's beliefs regarding mathematics impacts the way they teach more than their beliefs about education and pedagogy (Laursen, Hassi, & Hough, 2015). These beliefs were largely shaped by the teacher's personal experiences with mathematics while in school themselves. Many pre-service teachers also state an apprehension for teaching mathematics (e.g., Brady & Bowd, 2006; Bekdemir, 2010; Liu, 2008). Other studies have found that specifically in pre-service elementary teachers, there is a lack of appropriate knowledge and negative attitudes towards teaching mathematics (e.g., Brady & Bowd, 2006; Dornoo & Wiest, 2017; Liu, 2008). The result of an apprehension to learn mathematics, is a likelihood of using

ineffective methods while teaching, and inadvertently transferring negative attitudes towards mathematics to students (Brady & Bowd, 2006; Cady, Meier, & Lubinski, 2006; Liu, 2008). Liu (2008) explains that anxiety towards mathematics is a learned behavior that is transferred and worsens over time, leading many students to avoid mathematics during their high school years. Some of these students then continue to become pre-service elementary teachers who still carry this mathematics anxiety to college coursework and beyond (Liu, 2008).

Inadequate knowledge of mathematical content not only leads pre-service elementary teachers to feel unprepared, but it also leads to ineffective teaching (Chamoso, Cáceres, & Azcárate, 2012). An understanding of common mathematics (mathematics used outside of the scope of teaching) is not sufficient (Max & Amstutz, 2019). Content knowledge is defined by Shulman (1986) as the knowledge and organization of such knowledge by the teacher that extends beyond memorization of facts and concepts to have the ability to explain the “why” and its connections to the world and other disciplines. Effective teaching requires the teacher to have a broad and deep understanding of mathematics content, along with an understanding of the role of inquiry in the subject matter (Niess, 2005). Teachers must be able to support exploration of mathematical ideas by the students, further displaying the need beyond rote skill and procedural knowledge (Niess, 2005; Kajander, 2010). Unfortunately, the experiences many teachers had in their own schooling focused on procedural knowledge and fluency with large gaps in developing conceptual knowledge and problem-solving (Laursen et al., 2015). The combination of the common mathematics knowledge, specialized content knowledge, knowledge of mathematics studied previously and in further grades, and

knowledge of proper pedagogy constitutes the mathematics knowledge needed for effective teaching (Laursen et al., 2015; Max & Amstutz, 2019; Shulman, 1986). The content expected of teachers to prove proficiency can relate to the standard domains, Max and Amstutz (2019) explain that elementary pre-service teachers must hold a depth of knowledge on the domains from the Common Core State Standards (CCSS; i.e., Counting & Cardinality, Operations & Algebraic Thinking, Number & Operations in Base Ten, Number & Operations with Fractions, Measurement & Data, and Geometry, p. 1). When addressing these content areas in pre-service teacher preparation programs, it is vital that to change the existing beliefs of the pre-service teachers and position them to appropriately educate, they must be guided in creating new mathematical habits (Laursen et al., 2015). Such mathematical habits include learning how to reason with and make sense of mathematics, focus on inquiry and discovery learning, questioning, and recognizing and applying patterns (Laursen et al., 2015).

While content knowledge is important, pedagogical content knowledge is also crucial (Ball, Thames, & Phelps, 2008; Hill, Ball, & Schilling, 2008; Hill, Schilling, & Ball, 2004; Phelps & Howell, 2016; Shulman, 1986). Pedagogical content knowledge refers to the knowledge of teachers that relates how to appropriately teach the content (Ball et al., 2008; Shulman, 1986). Pedagogical content knowledge allows teachers to understand the background knowledge and prior conceptions students are likely to have (Ball et al., 2008; Hill et al., 2008; Shulman, 1986) and the most effective teaching strategies (e.g., representations, analogies, examples, demonstrations, illustrations) for the specific content (Shulman, 1986). Pre-service elementary teachers often enter their program with the conception that teaching mathematics is properly done through the

traditional style of lecture because the knowledge to impart is concrete and fixed, and characteristic of their own schooling experiences (Swars, Hart, Smith, Smith, & Tolar, 2007). The common structure of the teacher preparation program calls for the pre-service teachers to adjust their beliefs of how to teach mathematics to a constructivist view (Swars et al., 2007). Max and Amstutz (2019) furthered this idea by considering the content (i.e., CCSS domains) to show where pre-service teachers needed to have a depth of knowledge in content but also the mathematical concepts of which they learn how to “do mathematics” and “develop mathematical habits of mind” (p.1).

Purpose of the Study

The research presented in this study investigates the intersection of both of these issues— the beliefs about preparation of preservice teachers to teach children with critical illness and to teach mathematics. In regards to mathematics education, Nickels (2015) noted that,

children with long-term disorders may feel that they lack the capacity to control their mathematical performance, lose interest in mathematical work, perceive mathematics as having little immediate or long-term value, and feel increasingly socially isolated when returning to the regular school environment. (p. 2)

When the aforementioned happens, children become averse to mathematics and fail to see the value in having a mathematics education. The challenge then becomes how to teach mathematics effectively so that each child feels capable, valued, and motivated. For children with critical illness, education has traditionally been delivered in the form of remedial programs or through direct instruction in areas of need (Nickels & Cullen,

2017). Direct instruction disserves them in real-world and application tasks and the students' performance on real-world and application tasks is far more crucial to the mathematical learning of a child as those tasks best develop a rich conceptual understanding of mathematics (Kelley & Knowles, 2016; Miller & Hudson, 2006; Milton, Flores, Moore, Taylor, & Burton, 2019; Stevens, 2013).

Research Questions

To examine the intersection of these issues, this study asked the following questions: (1) How prepared do pre-service teachers feel to educate children with critical illness and address the needs of children with critical illness in the classroom as a result of completion of a 6-week internship at a hospital-based school program? (2) How prepared do pre-service teachers feel to teach mathematics to children with critical illness after completing a 6-week internship at a hospital-based school program? To address both questions, this research study will follow the same group of pre-service teachers.

The subsequent chapters will review the related literature and expound upon the topics briefly discussed in the introduction as well as explore the research method of the study, results, discussion and conclusion. The over-arching topics of focus in the literature review are teacher beliefs about children with critical illness, their perceptions of preparation to meet the needs of a child with critical illness in the classroom, and teacher perceptions on preparation to teach mathematics. The study design is an ethnography where data from the hospital-based school program application, interviews, end-of-day reflections, and background questionnaire were analyzed using the constant comparative approach to determine the perceptions of the pre-service teachers and to

identify common themes among the participations. The methods chapter includes a comprehensive description of the hospital-based school program, the participant characteristics, hospital-based school program application, the interview questionnaires, end-of-day reflections, background questionnaire, and technical aspects of the study procedures including a description of ethnography and its application to this study, theoretical framework, data collection, and analysis. The results and discussion chapter present the data in an ethnographic form and analysis of each participant responses. This section also includes a discussion identifying two common themes among the participants and connects the results to related literature. The conclusion chapter summarizes overall findings of the study, limitations, and study implications.

CHAPTER TWO: LITERATURE REVIEW

The literature relating the scope of topics in this study include teacher beliefs and preparations towards teaching children with critical illness and teaching mathematics. The organization of this literature review includes a focus on the topics pertaining to beliefs and preparation of teachers to teach children with critical illness in three sections addressing teachers' beliefs about children with critical illness, development and interventions for teachers regarding children with critical illness, and teachers' perceptions of their own preparation to teach children with critical illness including shifts in perceptions post-professional learning. The first portion of the literature review includes in-service teachers rather than pre-service teachers because the existing literature does not include that population for this topic of study. The second portion of the literature review specifically examines pre-service teachers, primarily at the elementary level, perceptions of teaching mathematics generally. It is well documented in the literature that anxieties and attitudes pre-service teachers have towards mathematics, their pedagogical and content knowledges, and perceptions on teaching mathematics contribute to preparation and thus, are organized in subsections to address the factors as well as preparation to teach mathematics to children with critical illness.

Teacher Beliefs about Children with Critical Illness

There are many types of critical illnesses that will consequently be presented within the classroom. The uncertainty and the unknown regarding children with critical illness and their diagnosis has often led to teachers feeling unprepared to meet health,

social, emotional, and academic needs (Brown et al., 2011; Irwin et al., 2018). Many teachers do not understand the effects of medical treatments, and do not have a realistic sense of what to expect in terms of the child's social, physical, and academic capabilities and therefore the focus tends to be on the child's quality of life (Brown et al., 2011). Irwin et al. (2018) explained that this lack of understanding also leads teachers to have misperceptions and succumb to stereotypical attitudes and responses. When asked to express types of helpful information needed, most teachers indicated wanting to understand the child's learning abilities and capabilities, physical and emotions impacts, and medical information (Brown et al., 2011). Other related areas of need expressed by teachers, included the need of a person to be an educational liaison, and have a comprehensive understanding of the realities surrounding the child returning to school. In a study focused on children with diabetes, the teachers felt concerned about their responsibilities to medically care for the child due to their lack of knowledge and experience with caring for children with diabetes (Boden, Lloyd, Gosden, Macdougall, Brown, & Matyka, 2012). These teachers also recounted feelings of high anxiety and apprehension towards having a child with diabetes in the classroom that stem from the lack of abilities to properly care for the child medically. Furthermore, in properly caring for the child's medical needs, teachers are concerned with maintaining appropriate student-teacher interactions, and fear the time the care will take may cause a disruption to the class causing an onset of behavior issues (Boden et al., 2012). Irwin et al. (2018) stated that the likelihood of a medical emergency occurring in the classroom thus creating liability risks is extremely low.

The studies that conduct pre- and post- assessments around professional learning, defined as teacher learning that directly impacts teaching practices (Driskell, Bush, Ronau, Niess, Rakes, & Pugalee, 2016) found that teachers are anxious and perceive themselves as unequipped in knowledge and resources to meet the needs of children with critical illness (e.g., Baskin et al., 1983; Brown et al. 2011; Duggan et al., 2004; Pallmeyer, Saylor, Treiber, Eason, Finch, & Carek 1986). In contrast, Berger et al.'s (2018) survey of nearly 400 educational professionals regarding their beliefs of children with critical illness, led them to conclude that a majority of the education professionals disagreed that children with a critical illness face obstacles or barriers related to schooling and achievement, nor did they feel that the children with critical illness needed additional attention at school (Berger et al., 2018). The authors acknowledged that the unawareness of the barriers children with critical illness face is largely due to the lack of knowledge school professionals have regarding critical illness.

Four Historical Conceptualizations of Children and Childhood

Nickels and Cullen (2017) described four historical conceptualizations of children and childhood that may underlie teachers' beliefs about children with critical illness and their capacity to engage in schoolwork. Childhood has been viewed in Western culture as a time of carefree, happy living where the child holds no responsibility and is under the protection and guidance of another termed as the sacralized child (Berman, 2003; Edwards, 2009; Nickels & Cullen, 2017). When considering the supposed qualities of the sacralized child, the antithesis of this view of childhood is a life with disease, including painful, aggressive treatments. This opposing and largely ignored childhood of life with

disease, has led to gaps in related research in the education field, particularly mathematics (Nickels & Cullen, 2017). Teachers of children with critical illness attempt to relieve children of this burden but ultimately provide a disservice through limiting their access and participation in education (Nickels & Cullen, 2017).

The second historical conceptualization of childhood is that of the “irrational and incompetent child” (Nickels & Cullen, 2017, p. 24). In this conceptualization, children are sheltered from the stressors and woes of adulthood, as they are viewed as not being of proper maturity. The lack of proper maturity in children suggests they are incapable of making reasoned decisions causing adults (Edwards, 2009), including teachers, to ignore children as decision makers in considering abilities and importance of mathematics (Nickels & Cullen, 2017). Children with critical illness may experience disempowerment through leadership of medical staff and parents through treatments (Nickels & Cullen, 2017). This disempowerment should not be reflected onto the child’s right to understand or take part in their medical care (Coyne, 2006) nor the child’s capabilities to perform meaningful and complex mathematics tasks (Nickels & Cullen, 2017). The opportunity to engage in rich and complex mathematics must be provided, along with needed interventions to support academic achievements (Nickels & Cullen, 2017).

Another view of childhood rests on the fact that children will eventually become adults, therefore their lives are overshadowed by the concept of becoming productive and valued upon reaching adulthood, rather than simply “being” (Berman, 2003; Nickels & Cullen, 2017). Critical illness and treatments may lead to permanent cognitive disabilities (Anderson & Kunin-Baston, 2008), preventing some children from fully becoming self-sufficient in adulthood, or the grim possibility of never reaching adulthood; however,

Nickels and Cullen (2017) argued this should not preclude these children from educational opportunities. These situations under this conceptualization result in the devaluing of the child's life and cultivate perceptions of inabilities and limitations (Coyne, 2006; Nickels & Cullen, 2017).

The final conceptualization of childhood claims that childhood is homogenous – devoid of any diversities or individualities; this conceptualization causes ignorance towards experiences of oppression, inequalities, and discrimination (Berman, 2003; Nickels & Cullen, 2017). In its most general definition, by the Merriam-Webster dictionary (2019), homogenous characterizes a group (in this case children) to be of the same nature. The field of education, particularly special education, a plethora of literature on differentiation and varying needs of children exists (e.g., Deorukhkar, 2018; Domina, McEachin, Hanselman, Argarwal, Hwang, & Lewis, 2019; Heidorn & Mosier, 2019; Webster & Blatchford, 2019) however, the body of literature pertaining to children with critical illness is limited. Viewing children as a homogenous group supports the historical idea of “one size fits all” (Carter, 2009) ignoring the diverse needs of children. Nickels and Cullen (2017) stated the implications of the ignorance towards children with critical illness are that these children remain invisible in terms of education. The researchers backed this claim by stating that the existing number of articles regarding the education of children with a critical illness is sparse, restricting the ability of existence of evidence-based practices for children with a critical illness (Nickels & Cullen, 2017).

Teacher Professional Learning and Intervention Regarding Children with Critical Illness

Duggan et al. (2004) provided professional learning for teachers in Atlanta, Georgia from the Cobb County School District in effort to educate and prepare teachers and school personnel to have a child with a critical illness in the classroom. Ninety-one school personnel from elementary, middle and high schools voluntarily took part in this study with 89% being teachers or paraprofessionals. The professional learning program consisted of three components created by the school psychologist in the school district. The components of the professional learning included in-service professional learning that addressed the cognitive, behavioral, social, and emotional aspects of critical illness in children, resources (e.g., local contacts and national organizations) for the teachers and school staff, and a website developed for use through the duration of the professional learning and for a period after conclusion (Duggan et al., 2004). The website housed the topics discussed during the in-service professional learning and provided additional resource links and information. The types of critical illnesses addressed through the professional learning included: “sickle cell anemia, asthma, diabetes, cancer, fetal alcohol syndrome, and HIV/AIDS” (Duggan et al., 2004, p. 155). The pre- and post-test in this study included a set of questions to assess for knowledge of facts about critical illness, the perceived confidence of the participant in working with a student with a critical illness, and the participant’s perceptions of students with critical illness. After analyzing the pre- and post-test it was found that all teachers, including those with experience with having a child with critical illness in the classroom, had significant gains in perceptions of preparation to meet the needs of and address the complexities of children with critical illness as a result of the professional learning. Though this study focused on several

critical illnesses, the remaining studies discussed specifically focus on professional learning for children with cancer.

Brown et al. (2011), along with medical personnel developed and implemented an online professional learning designed to prepare teachers to meet the needs of children with cancer. The first body of participants included 528 certified K-12 teachers, with two-thirds from the band of K-8, in an unspecified school district in the Southeastern United States that completed the needs assessment portion, voluntarily. In the needs assessment, the participants documented their experiences with, or without children with cancer in the classroom and completed a rating scale to indicate levels of knowledge of childhood cancer and treatments, preparation to handle the complexities that accompany having a child with cancer in the classroom, and perception of need in terms of additional knowledge to feel appropriately prepared (Brown et al., 2011). The needs assessment was then used to create an online professional learning that consisted of six modules covering the topics of reentering school, medical information on and effects of cancer treatments and diagnosis, psychological impacts, impacts on learning and cognitive developments, and coping with grief and loss (Brown et al., 2011). Twenty-five K-12 teachers and three school personnel from North Carolina, Massachusetts, and Ohio school districts voluntarily completed the online portion of the study. The professional learning program had positive results in the areas of increasing teachers' knowledge of cancer as well as equipping them to have a child with cancer in his/her classroom (Brown et al., 2011). The knowledge assessed included knowledge of chemotherapy and radiation treatment effects, academic and learning impacts, medical needs, and resources (Brown et al., 2011). The researchers compared the results of teachers with and without experience with

children with cancer in their classes and found that teachers with experience had a significant level of knowledge greater and were more prepared to handle issues such as absences, activity expectations, discipline, and physical education compared to those teachers without experience (Brown et al., 2011). Interestingly, the researchers found that there is not necessarily a connection in a teacher's perception of being prepared to handle the situation of having a child with cancer in the classroom and the fact-based knowledge he/she has about childhood cancer (Brown et al., 2011).

Baskin, Saylor, Furey, Finch and Carek (1983) studied twenty-six school personnel (e.g., elementary and high school teachers, guidance counselors, administrators, classroom aides, school nurses) from two counties in the Charleston, South Carolina area. The participants voluntarily completed a pre- and post-test and professional learning. The pre-test measured the school personnel's attitudes towards children with cancer and knowledge of cancer (e.g., treatments, prognoses, myths, emotional and schooling impacts; Baskin et al., 1983). The post-test served to assess changes in the school personnel's knowledge of cancer and to evaluate the workshops. The professional learning was led by faculty from the Medical University of South Carolina and included a pediatric oncologist, radiologist, two registered nurses, a social worker, the authors (psychiatry team), and a high school student in cancer remission (Baskin et al., 1983). The workshops occurred on two week-day nights, lasting approximately three and a half hours. During the first workshop, facts about cancer in terms of cancer types, prognoses, treatments, procedures, and side effects of treatments were addressed, as well as common myths (Baskin et al., 1983). The first workshop concluded with a discussion amongst the high schooler with cancer in remission and the

participants. The second workshop was led by the authors (psychiatry team) and focused on the role of the psychiatry consultation team and services provided to patient and families. A discussion about the emotional impacts on patients and families followed, ending with a discussion about the role of the teacher in addressing a child with cancer's needs. A particular point of focus was on the teacher learning to view the child as a student rather than a patient, coming to terms with death, and learning how to reintegrate the child back into school (Baskin et al., 1983). The results of the pre-and post-tests showed the teachers' gained confidence in abilities to have a child with cancer in the classroom as a result of increased knowledge base of cancer in general in addition to the workshop discussions (Baskin et al., 1983).

Pallmeyer et al. (1986) studied the same workshops in its second year of occurrence. Participants were recruited from the same area, greater Charleston, South Carolina area, with seventeen participants voluntarily participating in workshops and pre-post- tests. The workshops were based on the ones aforementioned (i.e., Baskin et al., 1983). Due to feedback from the previous year, there were format and minor content adjustments to allow for greater classroom applicability and discussion of teacher's personal emotional needs in dealing with children with cancer (Pallmeyer et al., 1986). The pre- and post-tests from the Baskin et al. (1983) study were adjusted minimally to include comparing beliefs, expectations, and behaviors to other students considered healthy (Pallmeyer et al., 1986). The pre- and post-test yielded similar findings to the Baskin et al. (1983) study. The participants increased their knowledge on cancer, and gained confidence in feeling well-informed about childhood cancer.

Across the studies reviewed, teachers that completed professional learning and that were provided resources are more prepared to meet the needs of students with critical illness in the classroom (Baskin et al., 1983; Brown et al., 2011; Duggan et al., 2004; Pallmeyer et al., 1986). The professional learning and resources educated the teachers on the facts about related disease profiles and treatments, and what schooling is like for children with critical illness leading to an increase of knowledge on these aspects. The studies in literature relating to children with critical illness and school primarily focuses on the child's school outcomes and experiences (e.g., Bessell, 2001; Berger et al., 2018; Closs, 2000; Daly et al., 2008; Forrest et al., 2011; Irwan & Elam, 2011; Nickels et al., 2017; Vance & Eiser, 2002). Other research focal points are identifying and assessing needs of children with critical illness in the school setting (e.g., Cunningham & Wodrich, 2006; Neuharth-Pritchett & Getch, 2001; Papadatou, Metallinou, Hatzchristou, & Pavlidi, 2002) and preparing teachers to meet those needs (Baskin et al., 1983; Brown et al., 2011; Duggan et al., 2004; Pallmeyer et al., 1986). Unfortunately, whereas there are studies that identify the need of professional learning for teachers, there are few studies reporting on professional learning to educate and prepare teachers to have a child with a critical illness in his/her classroom (Irwin et al., 2018). Furthermore, the population of pre-service teachers is largely excluded in these studies, as well as experiences and outcomes in learning mathematics. Thus, this section and the following sections include a sparse number of studies.

Teachers Perceptions of Preparation to Meet the Needs of Children with Critical Illness in the Classroom

Teachers without participation in professional learning about children with critical illness overwhelmingly have reported that they do not feel prepared to meet the needs (educational, social, and physical) of children with critical illness (Brown et al., 2011; Duggan et al., 2004; Neuharth-Pritchett & Getch, 2001). Teachers have also reported feeling unprepared to respond appropriately to medical related emergencies (Papadatou et al., 2002) which are unlikely to occur in the classroom (Irwin et al., 2018). Teachers report having little to no professional learning designed to educate and prepare teachers to meet the needs of children with critical illness either from their respective university or in-service professional learnings (Irwin et al., 2018; Neuharth-Pritchett & Getch, 2001). Teachers overwhelmingly feel professional learning is necessary to learn to properly meet the needs and be prepared to handle the unique situations as well as have personnel in place to aid with the transition back into school from a period of long absences (Papadatou et al., 2002). The professional learning, as show in the previous section, are successful in having positive gains in knowledge and confidence in preparation for working with or teaching children with critical illnesses. The following subsections explain the school professionals' reports of perceptions before the professional learning and then after the professional learning.

Teacher Perceptions before Professional Learning

Teachers are often unprepared (i.e., in both perceived preparedness and knowledge) to meet the needs of a child with a critical illness, particularly children that

experience absenteeism (Brown et al., 2011). Many equate this lack of preparation to the lack of knowledge about the myriad of aspects surrounding a diagnosis and treatments of critical illnesses (Brown et al., 2011; Duggan et al., 2004). In Brown et al. (2011), before access to professional learning and information materials, 86% of the teachers rated themselves having little to no knowledge about the effects of treatments (e.g., chemotherapy and radiation), medical needs, cognitive abilities and effects on learning, and the resources available. The same set of teachers also rated themselves in terms of preparation to deal with school activities such as homework, discipline, behavioral or academic problems, and missed work with 81% reporting they did not have the necessary knowledge to address these topics. The remaining teachers participating in the study (of which most had experience with having a child with cancer in his/her classroom), reported having the knowledge necessary to be prepared to meet the needs of a child with cancer. Baskin et al. (1983) found, with Pallmeyer et al., (1986) reporting similarly, that the school personnel had little knowledge about cancer in terms of types, prognoses, treatments, procedures, and side effects of treatments and those impacts on schooling prior to the professional learning.

Teacher Perceptions after Professional Learning

The result of exposure to professional learning sessions and materials (gained knowledge and understandings), led K-12 school personnel (e.g., school counselors, teachers, nurses, para-professionals) to report a gained confidence in their own abilities to meet the needs of children with critical illness in the classroom (Baskin et al., 1983; Duggan et al., 2004; Pallmeyer et al., 1986). Baskin et al.'s (1983) showed that teachers

are more likely to be consistent in dealing with children with cancer with more patience and understanding, post-training. Pallmeyer et al. (1986) modified the pre- and post-test from Baskin et al.'s (1983) and included a comparison to healthy peers. Pallmeyer et al. (1986) found that in comparison to healthy peers, children with cancer will more likely be lethargic, emotionally delicate, and have difficulties completing school work. On the other hand, school personnel reported that children with cancer would be similar to their healthy peers in aspects of cooperation with teachers, and likelihood of being bullied and injured (Pallmeyer et al., 1986). Brown et al. (2011) also reported the teachers' had gains in terms of their perceived knowledge of cancer and its affects and improvements in self-perceptions of preparation. Brown et al. (2011) discussed the positive correlations between the teachers' perceived knowledge regarding children with cancer and their preparedness in both the pre- and post-assessments however, there was not a particular relationship between the objective knowledge of the teachers and their confidence and feelings of preparation to meet the needs of a child with cancer. In essence, the more factual information that a teacher has regarding a critical illness (e.g., cancer) may not equate to high and confident self-perceptions of preparation (Brown et al., 2011). On the other hand, the increase in objective knowledge as a result of the professional learning had positive impact on the teachers' self-reports of knowledge (Brown et al., 2011). It is clear that teachers, or school personnel, gain confidence and understanding of children with critical illness as a result of participation in professional learning.

Pre-service Teacher Preparation to Teach Mathematics

Effective mathematics teaching requires teachers to first have content knowledge that stands alone from that of teaching knowledge (Norton, 2016). From that content knowledge, a knowledge of current educational practices, pedagogy, and the climate of education is necessary (Chamoso et al., 2012; Norton, 2016; Shulman, 1986). In the 1980s, Shulman (1986) and colleagues recognized the gap between content and teaching knowledge in the body of educational research as the “‘missing paradigm’ problem” (p. 6). The National Council on Teacher Quality (2019) identified that less than half of elementary pre-service teachers pass their subject area tests on their first attempt, indicating a need for increasing pre-service teacher’s content knowledge. Because elementary pre-service teacher preparation programs are responsible to prepare teachers to teach a range of subjects including reading, social studies, science, mathematics, and build foundations in STEM (science, technology, engineering, and mathematics), only some courses address content knowledge (National Council on Teacher Quality, 2019). Though some content knowledge is addressed, the teacher preparation programs and general education courses are not addressing the content knowledge deemed necessary by states to be an effective teacher (National Council on Teacher Quality, 2019). Among the 800 undergraduate programs surveyed, only 25% addressed the appropriate range of mathematics content necessary for elementary teachers (National Council on Teacher Quality, 2019).

Current practices in mathematics education have shifted from the traditional style of the teacher being the provider and student being the listener and receiver of knowledge, to teachers facilitating the construction of knowledge by students (Cady et

al., 2006; Huinker, 2018). To address the shift in teaching practice, Laursen et al. (2015) states that it is necessary to adjust the mindset of pre-service teachers as educators and lead them to developing new mathematical habits such as inquiry, discovery, reasoning, understanding, and questioning (Laursen et al., 2015). Unfortunately, in some cases, the lack of mathematical content knowledge and experience with mathematics in rich contexts, beliefs, and anxiety in pre-service teachers causes barriers in their learning new mathematical habits and practices (Brady & Bowd, 2006; Cady et al., 2006). Cady et al. (2006) furthered this idea by stating that most pre-service teachers still view mathematics education as absolute where the teacher holds the knowledge and answers where the acquisition of information and memorization is the goal for student learning. To break this cycle, pre-service teachers must reason with mathematics, question, and understand (Laursen et al., 2015) independently to discover that they have the power to construct understanding and learn mathematics (Cady et al., 2006).

After reviewing several pieces of literature relating to the preparation of pre-service teachers to teach mathematics, common themes among the literature were found. These common themes will be discussed and are, mathematics anxiety and attitudes towards teaching mathematics, understanding of mathematical pedagogy, and understanding of mathematics content. The literature discussed overwhelmingly focuses on elementary pre-service teachers, as the participants and focus of the study was on pre-service elementary teachers.

Attitudes Towards Mathematics and Mathematics Anxiety

A teacher's attitude towards mathematics influences their teaching practices and lesson implementation, and such attitudes will often transfer to students (Amirshokoochi & Wisniewski, 2018; Cady et al., 2006). Peker and Ulu (2018) described a model of attitude constructs that includes cognitive, affective, and behavioral. These components together ultimately compose a person's attitude. In the context of teaching mathematics, the cognitive aspect refers to mathematical knowledge. This knowledge can be robust or somewhat limited, depending on the level of schooling of the individual. The behavioral component refers to the past experiences and behaviors of a person, and in this instance, experiences related to mathematics (Peker & Ulu, 2018). The affective component comprises of a person's view of self in terms of mathematics teaching and can be heavily driven by a fear or anxiety towards mathematics (Peker & Ulu, 2018). These components are interrelated as past experiences and behaviors related to mathematics, have often led to the fear or anxiety of mathematics. Mathematics anxiety has been shown to affect a person's attitudes, beliefs, and self-perception towards teaching mathematics which influences instructional practices and activities (Amirshokoochi & Wisniewski, 2018; Peker & Ulu, 2018), ultimately affecting their students' attitudes, beliefs, and confidence towards mathematics (Amirshokoochi & Wisniewski, 2018).

Brady and Bowd (2006) studied 238 pre-service elementary teachers at a Canadian university to determine the relationship among mathematics anxiety, confidence to teach mathematics, and prior mathematics experiences. A two-part Likert survey was completed by the participants. The first portion of the survey was designed to assess the participants' prior mathematics experiences, highest level of learned content,

years since last enrollment in a mathematics course, perception of mathematics utilization, and perceptions on confidence to teach mathematics (Brady & Bowd, 2006). The second portion of the survey measured the participants' anxieties towards mathematics in several educational and non-educational settings (Brady & Bowd, 2006). The survey results showed the factors leading towards mathematics anxiety were level of mathematics course completed and experience with mathematics. A negative correlation was found between both levels of mathematics course completed and positive experiences with mathematics, meaning, the higher level of mathematics course taken, and the more positive experiences, led to less reported anxiety (Brady & Bowd, 2006). A positive correlation among the participants' anxiety level and their apprehension towards teaching mathematics. When asked to describe causes of anxiety, the participants reported the pace of the curriculum began to be too rapid during their secondary education experience, causing a lack of comprehension and thus, increased anxiety (Brady & Bowd, 2006). Furthering the finding that negative experiences in mathematics during compulsory education correlate with mathematics anxiety, Bekdemir (2010) sought to determine if negative experiences and difficulties in mathematics related to mathematics anxiety. Bekdemir (2010) studied 167 elementary pre-service teachers and found that the most severe reports of mathematics anxiety were directly related to the more negative experiences and difficulties.

Haper and Daane (1998) studied 53 elementary pre-service mathematics teachers to find level of anxiety towards mathematics prior to and after completing a mathematics methods course. Haper and Daane (1998) found a similar source of mathematics anxiety, and linked it back to elementary years stating that the anxiety often begins with negative

experiences at the elementary level, manifesting itself into low confidence levels and avoidance during secondary schooling. Researchers report that elementary pre-service teachers often begin university coursework with anxiety towards mathematics (Haper and Daane, 1998). Thus, the pre-service teachers' positioning leads them to hold concepts and ideas about mathematics teaching and learning that oppose research-based practices in mathematics (Haper and Daane, 1998). Furthermore, the interviews conducted showed reduction in the pre-service teachers' anxiety levels post-completion of the mathematics methods course. Haper and Daane (1998) concluded that pre-service elementary teachers need to be made aware of anxiety levels towards mathematics in order to identify ways to prevent transference of anxiety onto their students. The importance of preventing transference of anxiety to students is supported by Bekdemir's (2010) finding that the overwhelming majority of participants' anxiety towards mathematics was caused by teacher approaches, attitudes and behaviors in mathematics.

Gresham (2009) studied 156 pre-service elementary teachers completing a mathematics methods course participated in the study to find the relationship between teacher efficacy and mathematics anxiety. During the methods course, the pre-service teachers were engaged in learning evidence-based mathematics practices, proper mathematics pedagogy, and mathematical development in children (Gresham, 2009). Two surveys and an interview (of the 10 pre-service teachers with the highest and 10 pre-service teachers with the lowest reports of mathematics anxiety) were conducted to find the connections of the pre-service teachers' perceptions of self-efficacy, mathematical abilities, and mathematics anxiety (Gresham, 2009). It was found that the pre-service teachers with the highest reported mathematics anxiety had the lowest teacher efficacy

and the pre-service teachers with the lowest reported mathematics anxiety had the highest teacher efficacy (Gresham, 2009). A trend was found regarding the pre-service teachers' perceptions of mathematical abilities and skills and anxiety levels (i.e., the higher, or more confident, in belief of mathematical abilities and skills, lower mathematical anxiety was reported; Gresham, 2009).

All of these studies (e.g., Bekdemir, 2010; Brady & Bowd, 2006; Gresham, 2009; Haper & Daane, 1998; Peker & Ulu, 2018) reported on the prevalence and factors leading to mathematics anxiety. Overall, the experiences in compulsory school in terms of level of mathematics and difficulty in mathematics tended to have the greatest effect on the attitudes and anxieties pre-service teachers have towards mathematics.

Mathematical Pedagogical Knowledge

Several studies exist in literature that pertains to the pedagogical knowledge of pre-service mathematics teachers (e.g., Ball et al., 2008; Cady et al., 2006; Dogan et al., 2019; Hill et al., 2008; Hill et al., 2004; Laursen et al., 2015; Max & Amstutz, 2019; Niess, 2005; Norton, 2016; Phelps & Howell, 2016; Shulman, 1986; Swars et al., 2007; Turnuklu & Yesildere, 2007; Youmans, Coombs & Colgan, 2018). It is known that mathematical content knowledge alone is not sufficient to being an effective teacher (Ball et al., 2008; Hill et al., 2008; Hill et al., 2004; Max & Amstutz, 2019; Shulman, 1986). Mathematical pedagogical knowledge, refers to one's knowledge and effectiveness in implementing mathematics teaching practices (Youmans et al., 2018). Shulman's (1986) statement "mere content knowledge is likely to be as useless pedagogically as content-free skill" boldly states the necessity of having a content, or in this instance,

mathematical pedagogical knowledge (p. 8). Shulman (1986) brought attention to the idea of content pedagogical knowledge to bridge the gap between teachers' understandings of teaching practices and knowledge of content. Content pedagogical knowledge differs from pedagogical knowledge as the focus defers from behavioral and time management, structure of lessons and assignments, assessing basic student understanding and questioning to how the specific content (e.g., mathematics) is represented, explained, rephrased, and demonstrated (Ball et al., 2008; Shulman, 1986). Pedagogical content knowledge also asks "how does a teacher prepare to teach something never previously learned? How does learning for teaching occur?" (Shulman, 1986, p. 8). Teachers with a healthy pedagogical content knowledge can better anticipate student conceptions, preconceptions and misconceptions, identify gaps in the curriculum and effectively teach the missing content, cultivate learning opportunities understandable by the students (Ball et al., 2008; Shulman, 1986).

Ball et al. (2008) studied the ideas and theoretical positioning of pedagogical content knowledge by Shulman (1986; 1987) and concluded that a specialized pedagogical content knowledge was necessary for teaching. In decades following Shulman's publications, the idea of pedagogical content knowledge became popular in several disciplines as its application spanned from pre-kindergarten to collegiate studies (Ball et al., 2008). Ball et al. (2008) explored the studies from the 1990s and early 2000s relating to pedagogical content knowledge and found the majority of research lacked continuity with the definition of pedagogical content knowledge because the application of the idea manifests differently across the disciplines. Much of the research in pedagogical content knowledge is specialized to a single content area where connections

across disciplines are weak and essentially nonexistent (Ball et al., 2008). The conclusion that a specialized pedagogical content knowledge is necessary is from the general idea that pedagogical content knowledge is all the knowledge a teacher needs and knows in a particular content area with blurred lines regarding the teachers' beliefs, reasonings, knowledge, and actions (Ball et al., 2008). As mathematics education researchers, Ball et al. (2008) proposed a specialized content knowledge for mathematics teaching. Ball et al. (2008) stated an approach to teacher knowledge in a way that "places an emphasis on the use of knowledge in and for teaching rather than on teachers themselves" by focusing on what teachers need to know to teach effectively and what content knowledge is necessary for effective teaching (p. 394). Understanding the specific content pedagogical knowledge for mathematics starts in the classrooms, not the curriculum. The actual activities and lessons facilitated by the teacher must hold mathematical integrity, cultivate student mathematical growth thus the mathematical pedagogical content knowledge must be appropriate and sufficient to accomplish these teaching goals (Ball et al., 2008). Subsequently, a handful of recent research studies are explored in depth pertaining to mathematical pedagogical knowledge.

Turnuklu and Yesildere (2007) studied 45 Turkish elementary mathematics pre-service teachers during their last year at the university while taking a methods course. Data were collected through classroom problems focusing on the pre-service teachers' teaching strategies on the topics of fractions, decimals, and integers (Turnuklu & Yesildere, 2007). The problems included student misconceptions to determine if the pre-service teachers recognized the student's current understanding and reasoning, could create solution strategies, and create appropriate questions to guide student thinking and

assess the student's understanding (Turnuklu & Yesildere, 2007). It was found that the pre-service elementary teachers' questions were aimed at explaining the problem rather than understanding the processes and knowledge of the students. Other common areas of difficulty related to general pedagogical teaching practices (i.e., time and classroom management). The combination of poor pedagogy and mathematical pedagogical knowledge resulted in an overall lack of effective teaching.

Cady et al. (2006) conducted a longitudinal study on twelve pre-service teachers (7 elementary, 4 middle, 1 adult) through the course of their preparation program and 6-years post-graduation to track the beliefs and practices of the pre-service teachers in transitioning from their preparation program and in-service teaching. Data were collected through surveys and interviews to provide both quantitative and qualitative data (Cady et al., 2006). Overall, Cady et al. (2006) found the most significant changes to occur after the participants were considered experienced teachers (6 years of teaching post-graduation) and found no significant changes in either their beliefs or teaching practices between the beginning of their preparation program and their first year in teaching. In terms of mathematical pedagogy, the participants reported as experienced teachers (verses being a novice teacher) had the confidence to adapt lessons, choose content, and use other resources (other than the textbook) to meet the educational needs of the students (Cady et al., 2006). Additionally, the teachers felt their effectiveness in the use of manipulatives, pictures, class discussion, proper mathematics terminology, real-world tasks, and answering student questions improved after gaining classroom experience. Some teachers reported finding discussions on incorrect problems enhanced the students' learning and understanding of mathematics concepts (Cady et al., 2006).

Dogan's (2019) study differed from the previously reviewed studies in that the participants were supervising teachers (in-service teachers with a pre-service teacher intern), rather than pre-service teachers. Seventeen supervising teachers completed the study, answering questions regarding the pre-service teacher's teaching practices, competencies, and effects on class environment (Dogan, 2019). It was found that despite the evidence of substantial content knowledge, the pre-service teachers struggled to modify instruction in accordance to the students' level of understanding. An example was given that a participant was provided with a problem and solved it using a complex algebraic equation. However, the participant's area of focus was elementary-age students where the use of complex algebraic equations is not appropriate to their level (Dogan, 2019). Additionally, one supervising teacher reported that she had to intervene multiple times during the lesson to support proper student learning. This, and other examples led Dogan (2019) to conclude that many of the studied pre-service teachers had shortcomings in appropriately transferring knowledge to the students.

Mathematical Content Knowledge

Pre-service teachers' mathematical content understanding is arguably the most important aspect of preparation, largely because the other aspects discussed earlier rely on this as a baseline. Content knowledge is both the knowledge base and mental organization of content (e.g., mathematics) by teachers that transcends memorized facts and concepts to be a host of organized knowledge able to be teach reasoning, the "why," importance, phenomenology, and connections to the world and other content areas (Shulman, 1986). Norton (2016) referenced several countries (e.g., United States

Department of Education, United Kingdom, Singapore) to claim that it is nearly a worldwide expectation that teachers of mathematics have a mathematical content knowledge that exceeds the level of content they will teach. This level of content knowledge includes the ability to be proficient in reasoning, fluency, and accuracy (Norton, 2016). However, the ability to perform mathematics tasks by procedure is not sufficient when talking about teaching mathematics. Turnuklu and Yesildere (2007) found that pre-service elementary teachers did not have a depth of mathematical understanding. The pre-service teachers had a basic content knowledge, but the lack of depth prevented them from thinking about instruction and solutions methods in terms of known and potential student misconceptions (Turnuklu & Yesildere, 2007). Thus, the teachers would teach based on their level of understanding without considering the students and how a concept could be misunderstood. Norton (2016) explained that this issue arises from fact that primary and elementary teachers are trained to teach all core subjects (i.e., reading/ language arts, social studies/ history, mathematics, and science), thus they lack a depth of learning in a sole content area.

Flores, Thornton, Franklin, Hinton, and Strozier (2014), studied the mathematical content knowledge, in the areas of computation and problem-solving, of 178 pre-service teachers specializing in elementary education or special education. The areas of computation and problem-solving were selected because, as the researchers stated, these are the content types teachers will be teaching children. The results showed that on average, the pre-service elementary teachers and special education teachers answered 77% and 79% of the computational items correctly, respectively (Flores et al., 2014). The most common errors included the areas of performing the basic operations on fractions

and mixed numbers, and multiplying and dividing decimals. The percentage correct on the problem-solving portion was 80% for elementary education and 84% for special education pre-service teachers (Flores et al., 2014). The common mistakes from this section include adding units of measurement with proper regrouping, calculating volume, and attending to all operations needed in a multi-step word problem (Flores et al., 2014). The authors noted that the same areas missed by the pre-service teachers are also commonly misunderstood and missed by children. Flores et al. (2014) argued that in order to deliver effective instruction the teachers must show competency in performing such tasks.

Swars et al. (2007) studied 103 pre-service elementary teachers whom all participated in the same university teacher preparation courses, including completion of mathematics methods courses taught by faculty that hold similar philosophies towards mathematics teaching and learning. The focus in the courses was on reasoning, proof, connections, problem-solving, representing, and communication to cultivate positioning as continuous learners and doers of mathematics in the pre-service teachers (Swars et al., 2007). They incorporated analyzing areas other than content knowledge (i.e., pedagogical knowledge and beliefs, teaching efficacy), but when considering content knowledge, the researchers found that the pre-service teachers that had higher scores in content knowledge believed mathematics should be presented in ways that students are able to construct knowledge and understand concepts (Swars et al., 2007). The researchers found that there was no correlation with content knowledge and their own beliefs in their self-efficacy to teach mathematics effectively and believe it stems from lack of experience in

not understanding that a depth of content knowledge is part of effective teaching (Swars et al., 2007).

Laursen et al. (2015) studied pre-service elementary and secondary teachers in courses using inquiry-based learning approaches at four universities. In terms of content knowledge, study surveys show that the students with the lowest initial scores showed the greatest gains, but the majority displayed gains in content knowledge and in application of mathematical ideas. Specifically, the participation in inquiry-based learning courses led the pre-service teachers to gain understanding of mathematical concepts and cultivate stronger critical thinking and problem-solving skills (Laursen et al., 2015). Overall, having a strong mathematical content knowledge is important for teachers in order to effectively teach (Laursen et al., 2015; Norton, 2016). Content knowledge is an important component in developing an effective teacher along with pedagogical knowledge and awareness of current educational practices (Chamoso et al., 2012; Norton, 2016).

Teaching Mathematics to Children with Critical Illness

Limited research exists regarding mathematics education and children with critical illness. Because of the lack of research published on this topic, two studies are referenced in this section. Mathematics education must be tailored to a student's disease profile, any comorbidities, and cognitive abilities and is insufficient to address only the issues of increasing access to high-quality educational opportunities (Nickels et al., 2017). The popular notion in mathematics education is that providing access to equal education and opportunities is equitable, but, access does not undoubtedly result in equitability (Nickels et al., 2017). Nickels et al. (2017) also noted that educationally

labeling a population of students will not lead to equitable education, and cause further separation because of the grouping caused by labelling. The need simply put is that “HIV, and critical illness more generally, must be regarded as a contextual variable that not only influences processes and student outcomes at all levels within mathematics education but also as a variable that must necessitate a shift in the goals, content, and role of mathematics” (Nickels et al., 2017, p. 43).

In efforts to find meaningful mathematics tasks for children with critical illness, Nickels and Cullen (2017) studied a fourteen-year-old female with Acute Lymphoblastic Leukemia in a 52-week study of robotics task-based interviews utilizing mathematical thinking and processes. Under the theory of constructivism lies the idea that computers, or robotics, in the case of this study, can support the construction of mathematical knowledge through the contextualized, and authentic tasks (Nickels & Cullen, 2017). The power of using computers or robots includes immediate feedback. The child in this study was able to experience autonomous mathematical learning through the live interactions she had with the robot (Nickels & Cullen, 2017). These live interactions either confirmed or denied her actions prompting advancement or opportunity to rethink and restructure her thoughts and actions (Nickels & Cullen, 2017). The authors concluded that involving children with critical illness in mathematical learning facilitated through robotics can lead to the child’s growth in autonomy, risk-taking, and willingness to attempt complex mathematics (Nickels & Cullen, 2017). An important component in mathematical learning in general is that of exploration where the mathematical idea is discovered and refined. Infamously, the idea of exploration in children is equated to failure, but, the exploration through robotics learning is viewed as a step in the process fostering risk-

taking as the “mistakes” made are not equated to failing and are necessary (Nickels & Cullen, 2017). It is recognized that this form of learning would be beneficial to all students, however, is utmost important to children with critical illness because of the life they are forced to lead and experiences that include social isolation, pain, school absenteeism, and possible forthcoming of death (Nickels & Cullen, 2017).

Summary of Findings

The literature review shows that because there are many types of critical illnesses, a teacher will have a student or students with a critical illness in their classroom sometime during their career. The literature review focused on in-service teachers and discussed their perceived needs (Brown et al., 2011, Neuharth-Pritchett & Getch, 2001), beliefs about children with critical illness, and preparation to meet the needs of children with critical illness in the classroom (Baskin et al., 1983; Berger et al., 2018; Boden et al., 2012; Brown et al., 2011; Duggan et al., 2004; Irwin et al., 2018; Pallmeyer et al., 1986). It was overwhelmingly clear that in-service teachers do not feel adequately prepared to meet the needs (social, emotional, medical, and academic) of a child with critical illness due to a lack of knowledge (Berger et al., 2018; Boden et al., 2012; Brown et al. 2011; Irwin et al., 2018), and tend to believe myths and display stereotypical attitudes and actions (Irwin et al., 2018). Four studies with a professional learning were discussed in depth to show the positive shift in perspectives and feelings of preparation to have a child with a critical illness in the classroom, and gains in knowledge about critical illnesses (Baskin et al., 1983; Brown et al., 2011; Duggan et al., 2004; Pallmeyer et al., 1986).

The literature pertaining to pre-service teachers' preparation to teach mathematics largely focused on pedagogy, content knowledge, and attitudes, beliefs and anxieties towards mathematics (e.g., Amirshokoohi & Wisniewski, 2018; Bekdemir, 2010; Brady & Bowd, 2006; Cady et al., 2006; Chamoso et al., 2012; Laursen et al., 2015; Norton, 2016; Peker & Ulu, 2018). Effective teachers have rich understandings of pedagogy and content knowledge; however, studies have shown that pre-service elementary teachers lack in one or both of these areas (Cady et al., 2006; Dogan, 2019; Flores et al., 2014; Laursen et al., 2015; Norton, 2016; Swars et al., 2007; Turnuklu & Yesildere, 2007). Many pre-service elementary teachers enter the teacher preparation program with pre-existing anxieties towards mathematics that are a result of their experiences and difficulties in compulsory education (Amirshokoohi & Wisniewski, 2018; Bekdemir, 2010; Brady & Bowd, 2006; Cady et al., 2006; Gresham, 2009; Haper & Daane, 1998; Peker & Ulu, 2018). Lastly, the mathematics appropriate for children with critical illness extends beyond creating equal access to educational opportunities (Nickels et al., 2017). It must accommodate for the disease profile, and treatments (Nickels et al., 2017).

This study follows three pre-service teachers that completed an internship at a hospital-based school program to discern if participation in the internship led to a shift in perception of educational needs of children with critical illness, gained knowledge about critical illness, and preparation to teach mathematics.

CHAPTER THREE: METHODOLOGY

Purpose of Study and Research Questions

The purpose of this study was to explore the preparation of pre-service teachers to educate children with critical illness and teach them mathematics. Multiple data sources from three participants at a hospital-based internship program were analyzed and triangulated to identify emerging themes across the all participants and data sources. The guiding research questions were: (1) How prepared do pre-service teachers feel to educate children with critical illness and address the needs of children with critical illness in the classroom as a result of completion of a 6-week internship at a hospital-based school program? (2) How prepared do pre-service teachers feel to teach mathematics to children with critical illness after completing a 6-week internship at a hospital-based school program?

Study Design: Ethnography

This study uses ethnography to capture the detailed descriptions and lived experiences of the participants and researcher over a period of 6 months. Ethnography is a research method grounded in field work (e.g., observations, researcher reflections, artifact collection) and includes detailed accounts of the topic of study where the researcher collects interpretive data primarily in the form of field notes and through semi-structured or open interviews (Palmer, 2001). Hammersley and Atkinson (1983) explain that an ethnography “bears a close resemblance to the routine ways in which people make

sense of the world in everyday life” (p. 2). An ethnography artistically connects the facts to the environment of which these facts occur (Palmer, 2001).

The ethnographer is typically immersed in the environment of study and considers the point-of-view of those beings studied (Palmer, 2001) and in some cases may participate in the daily life of the participants or activity being studied (Genzuk, 2003). Hammersley and Atkinson (1983) state that an ethnographer “. . . participates, overtly or covertly, in people’s daily lives. . . collecting whatever data are available to throw light on the issues with which he or she is concerned. . .” (p. 2). The method of conducting ethnographic interviews positions the ethnographer to “risk the appearance of naivety and ignorance in order continually to satisfy themselves that they have understood what is being said” (Cohen, 1984, p. 226). Thus, an ethnographer may begin with a set of predetermined topics not necessarily questions, to address directly or indirectly (Palmer, 2001). Questions are typically open-ended to capture and reduce leading of responses (Palmer, 2001). The analysis of the data requires the ethnographer to be involved in interpreting the meaning of statements and actions by the study participants that is written in the verbal form (Genzuk, 2003). The data from the sources includes descriptions, quotations, and excerpts used in writing a descriptive narrative (Genzuk, 2003).

Theoretical Framework

Grounded theory “allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data” (Martin & Turner, 1986, p. 141). The purpose of grounded theory is

to enable the researcher to produce inductive theory (Wiesche, Jurisch, Yetton, & Krcmar, 2017). In particular, grounded theory is useful in exploring contexts that have limited studies and literature, requiring a theory to be constructed (Wiesche et al., 2017). Because of the nature of grounded theory, research may develop a new theory or produce description of a phenomenon (Wiesche et al., 2017). To utilize the framework of grounded theory, a constant comparative method is used for the data analysis.

Research Method: Case Studies

This study consisted of three unique cases. Case study, by its nature, turns away from the typical to focus on the unique (Shank, 2002). Case study research focuses on the participatory relationship between a single participant (although in this study a single source of information is comprised of three participants) and the researcher. “The case study is an exemplar” (Kvale, 1996, p. 273), conceivably functioning as a medium for learning. The case is studied not only for its complexity, but also for its curious and provocative nature. The researcher examines the specific details of the case’s reciprocity with its contexts, attempting to understand its activity within the world. The basic purpose is not to evaluate nor generalize; “the single case has to make its own case” (Shank, 2002, p. 53).

Setting and Participants

The study location was at a hospital-based school program in the Southeastern United States. The children’s hospital-based school program is a ground-breaking school program designed to bring patients and siblings researched-backed education during their

time, whether inpatient or outpatient, in the hospital. The program is staffed by university faculty and university students, whom are referred to as interns at the hospital-based school program, in this thesis. The interns are primarily elementary education students, however, interns also come from other academic disciplines (e.g., Marine Biology, Health Sciences) and participate in the program as well. The faculty range in educational disciplines including mathematics, engineering, science, reading, and special education, as well as in disciplines outside of education including physical therapy, speech-language pathology, and counseling.

Amber, Courtney, and Emily comprise the three cases. Amber completed the hospital-based school program internship during the first 6-weeks of the semester and Courtney and Emily completed the hospital-based school program internship during the second 6-weeks of the semester. This consisted of attending the hospital-based internship between the hours of 10:00 a.m. to 5:00 p.m. on Mondays and Tuesdays for the first 5-weeks and full-time (Monday-Friday) on the sixth week. During the 6-week portion of the semester that the interns were not placed at the hospital, they were placed at an area public elementary school. All elementary education students at the Southeastern university completing internship I, regardless of their participation in the hospital-based school program, must take three co-requisite courses (i.e., elementary mathematics methods, diagnostic and corrective reading, and teaching exceptional students). Although the official internship at the hospital-based school program was only 6-weeks, the three co-requisite courses also took place at the hospital and interns continued to engage in the hospital setting through experiences such as disease specific workshops (e.g., cancers, traumatic brain injury, muscular dystrophy), and donor events.

The hospital-based school program has a mission to engage each patient in STEM (e.g., robotics) activities. Thus, the interns at this program participate in a training workshop at the beginning of the semester to learn how to incorporate technologies (i.e., robotics, 3D printing, virtual reality) into their lessons. Additionally, interns are taught to address the needs of the children based on diagnosis, thus the hospital-based school program faculty director and on-site physical therapist conducted workshops to educate interns about the disease profiles and educational implications of cancers, muscular dystrophy, and traumatic brain injury on children's health and learning.

During the first week of the internship, the interns were involved in observation of the teacher-of-record and other faculty members to learn the nuances and how to navigate the hospital environment. During this time, the interns practiced how to properly identify what personal protective equipment (PPE) to wear in the hospital rooms, as well as proper procedures to put on the PPE, and how to clean educational supplies. In addition, interns were taught how to clearly communicate with nurses, other hospital staff, and families. The internship was designed to be a gradual release model; thus, it followed the form of observation, guided practice, and individual teaching. Given that the internship was only 6 weeks, the interns were independently teaching on the second week.

When arriving on-site each day, the interns were given an assignment sheet that included the names, ages, room numbers, and nurses' names for four children. There was no particular method of assigning interns, meaning interns would see a variety of ages and children on different floors during the course of a day in the internship. Not all children assigned were able to be seen each day, due to a multitude of reasons that included: being discharged, scheduled procedures and/or therapy, parental denial, or

condition specific behaviors or symptoms which limited participation. At the hospital, the interns served children in the infusion clinic, inpatient hematology and oncology unit, pediatric intensive care unit, cardiac intensive care unit, and inpatient rehabilitation unit. The interns' responsibility was to plan and prepare lessons appropriate to the children's individual needs, interests, and developmental level. Without knowledge of the children prior to attending internship, all planning and preparation was conducted on the same internship day as the service to the children and on-site at the hospital. Thus, planning and preparation took a total of about two hours throughout the internship day. Student summary sheets were utilized to keep a brief record of instruction and instructional suggestions for the children and were referenced by the interns in planning for children who had already previously been serviced by an intern. Interns were encouraged to consult grade level standards and the scope-and-sequence of an area school district to use as a guide during lesson planning. Additionally, research-backed mathematics and reading resources were provided for intern use, however, were not required to be used in lesson planning. The resources in the classroom available for lessons included but were not limited to, high quality and award-winning children's and adolescent books, mathematics manipulatives, educational games, robots and other technologies (e.g., laptops, 3D printer), and general classroom supplies (e.g., construction paper, rulers, printer). Additionally, the faculty members were available as a resource for the interns in planning and the implementation of lessons. Faculty available were experts in the areas of special education, mathematics education, and physical therapy.

Participants were recruited from a cohort of elementary education pre-service teachers at a Southeastern university completing a portion of their first internship at a

hospital-based school program during the data collection semester. Potential participants, from a convenience sample, were provided information regarding the research opportunity via e-mail and a presentation by the researcher during the first week of classes. The researcher received interest from three pre-service teachers, thus the three pre-service teachers participated in the study. Pseudonyms were assigned to all participants.

Participant Characteristics

The participants completed a background information questionnaire that sought to find each participants' educational experiences during school, outside of school, and work-related, experience and knowledge relating to critical illness, perceptions of personal mathematics learning during school, and other experiences influencing interview responses. Though the participants had unique individual experiences, there were a few common aspects in each participants' backgrounds. They all reported having mothers as educators, gaining additional experiences in education through that connection. Though very different, each had work experiences related to education (e.g., tutor, summer camp counselor, coaching). Lastly, they all reported difficulties in mathematics during schooling and some even reported anxieties towards mathematics.

Amber

Amber, at the time of the study, was a 23-year-old female studying elementary education. Amber was homeschooled, with participation in co-opportunities with other homeschooled children for her entire schooling experience and attended a university

model school during her secondary years. Her experiences as a homeschooler led Amber to decide to become an elementary teacher. Amber's mother engaged her and her siblings in learning that inspired creativity and logical thinking. Amber grew to love learning through those experiences, particularly the experiences she had when her mother would use nature to explore science, mathematics, and art concepts. Because Amber was homeschooled, she had the opportunity to be involved in the selection of curriculum and attend conferences and educational fairs. At the point Amber decided to become an educator, she was able to begin an internship in a first-grade classroom a few times a week at the university model school that she attended. In regards to experience with critical illnesses, Amber identifies her only experience was through her late-mother's journey with battling liver cancer and her tutoring experiences with a young lady with hydrocephalus and autism.

The decision to apply for the hospital-based internship program was largely driven by her mother's recent diagnosis and lost battle with late-term liver cancer. With several hospital stays, Amber was akin to the environment and the impact each hospital staff member had on the patients and families. She recounted these experiences as mostly positive, and saw the necessity of hospital staff being supportive, sensitive, and encouraging and had a strong desire to replicate that experience for the children at the hospital-based school program.

In terms of mathematics, Amber did not consider herself strong in mathematics and reports struggles while learning, however, still was a high achieving student in mathematics. Her flexibility in her homeschooled setting allowed for more time, and alternate ways of learning. Amber felt that it was a positive change to learn about how to

teach mathematics upon entering college rather than continue in taking pure mathematics courses. Even though it was viewed as a positive shift, Amber stated that she still had to work and take time to understand the content and teaching practices.

Courtney

At the time of the study, Courtney was a 23-year-old female who was raised in a Midwestern state and moved to the Southeastern state in college when transferring schools. Courtney attended public school in an affluent area for elementary and middle school and attended a private Jewish school for her high school experience. Courtney originally majored in Pre-Med at her first university in the Midwestern state. Courtney changed her major to elementary education after transferring to the Southeastern state university. During childhood, Courtney was heavily exposed to education and teaching as several women in her family, including her mother, were educators. She spent many hours in her mother's classroom and assisted in the classroom throughout her life. Additionally, Courtney taught art as an art staff member at a day camp. Because she was from a family of educators, she reported that several conversations centered on education and was a topic that was brought up daily.

Courtney states that during elementary school she dealt with classmates that would ignore her and be unwelcoming to her because of her religion. Her fifth-grade teacher cultivated a classroom environment that promoted acceptance and value to all her students, encouraging them to share those values among each other. This experience, in part with others, led Courtney to have a passion for children, originally in pediatric medicine, but found her passion in wanting every child regardless of backgrounds (e.g.,

race, religion, socioeconomic status, health) to be exposed to and learn the value and wonder of education. For these reasons, Courtney was interested in applying for the hospital-based internship program.

In terms of mathematics, Courtney reports a dislike and anxiety towards mathematics in all years of schooling, including college. In terms of experience with critical illness Courtney reported no experience other than the internship opportunity through the hospital-based school program.

Emily

At the time of the study, Emily was a 22-year-old female studying elementary education. Emily began school in the Southeastern state at a public elementary school of primarily Spanish speaking teachers, and transferred to an elementary school in an adjacent city of primarily English teachers where she completed her schooling. Emily's mother was an educator, and Emily spent time in her mother's classroom and around other educators. Emily had the passion to become an educator from her experience with her high school soccer coach and history teacher. She recounted that beyond coaching soccer, her teacher kept up with the academic performance of the players and would intervene to support and advocate for the players when they encountered academic issues. Furthermore, her coach kept in contact with families, reporting progress. His supportive nature, persistence, and dedication drove Emily's passion to become a teacher. Emily sought out opportunities to work and be involved in education over the past few years with working as a soccer coach and as an assistant teacher at a private Islamic school.

To begin work in the field of education, Emily became a tutor for summer school for 3rd graders, worked as an assistant teacher in a private K-12 school, and coached soccer. Additionally, while working towards her degree in elementary education, Emily pursued certification in registered behavioral therapy and teaching English as a foreign language as her interests in education lie in teaching underprivileged populations, including those abroad. The internship opportunity at the hospital-based school program was intriguing to Emily as this population of students are a type of underprivileged students. Emily acknowledged that quality educational experiences include interaction and immersive educational activities and hoped to bring those educational opportunities to the children at the hospital. Emily recounted a handful of times that she had overnight stays at the hospital as a child; thus has that perspective of what it is like to miss school. Beyond meeting educational needs, Emily recognized the need for distraction from their situation, support, and renewed excitement towards education.

In terms of mathematics, Emily feels as though she was not properly taught to understand mathematical concepts thus experienced difficulties in excelling in mathematics.

Study Data Sources and Collection Procedures

Data sources for the study included research field observation notes, hospital-based school program application, interview questionnaires, reflections, and background information. This section details the data sources included in the appendices (appendix A – G). The order as follows is the hospital-based school program application (appendix A), pre- and post-interview questionnaire (appendices B, C, and F), end-of-day

reflections (appendices D and E), and the background information questionnaire (appendix G).

Hospital-Based School Program Internship Application

Each pre-service teacher interested in completing half of their first internship through the hospital-based school program was required to complete an application before completing the interview process. The application (appendix A) collected needed information of the applicant for the hospital background checks, included pre-service teacher interview availability, questions, and a faculty reference. Examples of questions are:

- *Individuals aspire to be teachers for a variety of reasons. What are some of your reasons for wanting to be a teacher in a hospital setting?*
- *What experiences have you had working with diverse groups of children/adolescents?*

The questions focused on the intern's aspirations for serving as a teacher in the hospital setting, experiences and influencers leading to a desire to become a teacher, how the pre-service teacher is a motivated individual, the intern's perceived role of family in education, and experience with working with diverse children. Based on application responses, the faculty committee selected students to interview for participation in the hospital-based school program.

Interview Questionnaire

The study participants were involved in completing two in-person interviews, which were adapted from Nickels' (2015) previous examination of student's perceptions of mathematics and critical illness (see appendix B for full interview protocol). The first interview was conducted the week prior to the start of the internship, and the second was conducted the week following the conclusion of internship. The interviews lasted approximately 15-25 minutes each. All participants had completed both internship settings (i.e., the hospital-based school program and public school) at the time of the post-interview. The questions for both the pre- and post- interviews were consistent, however, the post-interview also included questions related to reflecting on the internship and overall teacher preparation program. Examples of the questions included:

- *What does it mean for a child to have a critical or complex illness?*
- *What type of educational hardships may children with critical or complex illness encounter?*
- *How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?*
- *When do you or others do mathematics?*
- *What kinds of mathematics can we expect children to do and understand?
How about children with critical or complex illness?*

The questions in the interview pertained to the intern's perceptions of preparation to teach a child with a critical illness and teach mathematics to children with critical illness. Though not included in study data sources, it is recognized that the participation in the elementary mathematics methods course informed responses to the post-interview. The

elementary mathematics methods course addressed the topics of instructional strategies, using manipulatives, planning learning activities and lessons, evaluation of learning, and diagnostic techniques. A few questions focused on the knowledge the interns had about critical illnesses and impacts on schooling, and self-perception of mathematical ability. Transcriptions for the pre-interview are located in appendix C and transcriptions for the post-interview are located in appendix F.

End-of-Day Reflections

At the conclusion of each internship day at the hospital-based school program, all interns were engaged in responding to a reflection about the day. The prompts for the end-of-day reflection included both reflecting on the educational aspects and the overall successes and challenges of the day. The complete list of prompt questions is:

- *How many students did you work with today?*
- *What content did you teach?*
- *What is something you wish you did differently today?*
- *What was your favorite part of the day?*
- *Any other thoughts or ideas you'd like to share.*

The reflections were housed in the university's online course platform and are located in appendix E, with the questions listed in appendix D. Amber interned at the hospital during the first-half of the internship and completed the reflection after each internship day. However, Courtney and Emily, completed the hospital internship during the second-half of the internship and only completed a reflection during their first three

weeks of the internship. This was at no fault of the interns, as the course coordinator did not publish the remaining reflection assignments for the interns to complete.

Background Information Questionnaire

At the conclusion of the post-interview, participants were e-mailed a document designed to collect information on the participants' backgrounds. The document, located in appendix G, included questions that identified schooling experiences as a child, related educational work experiences, potential experiences with critical illness, and experience in mathematics as a child. Examples of questions included:

- *How would you describe your experience in education growing up?*
- *What experiences do you have relating to critical illnesses (outside of [the hospital-based school program])?*
- *What were your experiences in and feelings towards mathematics education like in elementary school? Middle school? High school? College?*

Other data collected from this source included the participants' age and school and grade of the other internship placement completed during the semester. The purpose was to gain deeper insight on the experiences that affect the interview responses of the participants.

Data Analysis

Using a grounded theory approach, the primary form of data collection is often interviewing in which the researcher is constantly comparing data gathered from participants with hypothesized ideas about the emerging theory (Creswell, 2013). This process of constant comparisons consists of going back and forth between the

participants, conducting new interviews and then returning to the developing theory to fill in the gaps and to elaborate on how it works. In general, the constant comparative method combines systematic coding and analysis with theoretical sampling to generate a theory that is integrated and consistent to the data, and in a form that is clear enough to be applied for testing. Unlike other comparative methods of analysis, which tend to be applied to ensure that two analysts working independently with the same data will achieve similar results, the constant comparative method, by design, allows for the kind of flexibility that supports the creative generation of theory (Conrad, 1978).

According to Glaser (1965), the constant comparative method can be described in four stages: (1) comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting the theory, and (4) writing the theory. This method involves a constant process of development, with each stage eventually transforming itself into the next, and previous stages remain in operation throughout the analysis in order to provide continuous development to the subsequent stage until the analysis is terminated (Glaser, 1965). Accordingly, when applying the constant comparative method, the researcher first codes each annotated incident into as many categories of analysis as possible as different categories, and the conditions under which it is evident or minimized. This process involves a continuous return to the data, until the categories become theoretically saturated. The analysis increasingly moves from the comparison of incidents with other incidents, to the comparison of incidents with the properties of the category. The further refinement of categories and their interrelationships gradually leads to the development of theory. The theory is then repeatedly defined as a smaller set of higher-level concepts. Finally, when the researcher

is convinced that the theory is adequately integrated, the theory is then presented either in a discussion form or as a set of propositions (Conrad, 1978; Creswell, 2013; Glaser & Strauss, 1967). Figure 1, illustrates the steps of researcher in data analysis. Each step was completed once, with the exception of the fourth step, “refining and grouping codes,” which was repeated a total of three times.

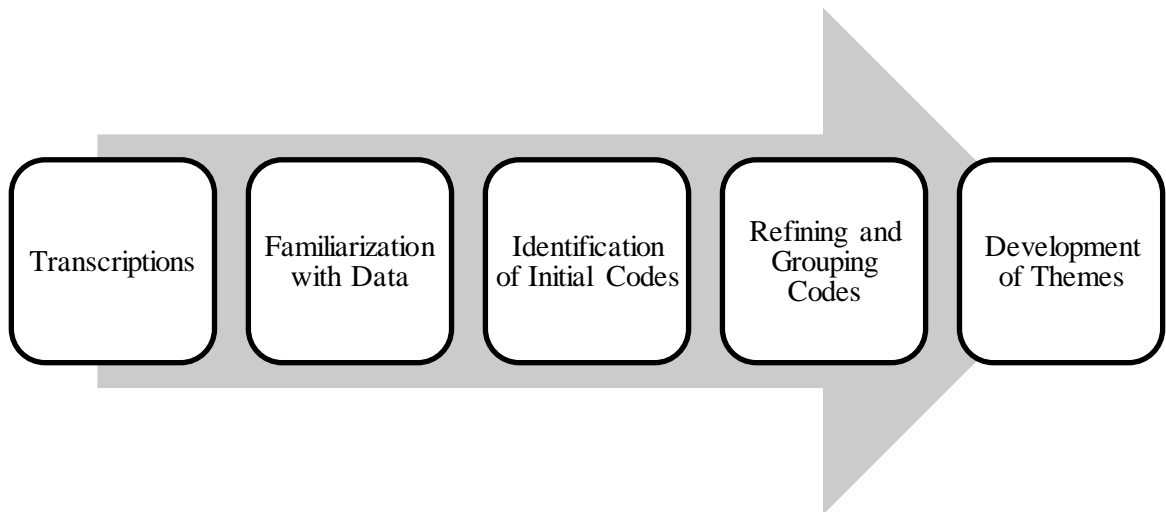


Figure 1: STUDY DATA ANALYSIS STEPS

There are several reasons for the selection and application of the constant comparative method of analysis. First, it is a methodology that is distinctly well-adapted to generate, and not simply verify, theory (Creswell, 2013). Instead of relying on preselected groups that place relative emphases on verification, the constant comparative method includes the comparison of similar and different groups to sustain and support the development of theory. In particular, the augmentation of differences between categories promotes the enhancement of the theory. Coupled with the theoretical sampling the constant comparative method promotes a multi-faceted investigation in which there are no limits to the techniques of data collection, the way they are used, or the types of data

acquired except for the requirements of theoretical saturation (Conard, 1978). Second, the constant comparison of categories (including their properties and their interrelationships with each other) results in a type of emergent theory. The grounded theory is constantly being defined and modified with respect to the phenomena under investigation (Creswell, 2013).

The data was coded initially using an emergent axial coding system (i.e., no predetermined codes in a manner consistent with grounded theory; Glaser, 1978) generated by the researcher. This axial coding system consisted of identifying key words and phrases directly from transcripts and other data sources such as the participant's internship applications and end-of-day reflections and active axial coding (which isolates one key theme in relation to others). Codes were used to merge categories together to establish thematic categories of processes found within the data sets. Table 1 outlines the initial codes of the data that ultimately collapsed into the two major themes of the study. Evidence from the data sources to explain the initial code name are included.

Table 1:

DATA ANALYSIS INITIAL CODES AND FINAL THEMES

Themes	Initial Codes	Quotes
Children as a Homogenous Group	Educational Needs	<i>Something I wish I did differently was plan for a more engaging assessment. . .I think next time I will try to have the students make [the robot] into one of the main characters. -Emily, End-of-Day Reflection</i>
		<i>If they're not [at school] they're not learning. That's the same as every other child. It doesn't matter if you have a critical illness nor not. If you're not in the classroom, you're not learning the material with the teacher. -Courtney, Post-Interview</i>
		<i>[Children with critical illness] are no different. You have to see where they're at and teach from there. . . you have to go and see where they're at and adapt your lesson to accommodate. -Courtney, Post-Interview</i>
Experience, or Lack of, Regarding the Schooling of Critical Illness	Experience, or Lack of, Regarding the Schooling of Critical Illness	<i>We have one student who's critically ill. . .the first week they reached out to the parents and gave them the work but once it became a lengthier thing, I think it just kind of faded out. -Emily, Pre-Interview</i>
		<i>So, even being from a brick-and-mortar school now, when a kid misses a lot, teachers are just like "ugh." They don't do anything really, they just feel sad that they're missing. -Amber, Post-Interview</i>
		<i>[Education] relies on the parents, the students, the textbook to teach the content. -Courtney, Post-Interview</i>

Themes	Initial Codes	Quotes
Non-Specific Recommendations		<i>I think manipulatives are big in the way that makes it more fun and interesting than a worksheet which I think is crucial for all kids. -Amber, Pre-Interview</i>
		<i>If you could create like an online module where they just click through and do it online on a laptop or iPad or something I feel like that would be better [than worksheets]. . . if you have to do worksheets I feel like just organizing it well and giving tips to kids would help. -Amber, Post-Interview</i>
		<i>[The child with critical illness] probably [has] a hospital homebound teacher, so coordinate with that teacher or with the parent to give them the assignments and work that they missed. -Courtney, Post-Interview</i>
Homogeneity in Education		<i>I think [mathematical ability] should be the same because I think you want to expect the same from everyone and believe everyone is capable. -Amber, Pre-Interview</i>
		<i>I think children can do pretty much anything once they're taught. . . I think we can expect just about everything. -Courtney, Pre-Interview</i>
		<i>I think the biggest thing for me is that [the internship experience] taught me how to modify on the spot. . . that's huge because in the classroom that's going to have to happen. -Amber, Post-Interview</i>
Lack of Confidence		<i>Do I feel prepared? Probably not. I don't feel prepared for much in life. . .when it comes to a critical illness it's kind of hard because there's so much that you need to take into account. -Amber, Pre-Interview</i>
		<i>Like signing up for [the internship] I was very intimidated because I don't know much about children with critical illnesses. -Emily, Pre-Interview</i>
Personalized Learning		<i>I learned that it's very diverse to the point that you can't really plan anything you kind of have to work with what you've got, and you have to do what's best for that particular child. -Emily, Post-Interview</i>

Themes	Initial Codes	Quotes
	Lack of Awareness of Resources	<i>If you're sitting in a hospital bed I think it's more fun if you're doing [educational activities] with blocks or games or something on the computer. . . So, I think colorful manipulatives [as a resource] just to make it happy. -Amber, Pre-Interview</i>
		<i>I'm not sure what [school districts] offer but they have to offer some kind of resources. . .the only thing I can think of is classroom stuff like specialists. -Emily, Post-Interview</i>
	Absences and Missed Academics	<i>[Educational hardships are] simply just falling behind. So, they're not in school and let's say the teacher does a unit or two on multiplication and they come back to school and they're like "I have no idea what you just taught." -Amber, Pre-Interview</i>
		<i>[Children with critical illness] might require intervention in area that they're missing in school a lot. They could be on the hospital homebound program which is spotty to say the least, and they could fall behind very easily. -Courtney, Post-Interview</i>
		<i>[An educational hardship is] the fact that they miss a lot of school and may not be on the right level. -Emily, Post-Interview</i>
	Modifications and Accommodations	<i>I've been doing a lot of manipulatives, hands-on, and repetition [in lessons]. -Emily, Post-Interview</i>
		<i>[Children with critical illness] could require intervention, they could require tutoring, extra support, assistive technologies, stuff like that. -Courtney, Post-Interview</i>

Themes	Initial Codes	Quotes
Procedural Mathematics	Computations	<i>[The mathematics children do are] addition and subtraction, things like that. -Emily, Pre-Interview</i>
		<i>[The mathematics children do are] the core four. The multiplication, division, subtraction, addition are kind of the big ones. . . then you have other things like unit measurements, decimals, geometry. -Amber, Post-Interview</i>
		<i>Fractions, geometry, shapes, measurement, collecting data, addition, subtraction, multiplication, all that jazz. -Emily, Post-Interview</i>
Consumer Mathematics		<i>I think [math] is part of daily life. I think even if it's like shopping like "oh this is 60% off. Okay, what is 60% of this price? How much am I actually going to pay for that?" -Amber, Pre-Interview</i>
		<i>I do math when I'm shopping. Sales, you know things like that. -Courtney, Pre-Interview</i>
		<i>Besides doing math [for school], like trying to figure out rent, what I owe, things like that. -Emily, Post-Interview</i>
Lack of Understanding of Mathematical Habits		<i>No, [mathematics is not done outside of school] not in general. Like, if you're a cashier at a grocery store. -Emily, Pre-Interview</i>
		<i>With the first student we worked on generating a number pattern based on a given rule. He flew right through the content and aced every rule we gave him. -Amber, End-of-Day Reflections</i>
		<i>But math is almost easier to teach because you get a concrete answer, you know? You can very clearly understand whether or not the student is getting what you're saying and is able to do it. Because if they're not getting the answer and they're not performing the steps in the right order it's easy to see the mistake. When you're like, "tell me the main idea," there's one main idea but there's a lot of other ways they can get to that answer. But when you have a math lesson, it's very straight forward. -Courtney, Post-Interview</i>

Themes	Initial Codes	Quotes
	Lack of Confidence – Personal Ability in Mathematics	<p><i>I hated math throughout all my years in schooling. I have severe anxiety when it comes to taking a math class. -Courtney, Background Information Questionnaire</i></p> <p><i>No, [mathematics] is not my strong suit. I have memories of struggling in high school specifically. -Emily, Pre-Interview</i></p> <p><i>I don't know if I'm good at [mathematics] but it doesn't come very naturally to me. -Amber, Post-Interview</i></p>
	Lack of Confidence – Teaching Mathematics	<p><i>I have no idea what kind of situation [in mathematics] I may run into and what kind of problems the kids might have. I may not be prepared for those. -Amber, Pre-Interview</i></p> <p><i>There's still some things where I'm still a little scared. . . elementary [mathematics], it's not like it's this really hard math so I feel pretty good about it. -Amber, Post-Interview</i></p> <p><i>Because as I think that I review lessons I start to pick it up more, so it's like teaching myself so as I get better at [mathematics] I'll get better at teaching it. -Emily, Post-Interview</i></p> <p><i>I think once I do it for 30 years maybe I'll be a little more comfortable. If I can stick with one grade and just be really comfortable with that content. -Courtney, Post-Interview</i></p>

These thematic categories underwent both a descriptive analysis in order to discern and understand the elements of the category. Cross-referencing of themes from the open codes identified in interview transcripts to other sources of data (e.g., field notes and documents) was undertaken for the purpose of triangulation.

IRB Information

This study was approved by the Institutional Review Board at a Southeastern state university. The study was considered exempt, and approval form is located in Appendix H.

Summary

This study uses grounded theory to guide the analysis of the data sources (i.e., field notes, hospital-based school program application, pre- and post-interviews, end-of-day reflections, and background information questionnaire). The method of data analysis used that aligns with the ideals of grounded theory is the constant comparative approach of which the data sources were examined in three rounds of coding to triangulate data and collapse initial codes to themes (i.e., children as a homogenous group and procedural mathematics). The following chapter details the experience (i.e., ethnography) of the participants in relation to the identified themes case by case, chronologically. Meaning, each participant's responses pertaining to the identified theme will be discussed by chronological order of data sources (i.e., pre-interview data, end-of-day reflections, post-interview data) beginning with Amber, followed by Courtney and then Emily. This

format is repeated for the second theme. The final portion of the chapter discusses the themes and findings relating them to the literature review.

CHAPTER FOUR: RESULTS AND SUMMARY

The data and results are displayed as an ethnography, creating a narrative that follows each participant through their experiences during the internship I semester. The results are organized first by theme (i.e., children as a homogenous group and procedural mathematics) then by participant. Each participant narrative reveals data relating to the theme from the sources chronologically (i.e., pre-interview, end-of-day reflections, post-interview). The background information questionnaire and the hospital-based program application data sources were utilized in Chapter 3 in the participant characteristics. References to these data sources are made in this chapter to support researcher analysis. The narrative weaves through detailing accounts and researcher analysis of the data. Specifically, a question or series of questions from the data sources are explained, then participant responses are detailed, and then researcher analysis concludes the topic. This format is repeated for each data source and each question or series of questions from the data source.

The purpose of this format, of interwoven data source descriptions and researcher analysis, is to utilize the grounded theory approach. The ebb and flow of narrative descriptions and researcher analysis shows the inductive reasoning by the researcher to the individual ideas and topics from the data sources. From the study and analysis of the questions or series of questions, the themes of the data emerge. The two themes (i.e., children as a homogenous group and procedural mathematics) were identified through constantly comparing the data, and through identification of consistent thoughts, positionings, and beliefs (i.e., participant responses) and determining the consistencies

among the participants. The discussion section of the chapter explains in detail the themes emerging from the data including the connections to literature.

Children as a Homogenous Group

This theme, children as a homogenous group, describes the historical point-of-view of all children being the same, stripped of individualities and diversities (Nickels & Cullen, 2017). In terms of education and children with critical illness, this view leads to the educational invisibility of these children (Nickels & Cullen, 2017). The view of homogeneity in education means that all children have the same educational needs and must attend compulsory school to meet those needs. Whereas the need for accommodations and modifications, a hallmark of inclusion and meeting the needs of students (The IRIS Center, n.d.), is addressed, the suggestions remain those meant for all students. The positionings, statements, and beliefs remain in this core idea that all children regardless of critical illness or diversities, need the same basic education and educational supports.

Amber

Pre-Interview

The first two questions explored Amber's knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. Amber stated that having a critical or complex illness causes a hindrance on a person's life preventing them from leading a life a typical healthy person could live. Amber explained such scenarios as being an inability to participate in outdoor activities and having several

doctor visits. From having experienced the turmoil and life changes that accompany a critical illness from her late mother's diagnosis of late-term liver cancer, Amber's responses are reflective of that experience as well as her experience in tutoring a young lady with hydrocephalus and autism. Her narrowed experience with critical illness types led to a generalization about all critical and complex illnesses to say those with a critical or complex illness do not live a full, typical life. Her specific list of types was limited to cancers and congenital diseases such as those affecting the brain or heart. She ended her response by stating that those are her examples of debilitating diseases, whereas the question asked about critical or complex illnesses. Thus, conclusions can be drawn that Amber generally views critical or complex illnesses as being debilitating in both areas of health and life. The idea of homogeneity in this response is not clear, in fact it is quite the opposite. These responses, identifying the stark difference between the way life is lived with a critical illness and a healthy life, would lead a reader or listener to assume recognition of individualized needs in terms of education. However, that is not the case, and these aspects and qualities of life of a critical illness are viewed as an unfortunate disruption to the status quo of life.

A related follow-up question pertained to Amber's self-perceptions of preparation to teach a child with a critical or complex illness. Amber responded that she did not feel prepared to teach a child with a critical or complex illness but follows up that, this is not an anomaly and that she doesn't consider herself prepared for most of life's events. Again, her recent experiences with her late mother's battle with cancer likely caused an upheaval of the status quo of her life and life's plans. She furthered her response to acknowledge there is a host of aspects to be accounted for with a critical or complex

illness. In terms of teaching, such aspects could be the ability of the child to talk or sit up. These aspects as well as others are stated reasons as to why she wants to complete an internship at the hospital-based school program. Though she did not feel prepared, she did not feel that it is impossible to become prepared. At this point it seems that Amber is still understanding the differences between healthy children and children with critical illness. She begins to outline few aspects that need to be accounted for in teaching, however, her following responses begin to illuminate that the needs of children with a critical illness are homogenous to healthy children.

The next interview question asked what Amber perceived as educational hardships of children with a critical or complex illness. Amber felt that the educational hardships children with a critical or complex illness have can be summed up as falling behind in school due to absences. Amber did not acknowledge other factors that contribute to educational hardships such as effects of treatment on cognition, developmental delays, and physical limitations. This lack of acknowledgement is surprising given that her beginning interview responses identified that life with a critical illness is “debilitating” and disrupts the status quo. Amber’s response also did not consider children with critical illness that are attending school regularly. Her narrowed view may stem from the setting of the hospital where it is true that a child is absent from school while physically in the hospital, but, does not address the circumstances when the child is not in the hospital and is attending school. This mindset groups children with a critical illness with healthy children homogeneously, in that, the absence from school results in missed academics and likelihood of falling behind academically, regardless of cause.

A related follow-up question about the unique learning needs of the children was asked in part to probe further thoughts and responses to the educational hardships experienced by children with a critical or complex illness. Amber's response included recognition of cognitive delays or disabilities, pain, and attention deficits. Though she recognized these as some examples of learning needs that children with critical or complex illness may have, she did not draw connections between these learning needs and how they manifest into educational hardships. Rather, these were discussed as aspects that teachers need to consider in adjusting and modifying lessons and activities. In education, the necessity of modifying and accommodating instruction is present for all children, as all children have needs. Though Amber identified a few specific needs characteristic of children with critical illness, her suggestions and educational implications remain rooted in a homogenous view that all needs of all children can be addressed through lesson accommodations and modifications.

To identify Amber's specific positions and recommendations towards having a child with a critical illness in classroom that does accrue several absences, the next two interview questions focused on the actions Amber would take as a teacher in regards to resources and absences. Amber's first response was to use manipulatives rather than worksheets because those are more engaging for the children. She furthers that response to say that a child in the hospital would be more engaged in using manipulatives, games, or computer-based activities. An example she gave was to use a highlighter and colorful manipulatives to engage the children. Among many gaps in this response, one is that it does not address how to truly utilize resources to assist a child with a critical or complex illness. Her response stated using tactile and colorful objects as resources, which are

currently used in schools for every child, aligned with the perception of children as homogeneous. The actual needs of the children are not considered, nor is method of teaching the child in school or during absences, learning the child's proper health care, experiences, or social situation. In terms of absences, Amber stated that she would communicate with parents and provide the parents with work to complete with the child. Absences of a healthy child are handled in such a manner, however in most cases, healthy children do not accrue excessive absences. The homogeneity of actions (i.e., sending missed work home during absences, use of manipulatives, games, and computer-based activities) shows the children being grouped homogeneously.

To probe further related to children with a critical illness accruing absences, the question was asked about Amber's perceptions of how high volume of absences affect their education. Amber repeated her response that absences cause children to fall behind because they miss lessons or even full units of study. Amber only addressed the fact of missing the teaching, not how the illness may affect the children in terms of health, as well as, socially and emotionally. All children that have absences to any degree miss academic learning opportunities, furthering the view of children as a homogenous group.

End-of-Day Reflections

From Amber's end-of-day reflection data, she had the opportunity to work with a variety of ages including ages outside of typical elementary grades (i.e., 5-11) such as an eight-month-old, four-year-old, and twelve-year-old. Amber reported that the ability to work with the same children helped in the planning process as the developmental levels and interests of the children are already known. She was able to use her knowledge,

informal assessments and observations from the previous day to create lessons more appropriate for the child. Amber recounted a few times that her lessons were not always appropriate for the children, meaning, that they were either developmentally too easy or too difficult. In reflecting on the lessons that were deemed too easy, Amber reported a desire to have previously planned a more difficult lesson, not necessarily how the lesson was adjusted to meet the children's needs. On the other hand, for lessons that were too difficult for the child, Amber reported the ability and action of modifying the lesson on the spot to be developmentally appropriate. In a specific example, Amber planned a mathematics lesson on the relationship between fractions and decimals for a child on a third-grade level and was able to adjust to meet the child's current understanding of fractions. It was positive to see Amber using informal assessments and observations to plan, adjust, and modify lessons, however, Amber's responses did not reflect on the individualities and needs of the children with critical illness specifically. Instead, Amber only considered the typical teaching strategy of using informal assessment data to guide modification of instruction. Amber did not report consideration of the disease profiles or effects of treatments of the child to inform instruction. Therefore, since the methods of using data to inform instruction and the adjusting of instruction remain the same across children with or without critical illness, these children are in this view, homogenous.

Post-Interview

The first two questions asked of Amber were related to her knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. In Amber's pre-interview responses she considered a critical or complex illness to be

something that hinders life and is debilitating. Amber's post-interview response reflected her experience and learning during the internship because she no-longer viewed a critical or complex illness as debilitating but viewed it as something that disrupts everyday life that could be short-term or long-term. She gave the example of it causing pain during typical activities such as school or sports. This is a stark difference from her initial responses in the pre-interview when she explicitly stated that critical or complex illnesses prevented participation in typical day-to-day activities such as school or sports. In terms of types of critical or complex illnesses, Amber's responses were clearly impacted by the internship experience, as she moved from listing cancers and diseases pertaining to the brain and heart to also including Cystic Fibrosis. Amber did not list any additional illnesses and stated that there were too many to list. Similarly, to the pre-interview, Amber's responses should inform a recognition of the specific needs and considerations of children with critical illness.

Amber's response to the question pertaining to her self-perceptions of preparation to teach a child with a critical or complex illness adjusted from considering herself unprepared to teach a child with a critical or complex illness to recognizing her growth through the internship experience. Amber stated that the internship experience gave her a better understanding of what happens at the hospital, and the abilities and limitations of the children. She sheds light to the fact that there are factors present in these situations that she did not previously recognize. She spoke to the vast differences between each case, in terms of medical and family situations. As a teacher, Amber stated that her understanding of their experiences in the hospital and other factors has led to her confidence in preparation. Amber's response demonstrated that she recognized that

children with critical illness in fact have unique needs that differ from the needs of a healthy child. Amber states that because of this knowledge and understanding she is prepared to teach a child. It would initially appear she is likely prepared, however, as subsequent questions are explored, the view of children as a homogenous group is made clear.

Amber's perception of educational hardships and unique learning needs of children with critical or complex illness did not change due to the internship. In fact, her point-of-view was solidified through her experiences at her brick-and-mortar placement in response to this question. Amber still viewed the educational hardships of children with a critical or complex illness to be falling behind academically due to absences. She extended her response from the pre-interview to include the effects of missing content on high-stakes state testing. Again, Amber disregarded the host of educational hardships beyond academics including effects of treatment on cognition, developmental delays, and physical limitations. Interestingly, Amber's response to the post-interview question regarding unique learning needs still did not address the additional educational hardships. Her pre-interview response included addressing pain and concentration difficulties as a result of her experience in tutoring a young lady with hydrocephalus and autism. However, her post-interview responses addressed pain and sickness as reasons to not provide educational activities and experiences. Her response to the question just before these questions, showed her recognition of the diverse and unique needs of children with a critical illness but, this understanding did not transfer to considering children with critical illness in the school context.

The actions Amber would take as a teacher with a child in her class with a critical or complex illness specifically in regards to resources according to her pre-interview responses were the use of colorful manipulatives and objects as resources and sending work to the parents for the child. Though her post-interview responses were not considerably different, she did include utilizing the resource of other teachers, nurses, or parents. In terms of providing educational opportunities, Amber stated she would create online modules for the child to complete. Her reasoning in creating these online modules was impacted by her experiences at the hospital-based school program because she recounted a time she served a child that had stacks of incomplete worksheets from school. She recognized the lack of effectiveness of worksheets and perceived computer-based modules as a better option. However, despite her recognition of the shortcomings of sending worksheet packets home, she ended her response by stating that if worksheet packets are sent home, they should include tips and be better organized. Although she was able to provide meaningful educational experiences to the children during her internship experience, it did not equate to a change in perception of how as a teacher she would bring meaningful educational experiences to a child in her class experiencing absences due to a critical or complex illness. Overall, her suggestions are characteristic of actions that would be taken for all students. Parents would be consulted, work would be sent home – even likely in an online format given the rise of technology in education, showing her grouping of all children homogenously.

The final question related to children with critical or complex illness regarded Amber's perceptions of how a high volume of absences affect the child's education. Amber's responses to how high volume of absences affects children continued to remain

in the fact that absences lead to missing classroom lessons and activities thus, the children experience gaps in academic learning. She extended her response from her pre-interview to include impacts on high-stakes state testing and on the learning in the next grade-level. Though these hold true in many cases, Amber still neglected how the illness may affect the child's health, social and emotional state. Amber's focus on academics and high-stakes state testing impacts all children with absences from school, thus, confirming Amber's view of children with and without critical illness as homogenous.

Courtney

Pre-Interview

The first two questions related to Courtney's knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. Courtney explained a critical or complex illness to be any type of illness that causes a disruption to the child's functioning and daily routines. Courtney's mother was a special education teacher; thus, Courtney was likely exposed to children that may have had a critical illness to understand the impacts of having a critical illness. Courtney acknowledged that there are many types of critical or complex illnesses but lists cancers, tuberculosis, and pneumonia. However, using the study's definition of critical illness as being a life-threatening or limiting diagnosis that is coupled with long-term treatment, Courtney's response contains illnesses (i.e., tuberculosis and pneumonia) that are not considered critical. Overall, Courtney was able to provide responses that acknowledge that a critical illness causes a disruption to life that is greater than a temporary disruption of an illness such as an ear infection. Courtney's experience with a mother as a special education

teacher and understanding of the effects on life of a critical illness, provided potential for Courtney to understand the unique needs of children with a critical illness. However, her responses forthcoming, displayed a view of children homogenously.

The following question pertained to Courtney's self-perceptions of preparation to teach a child with a critical or complex illness. Courtney displayed confidence in the abilities to teach a child with a critical or complex illness by stating that the skills taught during her teacher preparation program prepared her to teach diverse groups of children and though not particularly stated, children with critical or complex illness are inherently included. Courtney stated that she believes there is more to learn, but that she is on some level prepared. The educational suggestions to meet the needs of diverse children typically reflected the actions of accommodating and modifying. These are teaching strategies needed of all children, not exclusively children with critical illness. This statement justified Courtney's view of children as a homogenous group because she stated preparedness to meet the needs of children with critical illness without the learning or experience of the needs and implications of having a critical illness.

The next few questions sought to discern what Courtney specifically perceived as educational hardships of children with critical or complex illness. Courtney's response to the educational hardship's children with critical or complex illness was limited to the disruption of the child's routine and stability in attending school. Her response did not consider other factors contributing to educational hardships of children with a critical or complex illness such as the effects of treatments on cognition, possible developmental delays, or physical limitations. Interestingly, even though having a mother that was a special education teacher, Courtney focused on the absences from school and did not

consider children with a critical or complex illness that do attend school. This was likely due to the setting of the hospital and lack of reflection and thought towards her other experiences. This response is homogenous in the respect that it only considers the disruption of the routine of attending school rather than the host of educational implications of a critical illness.

When asked to consider the unique learning needs of children with a critical or complex illness, Courtney compared the learning needs to those of a healthy child stating that they may need additional time, or supports in activating background knowledge. This response did consider the unique factors that result in the unique learning needs of children with a critical or complex illness. Her response showed a knowledge of the needs of diverse children, but did not narrow the focus to those needs specifically to children with a critical or complex illness. The comparison of needs between healthy children and children with critical illness illustrates the idea of homogeneity.

The next interview question focused on the actions Courtney would take as a teacher with a child in her class with a critical or complex illness in regards to resources. Courtney began by addressing the importance of understanding the child's diagnosis whether that be through speaking with the family or doctor. Here, Courtney addressed the need for understanding the medical aspects of the child's diagnosis and effects on schooling. Though not specific on what these effects may be, she addressed that they exist and require education of the diagnosis on her part, as well as the need to utilize school personnel and resources to aid the child while at school to be successful. This statement is particularly shocking, given that her previous response outlined that the needs of all children, included children with a critical illness, are homogenous. On the

other hand, even though she began to recognize the individual needs, the accommodations and modifications listed are homogenous across all children (e.g., extra time, working with a school specialist).

In terms of absences, Courtney stated that her actions as a teacher would be to remember communication with parents is most important and to remember that the child is missing out on the lessons and information being taught. Her suggestions to teach the missed content are to send school texts and homework home and make visits to the hospital, if possible. Courtney did not address the difference in learning experiences between the learning activities presented in class versus completing reading and written work while in the hospital or at home. In Courtney's recommendations, the child is still missing out on rich educational opportunities and does not have the ability to engage in exploration and meaningful tasks. However, Courtney stated that this method is in efforts to keep the child on pace with the other children as much as possible but recognized it is not an equal educational opportunity. Furthermore, the action of sending missed work home, is homogenous to that of other children that have absences.

The last question related to children with critical or complex illness was about Courtney's perceptions of how high volume of absences affect the child's education. As expected, Courtney addressed that absences result in missing content, but, she also addressed the child missing the educational experiences provided including class discussions. Though Courtney began to address items beyond just missed content, she did not include the missed social experiences. The missing of content and class discussions is homogenous to what any child would miss with any number of absences.

End-of-Day Reflections

From Courtney's end-of-day reflection data, she was able to work with typical elementary age children (5-11 years old) on the content of reading, mathematics, and robotics. She reported enjoying working with the same child multiple times and on different content areas. The use of robotics was also important for Courtney as this served as an engagement piece for many of her children. Courtney's end-of-day reflections were not specific to how she planned or implemented her lessons. She gave one example of a reading lesson of which she selected a text that was too easy for the child and reflected on selecting harder texts. Her data does not lead to the conclusion or indicate her understanding or addressing the specific needs of children with a critical illness. Her responses towards using robotics and adjusting level of text is characteristic of any classroom of any type of child, showing homogeneity.

Post-Interview

The first two questions asked of Courtney was related to her knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. Similar to her pre-interview responses, Courtney stated that a critical or complex illness impairs some aspects of a person's life whether that is the ability to move, function or complete daily tasks. Though her views of what a critical or complex illness is remained essentially the same, her examples of types of critical or complex illnesses became more accurate. Previously Courtney had mentioned cancers, pneumonia and tuberculosis and in the post-interview gave the examples of scoliosis, cerebral palsy, and Graves' disease, all of which are considered a critical illness. The inclusion of correct critical illnesses shows

Courtney's growth in awareness of types of critical or complex illnesses a child in her class may have.

A related question pertained to Courtney's self-perceptions of preparation to teach a child with a critical or complex illness. Courtney identified that initially she did not have any prior knowledge on the particular needs of children with a critical or complex illness. She recounted that her first thoughts when considering children with a critical or complex illness were in thinking about and having concern over the severity of the illness and how that impacts their lives and ability to learn. These thoughts and concerns could have led Courtney to explore the specific needs of children with critical illness, instead, her experiences solidified the idea of homogeneity. Courtney stated that the hospital-based internship program led to her to become more prepared and more confident to meet the needs of a child with a critical or complex illness in her class through hands-on practice. Courtney stated gaining an understanding that not all children with a critical or complex illness are behind in school and that in most cases they behave and perform as we should expect a healthy child to behave and perform. Thus, positioning Courtney to consider children as a homogenous group.

Courtney's perceptions of educational hardships of children with critical or complex illness remained similar to the pre-interview. Courtney addressed falling behind in academics and included in her post-interview the impacts of continuing to miss classroom lessons once back in the school setting due to interventions and remedial pull-out classes. Courtney recognized that the hospital homebound program exists to serve children with high volume of absences but indicates the education is not equitable to the education provided in the classroom. There was no mention in the post-interview the

effects of treatments on cognition, possible developmental delays, or physical limitations as types of educational hardships. Regardless if the child has a critical illness or not, missing academics due to absences and receiving services including pull-outs and interventions are characteristic of all children furthering the notion of children as a homogeneous group.

In terms of the perception of unique learning needs children with critical illness may have, Courtney displayed little change between her pre- and post-interviews. She reported that the children would need varying interventions, supports, and even assistive technologies but that each case would be different. These responses still primarily focus on academics and are needs any child may have in the classroom; this solidifies her perceptions on educational hardships and continues to illustrate the conception of children as homogenous.

The next interview questions focused on the resources Courtney would seek to meet the needs of a child with a critical or complex illness in her class. Courtney restated her answer of reaching out to the parents to learn about the child's needs, but included consulting the special education teacher and administration for support and access to items such as assistive technologies. The mention of assistive technologies shows a recognition that children with a critical or complex illness may have needs in the classroom requiring a tool (i.e., assistive technology; e.g., speech-to-text or text-to-speech software, pencil grips, organizers) to assist in learning and during learning activities. However, assistive technologies are not unique to children with critical illness, and are used and designed for any child to assist in any type of learning challenge.

Therefore, this suggestion does not consider the needs of children with a critical illness, and furthers the view of children as homogenous.

In terms of high volumes of absences, Courtney first stated that if the child has been hospitalized they likely will have a hospital-homebound teacher. However, she still stated the necessity of the teacher to send work and visit the child. Courtney also mentioned coordinating video conference sessions for the child to be able to conference in on the classroom lessons. Though Courtney's intention was to provide the child with the closest experience as possible to being in the typical classroom, this method still does not allow the child to truly engage with the other children and participate in the activities of the classroom. While Courtney's intentions are well meaning, they do not lead to equitable educational opportunities. The assumption that children with critical illness' educational needs are best met through participation in class activities is characteristic of homogeneity in that all children need to be in class to learn.

The last question related to children with critical or complex illness was about Courtney's perceptions of how high volume of absences affect the child's education. Courtney continued to focus on the academics and the missing of content. As important as academics are, the other factors such as missing collaboration with peers, social growth and other activities were ignored. Once again, the stated sole impact of absences is missed academics, characterizes as children homogenous.

Emily

Pre-Interview

The first two questions asked of Emily was related to her knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. Emily stated that a critical illness means that a child is sick and incapable of completing and participating in certain tasks. Emily was unable to provide any examples of a critical illness and repeated that a critical illness is more extreme. Though the comparison is unclear, since children are being referenced, it can be inferred that Emily is likely stating that critical illnesses are more extreme than colds and stomach viruses children typically contract. Emily's vague responses do not lend to the possibility of her understanding the specific needs of children with a critical illness.

A related follow up question pertained to Emily's self-perceptions of preparation to teach a child with a critical or complex illness. Emily did not directly state whether she perceived herself as prepared to teach a child with a critical or complex illness but stated that she felt intimidated about teaching children in the hospital setting. Emily had never had any previous experiences with someone with a critical or complex illness. Unlike the previous two participants, Emily's lack of response lends to the understanding that she will view children as homogenous.

Educational experiences for children with a critical or complex illness are often complicated therefore the next interview questions asked what Emily perceived educational hardships and unique learning needs of children with critical or complex illness. Emily believed that children with a critical or complex illness may have difficulties in processing and understanding information, need may additional resources

and time. Emily did not explain why she believes children with a critical illness have these educational hardships, but her responses may lead one to assume her understanding of the effects of treatment on the cognition, possible developmental delays, and possible physical limitations, which is interesting as she was unable to describe what a critical illness is or provide examples. However, her generalized examples can be characteristic of any child, supporting the theme of homogeneity of children.

Emily answered the question regarding the unique learning needs of children with a critical illness hesitantly and in an unsure manner. She restated her response to the questions regarding educational hardships to say that children may have difficulties processing and understanding information. Her hesitation and brief responses likely stem from a lack of experience and knowledge about critical or complex illnesses and hospitalizations in general. Emily had a plethora of experiences in education and her responses towards the possible cognitive needs (i.e., processing and understanding information) reflect her experiences. As mentioned previously, her recognition of difficulties processing and understanding information can relate to the effects of treatments or innate cognitive disabilities of children with a critical or complex illness. However, because of her indication of intimidation and lack of knowledge on critical or complex illnesses, her responses are reflective of an understanding of possible needs of any child in the education setting, thus demonstrating homogeneity among children.

The next few interview questions focused on the actions Emily would take as a teacher with a child in her class with a critical or complex illness specifically in regards to resources. Emily's first response was to contact someone that has a greater understanding of the child and illness to gain insight on the needs of the child and how to

support them academically. Emily also mentioned being involved in independent research on the illness. Emily only addressed the academic needs of the child and did not consider the medical, social and emotional needs of the child. The neglect or afterthought of these aspects likely stem from a focus on education aspects of being a teacher and lack of experiences teaching full-time where consideration of these factors is routine.

In regards to absences, Emily only mentioned meeting with the family to provide make-up work. Emily did not consider how to provide or assist in providing the child with equal educational opportunities. This shows an educational injustice to the children experiencing absences due to a critical or complex illness. This also mirrors the same actions given to other children without critical illness that miss school. The child's critical illness is not considered, leading children to be viewed as a homogenous group.

The last question related to children with critical or complex illness was about Emily's perceptions of how high volume of absences affect the child's education. Emily stated that the absent child would not receive the same information and learning experiences as their peers as well as miss out on the social interactions. It is interesting that when considering the child being absent from school, Emily acknowledged the missed social interactions but does not make the connection between social interactions and educational hardships. Emily also does not extend to connect how the missed social interactions affect a child with critical illness specifically. Furthermore, any child absent from school also misses out on the social interactions, again leading to the homogenous grouping of children.

End-of-Day Reflections

From Emily's end-of-day reflection data, she mainly worked with primary elementary ages (4-8). Emily mentioned the use of robots in each lesson or indicated the incorporation of robotics would have made her lessons more engaging. Emily incorporated robots into her mathematics lessons but explained that she desired to figure out how to properly incorporate the robot into her reading lessons. Emily assessed the success of her lessons based on the engagement and motivation of the children. This response is in part driven by the fact that the children that were more engaged, had more responses to her questions and discussions. However, Emily's first reflection did identify that she wished she had created an assessment to understand what the child learned as a result of her lesson. The following week, Emily mentioned the use of assessments, but addressed the use in terms of modifying it to make it more engaging for the child. Emily's desires to incorporate robotics into the disciplines and how to inform instruction are general teaching practices she would take in the traditional classroom. None of her reflections address the specific needs of the children with critical illness. The needs and supports reflected upon are homogenous with healthy children.

Post-Interview

The first two questions asked of Emily was related to her knowledge of what a critical or complex illness is and what it means to have a critical or complex illness. Emily's perceptions on what a critical or complex illness is remained the same as she explained that the illnesses hinders the child's ability to participate in activities such as sports. As a result of participation in the internship program, Emily learned that the

treatments have effects on children with a critical or complex illness and was able to list a few examples of critical or complex illnesses (i.e., cancers, traumatic brain injury, muscular dystrophy). Her growth in understanding what a critical illness is and types could inform a growth in understanding the educational implications of a critical illness, however, that connection is not made.

A related question pertained to Emily's self-perceptions of preparation to teach a child with a critical or complex illness. Previously, Emily did not have any experiences with or in teaching a child with a critical or complex illness so as a result of participation in the internship, Emily reported feeling more prepared to teach a child with a critical or complex illness. Though Emily felt more prepared, she did express hesitation to properly meet the child's educational needs depending on the type of critical or complex illness. This indicates that Emily recognized that children with a critical illness do have specific needs due to disease profile, however she is unaware of those needs and educational implications.

With the responses from the first two questions, Emily sets the stage to be able to explain and show understanding of the specific and unique educational needs of children with critical illness; however, most of her responses are similar to her pre-interview responses. The next two interview questions asked what Emily perceived as educational hardships and unique learning needs of children with critical or complex illness. In both of Emily's pre- and post-interview responses, she addressed missing content from absences and difficulties in learning processes, but in the post-interview only, acknowledged the treatments may have effects on difficulties in learning processes. Her acknowledgement of treatment effects on the learning processes was a positive change,

however Emily did not explain the effects. In terms of unique learning needs, Emily reflected on the use of manipulatives and other hands-on items, repetition, and visual tools. Though these educational tools and practices should be implemented with every child, the particular mention of repetition is important as the effects of treatments (e.g., chemotherapy) and profiles of some critical or complex illnesses include a delay in cognition requiring the use of repetition for learning. Emily did not make those connections, she simply stated her use of the manipulatives, hands-on items, repetition, and visual tools. All of which should be present in a typical classroom. Though Emily begins to branch away from the view of children as homogenous in education, her action statements still display that rooted view of children as homogenous.

The next interview question focused on the actions Emily would take as a teacher with a child in her class with a critical or complex illness specifically in regards to resources and absences. Emily's first response towards resources was to consult the faculty and the hospital-based school program and reflected on how the various faculty provided support during her internship. This response shows Emily's recognition and use of professional connections. Furthermore, Emily stated using online resources and consulting previous teachers and the child's parents for information and tips. Emily's perceptions on addressing absences as a teacher is to send the child's missed work home with the parents, to create online modules, or to video conference with the child. These responses are similar to her pre-interview responses but in the post-interview she included the use of video conferencing. This may be because Emily has reflected on her experiences in the hospital-based school program, knowing that worksheet packets are not effective. However, this view still suggests that children with critical illness are best

severed by the typical education setting and that the goal is to keep the child on-pace with classroom content rather than other methods of education. This point-of-view supports the notion of children as a homogenous group.

The last question related to children with critical or complex illness was about Emily's perceptions of how high volume of absences affect the child's education. Emily's response remained focused on the child's missed academics and thus, falling behind their peers. Emily mentioned the cooperation with peers in relation to academic discussions but no mention is made about the social and emotional effects of absences. The focus on missed academics ignores the other impacts of a critical illness in relation to absences from school, and her responses continue to align with the idea that children are viewed homogeneously.

The additional questions were asked in the post-interview only. The first question asked what Emily perceived that she learned about the education and educational needs of children with a critical or complex illness as result of participation in the hospital-based internship. Emily addressed the exposure to many types of critical or complex illnesses and recognizes the vast differences among them. She felt that these differences made it difficult to plan lessons because it was critical that the specific needs of the children as individuals must be considered and addressed. Beyond consideration of children with a critical or complex illness, this exposure likely solidified the learning and focus on the necessity of modifying lessons and accommodating for the various children in the classroom. However, modifications and accommodations are standard procedures in classrooms, thus all children are grouped homogeneously.

Procedural Mathematics

Amber

Pre-Interview

The first interview questions related to mathematics pertained to the self-perceptions of Amber's own abilities in mathematics and why she had such perceptions. Amber stated that she perceived herself as capable of achieving high scores and grades on mathematics but that it took her more time and work to be successful in comparison to subjects like English. She did not explicitly state whether or not she truly believed in her mathematical ability. Instead she turned to address her abilities and enjoyment in English and writing. Thus, it can be assumed that she does not perceive herself in being highly able to complete mathematics tasks or whether ability is present or not it seems she does not enjoy the process of completing mathematics tasks. The assumption stems from the avoidance of answering the question, the statement of enjoyment and ease of abilities in differing subjects, and her statement in her background questionnaire of relief that her college courses focused more on teaching mathematics rather than continuation in learning complex mathematics. This response does not explicitly relate to procedural mathematics, however, will influence subsequent responses that relate to procedural mathematics because she is positioned to default to traditional methods of teaching mathematics and narrowed views of mathematics.

The second question related to the understandings of when people do mathematics. Amber began her response by stating that mathematics is something that people do every day. However, her acknowledgement of mathematics conducted daily is

limited to consumer mathematics specifically shopping and going to the gas station. Amber only considers the types of mathematics to complete by procedure rather than consider moments with mathematics is used flexibly and to reason.

The next question asked Amber's self-perceptions of preparation to teach mathematics. Amber recognized how the courses she took at the Southeastern university prepared her to teach mathematics but reported she was only somewhat prepared. Her own lack of confidence in mathematical ability likely contributes to this perception. Amber's perceived reason for a lack of confidence stems from her being unaware of what misconceptions children may have. Understanding of misconceptions and teacher knowledge of common misconceptions and effective ways to mitigate misconceptions is an important component of effective teaching. However, Amber reported that she was mostly prepared to teach mathematics and was fond of the current practices in mathematics education. The acknowledged lack of awareness towards misconceptions could lead to mathematics topics being taught procedurally due to a limitation of understanding on how to address the misconceptions.

The next question asked what mathematics can be expected of children to be able to do and understand. Amber's response to the mathematics we can expect children to do was simply the standard operations of addition, subtraction, multiplication, and division. Amber did not address other content areas, and more so, she did not address the mathematical practices that children need to utilize when completing mathematics tasks. This response shows a reliance and focus solely on procedure rather than conceptions, process, inquiry, and mathematical habits. These responses show that Amber is prepared

to relay mathematical procedures, but not be a facilitator of mathematical learning, exploration, and inquiry.

Post-Interview

The first interview questions related to mathematics pertained to the self-perceptions of Amber's own abilities in mathematics and why she had such perceptions. In Amber's pre-interview she avoided answering the questions directly, but in the post-interview Amber indicated that she was unsure if she is good at mathematics but recognized that it does not come naturally or easily to her. This response does not explicitly relate to procedural mathematics, however, will influence subsequent responses that relate to procedural mathematics because teachers are highly influenced by their own beliefs and experiences, and given Amber's responses, shows her likelihood of defaulting to traditional methods of teaching mathematics procedurally.

The second question related to the understandings of when do people do mathematics. Amber stated that mathematics is often conducted in everyday life, and the basic operations (e.g., addition, subtraction, multiplication and division) are encountered often. Though her example was limited to consumer mathematics, her statement that the basic operations are used the most in everyday life means that she recognized that other forms of mathematics do occur. Her pre-interview responses also did not consider other types of mathematics that can occur and was strictly limited to consumer mathematics. Again, this shows a limit to Amber's understanding of how mathematics can be used in terms of reasoning and abstract or complex situations.

The next question asked Amber's self-perceptions of preparation to teach mathematics. Amber stated that she feels prepared overall but still has reservations and did not answer the question in a confident manner. She recognized that her classes equipped her and gave her experiences in using manipulatives appropriately and ideas on how to teach. Similar to her pre-interview, Amber did not address research-based teaching practices. Amber's main focus was the learning of manipulative use, which is helpful in cultivating mathematical conceptions but no response was given on the various uses of manipulatives to create mathematical understanding. Furthermore, the mathematical practices and habits are not discussed, leading Amber to likely teach procedurally.

The next question asked what mathematics can be expected of children to be able to do and understand. Amber answered in the same way as she did in her pre-interview that children are expected to understand the basic mathematics operations but also added in other domains of mathematics such as measurement and geometry. This was likely due to the experience in teaching these concepts and discussing them in the mathematics methods course. Again, there was no mention of conceptions, process, inquiry, and mathematical habits. This provides evidence towards the notion that Amber will likely err towards teaching procedurally. Her expectation of mathematics that children do is basic computations and other content domains with no regard to how children will be doers of mathematics.

The final question asked Amber her perceptions on if participation in the hospital-based school program prepared her to teach elementary mathematics. Amber believed that the internship program helped her become prepared to teach mathematics in the ways

that she was able to practice and learn how to modify during facilitation of a lesson. Her responses were not specific to mathematics, meaning she gave no examples or spoke about her practices in mathematics. This response can be applied to teaching mathematics, but generally lesson modification is a general teacher skill needed for all content areas. It is unclear to what extent the internship program prepared Amber to teach mathematics.

Courtney

Pre-Interview

The first interview questions related to mathematics pertained to the self-perceptions of Courtney's own abilities in mathematics and why she had such perceptions. Courtney stated that mathematics makes her anxious and she feels that she is not good at mathematics. However, she recognized that with the mathematics content that she has already learned, she is typically successful at completing the problems. She felt that it took her more effort and time to understand new mathematics content than her peers. A large part of her perceptions is driven by her anxiety and negative attitudes towards mathematics. She has a disposition to be anxious about mathematics tasks and mathematics classes before involving in them. These negative attitudes and anxiety will likely influence her teaching, even leading her to revert back to traditional practices of procedural teaching.

The second question related to the understandings of when do people do mathematics. Courtney stated that mathematics is used in all areas of life and daily. Her examples though, related to only consumer and domestic uses of mathematics. Courtney

did not address the use of mathematics in contexts of reasoning, thinking abstractly or in complex tasks. The mathematics Courtney referenced was strictly simple computations that follow a procedure.

The next question asked Courtney's self-perceptions of preparation to teach mathematics. Courtney stated that she feels prepared to teach because it's "elementary" mathematics and that her courses have prepared her with proper teaching strategies. Her comment regarding that the content is elementary mathematics, not high school level mathematics lends to the assumption that elementary mathematics content is doable therefore teachable. The reference that she made to specific pedagogy for mathematics is having the ability to explain the "why". Courtney's explanation of teaching mathematics follows the form of introduction of an idea and the procedure, and then using the procedure to explain the "why." This view still strips the children's flexible thinking and opportunities to develop mathematical habits.

The next question asked what mathematics can be expected of children to be able to do and understand. Courtney did not list specific content areas of mathematics that children should be expected to do and understand but rather took the position that children are able to achieve what they are taught and equipped to achieve. To Courtney, it is about providing the proper resources and learning experiences to become successful. This answer errs more towards the concept of children being doers and mathematical thinkers, whereas engagement in inquiry, exploration, and mathematical discussion are not blatantly stated.

Post-Interview

The first interview questions related to mathematics pertained to the self-perceptions of Courtney's own abilities in mathematics and why she had such perceptions. Courtney simply stated that she is still not good at mathematics. This statement is interesting, because it indicates first of all, she anticipated change in perception throughout the semester and second, her previous perception was that she is not good at mathematics. In her pre-interview, her initial response was no, but she followed it up by stating that she can complete the mathematics tasks that she has previously learned well but, that she has high anxiety towards learning new mathematics concepts. Courtney is equating her mathematics anxiety to her abilities to successfully do mathematics. She indicated that this anxiety is still present in her mathematics methods course and surfaces the most when a topic she is unsure about (e.g., fractions) is discussed. She ended that statement by saying near the end of her teaching career, she believes she will be more comfortable. This is unfortunate, as confidence in teaching mathematics should be present well before the end of one's teaching career. These attitudes and anxieties will likely influence Courtney's teaching and lead her in reverting back to traditional forms of teaching focused on procedural learning.

The second question related to the understandings of when people do mathematics. Courtney stated that mathematics is done each day but quickly transitioned to stating that the mathematics being taught and done in school is strictly only done in school and school assignments. This response indicated Courtney's lack of understanding of mathematical habits and practices that should be demonstrated and cultivated in her classroom. A large purpose in developing these habits is to mold children as doers of

mathematics. Courtney, based on the nature of these responses likely heavily focuses on the procedures of mathematics.

The next question asked Courtney's self-perceptions of preparation to teach mathematics. Courtney believed that she is more prepared to teach mathematics after participation in the hospital-based internship program and her mathematics methods course. She even stated that she often preferred to teach a math lesson to the children rather than other content areas. However, her reasoning behind mathematics being preferred is that mathematics produces a concrete answer. There is a problem, the problem has a solution method, and a clear answer. This response shows a stripping of flexible mathematical thinking, inquiry, mathematical habits, and discovery. It also supports the teacher being the supplier of procedural knowledge and the students being the receivers of such knowledge.

The next question asked what mathematics can be expected of children to be able to do and understand. Courtney still believes that there's not a set amount of mathematics that children can learn, but rather it is about setting high expectations and providing the proper resources to achieve what they are able to achieve. Though the intentions are well meaning, the lack of understanding of how to instill proper mathematical habits and learning will squelch the children's opportunity to truly become flexible mathematical thinkers and doers.

The final question asked Courtney her perceptions on if participation in the hospital-based school program prepared her to teach elementary mathematics. Courtney felt that participation in the hospital-based internship program prepared her to teach mathematics. Courtney first reported gaining confidence and interest in teaching

mathematics and feels that it is because she was able to work with the children one-on-one. Working one-on-one also relieved Courtney's anxieties and intimidation towards teaching mathematics. She felt that she was able to gain better insight on her own strengths and weaknesses in teaching mathematics. Though Courtney's perspective is that she felt prepared and confident, from previous responses it is clear that Courtney is prepared and confident to teach procedural mathematics.

Emily

Pre-Interview

The first interview questions related to mathematics pertained to the self-perceptions of Emily's own abilities in mathematics and why she had such perceptions. Emily did not consider herself good at mathematics and stated that she has a clear memory of struggling in high school mathematics. Emily felt that this is due to how she was taught mathematics. During her elementary mathematics content courses, Emily felt that this was the first time she was correctly taught mathematics and felt like she understood it. Emily's understanding of mathematics now, may not translate to an understanding of how to teach mathematics.

The second question related to the understandings of when people do mathematics. Emily answered this question in an unsure way and stated that she assumed mathematics is done every day, but that it usually only is done if needed for class. Emily did not make any mention of the standard expected answer of consumer or domestic mathematics, until the researcher asked specifically about mathematics outside of school. Emily's initial answer was no, but then said cashiers would engage in mathematics daily.

This shows a lack of understanding of the utilization of mathematics for daily activities. Emily does understand that mathematics is used in reasoning, and flexible thinking of tasks. Her statement that mathematics is only done in school and her acknowledgement of one example of mathematics done indicated a traditional view of mathematics; that mathematics is to be taught by procedure.

The next question asked Emily's self-perceptions of preparation to teach mathematics. Emily stated that she does feel prepared to teach mathematics but that she may need to review the content prior to teaching. This confidence may be due to the fact that Emily understood the mathematics being taught in her college level courses. She felt that review on some content is necessary due to her past struggles in mathematics however, at the time of the study she was employed as a tutor at school after-care to help children with their math homework and felt confident in assisting them with their mathematics. Her review of mathematics is likely focused on the procedures of completion of the task.

The next question asked what mathematics can be expected of children to be able to do and understand. Emily started by answering the question with listing mathematics courses for high school such as algebra and geometry. She then addressed the fourth graders that she tutors and listed types of mathematics problems the children have such as multiplication. Emily's answer did not reference mathematical practices or habits that children should have in completing mathematics tasks. This shows an understanding of content and procedural learning not developing skills in inquiry, perseverance, and application.

Post-Interview

The first interview question related to mathematics pertained to the self-perceptions of Emily's own abilities in mathematics and why she had such perceptions. In the pre-interview, Emily initially stated that she did not perceive herself as good at mathematics and has memories from compulsory schooling of struggling and disliking mathematics. In the post-interview Emily addressed the elementary mathematics methods course completed during the semester of study to explain that during the course she realized that she had not been taught mathematics properly. Emily felt that as she learned how to teach mathematics to children in the mathematics methods course, she was able to understand mathematics herself. Emily attributed her lack of confidence in mathematics to being taught mathematics incorrectly. It is unclear to what extent Emily learned proper teaching practices in mathematics, however, her subsequent responses indicated that she did not gain understanding in creating an environment of flexible mathematical thinking and mathematical habits.

The second question related to the understandings of when people do mathematics. Emily's response changed from a simple no, to recognition that mathematics is done each day, however her focus was on consumer uses of mathematics (e.g., calculating rent). Her view remains narrowed; however, she did display growth in recognizing the areas of which mathematics is and can be present. Emily still does not recognize where mathematics can be used in other areas aside from completing simple mathematics procedures.

The next question asked Emily's self-perceptions of preparation to teach mathematics. Emily stated that she is prepared, though responds in an unsure manner,

characteristic of her pre-interview responses. She spoke again about the need to review the lessons and teach some content to herself before presenting the lesson to the children. This situation does not lend itself to the time needed to prepare lessons that instill mathematical habits, inquiry, application and discovery. Emily focused on learning and practicing the content in a procedural way, meaning she will likely present the knowledge in that way as well.

The next question asked what mathematics can be expected of children to be able to do and understand. Emily focused on the types of mathematics content taught in the elementary grades (e.g., fractions, geometry, measurement, basic operations). Emily ignored the mathematical habits students should learn and use supporting the likelihood of focus on mathematical computation, processes, and procedures.

The final question asked Emily her perceptions on if participation in the hospital-based internship program prepared her to teach elementary mathematics. Emily felt that the program aided in her preparation to teach mathematics because she was exposed to more mathematical games, manipulatives and ways of teaching that she was not in other courses and settings. In addition to that exposure, Emily felt that her ability to put into practice the teachings of her teacher preparation courses helped her feel prepared. Though her perceptions of preparation and confidence increased, the utilization of mathematics and ways of teaching did not increase tremendously and remained grounded in the concept of mathematics being a procedural task and to be taught in that fashion.

Summary of Results Across Cases

Aside from classroom observations and any background experiences in teaching, this first internship is the first opportunity pre-service teachers have to put the skills learned from their courses to practice. The participants in this study completed a 12-week internship, 6-weeks at the hospital-based school program and 6-weeks at a local public elementary school, along with three co-requisite courses (i.e., elementary mathematics methods, diagnostic and corrective reading, and teaching exceptional students). After analysis of the data sources through the use of the constant comparative approach rooted in grounded theory, two themes emerged as forefront issues across all participants: 1) children as a homogenous group and 2) procedural mathematics. In this discussion, these two themes will be explored and connections drawn to related literature.

Children as a Homogenous Group

The education of children with critical illness must be tailored the child's disease profile, any co-morbidities, and cognitive abilities (Nickels et al., 2017). For children with critical illness, access to high-quality education is not sufficient. Access alone does not address the specific needs of the children (i.e., disease profile, comorbidities, cognitive abilities) therefore for is not equitable (Nickels et al., 2017).

. . . [children with critical illness] probably have a hospital homebound teacher, so coordinating with that teacher or with the parents to give them the assignments. . . doing things like [video conferencing] so they can still get some interaction from the classroom. Just so they have access to the work that you're

teaching. So, even though they'll probably fall behind, they'll still see what you're working on. -Courtney, Post-Interview

The participants of this study provide overwhelming evidence pointing towards the stance that children with critical illness are no different from healthy children— they are homogenous. As seen in Courtney's response, the mere ability to access content of the classroom suffices the educational need.

Homogeneity in children refers to the absence of the individualities of the children and the ignorance of oppression, inequities and discrimination (Berman, 2003; Nickels & Cullen, 2017). The participants view children with critical illness homogeneously in that the access to school, educational materials and standard supports (e.g., standard accommodations, modifications, interventions) are sufficient to meet their needs. This does not address the educational inequalities or discrimination children with critical illness may face.

I think [regarding resources for children with a critical illness] manipulatives are a big way that makes it more fun and interesting than a worksheet which I think is crucial for all kids. -Amber, Pre-Interview

In Amber's pre-interview response, she clearly states her suggestions are “. . . crucial for all kids” justifying her view of children with or without critical illness as homogenous in terms of education (Amber, Pre-Interview, Appendix D). Amber's closely followed, and troubling statement of,

. . . also giving grace [to children with critical illness] and not expecting them to keep up all the time, obviously. -Amber, Pre-Interview

is intended to be kind, however this positioning eradicates necessary actions to lead and support the child with critical illness to academic success. Nickels & Cullen (2017) address that appropriate education equips and empowers children with critical illness to regain control, confidence, and dictate how they choose to live. The ability to position children with critical illness for successful and fulfilled lives, comes at the necessary cost of addressing and considering their specific needs in providing education. The nature of education and support in place for all students in current classrooms will not sufficiently meet those needs. Despite the participants' experiences in the hospital setting, their view of children with critical illness is homogenous with their view of healthy children. The suggestions for addressing absences make this statement particularly clear.

I'm thinking different apps even that can help them, different online resources, even if you could create an online module. . . but, you know even if you have to do worksheets I feel like just organizing it well and giving tips to kids would help. -

Amber, Post-Interview

. . . Send them what they're missing or work with the parent and give it online, maybe [video conferencing]. -Emily, Post-Interview

Additionally, in Amber's addressing of what she learned from the internship program she states,

A lot of [children with critical illness] love to learn. . . especially if you make things interesting. So, that was kind of a big one for me, how can I make this interesting. . . How could I make it interactive, engaging? Which is something you should do in all classrooms. -Amber, Post-Interview

Amber's focus on engagement first of all, does not address the rich educational experiences that should be facilitated with the children with critical illness. Her statement also indicates that the things learned are good for all classrooms, addressing the homogeneity across all children.

The danger of the view of children as homogenous is that there is a reversion to historical thoughts and ideals that so many have fought to destroy. Though the supports, accommodations, and modifications suggested are posed as means to address individualities, when they come at benefit and necessity to all children, it is by definition not individualized and is homogenous.

Procedural Mathematics

Even though this discussion is focused on the pre-service teacher's views of mathematics and teaching mathematics as procedural, it is important to acknowledge that all participants displayed negative attitudes towards mathematics and one participant blatantly stated anxiety towards mathematics.

I hated math throughout all my years in schooling. I have severe anxiety when it comes to taking a math class. -Courtney, Background Information Questionnaire

This acknowledgement is important because research has shown that teacher beliefs and positioning towards mathematics largely influences the way that they teach (Laursen et al., 2015).

Inadequate content and pedagogical knowledge lead to ineffective teaching methods (Chamoso et al., 2012). This study did not assess the content or pedagogical knowledge learned by the pre-service teachers, however the understanding of the use of

mathematics and the mathematics expected of children to be able to do and understand proves a disconnect or lack of preparation in the content and pedagogy of mathematics.

. . . math is almost easier to teach because you get a concrete answer, you know?

You can clearly understand whether or not the student is getting what you're saying and is able to do it. Because if they're not getting the answer and they're not performing the steps in the right order it's easy to see the mistake. When you're like "tell me the main idea," there's one main idea but there's a lot of other ways they can get to that answer. But when you have a math lesson, it's very straight forward. -Courtney, Post-Interview

All participants stated that the mathematics expected of children to understand and be able to do includes only content areas (e.g., basic operations, geometry, measurement).

I feel like, the core four. The multiplication, division, subtraction, addition are kind of the big ones and then the levels that come with that. Then you have other things like unit measurements, decimals, geometry. They have a lot of different things that come with elementary math but I feel like there's four core things they should know. -Amber, Post-Interview

The focus only on the content areas in mathematics is concerning, as not one participant addressed developing appropriate mathematical habits or preparing to teach mathematics through research-backed methods. Beyond the abhorrent disregard of mathematical habits, Emily furthered this ill-preparedness by stating,

The only times that I do like elementary math is if I'm teaching myself to teach it and reviewing it. . . I think that as I review lessons I start to pick it up more, so

it's like teaching myself so as I get better at it I'll get better at teaching it. -Emily,

Post-Interview

Teachers must cultivate a mathematical environment of which students are able to explore, inquire and deepen understanding of mathematics (Niess, 2005; Kajander, 2010). Being taught rote memorization, procedural knowledge and computation does not equate to a sufficient mathematical learning experience. Several authors (e.g., Ball, Thames, & Phelps, 2008; Hill, Ball, & Schilling, 2008; Hill, Schilling, & Ball, 2004; Phelps & Howell, 2016; Shulman, 1986), have all explained that effective mathematics teaching requires a content and pedagogical knowledge specific to mathematics and includes using representations, illustrations, analogies, demonstrations, with provided opportunities to engage in exploration and develop mathematical habits. The mathematical habits expected of students to develop are referred to as the Standards for Mathematical Practice that promote conceptual understanding, and develop problem-solving and reasoning skills, strategies, and connections (Common Core State Standards Initiative, 2019).

Chapter Summary

The two themes discussed were the participants' view of children as a homogenous group and procedural mathematics. Connections from the participants' responses and perspectives were made to research studies and related literature. Overall, the participants' reported addressing the educational needs (in and out of school) of children with a critical illness as the same as healthy children, resulting in the concept of children as a homogenous group. The participants also had a consistent view of

mathematics as procedures. The participants' understandings of the mathematics children should be able to do and even mathematics done outside of school had a strict focus on content and procedures with no mention of mathematical habits or research-backed mathematics teaching practices. In Chapter 5, study limitations and implications will be discussed.

CHAPTER FIVE: CONCLUSION

The purpose of this study was to identify the perceptions of pre-service teachers to teach children with critical illness and to teach mathematics to children with critical illness before and after completing an internship at a hospital-based school program. This chapter provides a summary of overall findings, study limitations, implications of the study, and conclusions.

The participants of the study were among the most passionate and dedicated pre-service teachers entering into their Internship I placement. Participation in the internship at the hospital-based school program is voluntary, including application and interviews to participate. Those that volunteer are willing to drive off-campus to take courses, go through required medical testing and clearance to work in the hospital setting, and educate children who are critically ill, which is both rewarding as well as emotional and at times heartbreaking. The hospital-school program allowed the participants to engage in workshops to learn about disease profiles and using technology (i.e., robotics, virtual reality, 3D printing), learning that is unique to this internship setting. Additionally, the participants gain practice in teaching children in a one-on-one setting, practicing how to properly accommodate, modify and meet the needs of the child in regards to disease profile and treatment effects. The data shows that participants felt that they had grown through their preparation and were prepared to teach children with critical illness. The participants felt that since they had the opportunity to work one-on-one with the child, they were able to hone skills in teaching content and in modifications and accommodations of lessons. Outcomes of participation in the hospital-based school

program include understanding the culture of the hospital and the effects of that environment on children and families, learning to adapt for specific learning needs, and the effects of treatments. Despite these targeted outcomes, the perceptions of the pre-service teachers in this study towards the education of children with a critical illness remained by and large the same, considering pre- and post-interview responses. This demonstrates the need to further the experiences and education of pre-service teachers to meet the educational needs of children with a critical illness (e.g., tailoring education to disease profile, any co-morbidities, and cognitive abilities). The ignorance, that is, failure to consider individualities and meet the specific needs of children with critical illness, positions these children as invisible in education. Their invisibility in education refers to the fact that disease profiles, co-morbidities, and effects of treatments (e.g. cognitive ability), are not being considered. Equitable opportunities and access do not equate to equitable education, providing an educational disservice.

Contrary to the perceptions reported by the participants, their preparation to meet the needs of children with critical illness in teaching and, teaching mathematics specifically, did not change substantially. The participants' responses indicated that in terms of education, the needs (i.e., accommodations, modifications, school staffing supports, plan for absences) of children with critical illness did not differ from healthy typically developing children. This illuminates the theme of children as a homogenous group because the specific needs (i.e., considering disease profiles, comorbidities, and cognitive abilities) of children with a critical illness are not considered, rather, actions (e.g., lesson accommodations, modifications, staffing specialist support, sending work home during absences) for healthy children are suggested. This means that the

participants' view that actions acceptable for healthy children are acceptable for children with critical or complex illness. Instead, teachers should utilize information about the child's disease profile, effects of treatment, and cognitive abilities to drive actions. For example, a child with cancer undergoing chemotherapy likely will experience difficulties with memory, thus repetition is specifically important for that child. In terms of mathematics instruction, the hospital-based internship program led to more confident feelings towards preparation in teaching mathematics with regards to the ability to practice skills. However, the participants were consistent in their viewing of mathematics as procedurally-based, which was the second theme revealed. The opportunity to teach mathematics did not lead to learning to use research-based practices in teaching mathematics (e.g., conceptual learning, discovery, student mathematical habits) and maintained and in some cases solidified the view of mathematics as procedures. This view was solidified because the participants practiced teaching mathematics through the use of procedures. One intern specifically stated that teaching mathematics was easier than reading because she can easily watch the child perform the computations in following a specific procedure, that results in one answer. In her conception of teaching mathematics, this rigid way of teaching allows for ease of identifying mistakes.

More research is needed on the effects of a hospital-based school program particularly as this program is in its infancy and the first of its kind. As this program moves towards solidification, longitudinal case studies of pre-service teachers through their first few years of teaching are needed to discern impacts of the hospital-based school program. Although the results of the data, which confirm the strong-held conceptualization of children as a homogenous group, are disappointing given the unique

experience and intentional learning (i.e. disease profile workshops) this internship offers. Further research is also needed to determine specifically what the participants in this program learned in terms of teaching mathematics. Specifically, the mathematics methods course needs to be included in study data sources and the participants need to be studied and evaluated through research-backed study instruments (e.g., vetted interview questionnaires, scales). Overall, this research study shows the benefits of involving in a non-traditional internship experience in terms of pre-service teachers' perceptions of preparation for teaching. The benefits include the pre-service teachers' ability to practice teaching skills one-on-one with a student and learn to prepare lessons using research-backed lessons and high-quality resources (e.g., robotics, award winning literature, access to field experts- special education, mathematics education, technologies).

Study Limitations

This study included a focus on pre-service teachers' perceptions to teach mathematics to children with critical illness. One limitation was that the study data sources did not include data from the elementary mathematics methods course concurrently taken by the participants during the internship semester, such as assessments, lesson plans, or other assignments showcasing the participants' growth in teaching mathematics. In terms of study instruments, the questions were adapted from Nickels' (2015) work, however, in the pre-and post-interviews, the way of which the questions were asked could possibly have been. This study also included only three participants, representing approximately 17% of the applicable study population and included data from only a span of 6 months.

Implications

The participants in the hospital-based school program were introduced to the understandings of the complexities and implications of disease profiles and treatments on the children. In reference to the hospital setting specifically, these understandings are apparent, however, when the context or focus becomes on the school these new banks of knowledge and experiences do not translate. Meaning, that the participants display factual learning as a result of the internship, but do not apply the new knowledge into the context of the classroom. This implies that reflective practices on the implications of the learning of the setting need to be translated to the context of school. This research is very valuable in thinking through changes to the hospital-based school program and internship model. Changes to the workshops provided need to include a wider scope of critical illnesses, as well as a more explicit coverage of the educational impacts of the illnesses individually (e.g., educational impacts of cancer and treatments). Future interns also need to be involved in intentional reflective practices on the implications the experiences and new knowledge from the hospital-based school program experience has on teaching and their future classrooms. This change can be implemented, in part, through adjustment of the end-of-day reflection questions. Furthermore, the illumination of the viewing of children as a homogenous group by the study participants indicates a need for further examination of pre-service teacher views on homogeneity and marginalized student populations. This view supports the need of learning about the needs of children with critical illness to be imbedded in teacher preparation programs. Methods to address this learning gap can include explicit workshops and reflection activities. In the end, children with a critical illness remain invisible in terms of education implying that the hospital-

based school program did not achieve the goal of influencing change among pre-service teachers. Overall, the impacts of the hospital-based school program lie in boosting self-perceptions of preparation and factual knowledge. The limitations of the hospital-based school program lie in the inability to influence changes in pre-service teacher's view of children with a critical illness in terms of education and influence shift in perspectives of mathematics and teaching mathematics.

Conclusions

This study provides insight to the overwhelming necessity to educate pre-service teachers about the specific needs of children with a critical illness. With the rate of rising medical advances (e.g., Stanford Medicine, 2017), the state of education for children must also rise, including addressing the needs of children with a critical illness. Public schools are currently designed and function to meet the needs of healthy children (Tseng & Pluta, 2016). The educational needs of children with a critical illness must include consideration of disease profiles and related treatments in terms of their education impacts and needs (e.g., understanding immediate and latent cognitive effects of chemotherapy; Anderson & Kunin-Baston, 2008; Nickels et al., 2017). It is each child's right to a free and appropriate public education (Section 504 of the Rehabilitation Act of 1973) and it can no longer be acceptable to allow children with a critical illness to be ignored.

APPENDIX A: HOSPITAL-BASED SCHOOL PROGRAM INTERNSHIP
APPLICATIONS

Hospital-Based School Program Internship Application – Amber

Hospital-Based School Program Internship I Application

*Please email your completed application to [Researcher] at [Researcher’s E-mail Address].

Name (Include middle initial) Amber

Address [Participant personal information has been removed.]

Phone Number [Participant personal information has been removed.]

Email [Participant personal information has been removed.]

Date of Birth (*needed for Nemours access*) [Participant personal information has been removed].

Please indicate what day & times M-F you are available for an interview:

Day	Available (Y/N)	Times
Monday	N	
Tuesday	Y	Morning
Wednesday	N	
Thursday	Y	Morning
Friday	Y	Morning

Please check the following boxes.

Condition of Internship	Yes	No
Are you willing to get any vaccinations you may need such as a tetanus shot and flu shot?	X	
Do you have health insurance?	X	

Student health records of immunizations are available at no cost at [Southeastern university student health center]. Please attach a copy of your immunization records to this form. This will help expedite your application process.

Expenses: Note that you will be required to purchase SNEA insurance for \$30 to participate in this internship. Additionally, extra uniform shirts and jackets are available for purchase if desired.

Please answer the following questions.

1. Individuals aspire to be teachers for a variety of reasons. What are some of your reasons for wanting to be a teacher in a hospital setting?

Over the past couple years my mom battled a rare form of liver cancer. Throughout her battle I often heard stories about the hospital staff that she interacted with on a weekly basis. Often times they made her experience easier and offered encouragement, on rare occasions there were stories where she felt discouraged because of bad interactions. These stories showed me how impactful the people and especially the staff in the hospital can be to a person's medical and emotional experience. Families and children in the hospital setting are most often in a sensitive spot and need staff, and teachers, to come alongside them to support and encourage them right where they are at. I would like to learn how I can do that and would love to, if possible, I would like to be a "bright spot" in their hospital experience.

2. Describe one of your most effective teachers or best experiences in school and explain why he/she or it was so.

I have found that the impact of a teacher is crucial when it comes to development and learning. I was homeschooled until I was in high school. Because of this, when I look back, I see the impact my mom had on my schooling experience and how she instilled a love of learning into me. She was effective because she brought awe and wonder to our learning along with creativity and logic. Often times she would take us on "nature walks" in which she would bring us out and teach us math, science, or art through our observations in nature. Other times she would read us books and show us how books can be brought to life through history, baking, or acting. She helped us discover and create in ways that I still appreciate to this day and hope to use one day in my own future classroom.

3. Participants in this program must be highly motivated individuals. Describe yourself and indicate the qualities that make you this type of person.

As a young child I was what most would consider to be very shy. I struggled to not only do the big things, like speak my mind, but also to do the little things, such as talk on the phone. The turning point in this was when my dad sat me down one day and explained to me that being shy was not necessarily a bad thing, but it should not stop me from doing things that would help me to one day attain my goals. This shone a light on the situation and helped me take steps outside of my comfort zone. Ever since then I have sought out ways to stretch myself because I have found that, in every time that I do, I become more self-assured and confident, even if the situation back fires on me. I have learned to set goals and to work each day to attain them. I have learned to seek out opportunities not only to help me grow, but to help others grow. These are just a few of the attributes that contribute to me being a highly motivated person.

4. Discuss your view of the role of the family in education.

Having been homeschooled in the primary years and then having switched to more traditional education in high school, I have seen the direct impact that the family can have on education, and more specifically the educational system, I think the family play a huge role. They are the cheerleaders and support system at home that can make or break a child's view on education and learning. I think that it is important for schools to offer as much support to families as they can and that they should help guide them as they seek to help their child(ren) learn. I think having a supportive, encouraging family is one of the best things that a teacher, and a student, can have.

5. What experiences have you had working with diverse groups of children/adolescents?

Throughout all my years I have had a good amount of experience working with children of all kinds. The opportunity that has given me the chance to work with the most diverse set of children is my job at [a Southeastern state] Church. I am the Grade School coordinator for the Elementary kids and their Sunday school classrooms. [A Southeastern state church] has a huge amount of diversity walking into the doors every Sunday and because of that I work with children of all nationalities and backgrounds, as well as children who are special needs. I am grateful for this experience because it is through it

that I have been able to widen and round my view on the people, and children, living in the community around me.

6. As you consider this particular program, describe what you expect to gain from participating in it.

Dr. Jenkins mentioned this opportunity in class and I was instantly interested. I value diversity when it comes to experiences and I believe this would be a great opportunity to broaden my range of experience in the educational world. I would love to see how education works in an alternative setting and I would love to widen my horizon of knowledge and experience while gaining more input into the conversation on education, and life in general.

Please list the name and email address of a [Southeastern university] faculty member who can be contacted to provide a recommendation for you.

Name: [Personal information has been removed] Email: [Personal information has been removed]

Hospital-Based School Program Internship Application – Courtney

Hospital-Based School Program Internship I Application

*Please email your completed application to [Researcher] at [Researcher’s E-mail Address].

Name (Include middle initial) Courtney _____

Address [Participant personal information has been removed.] _____

Phone Number [Participant personal information has been removed.] _____

Email [Participant personal information has been removed.] _____

Date of Birth (*needed for Nemours access*) [Participant personal information has been removed].

Please indicate what day & times M-F you are available for an interview:

Day	Available (Y/N)	Times
Monday	Y	Before 1:30
Tuesday	Y	Before 1:30
Wednesday	N	
Thursday	Y	Before 1:30
Friday	N	

Please check the following boxes.

Condition of Internship	Yes	No
Are you willing to get any vaccinations you may need such as a tetanus shot and flu shot?	X	
Do you have health insurance?	X	

Student health records of immunizations are available at no cost at [Southeastern university student health center]. Please attach a copy of your immunization records to this form. This will help expedite your application process.

Expenses: Note that you will be required to purchase SNEA insurance for \$30 to participate in this internship. Additionally, extra uniform shirts and jackets are available for purchase if desired.

Please answer the following questions.

1. Individuals aspire to be teachers for a variety of reasons. What are some of your reasons for wanting to be a teacher in a hospital setting?

I would love to be a teacher in the hospital setting for a couple of reasons. Before transferring to [the Southeastern university] I was Pre-Med at [a Midwestern university]. My dream was to become a doctor with specialties in pediatrics. Any child, no matter the age, health, sex, religion or nationality deserves to be able to see, and understand the magic of learning. My goal in life is to make every child see that.

2. Describe one of your most effective teachers or best experiences in school and explain why he/she or it was so.

My 5th grade teacher, Mrs. Nate is an incredible woman. She made me feel accepted and valued when my classmates saw me as different and undesirable because of my religion. She made it possible for me to have the courage to come to school every day. She accepted all of her students, and transformed the four walls of her classroom into a safe space. Mrs. Nate is who I aspire to be like every day.

3. Participants in this program must be highly motivated individuals. Describe yourself and indicate the qualities that make you this type of person.

I find myself highly motivated because failure is not an option. I see every opportunity in life as an opportunity to learn and grow, not only for myself but to enhance the lives around me as well. I am also organized and always strive to always do my best.

4. Discuss your view of the role of the family in education.

Family is everything in education. School takes up a majority of the child's day, but when they go back to their families at the end of the day that is where learning is either cemented or ruptured. With a loving family the student has the opportunity to learn 24 hours a day. However, not all students come from a loving home. I see this as my opportunity to shine. I get to be the child's family. I get to be their support and motivator.

5. What experiences have you had working with diverse groups of children/adolescents?

I have completed service learning in a variety of title 1 schools, as well as charter and religious Muslim schools. I have also worked in a summer camp as art staff that welcomes in students with special needs.

6. As you consider this particular program, describe what you expect to gain from participating in it.

Honestly, I am expecting to gain perspective on life, learning, and love. These children have the most basic thing in life taken from them...their health. I see it as my responsibility to help them grow as learners and creative souls. I think that seeing how strong these children and their families are will give me so much perspective on how lucky we are to have what we have. I am excited at the possibility of impacting these children's lives and the opportunity to grow as an educator.

Please list the name and email address of a [Southeastern university] faculty member who can be contacted to provide a recommendation for you.

Name: [Personal information has been removed] Email: [Personal information has been removed]

Hospital-Based School Program Internship Application – Emily

Hospital-Based School Program Internship I Application

*Please email your completed application to [Researcher] at [Researcher’s E-mail Address].

Name (Include middle initial) Emily _____
 Address [Participant personal information has been removed.] _____
 Phone Number [Participant personal information has been removed.] _____
 Email [Participant personal information has been removed.] _____
 Date of Birth (*needed for Nemours access*) [Participant personal information has been removed].

Please indicate what day & times M-F you are available for an interview:

Day	Available (Y/N)	Times
Monday	Y	After 4:00
Tuesday	Y	After 4:00
Wednesday	Y	3:00 – 5:00
Thursday	Y	12:00 – 2:00
Friday	Y	After 4:00

Please check the following boxes.

Condition of Internship	Yes	No
Are you willing to get any vaccinations you may need such as a tetanus shot and flu shot?	X	
Do you have health insurance?	X	

Student health records of immunizations are available at no cost at [Southeastern university student health center]. Please attach a copy of your immunization records to this form. This will help expedite your application process.

Expenses: Note that you will be required to purchase SNEA insurance for \$30 to participate in this internship. Additionally, extra uniform shirts and jackets are available for purchase if desired.

Please answer the following questions.

1. Individuals aspire to be teachers for a variety of reasons. What are some of your reasons for wanting to be a teacher in a hospital setting?

I am interested in the idea of becoming an educator in a hospital setting because I may choose to pursue this route in the future. I know that the children at [the partnering hospital] may not receive the same educational experience as other children their age in a traditional classroom setting, however I feel that this does not mean that we cannot provide a quality educational experience for them. Every child deserves an immersive and interactive education. As a child I remember several instances in which I had to be overnighed in hospitals, so I can sympathize to an extent how emotionally taxing and uncomfortable children can be in a hospital setting. If we can provide engaging activities to present these children with implicit as well as explicit information, they will have the opportunity to gain knowledge about various subjects that may interest them and have the opportunity to think about things other than their current circumstances. I am extremely passionate about educating children, however this experience is so much more than just teaching math, reading, science, and social studies. This is about developing productive and supportive relationships with children and their parents or caregivers all while instilling a sense of excitement and worth towards knowledge.

2. Describe one of your most effective teachers or best experiences in school and explain why he/she or it was so.

I encountered one of my most effective teachers when I was in high-school. He was my history teacher as well as my varsity soccer coach. His passion for soccer matched mine and it showed through his training on the soccer field. A few hours before a practice or game he would open his door to each player and allow us to sit with each other to catch up on homework, talk to him if we needed to, or nap if we were exhausted. In this setting we felt comfortable asking for help from another teammate or from our coach. He kept tabs on our grades and if we began to slip in one subject, we would hear about it immediately from him and he would sit with us to ensure we were understanding the material or contact our teacher and speak to them about how we can improve in the

classroom. He spoke to my parents about my performance on and off the field and was always lending a hand the second I asked for help. His willingness to help me off the soccer field and outside of history class is what inspired me to become a teacher. Due to his support and persistence he created a team of hardworking students and soccer players who would all go on to graduate high school and achieve great things.

3. Participants in this program must be highly motivated individuals. Describe yourself and indicate the qualities that make you this type of person.

I am currently pursuing my degree in Elementary Education, while also working towards receiving my RBT (Registered Behavioral Therapist) certification. I am also currently studying to take my FTCE Professional Education Test in November. I have big plans for my future in education and I work hard every day to ensure that I complete my goals. I plan to get TEFL certified in the near future so that I can teach abroad and help underprivileged students receive a quality education because I believe that your circumstances do not define who you are or what you can be/do. I would love to teach in a Spanish speaking region because I am also currently working on teaching myself Spanish. I am an individual who prefers listening to knowledgeable podcasts versus music on long car rides, reading books versus watching television, and I am constantly working on new projects or learning new things so that I can better myself as a future educator as well as an overall individual.

4. Discuss your view of the role of the family in education.

I believe that building effective relationships between parents and educators is important in promoting a child's success in the classroom. Parents are the first teachers that their children will experience until they reach a classroom. They are the ones who aid in the personality development of their children and can also aid in the development of a positive attitude towards education in school settings. With a respectful parent-teacher relationship, a child can be supported throughout their educational experience and together they can instill a sense of worth towards knowledge for their children so that they are more eager to come to school and learn. We should be working alongside of them to ensure that each child is being supported inside and outside of the classroom.

5. What experiences have you had working with diverse groups of children/adolescents?

When I first began middle school, one of the first elective classes that I signed up for was the “Paw Pals” program. This program was designed to integrate general education students as aids into the special needs’ classrooms. This class period was dedicated to teaching these students various lessons from math, to learning how to tie your shoes, to cooking in the kitchen, and each one was always engaging and interactive. I really enjoyed this experience because it was my first encounter in which I had to step into a teacher’s shoes, and I found myself working hard to help these students and develop positive relationships with them.

For approximately 10 years I volunteered for [a soccer program]. This program was designed to reach and meet the needs of children 4-19 years old, with physical and/or mental disabilities. It is a community-based training and team placement program for young athletes, organized by youth soccer association volunteers. Through this program I as a coach would set up various drills and activities for the children to aid in the development of their soccer skills. I loved volunteering with this program because of the environment. Children were running and playing soccer with friends and coaches and being cheered for as they worked hard to achieve a goal.

After my positive experience with [the soccer program] I chose to apply for a position with [a different soccer program]. I became a coach for children ages 2-14 and taught various soccer skills through unique performance methods. These unique methods included developing a storyline for the younger children and acting out scenarios in which they had to respond, using soccer skills. For example, for my 4-5-year-old age group I would tell them that we were at the beach and the flat cones were pinching crabs, so we had to carefully move our soccer balls around the crabs so that we wouldn’t get pinched! I loved this job because it required me to put a lot of eccentrics and energy into my lessons and I could finally grasp how important it is to produce positive and exciting energy when introducing a lesson to keep the children engaged and willing to participate. After I moved to [a Southeastern state] to attend [the Southeastern university], and chose to pursue a degree in education, I was offered a job as an assistant teacher. I now work at

[a private school]. [The private school] is a K-12, Islamic school that works towards instilling qualities of faith, compassion, and knowledge as well as developing children into future leaders. This has been an eye-opening experience for me so far because I have been introduced to a different religion, culture, and standards of attire. The students and teachers at [the private school] have already taught me so much about their culture, beliefs and views on education. I admire the teachers at this school because of their ability to relate important moral standards with the presented curriculum. Every morning they begin the day with a statement of gratitude and a moral standard that they believe is important for the students to acknowledge and work towards. I respect the educators taking time out of their mornings to gather up the students and allow them to contemplate the importance of each lesson being presented to them.

6. As you consider this particular program, describe what you expect to gain from participating in it.

I expect to be moved and inspired by the individuals I will be working with. I know that this experience will put into perspective why I chose to become a teacher because I will have to put my own emotions aside and work hard to ensure that each child is receiving a quality experience. It will help me determine whether I prefer a traditional classroom setting, versus working in a hospital setting. I may be working with children of all ages and abilities and I will have to adapt my lessons according to their needs. This experience will allow me to work on my one-on-one interactions with children as well as my motivational techniques. With one-on-one interactions it will be easier for a child who may be struggling with a particular subject because I can devote my time solely to that child and that subject. This will help me learn how to best utilize my time with the student versus being interrupted by bell schedules or other children. I am grateful for the opportunity to participate in this program and I know that it will be a beneficial and life changing experience.

Please list the name and email address of a [Southeastern university] faculty member who can be contacted to provide a recommendation for you.

Name: [Personal information has been removed] Email: [Personal information has been removed]

APPENDIX B: INTERVIEW QUESTIONS

Directions: For the qualitative interviews the PI will be asking questions to participants. The interviews will be audio recorded and the PI will be taking notes.

Pre- and Post-Interview Questions

1. What does it mean for a child to have a critical or complex illness?
2. What types of illnesses do you consider critical or complex illness?
3. Do you feel prepared to teach a child with a critical or complex illness?
4. What type of educational hardships may children with critical or complex illness encounter?
5. What type of unique learning needs do you think children with critical or complex illness may have?
6. What help or resources would you seek in order to help a child with a critical or complex illness?
7. How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
8. What do you think school districts offer for children with a high volume of absences due to a critical or complex illness? What does that entail?
9. How does a high volume of school absences affect the education of a child with critical illness?
10. Are you good at mathematics? How do you know?
11. When do you or others do mathematics? Do you do mathematics outside of school?

12. Are you prepared to teach mathematics? Why or why not?
13. What kinds of mathematics can we expect children to do and understand? How about children with critical or complex illness?

Post-Interview Questions Only

14. What did you learn about the education and educational needs of children with critical illness as a result of this internship program?
15. What do you think should be added to your program to increase pre-service teacher preparation to educate children with critical illness?
16. Did this internship program better prepare you to teach elementary mathematics at any level? If yes, how? If no, why not?

APPENDIX C: PRE-INTERVIEW TRANSCRIPTIONS

Pre-Interview Transcription – Amber

- Researcher – So the first question is, what does it mean for a child to have a critical or complex illness?
- Amber – I think it's something that hinders their life. So, they can't live life the way most people would if they were healthy. So, whether that means doctor visits or they can't go outside and play like they normally would or that kind of stuff. So, it just means that it hinders them living life to the fullest.
- Researcher – The second question is, what types of illnesses do you consider critical or complex illness?
- Amber – I feel like there's a lot!
- Researcher – You don't have to list all of them.
- Amber – If I did we'd be here for like 20 minutes. I think some the biggest are cancers, because you're going in for chemo and you're just having to live with that. Also, stuff you're born with whether it's brain development issues or a heart issue. Those are kind of the big ones to me, brain and heart, for me that I think of when it comes to debilitating things.
- Researcher – Are you ready for the next one?
- Amber – Yes.
- Researcher – Okay, I just did not want to cut you off.
- Amber – Of course.
- Researcher – Do you feel prepared to teach a child with a critical or complex illness?

- Amber – Do I feel prepared? Probably not. I don't feel prepared for much in life, but I feel prepared to teach in the way that I know how to create a lesson plan. I know how to help them where they're at and get them where I want them to be usually. But when it comes to a critical illness it's kind of hard because there's so much that you need to take into account. Like, will they be able to talk? Will they be able to sit up? All that kind of stuff. So, it's a new factor that I have to factor in now. So, I want to learn so that's why I'm at [the participating hospital] but I don't know if I feel totally prepared.
- Researcher – We don't expect you to at this point.
- Amber – Right.
- Researcher – The next one is, what type of educational hardships may children with critical or complex illness encounter?
- Amber – I think simply just falling behind. So, they're not in school and let's say the teacher does a unit or two on multiplication and they come back to school and they're like "I have no idea what you just taught" and it's like this foundation, multiplication which is crucial for a lot other things. So, I think just falling behind in the way that they might be out even if it's for a day and it's something that's taught that's foundational they don't get it. So just falling behind I think is the biggie.
- Researcher – What type of unique learning needs do you think children with critical or complex illness may have?
- Amber – I'm thinking of like mental things. So, like the girl I work with, Shannon, she has like a disability where it's like, I don't know if it's dyslexia or

what, but sometimes not everything aligns so it's hard for her to see things. Or, maybe they're in some pain and it's hard to concentrate or maybe it's an attention thing and it's hard for them to pay attention because of other things going on. So, I think pain can be a biggie I also think cognitive things if it's like dyslexia or something like that. Yeah there's a lot so those are just a few.

- Researcher – What help or resources would you seek in order to help a child with a critical and complex illness?
- Amber – I think manipulatives are big in the way that makes it more fun and interesting than a worksheet which I think is crucial for all kids. But especially if you're sitting in a hospital bed I think it's more fun if you're doing it with blocks or games or something on the computer or even if it's like a highlighter ruler kind of thing where you can highlight different lines that really helps them. So, I think colorful manipulatives just to make it happy.
- Researcher – How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
- Amber – So if I were a teacher?
- Researcher – Yes.
- Amber – I think working with the parents. Because the parents are going to be with them most likely I'm assuming when they're in the hospital or at home or wherever. So, working with the parents to see if I can give them stuff to work with especially if they're younger and if it's just reading or helping them with their addition or sight words or stuff like that. So, making sure I'm in contact

with the parents. And also giving grace and not expecting them to keep up all the time obviously.

- Researcher – What do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Amber – I have no idea. I don't really know what they offer. I'm assuming some sort of help like a tutor or something but I honestly have never really heard of that so I don't know.
- Researcher – How does a high volume of school absences affect the education of a child with critical illness?
- Amber – Yeah, so kind of like the other question, it causes them to fall behind. They may not get key concepts that were taught even if it's within a unit in the week or even three days that they're gone it could be that they miss this huge important lesson. So even if they're out for a little could cause them to fall behind.
- Researcher – Are you good at mathematics?
- Amber – I'm like, it takes work for me it's not something that comes naturally I'll say that. So, like other subjects like English and writing and grammar come naturally to me whereas math I've always had to work. Like I've always had good grades but I've really had to work for those grades.
- Researcher – The second part of that question is, how do you know? Or why do you think that?
- Amber – So kind of like I said, it's something where like. . . Let's say writing. I feel like I can write a paper no problem and it just comes easily I actually enjoy

it. I enjoy figuring out what words I want to use and how I want to structure the sentences. Whereas like math I like, I've heard people say it's fulfilling to. . . it's almost like a puzzle and you're putting together and I'm like "Oh my gosh I don't see it that way" it's just hard so not super enjoyable for me.

- Researcher – When do you or others do mathematics?
- Amber – I think it's a part of daily life. I think even if it's like shopping like "Oh this is 60% off. Okay, what is 60% of this price? How much am I actually going to pay for that?" Or you know, just simple stuff like that at the gas station or whatever. I really think it's a part of everyday life which is why it's important to learn.
- Researcher – Are you prepared to teach mathematics?
- Amber – Somewhat. I think, you know, the classes at [the Southeastern university] have really prepared me and I like the way we're teaching it now. I think it makes sense. But you know I have no idea what kind of situation I may run into and what kind of problems the kids might have. I may not be prepared for those but I like to think I'm pretty much prepared.
- Researcher – What kinds of mathematics can we expect children to do and understand?
- Amber – I think the basics like adding, subtracting, multiplication, and division. I think those are the four biggies that you learn.
- Researcher – Follow up to that, how about children with critical or complex illness?

- Amber – I'd like to say the same. I think it should be the same because I think you want to expect the same from everyone and believe everyone is capable. So, I don't think you should just look at someone and say "Well they obviously aren't going to be able to multiply so we shouldn't even try" so I think it's fair to try and teach everyone.

Pre-Interview Transcriptions – Courtney

- Researcher – The first question is, what does it mean for a child to have a critical or complex illness?
- Courtney – I guess it's like any illness that would impair the child's everyday functioning, every day routines. So, things that would affect your schooling or home life. . . That would need an intervention for.
- Researcher – The second question is, what types of illnesses do you consider critical or complex illness?
- Courtney – It's any type of illness that would affect the child's everyday routine. Something that they would need repeat doctor visits for. Something I guess more than strep throat or an ear infection, something that's not you know. . .
- Researcher – Can you think of any specific examples?
- Courtney – I mean Cancer, TB, pneumonia . . . Let's see. . . Literally there's so many. Sorry.
- Researcher – It's fine.
- Courtney – Sorry, I'm blanking. Let's go with that.
- Researcher – The next is, do you feel prepared to teach a child with a critical or complex illness?
- Courtney – I hope so. I mean I think that the classes at [the Southeastern university] prepared us to teach children and children come in many different sizes, conditions, you know, backgrounds. So, I think there's going to be a learning curve but hopefully. I guess we'll find out in the coming weeks.

- Researcher – The next one is, what types of educational hardships may children with critical or complex illness encounter?
- Courtney – So they will lose their routine of going to school. And the sense of stability that usually comes with school or home life that if they're not there. They can lose that pattern of, you know, 8 a.m. go to school then 3:30 come home, you know. It helps your mental state. When you're being pulled in and pulled out, and pulled in and pulled out, you know, you're not absorbing as much information if you were always there. So, you lose that. You know, whenever you're leaving and coming in there's a transition time. You don't just start learning the second you get there. You know, so, whatever a teacher's going over you're going to lose it.
- Researcher – The next question is, what type of unique learning needs do you think children with critical or complex illness may have?
- Courtney – Every child is going to be different and no two illnesses are exactly the same. I think they're going to require more time. Maybe activation or background knowledge just because you don't know what they've had prior, or what they know. So maybe some time getting to know the child and getting to know what they know and what they don't know. But, maybe some. . . Also not just content, you're going to need to. . . The children are going to have questions and things outside of school related things and I'm sure it's going to come up because you're going, something's going to click, and something's, you're going to have to kind of be able to take a, like a detour and be able to come back. Or I think, like a regular healthy child.

- Researcher – The next one is, what help or resources would you seek in order to help a child with a critical or complex illness?
- Courtney – Resources like people? Or resources like?
- Researcher – Resources as if you were a teacher. So, you're just in a traditional classroom and you have a child with a critical illness. What resources would you look for?
- Courtney – I would want to know like what the child has so I can be able to understand it. So, you know, either speaking with the doctor, the child's parent, to be able to understand their needs on a health level. And then be able to seek resources, you know, like maybe a reading specialist and things like that when the child isn't totally – if they're not up to grade level, be able to help them on that level to get up to grade level. But any resources like medical {inaudible} seek out.
- Researcher – The next one is, how would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
- Courtney – I think communication with the child and the parents is going to be key. Keeping the student – you know, not forgetting you know, thinking the student is going to come back and be fine because those weeks that the child's out of class all the other students are learning information that that student is not learning. So, if that's sending homework home, books home, you know, coming to the hospital to see the child. Literally anything to help, that's what's going to be key. In keeping the child on pace with the others as much as possible at least.

- Researcher – The next one is, what do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Courtney – So, I know what [the Midwestern state] does because my mom’s in special education but I don’t know what [the Southeastern state] does. So, [the Midwestern state] has homebound teachers so when a child is out for extended periods of time the school district is required to send teachers to the home or things like that for the student to keep them on par with grade level. I have no clue what Florida does.
- Researcher – It’s actually very similar.
- Courtney – Oh really? [The Southeastern state] operates on counties not like districts so I don’t know if that, you know, changes ‘cause like, you know, [the Midwestern state]-
- Paul – Counties are districts.
- Courtney - Right.
- Paul – Just like [the Midwestern state].
- Courtney – Districts are towns, you know, it’s a smaller.
- Paul – {*Inaudible*}
- Courtney – Yeah. . . Yeah, like our district was 3 elementary schools and 1 high school back home.
- Paul – Do you know how many districts are in [the Midwestern state]?
- Courtney – I was in 95 so probably a lot.

- Paul – There are only 67 here in [the Southeastern state]. Actually, there's more now that they count virtual school as a school district.
- Courtney – Right. There's probably. . . And I was, I don't know where one starts, but I was in like northern [Midwestern state] so if 1 is up there you got all of southern [Midwestern state].
- Paul – There's probably well over 200.
- Courtney – Oh yeah, I'm sure, I'm sure.
- Paul – I'm from [a Midwestern state] so I know.
- Researcher – So the next question is, how does a high volume of school absences affect the education of a child with critical illness?
- Courtney – I mean as much as, I think, you know, the second a child misses school they're going to miss content. They're going to miss, there's experiences you have in the classroom that even doing homework at home or you know, your parents homeschooling you, you're going to miss content, you're going to miss any type of information that happened because of a discussion in the classroom. So, when you have a high volume of absences the amount of content and discussions missed increases. So as much as you can do at home, there's going to be experiences that the child misses because they weren't in a traditional classroom.
- Researcher – The last set of questions are going to be in regards to mathematics.
- Courtney – Great. . . Great.
- Researcher – The first question is, are you good at mathematics?

- Courtney – No. No. I – I’m quick to think. Like when you give me a math problem I can solve it quickly. But sitting in a math class and learning new content, I start sweating.
- Researcher – Okay.
- Courtney – So once I get it, I get it and I’m good but learning it it’s. . . Challenging.
- Researcher – So I already think you already answered this but, the follow up is, how do you know? Is there anything else you want to add to what you said?
- Courtney – I mean I already, yeah I think I’m good.
- Researcher – Okay. Alright so the next one is, when do you or others do mathematics?
- Courtney – I do math when I’m shopping. Sales, you know things like that. But, you know you do math a lot more than I think you realize you do math cause it’s second nature. You know when you’re living your everyday life math comes up. When you’re cooking math comes up. When you’re literally doing anything, math is a thing and it’s probably more of a thing in my life because everyone in my family is math so you know, multiplication tables were a thing when you were 3 years old and like it’s whatever but, you know, you, math comes up in all aspects all the time so I don’t know if I answered your question.
- Researcher – Mhm. The next one is, are you prepared to teach mathematics?
- Courtney – I’ve learned strategies to teach math, so you know the content, you know, first grade math is first grade math. When it comes to like high school math I’m probably not prepared to teach math because I’m elementary.

- Researcher – Right.
- Courtney - But, you know, math is. . . There's content but there's also the strategies you need to teach math. Because, you know, you can't just say $4+4=8$. Because, why? And learning how to teach why is what our classes prepared us to do. So, on that end I feel very confident in being able to teach math. But content for the higher levels probably not so much.
- Researcher – And the last one is, what kinds of mathematics can we expect children to do and understand?
- Courtney – I think children can do pretty much anything once they're taught. So, if you've given children the opportunity to learn and the resources to learn, I think we can expect just about everything. You just have to have the applications and knowledge level to teach them what they need.
- Researcher – Okay and the last, like it's a follow up to it, how about children with critical or complex illness?
- Courtney – They're no different than every other child. Just because they're ill doesn't make them any less capable to learn. They just may need more time or resources. Children are children.
- Researcher – Perfect.

Pre-Interview Transcription – Emily

- Researcher – I’m going to start with the first question, what does it mean for a child to have a critical or complex illness?
- Emily – I guess just. . . Having a critical illness means they are sick and they are incapable of doing certain things.
- Researcher – The second one is, what types of illnesses do you consider critical or complex illness?
- Emily – . . . I don’t understand. Do you mean like specific?
- Researcher – Yeah, so like if someone walked up to you on the street and said “What’s a critical illness?” What would you tell them? Do you have examples that you would say?
- Emily – I would probably just say I’m not really sure but I believe a critical illness is when you’re, just have some kind of sickness to the point where it’s dire or more extreme.
- Researcher – Okay. The next one is, do you feel prepared to teach a child with a critical or complex illness?
- Emily – More so now, after we did the training (*referring to the hospital onboarding training*) but originally like signing up for this I was very intimidated because I don’t know much about children with critical illnesses. I’ve never, even in my family, had to experience that.
- Researcher – The next is what type of educational hardships may children with critical or complex illness encounter?

- Emily – Education hardships?
- Researcher – Yes
- Emily – It depends. But I guess depending on their illness they have a more difficult time receiving some information or like having access to different resources or they may need extra, like additional help.
- Researcher – Next one is, what type of unique learning needs do you think children with critical or complex illness may have?
- Emily – Unique learning needs?
- Researcher – Yes.
- Emily – I don't know. I guess just that they're, they just have different needs so they can't, or they don't generally have the same opportunities in education as another student. So, I guess that still doesn't answer the question but it's what I have.
- Researcher – Alright, the next one is, what help or resources would you seek in order to help a child with a critical and complex illness?
- Emily – As a teacher?
- Researcher – Yes.
- Emily– Resources?
- Researcher – Yes.
- Emily – Probably I would definitely try and find some other individual who knows more about the child or the illness like itself and see what kind of necessities I would need as a teacher to help them gain the information. But it's

depending on the illness they all need different things. Or try and find, like they have different resources and stuff like, I don't know, we went through a few of them yesterday. Like I guess just getting more information on the illness itself and what I would need to accommodate the child with.

- Researcher – The next one is, how would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
- Emily– If, like my student?
- Researcher – Yes.
- Emily – I mean I would obviously have to have a meeting with the student and their parents and talk about what information they were missing and whether or not they would be able to make that up or if they needed to do it in another setting or if there were any other kind of way for them to get the work done.
- Researcher – The next one is, what do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Emily– The school? I don't know. We have one student who's critically ill, I don't know or at least I have not heard that they have done anything for them. In the first week they reached out to the parents and gave them the work but once it became a lengthier thing, I think it just, kind of just faded out. Like not necessarily dropped out.
- Researcher – The next one is, how does a high volume of school absences affect the education of a child with critical illness?
- Emily – Can you repeat that?

- Researcher – How does a high volume of school absences affect the education of a child with critical illness?
- Emily – Well they're not, one they're not getting the same information as other students and they're not, more than likely, in a super social setting so they're not getting that aspect of it either.
- Researcher – Are you good at mathematics?
- Emily – No, it's not my strong suit.
- Researcher – The follow up to that is, how do you know or why do you think that?
- Emily – I have memories of struggling in high school specifically.
- Researcher – The next one is, when do you or others do mathematics?
- Emily– I guess daily but not in. . . Unless I need to like for a class. But yeah, you do math every day.
- Researcher – The follow up to that, which I feel like you touched on a bit, but do you do mathematics outside of school?
- Emily – No, not in general. Like, if you're a cashier at a grocery store and various instances.
- Researcher – The next one is, are you prepared to teach mathematics?
- Emily– I believe so, I think I would just need to review the information myself first and kind of make sure I have a grasp on it before I try and explain it to everybody.
- Researcher – The follow-up on that one, why do you say that?

- Emily– Just because I . . . I’ve never really, math has never really clicked with me so I feel like, but elementary math I get but I would definitely need some review. Even know like at the school I work at, kids come up to me with math questions and I’ll have to get a second before I’m like “Okay, let’s figure this out together.”
- Researcher – This is the last one, what kinds of mathematics can we expect children to do and understand?
- Emily– What kinds of mathematics? I don’t know what you mean, like. . . I know in high school Algebra and Geometry and things like that, but younger grades it’s not necessarily like that.
- Researcher – So let’s say we’re taking a 3rd, 4th, or 5th grader. If a student in 4th grade came up to you what kind of mathematics would you expect them to be able to do and excel at?
- Emily – Well, currently the 4th graders I work with are working on, I literally just graded their math tests today, they’re working on a lot of multiplication and they don’t know how to do division yet. Addition and subtraction, things like that.
- Researcher – Follow up to the last questions is, how about children with critical or complex illnesses? Like what kind of mathematics can we expect them to do?
- Emily – Hopefully the same. It just depends what level they’re at.

APPENDIX D: END-OF-DAY REFLECTION QUESTIONS

End-of-Day Reflection Questions

1. How many students did you work with today?
2. What content did you teach?
3. What is something you wish you did differently today?
4. What was your favorite part of the day?
5. Any other thoughts or ideas you'd like to share.

APPENDIX E: END-OF-DAY REFLECTIONS

End-of-Day Reflections – Amber

January 14, 2019

I was not able to work with any students today but we were able to do some set-up things and we were also able to write out a lesson plan. Doing this along with discussion really helped me feel more comfortable with the process and gave me more of an idea of what we will be doing each day. I also am finding that I am becoming more comfortable with the layout of the hospital and the different floors. I am looking forward to learning more and experiencing more!

January 15, 2019

I worked with one student today and then was able to visit another. With the first student we worked on generating a number pattern based on a given rule. He flew right through the content and aced every rule that we gave him by creating a pattern using multiples of 3,4,5, and 6. We also were able to visit an eight month old and were able to see how interaction and stimulation can be helpful in their growth. I wish we had harder content for the first student. We had ideas to challenge him just in case he needed to go up a level, but even that seemed easy to him. My favorite part of the day was working with the student and getting to interact with the baby. It was encouraging to see how eager the student was to work with us and how proud he was of himself.

January 22, 2019

I was able to work with three students today and was able to teach one math lesson to different kids, and then one literature lesson. Each of the students was unique in their

own way and it was fun to see how the different lessons played out. I think today was a good day to learn how the different routines work in regards to hospital procedure. It was good to be able to gown up and also learn how to clean the different tools and manipulatives. I really enjoyed interacting with the students and their families. They were all eager to learn, and that was encouraging!

January 28, 2019

I worked with three students overall today. I have seen two of them before, so that was helpful when it came to preparation. I focused on using Dash for lessons in two of the rooms, and then did a spelling inventory alongside a book in the other. Today I realized that I need to become more acquainted with Cue, as that is a robot that I was hoping to use, but because of my lack of knowledge I had to switch to Dash. I really enjoyed working with all of the kids, but it was especially nice to see physical progress being made in one of the students.

January 29, 2019

I worked with three students. I taught math for all three of the lessons. I did a diagnostic assessment, a lesson on fractions, and a lesson on lines and line segments. I stepped into one of the student's rooms with a lesson on fractions and decimal places and how they relate, and quickly realized that I had prepared a 4th grade lesson for a 3rd grade 8 year old. Thankfully I was able to modify quickly, but I wish I had been more prepared in the lesson planning.

I enjoyed working with Jonathan in the beginning part of the day!

February 4, 2019

I was able to work with two different students today. I taught a math lesson working on division word problems with one and then worked on reading skills with the other. I wish I had done more looking into the prior knowledge of the one regarding division as I realized too late that had not had any prior learning in that area. Thankfully I was able to modify the lesson quickly. I enjoyed seeing both of my students today as they were students that I had worked with before. It was fun to see them recognize me and nice to be able to have conversations with them while working on the lesson. It worked out really well as the book I brought for one of the students was one that fit perfectly with his interests and the interests of his Poppa who is with him in the room...which was encouraging! :) One thing that I noticed that we are lacking in in regards to materials is games for older students (7-8+). I think it would be nice to have even just a deck of cards to work on different memory skills, or even math skills!

February 5, 2019

I was able to work with just one student today and I worked on a reading assignment. The other children were either discharged or somewhere else in the hospital. I enjoyed working with the student and was encouraged at how quick she was and how engaged she was with the lesson. There were some things that I wish I did differently when it came to the lesson, but those things also gave me ideas for another lesson for next time.

February 11, 2019

I was able to see two different students today and I worked on math with both. I used Dash to work on line segments and estimation with one of them and then worked on commutative addition with another student. They both were excited to do the work and both of the lessons went smoothly-which was encouraging for me! I'm not sure if what I would have done differently. Not much went wrong, which I am thankful for!

February 12, 2019

I was able to work with 3 different students today, the fourth one on my list was discharged. I was able to work on math and reading with all different ages. I did a math lesson exploring prior knowledge on fractions with the 11 year old, and then explored area using multiplication with the 9 year old. With the 5 year old I was able to read a book and identify how the different characters were feeling and how those feelings contrasted. I forgot to bring a white board into one of the rooms when I had originally planned to...thankfully I had pencil and paper with me so the student could write down what they were thinking.

All of my students were eager to do the work and were clearly encouraged by it, which was encouraging in turn for me!

February 25, 2019

Today I was able to work with two different students. I originally had 4 scheduled but one was discharged and the other was about to go in for an MRI. I was able to work on reading and comprehension with one student. He was a 5 year old who could not fully read yet, yet was on his way. He was bright and inquisitive and showcased knowledge

about different subject throughout my conversation with him. It was a lot of fun to work with him. The other student was a 4 year old girl who could not speak English. She was shy yet sweet, but the language differences caused a barrier. She seemed happy to see me, yet did not seem interested in talking about colors-the language difference also proved to be a big barrier. I was able to leave a graphic organizer behind that I saw her mom doing with her as I left.

I wish I knew more Spanish as that would've made communication easier today. Perhaps that is something I will work on!

February 26, 2019

I was able to work with three different students today, the last one I was assigned was in an MRI all day. I focused on reading today and did different levels of story maps with my three students. One of them was 7 and she did a lower level story map, another one was 8 and he did a little bit higher of a story map, and the third was a twelve year old and she did the most complicated story map. All of the books that we read today were really interesting and the children did well with all of the books and with the story maps. I enjoyed working with all of them!

End-of-Day Reflections – Courtney

March 11, 2019

-How many students did you work with today?

I worked with 2 students today. I worked with one 8 year old and a 9 year old.

-What content did you teach?

I taught math. The 8 year old did a lesson on area. I tried to do a math lesson about patterns with the 9 year old but he was not having the best day.

-What is something you wish you did differently today?

I thought overall the day went really well.

-What was your favorite part of the day?

My favorite part of the day was going back and visiting the 8 year old in the afternoon and we worked with Dash.

-Any other thoughts or ideas you'd like to share.

I thought it was very interesting how Dr. Brown dealt with the 9 year old who wasn't having a good day. She was understanding yet firm and I learned a lot from her.

March 12, 2019

-How many students did you work with today?

I worked with 2 students today.

-What content did you teach?

I taught reading today. I brought leveled texts and read with the children. We filled out a graphic organizer for recounting plot, settings and characters.

-What is something you wish you did differently today?

I wish I had brought harder texts into one of the rooms. The text was very easy for the male student.

-What was your favorite part of the day?

My favorite part of the day was being able to go back and work with a student on reading.

-Any other thoughts or ideas you'd like to share.

I really enjoyed today.

March 26, 2019

-How many students did you work with today?

I worked with 3 students today.

-What content did you teach?

I taught a 2 math lessons and a reading lesson.

-What is something you wish you did differently today?

I wish I would have brought more materials with me for the math lesson. I had to improvise with construction paper.

-What was your favorite part of the day?

My favorite part of the day was teaching a student in infusion how to use dash. She was super engaged!

-Any other thoughts or ideas you'd like to share.

End-of-Day Reflections – Emily

March 5, 2019

Today I worked with one student. I taught the mathematics concept of "How many?" in various ways. Something that I wish I did differently would be creating an assessment to grasp what the student gained from the experience with me. My favorite part of the day was watching the student engage and interact with Dash and so willingly answer questions that I presented him. I look forward to next week and meeting some new patients!

March 11, 2019

Today I worked with three students who were all five years old. I taught an ELA concept that included identifying the main characters, setting, and plot within a story. Something that I wish I did differently was plan for a more engaging assessment. I had the students fill in the butterfly story chart with pictures of the setting and main characters however I think next time I will try to have the students make dash into one of the main characters. My favorite part of the day was working with one boy who was very engaged with the lesson and the story who had a lot of input to contribute. I look forward to working with these students again tomorrow if possible and extending what they have learned today.

March 12, 2019

Today I worked with one student. I initially worked on "How Many?" math concepts with her using Dash on a number line. I then went back and worked with her on CVC words which included helping her with some of her homework. Something that I wish I

did differently today would be to incorporate Dash somehow in the CVC lesson. She loved using the robot and would get distracted from the lesson because Dash was nearby. My favorite part of the day was playing with Dash and introducing it to the patient. She was amazed by it! I will definitely try to incorporate it into my future lessons with her.

March 26, 2019

Today I was able to work with two students. I worked with one 5 year old on subtraction and decomposing numbers using manipulative ducks and a mathematical coloring page. I also worked with an 8 year old on character analysis with fictional text. We read "A Tiger Tail" and discussed the various characteristics and personality traits of the main character. We then filled out a chart which analyzed the motivation, personality, and features of the main character. Something that I wish I did differently today would be find an additional activity to incorporate dash with the ELA content for the 8 year old student. My favorite part of the day was working with the eight year old because he was initially very hesitant and unmotivated to work, but after a few prompts and questions he was very engaged with the story and the drawing

APPENDIX F: POST-INTERVIEW TRANSCRIPTIONS

Post-Interview Questions – Amber

- Researcher – The first question is, what does it mean for a child to have a critical or complex illness?
- Amber – It means something that, for me, takes them away from everyday life for periods of time, or hurts everyday life. Or, whether it's just they have pain while they're at school, or sports, or they have to go to the hospital. It affects their everyday life.
- Researcher – What types of illnesses do you consider critical or complex illness?
- Amber – I feel like there's so many. I feel like there's a huge list but for me, some of the big ones that you see are cancers because they're going through chemo treatments. It also just takes over your mind, I feel like you're just thinking about it a lot. Uhm, and C-, C?
- Researcher – Oh yes, CF.
- Amber – Yes! Cystic fibrosis, that's another one. Uhm, I feel like there's a huge list, I feel like there's too many to list.
- Researcher – Do you feel prepared to teach a child with a critical or complex illness?
- Amber – I'm definitely more prepared than I was before, uhm, I just have more understanding, and even of what goes on here. What they might be able to do or probably not be able to do, whether nurses will be helpful, or parents will be around like all that. The factors that I had no idea would be factors. Of course,

every kid is different, every situation is different, and every family is different.

But, I definitely feel more prepared, just kind of understand their situation at least.

- Researcher – What type of educational hardships may children with critical or complex illness encounter?
- Amber – I think the biggest is just falling behind, like even, like I see that at my brick-and-mortar school that kids that miss a few days miss a lot. So, you think about kids that are out for two weeks or longer, which sometimes they can be. Like how much are they missing? Especially when it comes to [standardized tests] and stuff like that it's huge, so uhm, what was the question again?
- Researcher – What type of educational hardships–
- Amber – Oh yeah, I think the main one is falling behind and coming back and not knowing what the teacher is talking about and with the other kids it's hard to feel that way and have to catch up.
- Researcher – What type of unique learning needs do you think children with critical or complex illness may have?
- Amber – Uhm, I think a lot of it is they're not feeling well so they're not going to want to do a lot. So, you have to find activities that relate to them, and that will interest them and know that you might have to wait depending on what they have but most of the time I feel like they're just not feeling well, and are very exhausted and don't feel up to doing a lot of hard mental work. As the teacher you have to figure out how you're going to help them with that.
- Researcher – What help or resources would you seek in order to help a child with a critical and complex illness?

- Amber – There’s so many different things. There’s people that can help, parents for sure. I’m thinking like different apps even that can help them, different online resources, even if you could create an online module that they could do while in the hospital, stuff like that. So, there’s technological resources, and there’s people you can use, whether it’s like other teachers, or maybe it’s they’re in the hospital long enough getting to know a nurse that’s with them all the time and of course parents.
- Researcher – How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
- Amber – Well, uhm, I would do, like to my best ability, I would create school work that they can do in this environment. I know there’s this one kid here and he had just loads of paper work. Like worksheets that he had to do and I was like “Okay, we have to go through all of these.” And it’s just not, it’s not their top priority when they’re sick in the hospital for weeks. So, like I said, if you could create like an online module where they just click through and do it online on a laptop or iPad or something I feel like that would be better. But, you know even if you have to do worksheets I feel like just organizing it well and giving tips to kids would help.
- Researcher – What do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Amber – I still don’t really know, like other than you know, [the hospital-based school program] which we have here but that’s not even really the district that’s [the partnering Southeastern university and hospital], from what I understand. So,

even being in a brick-and-mortar school now, when a kid misses a lot, teachers are just like “Ugh.” They don’t do anything really, they just feel sad that they’re missing. So uhm, now these kids are missing for different reasons, it’s not medical so I don’t know if medical is different but I wouldn’t think it would be that different. So, I don’t think there’s much, I don’t think there’s much that’s being done. Uhm, from just now being in a brick-and-mortar and seeing how teachers deal with absent kids it doesn’t seem like much is going on.

- Researcher – How does a high volume of school absences affect the education of a child with critical illness?
- Amber – It really affects it, it really affects the kid. I think sometimes parents don’t realize that but, it really does affect their learning. Because you can have a whole week-long unit on something and if they miss that week then they have no idea what’s going and then they get to the [standardized test] and they have no idea what those questions are talking about and they miss all those and it’s kind of the domino effect. You know? And then they get to the next year where they’re building on that material and they still have no idea what’s going on. So, there’s a reason it’s not good to miss school, because so much has been taught.
- Researcher – Okay, these are the math questions. Are you good at mathematics?
- Amber – It doesn’t come naturally, there are other subjects that come more naturally for me. So, I have to work a little bit harder to get good grades. But, so I don’t know if I’m good at it but it doesn’t come very naturally to me.
- Researcher – When do you or others do mathematics?

- Amber – Oh, I feel like all the time. Especially the more simple things like addition, subtraction, multiplication, and division, we use that all the time in everyday life. Like even yesterday being at the grocery store, you see sales and you have to calculate like “Okay, it’s 2 for 5, then get one, how much would it be?” Really just simple stuff like that I do all the time.
- Researcher – Are you prepared to teach mathematics?
- Amber - Uhm, I would say so, there’s still some things where I’m still a little scared but I feel like in my classes they equipped me with tools and manipulatives and all these ideas on how to teach different subjects. Especially elementary, it’s not like it’s this really hard math so I feel pretty good about it, I don’t feel scared to do it.
- Researcher – What kinds of mathematics can we expect children to do and understand?
- Amber – I feel like, the core four. The multiplication, division, subtraction, addition are kind of the big ones and then the levels that come with that. Then you have other things like unit measurements, decimals, geometry. They have a lot of different things that come with elementary math but I feel like there’s four core things they should know.
- Researcher – How about children with critical or complex illness?
- Amber – The same. Hopefully you want them, you want them to go into middle school and high school knowing the same as their peers. That would be the goal. You need extra help in doing that, they’ll need extra help. But, that doesn’t mean you should not expect them to learn just as much.

- Researcher – The last set of questions are the post-interview questions only. What did you learn about the education and educational needs of children with critical illness as a result of this internship program?
- Amber – I learned a lot. I think a lot of that came from just that I knew nothing. Just learning what they would be up for, learning that they actually don't mind doing school in the hospital. That they get excited, a lot of that is the social interaction but also just learning. A lot of them really love to learn, to read, especially if you make things interesting. So, that was kind of a big one for me, how can I make this interesting and not just come in and say, "Alright let's do a worksheet with addition problems." How could I make it interactive, engaging? Which is something you should do in all classrooms but especially here. So, I learned a lot. It was good.
- Researcher – What do you think should be added to your program to increase pre-service teacher preparation to educate children with critical illness?
- Amber – Here?
- Researcher – Yeah, at [the Southeastern university]. Or really anywhere. Just reflecting back on the classes you took, what do you think should be added?
- Amber – In regards to helping kids with critical illness?
- Researcher – Yeah.
- Amber – Well I didn't learn anything in the classes. So, I think that would be a great. . . I don't know like, if it needs a whole class, but to be incorporated into a class like [classroom management and teaching strategies course] or whatever that class is. Just where you're talking about classroom basics, and classroom skills,

and what you need for the classroom. I think that should definitely be something that should be added. Because you will have kids that will have critical illnesses, you will have kids that will deal with family members that have critical illnesses. So even just helping pre-service teachers learn how to deal with kids that are going through stuff or kids that have family members that are going through stuff that would be great because I didn't get any of that.

- Researcher – The last one is, did this internship program better prepare you to teach elementary mathematics at any level?
- Amber – Yeah. I think the biggest thing for me is that it taught me how to modify on the spot and create lesson plans really quickly that had to be good. Uhm, so you just get the information for the lesson plan as quickly as you can and go in and sometimes they're at the level you want them to be and sometimes they're not so you've got to quickly say "How am I going to add or subtract to this lesson." That's huge because in the classroom that's going to have to happen. It was good to practice and become comfortable with that.

Post-Interview Questions – Courtney

- Researcher – The first one is, what does it mean for a child to have a critical or complex illness?
- Courtney – I mean it's so many different things now, like it's. . . Uhm, a child can't, I don't know how to answer this question anymore. It's when the child can't. . . It impairs the child's ability to operate, function, do the things of everyday life.
- Researcher – What types of illnesses do you consider critical or complex illness?
- Courtney – I mean I guess it means that you have an illness that would be critical or complex that would have the child end up here probably. Scoliosis, cerebral palsy. . . I had a child with Graves' disease the other day and I had to look up what that was. You know, things if the child has to spend a significant amount of time away from the normal activities of a child.
- Researcher – Do you feel prepared to teach a child with a critical or complex illness?
- Courtney – More so now than at the beginning of this. It's not so much that. . . I feel like I have more confidence in the areas of teaching students better that are outside the regular spectrum of children.
- Researcher – What type of educational hardships may children with critical or complex illness encounter?
- Courtney – Uhm, a lot. They won't have the normal amount of in-class time. They will be pulled for different reasons. They might require intervention in areas

that they're missing in school a lot. They could be on the hospital homebound program which is spotty to say the least, and they could fall behind very easily.

- Researcher – What type of unique learning needs do you think children with critical or complex illness may have?
- Courtney – Uhm, I mean each child's going to be, no child is going to have the same two struggles. It depends how. . . On the amount of time they're out of the classroom. They could require intervention, they could require tutoring, extra support, assistive technologies, stuff like that.
- Researcher – What help or resources would you seek in order to help a child with a critical and complex illness?
- Courtney – I think I would first seek out the parent to see what they think their child needs. Ask the child what they think they need. Then you could seek out the special education teacher and the administration to see if the child needed assistive tech or things like that, what they have and what you have access to.
- Researcher – How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?
- Courtney – So if they're missing school for several weeks, and they're hospitalized, they're probably, they probably have a hospital homebound teacher, so coordinating with that teacher or with the parent to give them the assignments and work that they missed. And setting up times where you could go to where the child is to help. Doing things like FaceTime so they can still get some interaction from the classroom. Just so they have access to the work and content that you're

teaching. So, even though they'll probably fall behind, they'll still see what you're working on.

- Researcher – What do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Courtney – Hospital homebound, uhm, that's yeah.
- Researcher – What you think that entails?
- Courtney – I think the students have to be hospitalized for 14 or 17 days straight to receive access to that and if they leave but get admitted the next day, it starts over. What I've heard from parents is that the teacher comes out once a week for an hour or two to work with the student. And that teacher coordinates with their general-ed teacher to get content and materials.
- Researcher – How does a high volume of school absences affect the education of a child with critical illness?
- Courtney – If they're not there, they're not learning. That's the same as every other child. It doesn't matter if you have a critical illness or not. If you're not in the classroom, you're not learning the material with the teacher, so it relies on the parents, the students, the textbook to teach the content. It's not like a face-to-face interaction with the teacher so they're going to fall behind.
- Researcher – The next set are the math questions. Are you good at mathematics?
- Courtney – Still no.
- Researcher – How do you know?

- Courtney – I think it comes a lot from the math anxiety. When I feel like I'm not good at something my anxiety goes up when I have to interact with it.
- Researcher – Did you experience that in class?
- Courtney – Here?
- Researcher – Yeah.
- Courtney – Yeah. She started talking about fractions and I was like “Yeah, I ain't doing that.” But, I think once I do it for 30 years maybe I'll be a little more comfortable. If I can stick with one grade and just be really comfortable with that content.
- Researcher – When do you or others do mathematics?
- Courtney – Well you do math everyday whether you like it or not. But teaching math, and doing math that's not everyday math is basically only when you're teaching or working on assignments. It's important. I know it's important. It's definitely something you use every day.
- Researcher – Are you prepared to teach mathematics?
- Courtney – More so now, than when I started here. I think if you would've told me that I would've almost preferred to teach a math lesson instead reading when I started I would've been like “absolutely not.” But math is almost easier to teach because you get a concrete answer, you know? You can very clearly understand whether or not the student is getting what you're saying and is able to do it. Because if they're not getting the answer and they're not performing the steps in the right order it's easy to see the mistake. When you're like, “Tell me the main

idea,” there’s one main idea but there’s a lot of other ways they can get to that answer. But when you have a math lesson, it’s very straight forward. So, I guess I do feel comfortable teaching it because I have been, but there’s always room for improvement.

- Researcher – What kinds of mathematics can we expect children to do and understand?
- Courtney – There’s no limit to that. There’s you know, children. . . The second you set expectations high, the students will achieve them. If you’re like, “oh well, they’re second-grade they should only be adding and subtracting within 1,000.” Why can’t they do more? You know, things like that. Why can’t they do more than that? So, when you have a standard that’s very. . . It’s the only thing they should be doing in second-grade. If they’re doing it, go to the third-grade standard. Go to the fourth-grade standard. You know, there’s not limit what a student can do.
- Researcher – How about children with critical or complex illness?
- Courtney – They’re no different. You have to see where they’re at and teach from there because. . . Just because they’re in the second-grade age wise that may not be their performing level. So, you have to go and see where they’re at and adapt your lesson to accommodate.
- Researcher – What did you learn about the education and educational needs of children with critical illness as a result of this internship program?
- Courtney – I mean considering I went in with pretty much zero knowledge, everything I know now comes from this internship. Uhm, when you hear that a

child has a critical illness it's very intimidating. You are like "oh, my God, are they okay? Like, what's going on? Are they even okay to learn?" Like, you think things like this and they are, they are regular children. They could be performing above grade-level. The other day this girl, I think she was in second grade, I was like "oh what are you reading?" and she goes "Harry Potter." And she was understanding it, you know. She spends so much time here, she spends so much time in bed, but instead of playing video games her mom has her reading. You know, it's things like that. You have no clue what you're walking into. It's, it's kind of cool.

- Researcher – What do you think should be added to your program to increase pre-service teacher preparation to educate children with critical illness?
- Courtney – I mean, considering we have one special-ed class that is. . . Very broad to say the least. I was like "yeah, okay, autism. Awesome. What is it? What does it look like?" And it's mixed mode. It doesn't prepare you for anything. You can't learn online like you can learn in person. You can't learn in person unless you have a child that has whatever you're working with, you know? So, they need some required time almost in a special-ed classroom, or school, or camp. There's so many options that's not just a child with ADD. Because they're in the classrooms everyday so you see it you know how to deal with it. But it's because you have the experience working with the children.
- Researcher – This is the last one. Did this internship program better prepare you to teach elementary mathematics at any level?
- Courtney – Yes, absolutely.

- Research – The second part is, if yes, how?
- Courtney – Like I said I never would've thought I would enjoy teaching math. And working one-on-one with a student allows you to see actually more where your strengths lie and where you need to work on. It's not as intimidating, you don't have a class of 25 kids staring at you blankly. You have one and you can be like "what don't you understand? Walk me through." It's more one-on-one instruction and you can get more comfortable with the content when you're teaching it. Because, you have to review it and you have to know it inside and out.

Post-Interview Transcriptions – Emily

- Researcher – So the first question is, what does it mean for a child to have a critical or complex illness?
- Emily – Uhm, I would say that, uhm, I would say that a child with a critical illness means that it's more severe than normal. I guess to the point that they're less able to do certain things, sports. Yeah, I guess just a higher degree of severity.
- Researcher – What types of illnesses do you consider critical or complex illness?
- Emily – I would say TBI, cancer, not so much just like that but what they're on that affects them. What was the question again?
- Researcher – What types of illnesses do you consider critical or complex illness?
- Emily – I can't think of much else. Muscular dystrophy.
- Researcher – Do you feel prepared to teach a child with a critical or complex illness?
- Emily – More so now than I did originally. I think it still depends on the diagnosis but the experience has kind of opened my eyes to different ways to address different illnesses.
- Researcher – What types of educational hardships may children with critical or complex illness encounter?
- Emily – The fact that they miss a lot of school and may not be on the right level. Some medication they need to take may affect the way they learn and processing information and what they can do.

- Researcher – What type of unique learning needs do you think children with critical or complex illness may have?
- Emily – Unique learning needs?
- Researcher – Mhm.
- Emily – I’m trying to think of the ones I encountered here. I’ve been doing a lot of manipulatives, hands-on, and repetition. Sometimes they do seem to see and hear it in different ways. Did I already say manipulatives?
- Researcher – Mhm.
- Emily – Also visualization.
- Researcher – What help or resources would you seek in order to help a child with a critical and complex illness?
- Emily – Asking you guys, the people who work here. It’s been really helpful. I feel like every professor or every doctor has a different specialty. So, yeah. I would ask them or look online for resources, like search for the specific illness.
- Researcher – Let’s say that you’re already in a public-school classroom, in addition to looking online, are there other resources?
- Emily – Yeah, I think I would ask the teachers that had the student prior or parents.
- Researcher – How would you handle a situation of which you have a student that misses school for several weeks at a time due to a critical or complex illness?

- Emily – See if it's possible for me to send them what they're missing or work with the parent and give it online, maybe Skype sessions. I guess it depends. . . Talk with the administrators.
- Researcher – What do you think school districts offer for children with a high volume of absences due to a critical or complex illness?
- Emily – I'm not sure what they offer but they have to offer some kind of resources. I'm not sure what those are though. Probably like, the only thing I can think of is classroom stuff like specialists coming into the classroom.
- Researcher – How does a high volume of school absences affect the education of a child with critical illness?
- Emily – They're not going to be on the same level as like a regular kid and they're also not getting the visual aspect of things, regular teaching, and interactions with peers. And just being around other students, I think that's helpful. They can listen to each other's thought processes and stuff like that, to physically see what they're doing.
- Researcher – The next set of questions. . . We're going to transition to the math questions with mixture at the end. Are you good at mathematics?
- Emily- Uhm, I don't consider myself to be good.
- Researcher – Why is that?
- Emily – Honestly since being in Dr. Brown's class I think I was just taught a lot of things wrong or differently. So now that I'm like learning how to teach students I can kind of grasp it. But I don't know, I think I always as a kid

struggled with it because I wasn't taught it the right way and I just associate myself with not being good at math.

- Researcher – When do you or others do mathematics?
- Emily – Every day I guess, essentially.
- Researcher – Do you have examples of when that occurs?
- Emily – Besides doing math, like trying to figure out like rent, what I owe, things like that. The only times that I do like elementary math is if I'm teaching myself to teach it and reviewing it.
- Researcher – Are you prepared to teach mathematics?
- Emily – I think so, yeah.
- Researcher – Why do you say that?
- Emily – Because as I think that as I review lessons I start to pick it up more, so it's like teaching myself so as I get better at it I'll get better at teaching it.
- Researcher – What kinds of mathematics can we expect children to do and understand?
- Emily – What kinds of mathematics? Like fractions and things like that?
- Researcher – Mhm.
- Emily – Okay, fractions, geometry, shapes, measurement, collecting data, addition, subtraction, multiplication, all that jazz.
- Researcher – The second part to that is, how about children with critical or complex illness?
- Emily – Essentially the same.

- Researcher – These are the post interview questions. What did you learn about the education and educational needs of children with critical illness as a result of this internship program?
- Emily – I learned that it's very diverse to the point that you can't really plan anything. You kind of have to work with what you've got, and you have to do what's best for that particular child.
- Researcher – What do you think should be added to your program to increase pre-service teacher preparation to educate children with critical illness?
- Emily – I think it would be beneficial for us to see more observations of other teachers who have done it for a while. Like I guess the more examples of how to properly teach students. Also, more information on specific illnesses, like I know we got an intro to TBI, and others but a little more information would be helpful.
- Researcher – Did this internship program better prepare you to teach elementary mathematics at any level?
- Emily – I think so.
- Researcher – If yes, how or why?
- Emily – One, because I've been introduced to a lot more games, activities, manipulatives, and ways to teach different subjects. Like with all the resources in the classroom and then physically being in there and teaching the students. It's been really great practicing what we learned and you can see what works and what doesn't.

APPENDIX G: BACKGROUND INFORMATION QUESTIONNAIRES

Background Information Questionnaire – Amber

1. **First Name:** Amber
2. **Age:** 23
3. **What education related experiences do you from childhood (birth-18) outside of the scope of attending school?** Once I decided that I would like to go into education I was able to start an internship with the private school that I attended. I helped out in the 1st grade classroom once or twice a week and was exposed to the “teacher life”. Since I was homeschooled I attended different curriculum fairs/conferences and on occasion even helped my mom pick out curriculum.
4. **How would you describe your experience in education growing up?** I was technically homeschooled for my whole schooling experience (K-12). I attended co-ops for most of my growing up years. When we moved to [the Southeastern state] I started at a university model school which meant that I attended several times a week but spent the majority of my time completing school work at home learning with my mom as my teacher.
5. **What educational related work experiences do you have?** I have spent several years working one-on-one with a young lady with specials needs. I am in charge of tutoring her and helping her learn and progress. Other than that my time in the schools/educational experience has not been paid.
6. **What work experiences do you have related to dealing with critical illnesses?** The young lady I work with has Hydrocephalus and Autism. I’m not sure if those fall under the category of “critical illness”. Other than that, no, I do not have much work experience.

- 7. What experiences do you have relating to critical illnesses (outside of the hospital-based school program)?** My mom suffered from a late term cancer for a total of 18 months. I was able to walk alongside her as she went through chemo and as she experienced the ups and downs that come with living with a critical illness.
- 8. What were your experiences in and feelings towards mathematics education like in elementary school? Middle school? High school? College?** Honestly, I struggled with math! I understood it but it always took a little bit more work and definitely was not my favorite subject. As I entered into college it was exciting to learn how to *teach* math...it was still something I had to work to understand, but it was a refreshing change.
- 9. What school & county did you complete your brick-and-mortar placement? Grade level?** [A Southeastern state elementary school], 4th Grade
- 10. List any other experiences you feel may have influenced how you responded to the interview questions.** I think my mom's journey has affected me the most and is where most of my answers flow from-whether it is in regards to critical health or education.

Background Information Questionnaire – Courtney

1. **First Name:** Courtney
2. **Age:** 23
3. **What education related experiences do you from childhood (birth-18) outside of the scope of attending school?** I would always go into the schools my mom was working at and help out in the classroom. All the women in my family were teachers so the topic of education was brought up at least once a day.
4. **How would you describe your experience in education growing up?** I was in a public school in a wealthy area K-8. I was then placed in a private Jewish high school.
5. **What educational related work experiences do you have?** I was art staff at a day camp.
6. **What work experiences do you have related to dealing with critical illnesses?**
[Partnering hospital for the hospital-based school program]
7. **What experiences do you have relating to critical illnesses (outside of the hospital-based school program)?** None
8. **What were your experiences in and feelings towards mathematics education like in elementary school? Middle school? High school? College?** I hated math throughout all my years in schooling. I have severe anxiety when it comes to taking a math class.
9. **What school & county did you complete your brick-and-mortar placement?**
Grade level? [A Southeastern state elementary school] – 5th grade

10. List any other experiences you feel may have influenced how you responded to the interview questions. I learned a lot through my volunteer experiences and my classes at [the Southeastern university].

Background Information Questionnaire – Emily

1. **First Name:** Taylor
2. **Age:** 22
3. **What education related experiences do you from childhood (birth-18) outside of the scope of attending school?** My mother was a teacher. I was a summer school tutor. I worked as an assistant teacher for a K-12 private school.
4. **How would you describe your experience in education growing up?** I began at a public elementary school in [the Southeastern state] where the teachers primarily spoke Spanish. I then transferred to an elementary school in [the Southeastern state] and finished middle and high school in public schools there as well. I was encouraged to have few absences and good grades because my mother was an educator.
5. **What educational related work experiences do you have?** I worked as an assistant teacher for a K-12 private school. I was a summer school tutor for 3rd grade students. I worked as a coach.
6. **What work experiences do you have related to dealing with critical illnesses?**
None.
7. **What experiences do you have relating to critical illnesses (outside of the hospital-based school program)?** None
8. **What were your experiences in and feelings towards mathematics education like in elementary school? Middle school? High school? College?** I struggled with mathematics throughout my entire school career, until I reached college and

was properly taught how to understand mathematics concepts. I never seemed to excel in that subject.

9. What school & county did you complete your brick-and-mortar placement?

Grade level? [A Southeastern state elementary school]; 3rd grade

10. List any other experiences you feel may have influenced how you responded to the interview questions.

APPENDIX H: IRB HUMAN RESEARCH EXEMPTION LETTER



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Determination of Exempt Human Research

From: **UCF Institutional Review Board #1
FWA00000351, IRB00001138**

To: **Bethany Diane Fralish and Co-PI: Megan Nickels, Ph.D.**

Date: **October 23, 2018**

Dear Researcher:

On 10/23/2018, the IRB reviewed the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: Pre-Service Teacher Perspectives on the Education of
Children with Critical Illness and Preparation to Teach
Mathematics to Children with Critical Illness
Investigator: Bethany Diane Fralish
IRB Number: SBE-18-14459
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

This letter is signed by:

A handwritten signature in black ink, appearing to read "J. Jacques".

Signature applied by Jessica Jacques on 10/23/2018 08:01:14 AM EDT

Designated Reviewer

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