

**LEARNING AND QUALITY IMPROVEMENT:
NURSING IN THE PEDIATRIC INTENSIVE CARE UNIT**

by

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Abstract

Maintaining a high quality of care in a Pediatric Intensive Care Unit (PICU) is a constant challenge. Continual 24/7 staffing, ongoing staff turnover, and the constant introduction of new equipment and procedures in a highly technologically-dependent unit requires continuous learning to deliver and improve the quality of children's care. While all staff consider continuous learning important to maintaining and improving care, learning as quality improvement is made most explicit when new nursing staff are hired and incorporated into the PICU.

In this dissertation, I investigated the process of learning by individuals in the interactive social environment of the PICU to answer the following questions: How does learning occur among the newly hired nurses in the PICU? And, how does learning contribute to quality improvement? In this mixed method inquiry, I employed ethnography, Social Network Analysis and simple descriptive and inferential statistical methods to explore process of learning among the newly hired nurses in Western Canada Hospital.

I found that learning among newly hired nurses happened through face to face interactions in the context of two main activities: Orientation sessions and their Preceptorship. The most significant learning for the newly hired nurses, however, happened during their Preceptorship. Learning in the Preceptorship was social and experiential as they moved from legitimate peripheral participation in the multi-disciplinary and complementary social environment of the PICU into full participation as members of the PICU Community of Practice (CoP). This learning required the transformation and development of their individual and collective identity, as their preceptors, fellow nurses, and other staff employed scaffolding to mentor them through their constantly evolving Zone of Proximal Development (ZPD). Social and experiential learning activities became the basis for continuous quality improvement (CQI).

I conclude that, in the PICU, quality improvement is the tangible manifestation and product of social and experiential learning. Rather than a sequence of corrective actions, in its most effective form, quality of care is improved through scaffolded ongoing learning activities in the authentic setting of a CoP. I recommend the unit to adopt a “learning together” sociocultural approach with scaffolding as key component for successful learning and CQI.

Lay summary

Learning as quality improvement (QI) is made most explicit when new nursing staff are hired and incorporated into the PICU. In this research, my goal was to answer: How does learning occur among the newly hired nurses in the Pediatric Intensive Care Unit (PICU)? And, how does learning contribute to QI?

In my research, I found that the most significant learning for the newly hired nurses happened during their Preceptorship. Learning in the Preceptorship was experiential and social. Their interaction and the learning they gained led to delivering high quality care. I also found that quality improvement in the PICU is a sociocultural activity and the result of social and experiential learning rather than a sequence of corrective actions. I recommend the unit to adopt a “learning together” sociocultural strategy with scaffolding as key component for successful learning and quality improvement.

Preface

This thesis is an original, unpublished and independent intellectual product of the author, Mir Kaber Mosavian Pour (Mirkaber Mosavianpour). As of the date of this thesis, no part of this research has been published (partially or wholly).

I was the lead researcher of the whole of this research. I was responsible for all areas of research design, data collection, data analysis and the author of the whole manuscript of this thesis. This research was approved by the University of British Columbia's Behavioral Research Ethics Board under certificate (H12-03405).

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List of abbreviations

AACN: American Association of Critical Care Nurses

ACLS: Advanced Cardiovascular Life Support

AR: Action Research

AT: Activity Theory

BC: British Columbia

BiPAP: Bilevel Positive Airway Pressure

BPR: Business Process Reengineering

BSN: Bachelor of Science in Nursing

CHAT: Cultural Historical Activity Theory

CME: Continuing Medical Education

CNC: Clinical Nurse Coordinators

CNE: Clinical Nurse Educator

CNS: Clinical Nurse Specialist

CoP: Communities of Practice

CPAP: Continuous Positive Airway Pressure

CQI: Continuous Quality Improvement

CRRT: Continuous Renal Replacement Therapy

DMAIC: Define, Measure, Analyze, Improve and Control

ECLS: Extracorporeal Cardiac Life Support

GDRN: General Duty Registered Nurse

ICU: Intensive Care Unit

IHI: Institute for Healthcare Improvement

IOM: Institute of Medicine

ITL: Intent To Leave

LOS: Length Of Stay

LPP: Legitimate peripheral participation

NHS: National Health System

OR: Operation Room

OT: Occupational Therapist

PALS: Pediatric Advanced Life Support

PAR: Participatory Action Research

PBL: Problem-Based Learning

PDSA: Plan, Do, Study, Act

PHSA: Provincial Health Service Authority

PICU PAR: Pediatric Intensive Care Unit Participatory Action Research

PICU: Pediatric Intensive Care Unit

PM: Program Manager

PRO: Personal Responsibility Orientation

PT: Physiotherapist

QI: Quality Improvement

QSL: Quality and safety leader

RN: Registered Nurse

RPIW: Rapid Process Improvement Workshop

RT: Respiratory Therapists

SBAR: Situation, Background, Assessment, Recommendation

SCCM: Society of Critical Care Medicine

SDL: Self-Directed Learning

SNA: Social Network Analysis

SoPK: System of Profound Knowledge

SPC: Statistical Process Control

SW: Social Worker

TCU: Transitional Care Unit

TNCC: Trauma Nursing Core Course

TPS: Toyota Production System

TQM: Total Quality Management

UBC: University of British Columbia

UK: United Kingdom

USA: United States of America

VPMA: Vice President of Medical Affairs

WCH: Western Canada Hospital

ZPD: Zone of Proximal Development

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Dedication

Kindly dedicated to:

Hamideh (Helen) Sarmast

My beloved wife for her faith, advice and her patience,
since she always understood.

&

Aryan Mosavian Pour

My loving son for his great deal of patience,
determination, and understanding since he always cared.

Chapter 1: Introduction

I'd say every day is a learning opportunity. Things are always changing, especially in intensive care. (New nurse NN25)

Um, ... learning's sort of the, I would say like the progression of the individual, um, from going from novice to an expert. (New nurse NN11)

*I think anybody who, who demonstrates, you know, a competency, and a willingness to teach, or even just a competency, such that **I can observe them in what they're doing**. Then I would learn something from that situation. So, **I mean I'll watch, you know** a new physician, the way they do a procedure. I might learn the right way to do it. And I might also learn how not to do a procedure. And whatever it is, like **I take that information forward with me**. Um, as far as who I prefer to learn from. Like, you know, like I said anyone who seems like, they know what they're doing. [chuckle] basically. Or if they don't know what they're doing then I, **I take that and I internalize that as well**. As how, you know as a, reminder for myself, as to how not to practice. Because, you see that as well. (New nurse NN12)*

I think learning is a key facet of quality improvement. (New nurse NN12)

1.1. Introduction

This thesis is about the process of learning by newly hired nurses in the Pediatric Intensive Care Unit (PICU) in Western Canada Hospital. What follows is a study of learning and teaching activities in which the newly hired nurses learn how to deliver good care in the PICU when they start their work in this unit. In short, this research uses mixed methods including ethnography and Social Network Analysis to examine learning to deliver good quality care in a PICU.

I present an account of Vygotskian sociocultural learning (1–6), Activity Theory (2,6–15) and Communities of Practice (16–23) in the complex clinical setting of the PICU while I also acknowledge the relevance of individualist perspectives on learning (18,24,25). From this vantage point, I look beyond the more technical aspects of nursing procedures and the institutional

orientation that newly hired nurses encounter to explore how they learn, the role that social interactions play in their learning, how they relate learning to quality of care, and their learning goals.

I will examine how learning among the newly hired nurses takes place through face-to-face interactions in the context of two main activities: Orientation sessions and Preceptorship. Learning in the Orientation sessions is didactic formal learning that occurs through decontextualized traditional classroom-based instruction, which does not resemble the natural setting of the PICU. It provides them with an introduction to the organizational structure, administrative procedures, and acquaints the nurses with the unit's approaches to fundamental nursing activities.

The most significant learning for the newly hired nurses, however, happens during their Preceptorship. Learning in the Preceptorship is social and experiential; they move from legitimate peripheral participation in the multi-disciplinary and complementary social environment of the PICU into full participation as members of the PICU Community of Practice. I demonstrate that this learning process requires a progressive transformation and development of nurses' knowledge and skill while preceptors, fellow nurses, and other members of the PICU employ scaffolding to mentor new staff through their constantly evolving Zone of Proximal Development (ZPD). I maintain that the division of labor and role boundaries are important sociocultural factors influencing their transition through their Preceptorships. These initial months in the PICU serve as a rite of passage during which individuals' identities are transformed from qualified registered nurses into full-fledged PICU nurses. This transition from novice to expert takes them from their initial roles and functions in the unit into roles that are more complex, and demonstrates the unit's recognition of their new capacities. This continuous stepwise process is a fundamental aspect of

the PICU's progressive social integration of the new staff. Finally, I demonstrate that social and experiential learning activities become the basis for continuous quality improvement (CQI) in the unit.

I conclude that, quality improvement is the tangible manifestation and product of social and experiential learning which happens through scaffolding in a Community of Practice. These continuous, scaffolded social and experiential learning activities in the actual setting of a Community of Practice are the most effective means of improving quality of care, in contrast to other approaches that attempt to improve quality through a series of corrective actions.

Finally, I recommend that the unit to adopt a “learning together” sociocultural approach to learning and continuous quality improvement (CQI) in which scaffolding is the key component. In such an approach to learning and CQI, there is a gradual increase in the complexity of experiential learning in the Community of Practice. That is to say, an ongoing assessment and adaptation of learning to each individual's and the whole unit's Zone of Proximal Development leads to the establishment of a culture of continuous quality improvement and reduced resistance to change.

1.2. Overview background

1.2.1. Quality of care at stake

The Institute of Medicine (IOM)'s revolutionary twin reports considered poor quality of care as an important preventable cause of mortality and morbidity (26,27). After IOM's alarm regarding low quality healthcare (26,27), numerous initiatives developed to improve quality of care using various quality improvement models. These includes strategies developed in the industry such as Total Quality Management (TQM), Business Process Reengineering (BPR),

Rapid Cycle Change, Lean thinking, Six Sigma and, the amalgamation of the last two in Lean Six Sigma. However, the literature shows that unlike progress in quality improvement in various industries, the application of these conventional improvement models in healthcare systems has faced serious barriers. These challenges are related to the unique features of healthcare systems, which include variability of human beings as opposed to industrial machines, the complexities of healthcare systems, the unpredictability of patients' conditions, the variety of stakeholders in healthcare systems, and the continuous revisions in evidence-based guidelines and new practices. These are compounded by other barriers such as long standing professional standards of practice and inter- and intra-disciplinary tensions (28–36).

1.2.2. Learning and quality of care

Quality improvement in the healthcare system involves the ongoing refinement of practice, as a learning philosophy (35), it is a framework for learning aimed at enabling the staff, individually and collectively, to develop intelligent practices and take effective actions (35). The interplay between learning and delivering better care addresses a newer perspective and opens new horizons for quality healthcare delivery. From this perspective, success in delivering better care depends on highly effective learning and constant reflection about practice among people involved in the target practice particularly groups of frontline staff (37,38). The crucial role of learning is woven throughout the fabric of quality improvement philosophies and methodology. In other words, learning is the backbone of delivering better care (37).

Due to continuously evolving character of clinical science, learning and development are perpetual processes in medicine (39) and nursing (40–42). Professional life in these fields is an ongoing learning process in which every person is continuously moving from novice to expert as

they enter new areas of practice and encounter new technologies and procedures (43,44). In fact, continuous evolution of medicine (39) and nursing (40) behooves staff working in these teams to engage in lifelong learning (39). This is particularly important in a complex setting such as critical care.

The WCH Pediatric Intensive Care Unit (WCH PICU) is a very complex organization that cares for patients with complex conditions and high acuity. Care is delivered around the clock, seven days a week by a multidisciplinary team that include nurses, physicians, respiratory therapists, dieticians, pharmacists, and other physicians and allied health professionals from outside of the unit. The PICU is a place where any minor mistake in a procedure can have serious consequences from morbidity to death. Consequently, the PICU demands highly competent and professional staff who are able to meet the needs of critically ill patients and adapt to the introduction of new technologies and procedures (39). Additionally, the WCH PICU is part of a university hospital system and an educational site for clinical trainees (such as medical fellows, medical residents, and nursing students). To work and deliver consistent high quality care, the staff of the PICU must continuously learn how to work with other staff as a multidisciplinary Community of Practice. Continuous learning is considered critical to maintaining and improving care (45–48).

The learning process is made more explicit when new nursing staff are hired and incorporated into the PICU. The newly hired nurses represent a very interesting population for study because when they are hired they must be fully qualified registered nurses, and often have considerable experience in pediatrics and intensive care. Therefore, their initial learning and training phase is aimed at engaging them as full member of the unit through a complex initiation process during which the new staff will move from novice to expert through identification of

resources and learning the rules of communication and operation. The learning activities designed for them during their first months are intended to provide them with considerable organizational and technical information and professional knowledge necessary to work in a complex social learning environment, and to transform them into members of a multidisciplinary PICU team in which continual learning is necessary to provide quality care.

1.2.3. Complexity of the unit:

As stated earlier, the PICU is an extremely complex team-based unit. Each patient poses different challenges that require the contribution of diverse PICU staff including nurses, physicians, respiratory therapists, dieticians, pharmacists, and additional consulting physicians and allied health professionals from outside of the unit. In such a complex, team-based unit, the division of labor and the hierarchy of the professions within the unit contributes to different disciplinary perspectives about the patient and best therapeutic approaches. In this context, “what on the surface appears to be a single central problem of care for the patient is in fact a constantly evolving constellation of problems: it looks different depending on whose point of view we take, and on which point in time we emphasize during the process” (49).

The challenging complexity of the patients and the multidisciplinary perspectives of the staff are further amplified by the complexity of the tools they employ in diagnosing, treating, and monitoring patients. These tools range from highly sophisticated medical equipment including Extra Corporal Life Support (ECLS) systems, to more prosaic monitors and communication media, including beeping pulse oximeters and paper charts.

Thus, each of the many multidisciplinary teams that treat patients using these technologies develops its own set of formal and informal rules, and each becomes a Community of Practice

devoted to the treatment of a patient. These complex teams and the tools they employ influence the process of interaction, decision-making and re-assessment among the different disciplines which provide quality care for a patient. However, not only do team members create a Community of Practice for each patient, as they work together caring for many patients, the multidisciplinary staff members contribute to the emergence of a collective, unit-level Community of Practice across the PICU.

1.3. Rationale

1.3.1. Prelude to the study: quality improvement activities in the PICU

Prior to this study, the PICU had conducted various initiatives to improve quality of care and had become a regional and national leader in developing Quality Improvement (QI) initiatives (50,51). However, the staff of the PICU felt that results of these QI projects have been mixed, and that success was limited (52,53). There were important early successes, most notably a significant reduction in healthcare-associated infections in the PICU. In 2008, when the Provincial Health Service Authority (PHSA) adopted the Lean thinking quality improvement model in an effort to bring efficiencies to the system, the WCH PICU leadership volunteered to be WCH trial unit and four of its members became Lean Leaders. Following this, the PICU team completed impressive 23 Rapid Process Improvement Workshops (RPIWs) over 4 years, but with mixed success. Only 9 of 23 RPIW projects (approximately 40%) were sustained for one year, whereas the remainder had very limited success due to various individual and contextual barriers (50).

1.3.2. PICU Participatory Action Research (PICU PAR)

Among the contextual barriers was the process for developing and implementing QI projects. In discussions with the PICU staff prior to this research, they noted that until 2012, almost

all Quality Improvement initiatives in the PICU were top-down, developed by the leaders of the unit, with minimal frontline staff engagement, and pushed down to the bedside for implementation. This, we discovered, was one of the main reasons that QI projects were not welcomed by the frontline staff, and led to very limited adoption and restricted success (50,52).

In 2012, the PICU decided to change its approach and tried to enhance frontline staff engagement and distributed leadership in the development and implementation of quality improvement initiatives. Therefore, under the guidance of the JPC Lab in the WCH Research Institute, a Participatory Action Research and Quality Improvement team was formed with the PICU. This team developed and conducted the PICU Participatory Action Research (PICU PAR) that ran between 2012 and 2016 in two phases: phase 1 or PICU PAR 1 (2012-2015) and phase 2 or PICU PAR 2 (2015-2016) (50,51).

The overarching goal of this project was to increase the engagement of frontline staff leadership in improving practice quality through staff-identified and led change initiatives (50–52). This was a mixed method project that used both qualitative and quantitative methods. Data collection for the PICU PAR1 was conducted from January to October 2013 and was comprised of surveys, semi-structured interviews, social network analysis, and observations. The PICU PAR 1 identified multiple factors influencing clinical practice that affected the quality of care in the PICU (51). These initial findings inspired this thesis research. Early in our discussion about the PICU PAR project, staff drew a direct relationship between Quality Improvement and Learning. Therefore, first and most important of these findings inspiring the present study was the relationship between Quality Improvement (QI) and learning. Findings of the PICU PAR1 study showed that the staff from various disciplines in the PICU including nurses looked at Quality Improvement as an ongoing learning activity (51,53):

P16: ABI_RN - 16:54:

P: [pause] Um, [pause] I think quality improvement is a lot about learning. Um, ...Because quality improvement [is] to improve something you have to change what you're doing. Changing what you're doing, means not doing it like you've always done it before. And so there's gonna be new steps involved. So then in learning new steps ..hm.. you have to learn the new steps. And you have to learn the rationale as to why you're changing what you're doing. So, um, [pause] yeah, I, I think it is a little, it's a lot about learning. It's about going out there and looking at what other centers are doing, and what other programs are doing. And, if, if, quality improvement is being measured, then you can see how the improvements are affecting patients. And, the care that they're receiving. And outcomes, and so, that's all learning as well, because you see how things are being done. Um and then we can try it out and, and see how it happens.

In addition, interviews in the first phase of the PAR study (PAR 1) showed that the staff from almost all disciplines in the PICU believed that the knowledge, experiences and information that nurses acquire is crucial for decisions regarding patient care, delivering good care and preventing medical errors by other staff such as physicians, nurses and allied health professionals (52).

1.4. Statement of the problem

The PICU PAR findings revealed that members of the PICU considered that learning and the dissemination of knowledge played a crucial role in quality improvement and delivering better care. However, the PICU PAR project did not provide in-depth information about the process of learning among PICU staff. We thought that the process of learning in the PICU would be most explicit and clearly articulated around the experience of introducing newly hired nurses in the PICU. We also needed to investigate various methods of learning that also involved other staff in the PICU. Consequently, I decided to focus on the process of learning among the newly hired nurses, who are fully qualified registered nurses, and may have pediatric and or critical care experience, but have not worked in this unit. I selected them for the following reasons: (a)

Studying new nurses will be helpful in revealing the process of learning that is employed and modeled for a typical PICU nurse over his/ her trajectory of employment in the PICU from the time this nurse enters to the PICU until he/ she is fully integrated into the unit. (b) Focusing on the newly hired nurses' experience highlights the explicitly identified and institutionalized learning schemas that are identified for new nurses during the Orientation and throughout their Preceptorship. This focus also captures the learning culture in the PICU as most of the routines of working in the PICU, expectations of/ from the new staff, and values about improving the quality of care in the PICU are made explicit during these periods. (c) In addition, studying process of learning among the newly hired nurses creates an opportunity for prospective investigation of the process of learning among nurses as they interact with their new nursing colleagues and other clinical staff in the unit. This prospective approach, based on observations *in situ* and interviews is helpful in understanding the learning experience not just of the newly hired nurses involved in the study, but also the experiences of the veteran nurses who had similar experiences when they joined the unit and participated in the Preceptorships and enculturation of more recently hired nurses. This way, I did not need to depend solely on the self-reports of experienced nurses (54).

1.5. Research question

In this research, I am going to study the process of learning among the newly hired nurses in the collaborative social environment of clinical setting of the PICU in order to answer the following research question: How does learning occur in the PICU?

1.6. Research objectives

Findings of this research will provide insight into (a) understanding of the process of learning in the PICU; (b) the role that interaction with other nurses and other staff play in learning;

(c) how this learning process affects the professional identity of newly hired nurses; (d) how learning is conceptualized by both the new nurses and their more experienced counterparts, and (e) how learning contributes to quality improvement and care quality. These findings have the potential to contribute to (a) the evidence regarding learning among advanced critical care nurses, (b) a model of learning and education for nurses based on empirical data, (c) the development of learning strategies for quality improvement initiatives.

1.7. Organization of thesis

The focus of this thesis is to assess and describe the process of learning in the PICU and to understand how it is related to quality care. The organization of the thesis is as follows:

In this chapter (Chapter 1), I have introduced how staff in the PICU related quality care to learning in our previous research, the importance of exploring process of learning among the newly hired nurses and lack of enough evidence in this regard. I also detailed my research question, aim and specific objectives.

In Chapter 2, I present my literature review. In this chapter, I shortly introduce the concept of quality improvement in general and in healthcare, then I describe the role of learning in quality of care. I follow this with a detailed description of literature around learning theories. In so doing, I present a brief literature review about individualistic learning theories. Then, I focus on Vygotskian sociocultural learning theory, Communities of Practice and Activity Theory. Finally, I elaborate on Cultural Historical Activity Theory (CHAT) that is going to form the theoretical framework of this thesis.

Chapter 3 focuses on methodology. In this chapter, I re-introduce my conceptual orientation, study design, setting and participants. I also outline my data collection methods, data analysis, as well as methodological soundness.

Chapters 4 through 11 present findings of my research. Chapter 4 describes characteristics of the participants. Chapters 5 through 11 describe two teaching and learning opportunities organized by the unit for newly hires nurses to learn how to work in the PICU. Chapter 5 focuses on the Orientation sessions as the first teaching and learning opportunity and Chapters 6 through 11 focus on the Preceptorship as the main learning opportunity for the newly hired nurses. Chapter 6 presents a description of the Preceptorship. Chapter 7 focuses on the teaching aspect of the Preceptorship whereas Chapter 8 focuses on the learning aspect of the Preceptorship. Chapter 9 presents the role of social interaction in learning during the Preceptorship. The focus of Chapter 10 is perceptions of the participants about learning, quality improvement and quality of care, as well as the relationship between these two. This follows by Chapter 11 that focuses on learning goals of the newly hired nurses in the Preceptorship. Finally, I present my discussion in Chapter 12 that includes summary of my main findings, and how they are comparable with related literature. I follow this chapter by drawing some recommendations based on my research findings, strengths and limitations of my research and future directions in research.

Chapter 2: Literature review

This chapter provides a review of the relevant literature beginning with a very short introduction to ICUs and PCIUs, quality improvement (QI) in industry and in healthcare, and the role of learning in the quality of care (a more detailed literature review about ICUs and QI is included in Appendix A). Then, I present a detailed examination of the literature concerning relevant learning theories that have contributed to my understanding of the process of learning in the PICU. This will include a brief review of the literature about individualistic learning theories and an examination of Vygotskian oriented sociocultural learning theories, including Communities of Practice and Theory Activity Theory.

2.1. Care in critical care and rise of PICUs

The first Pediatric Intensive Care Unit (PICU) was founded by a pediatric anesthesiologist (Goran Hoagland) in Goteborg, Sweden in 1955(55). Twelve years later, in 1967 the first PICU was established in the USA with six beds, each with separate nurses and 24-hour resident physicians and coverage by pediatric anesthesia fellows (56). Thereafter, PICUs started to develop across the USA so that by the mid-1970s they could be found in most hospitals with pediatric residency programs (55,56). Meanwhile, pediatric critical care emerged as a discipline in the 1960s (57) and has evolved over the last 50 years (56).

Intensive care units (ICUs) play important roles in healthcare. Many patients admitted to the hospital receive direct or indirect ICU care during their hospitalization. Characterized by high patient acuity, employment of high technology, high staff-patient ratio (one bed, one nurse and sometimes two nurses for one bed), as well as number of complex care procedures (which are

costly), they consequently produce a sizable economic burden (58). According to recent studies, 17.4-39.0% of all hospital costs and 0.56-1% of the gross domestic product in the United States of America (USA) are spent for delivery of care in ICUs (56). I have provided more literature about evolution of PICUs in Appendix A.

2.2. Quality Improvement

2.2.1. Rise of Quality Improvement in industry

The Quality Improvement (QI) movement arose in industry in the 20th century. Walter. A. Shewhart, W. Edwards Deming and Joseph M. Juran are considered the pioneers who set the ground works for the movement. Shewhart introduced the Specification, Production and Inspection cycle (SPI cycle) and also created control charts (59). Deming's unique contribution in quality improvement was his internationally known "system/ theory of profound knowledge" and "Plan, Do, Study, Act learning cycle (the PDSA cycle)" (59–63) (for more literature about these topics, please refer to Appendix A).

2.2.2. Quality and Quality Improvement in healthcare

Quality Improvement in healthcare poses a big challenge and has been a subject of considerable debate in recent years (64,65). Research on medical errors identified tens of thousands of cases of mortality and hundreds of thousands instances of morbidity annually that could have been prevented by improved quality of care (66).

The most significant work in improving quality in healthcare started in the late 1980s in the United States of America (USA) as part of the National Demonstration Project on Quality Improvement in Healthcare, led by Dr. Don Berwick. This led to the establishment in 1991 of the Institute for Healthcare Improvement (IHI), which has become an influential organization in

promoting healthcare quality improvement in the USA. The IHI has expanded to other countries such as Canada, England, Scotland, Denmark, Sweden, Singapore, Latin America, New Zealand, Ghana, Malawi, South Africa and the Middle East (67).

More recently, the Institute Of Medicine (IOM) identified the low quality healthcare as one of the preventable leading causes of death in the USA (26,27). Through its twin reports “To Err is Human” and “Crossing the Quality Chasm”, the IOM called for healthcare quality improvement and a redesign of healthcare systems (66,68). The IOM defined quality as “the degree to which healthcare services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (27,69,70). Furthermore, IOM defined quality improvement as bridging the gap between existing and desired levels of quality using special methods and tools (27).

After IOM’s profound warning regarding the low quality healthcare (26,27), various healthcare organizations developed initiatives to improve six aspects of healthcare quality including: safety, effectiveness, efficiency, timeliness, patient-centeredness and equity (66,68,71). In so doing, these organizations recommended various quality improvement approaches to improve the quality of care.

2.2.3. Conventional approaches for Quality Improvement (QI)

The most widely recognized models used in development, implementation, and evaluation of quality improvement initiatives include: Total Quality Management (TQM), Business Process Reengineering (BPR), Institute for Healthcare Improvement (IHI) Model for Improvement (also known as Rapid Cycle Change), Lean Thinking, Six Sigma and combined model of Lean Six Sigma (32).

TQM is a holistic approach for improving quality through identifying root causes of poor performance. The fundamental element of TQM is its strong emphasis on quality improvement as ongoing activities that mainly focus on internal and external customers' needs (32,72,73). This model was increasingly adopted in healthcare systems in the 1990s (32,72). Integration of the central approach of TQM in healthcare systems has not been as successful as expected even though apparently it was widely adopted (28–32,34,74).

The Business Process Reengineering (BPR) focuses on the fundamental organizational issues that contribute to quality (32,75). Examining and reengineering systemic business processes is core of this approach (32,75). Few healthcare systems have fully implemented BPR. However the British National Health Service (NHS), conducted two notable 3-year pilot studies in the 1990s, which showed only slight improvements through this approach (32).

The Model for Improvement was developed by Langley and his colleagues (76,77) and was adopted by the Institute for Healthcare Improvement (IHI) (32,76,77). This model is based initially on short iterative cycles and small scale changes (32,76,77) that are then expanded on the basis of reflection and learning (32,76). Unfortunately, this model has received limited peer-reviewed evaluation (32).

Lean Thinking (also known as the Toyota Production System or TPS) is another variation of Deming's model of quality improvement (78). This model was developed by Deming while he worked at Toyota in Japan in the 1950s (32,79). Lean Thinking presented a radical alternative to the traditional method of quality improvement for mass production industrial systems (79). It focuses on streamlining the processes to meet expectations of customers (both internal and external) with the least amount of waste in resources such as time and cost (32,79). Lean is an approach that focuses on integrating three aspects: (a) quality-related beliefs and attitudes

(philosophy), (b) elimination of waste; in the context of healthcare specifically in hospitals, this means trying to remove duplication in processes and procedures that are not necessary (80) such as multiple records of patient information, patient transfer before readiness of the recipient unit, long waiting time for consultants and physicians and also discharge processes conducive to longer Length Of Stay (LOS) (79). (c) Involvement of the staff that is supported by a management system (80). Through these processes, Lean is following two primary objectives: (a) identifying and specifying value to ultimate customers. This implies that any process and its components should have added value to be considered meaningful (32,80). (b) Analyzing and focusing on value stream in a way that keeps and continues only activities that have added value (80).

The Lean method has been used in healthcare systems and has achieved some success in waste reduction (32,80). This approach is more useful in facilitating processes in departments that support clinical activities rather than in mainstream clinical services (32).

Six Sigma is another approach for quality improvement that is based on Shewhart-Deming's PDSA cycle (32,81). Ideally, improvement activities in Six Sigma are based on a structured approach that is called DMAIC that is an acronym for the sequence of steps: Define, Measure, Analyze, Improve and Control (32,38,81). Application of this approach in healthcare has been limited and recent (82).

Currently, there is some interest in industry and in healthcare in a hybrid model of Lean and Sigma that is called Lean Six Sigma (32,80,83). The logic behind the integration of Lean and Six Sigma is that Lean is more a holistic approach for controlling the processes without any statistical basis whereas Six Sigma is rich in statistical tools without deep focus on process improvement. Lean and Six Sigma each have strengths; synthesizing these strengths can be helpful in developing and implementing systematic improvement projects in healthcare (80).

In summary, the dominant models of quality improvement are all variations of Deming's theory of profound knowledge and PDSA cycle, and there are considerable similarities in their implementation (32). Objectively, there is no best model, method or approach that is the most effective (32,72). Rather, there is an interplay between the local context and the model that is central to the success or failure of improvement projects (32). As outlined above, research has shown that quality improvement strategies in industry and healthcare systems have made some progress, however healthcare presents unique challenges. These challenges in healthcare include the complexity of the healthcare organizations, complexity of the patients, the variety of stakeholders in these systems, professional practice standards, inter- and intra-disciplinary tensions, and the complexity of care processes (28–35,84–86).

2.3. Quality Improvement and learning: a paradigm shift in Quality Improvement

After the first two reports of IOM about the crisis in the quality of healthcare (26,27), a more recent seminal report entitled “Best Care at Lower Cost: The Path to Continuously Learning Health Care in America” (84), took a new direction. In their more recent report, the IOM relates quality improvement to learning, and more specifically to continuous learning. In other words, learning is considered as a crucial aspect of delivering quality care. The IOM believes that healthcare systems should change their orientation to quality improvement from merely detecting errors and identifying variations from standards to develop continuous learning systems. Real quality improvement (and cost reduction), they contend, requires moving to systems in which learning emerges from every experience of care delivery (84,87).

This major paradigm shift in quality improvement recognizes that detecting errors and defects in conventional quality improvement strategies has not produced their expected outcomes

in healthcare (38,84,87). This focuses attention on quality improvement as a paradigm of ongoing learning (35,37,84,87). I will elaborate on the role of learning in quality care in Chapter 10 of my thesis.

2.4. Learning in medicine and nursing

Ongoing changes in clinical science and the continuously evolving technology require ongoing learning and development in medicine (39) and nursing (39,40,88). These demands are addressed by formal Continuing Medical Education (CME) in medicine and variety of types of formal and informal in-service education in nursing (89,90).

Through ongoing learning in the trajectory of their professional careers, clinicians continuously move from novice to expert (43,44). In medicine this learning process is described by Dreyfus and Dreyfus as five steps: novice, advanced beginner, competent, proficient and expert (39,91–93). Learners develop into trainers and trainers go on to be learners in other stages of their professional life; in other words, throughout their professional development in medicine individuals are moving continuously between novice and expert roles. For example, medical students grow into residents who are teaching medical students and are learning from their senior residents and so forth (39). Benner's studies in nursing have showed that Dreyfus and Dreyfus's model of novice to expert is generalizable to nursing as well (88):

“In my studies, I have found that the [Dreyfus and Dreyfus's] model can be generalized to nursing. It takes into account increments in skilled performance based upon experience as well as education. It also provides a basis for clinical knowledge development and career progression in clinical nursing.” (88)

For example, the newly hired nurses joining the unit learn from experienced nurses. They are initially grounded, become experienced, and eventually become preceptors for nursing students

and other newly hired nurses. At the same time, they learn from more senior nurses, medical trainees and attending physicians and other staff; continuous evolution of medicine (39) and nursing (40,88) requires medical and nursing team to have a lifelong learning (39).

2.5. Learning in the Pediatric Intensive Care Units

Pediatric Intensive Care Units (PICUs) have special features that make these units very special places for continuous learning (94). Patients in PICUs are extremely complex with severe illnesses and wide variation in their age (39,95,96). They mostly need complex and multiple treatments (39,97) and quick reaction to the deterioration of their conditions (97). These features of PICUs create a situation in that any minor mistake in any of the procedures can lead to serious results such as severe morbidity or even mortality. In addition, PICUs are in the forefront of technological and pharmaceutical developments (45,97) and continuous development of medical technology and therapies used in PICUs (39,97). All these features of PICUs demand clinical staff such as nurses (45) who are: (a) highly knowledgeable, professional, skilled and detail-oriented with strong interpersonal skills (39,45,94,98), (b) continuously learning, empowering themselves and keeping up with progressively evolving knowledge in order to be able to deliver quality care on an ongoing basis to the children cared in PICUs (45,94).

On the other hand, these features of PICUs create a heavy workload and stressful situation that, along with other contextual factors, lead to job turnover among nurses and consequently a shortage of specialty nurses which may result in lower quality care (99). In response to these issues, new nurses are continuously hired to work in PICUs. These newly hired nurses join the unit with various levels of competencies that can fit in various levels of the novice to expert model offered by Dreyfus (39,91,92,94) and Benner (88,94). Therefore, in order to deliver expert care,

like experienced nurses already working in PICUs, these newly hired nurses need continuous learning.

Ongoing learning among novice as well as experienced nurses working in PICUs has various positive impacts. First, it is widely accepted that high level of knowledge, skills and competence among nursing staff improves quality of care (45,98). Second, research has shown that ongoing learning can improve nursing staff retention in these units (98,100,101). Findings of a national large scale study of 2323 registered nurses among 110 ICUs in the USA showed that ongoing improvement of ICU nurses' clinical competence and supporting their professional practice in the organization were two important contributing factors in improving retention of ICUs nurses (101). In this study, "perceptions of high nursing competence were associated with reduced likelihood of Intent To Leave (Odds Ratio: 0.61; 95% Confidence Interval: 0.44, 0.83)" (101) among nurses working in these units. Thirdly, findings of another study showed that nurses who are more empowered and highly competent were significantly less likely to leave their current position and their nursing job (100). Furthermore, research has shown that specialty critical care knowledge among critical care nurses has crucial contribution in quality of their interaction with other members of multidisciplinary teams during decision making for patient care in these units (98).

2.6. Various forms of knowledge in nursing

Researchers have identified various forms of knowledge in nursing. Two types of knowledge are consistently recognized: knowledge produced by research (evidence based knowledge) and knowledge arising from the experience (experiential knowledge) (102–108). Knowledge based on research is identified as "science" (102–106) , "knowing that" knowledge (102), "explicit knowledge" (102), "propositional knowledge" (107,108) and "content knowledge"

(103). On the other hand, the knowledge emanating from experience is described as intuition-based knowledge, “knowing how” knowledge, “tacit knowledge” (102), “non-propositional knowledge” (107,108), and “practical knowledge” (103).

Carper presented these as four fundamental types of knowledge in nursing that include empirical or scientific knowledge (science of nursing), aesthetic knowledge (art of nursing), personal knowledge (inner experience of nursing) and finally ethical knowledge (the moral component of nursing knowledge) (103–106). Later, this list was expanded by White (1995) by adding sociopolitical knowledge (the context of nursing) as the fifth way of knowing (106). Carper elaborates that none of these ways of knowing can be individually sufficient, rather, all of these types of knowledge are needed for mastery in nursing discipline (104).

As another example, Rhyl (102) described two types of knowledge in nursing that includes “knowing how” knowledge and “knowing that” knowledge. Christensen elaborated on this and suggested another categorization of “knowing how, knowing that” knowledge by expanding that “knowing how” knowledge involves three types of knowing: “knowing how,” “knowing why,” “knowing what”. Christensen articulated that “knowing how” includes practical and experiential knowing. “Knowing why” includes empirical and theoretical knowing and “knowing what” encompasses pattern recognition. Then, she carried on that “knowing that” is the action that clinicians perform using their full understanding of the context (103). In other words, she described “knowing that” as the selection of action by the clinician based on clinician’s understanding of the situation. This is only possible via a culmination of “knowing how”, “knowing what” and “knowing why” (103).

These various typologies provide a picture of the range of sources and content that contributes to the areas of knowledge that an effective nurse must learn to develop expertise. They

are fundamentally based on two different learning processes - explicit knowledge based on evidence, and knowledge that is acquired through experience during situated practice.

2.7. Learning theories

Learning theories in clinical education are categorized in various ways. One popular way is to group them into two broad categories of individualistic and sociocultural learning theories (25,109). This categorization is helpful since it represents two learning metaphors that are used for describing the learning process, namely the "[knowledge] acquisition" and "participation" metaphors (18,25,110,111).

Acquisition focuses on learning as an individual process and implies that knowledge can be transferred across situations. In this metaphor, learning is considered an individual's acquisition of knowledge, beliefs, skills, capabilities, competencies, and values. In other words, learning is described as seeking for knowledge by the individual learner, transfer of information to the learner, and reception, accumulation, and reproduction of knowledge by the learner.

In the participation metaphor, on the other hand, learning is not considered a kind of object or "goods" that can be gained or transferred (18,25,110). "Participation describes collaborative knowledge production as an active process of legitimate engagement in a community of practice" (18). In this metaphor, learning is a process of internalization that transforms socially shared interpersonal experience and knowledge into intrapersonal cognitive understanding; a process that is transformative not transmissive (4,18,25,110,111). In the acquisition metaphor, learning occurs at micro level of the individual while in participation metaphor it happens at macro level (social level) in the interaction of an individual learner with others in their community (24). In the context of nurses learning in the PICU, learning is more than the transfer and acquisition of information;

it is also a practice that occurs within the unit as a member of a team, making the social learning model more relevant to explain learning in the PICU.

This distinction between the theoretical approaches is not always totally clear and some aspects of learning can be found in multiple theoretical Orientations. In this thesis I will use this approach and simply categorize learning theories into individualistic and sociocultural learning theories (25). This approach is selected since it will help me explain process of learning among the newly hired nurses considering them individually acquiring knowledge by themselves (individualistic learning theories in line with acquisition metaphor), as well as in the context of social interaction with other PICU staff and other contextual factors that may influence their learning (sociocultural learning theories in line with participation metaphor).

2.7.1. Individualistic learning theories

According to individualistic theories of learning, learning happens at individual level even though individuals are interacting dynamically with the environment (18,24,25). Learning theories in clinical education must take into consideration that the learners are adults rather than children. Therefore, among theories belonging to individualistic perspective, first, I will examine different approaches that differentiate adult learning from the larger body of theory that has developed from studies of learning among children. I will then explore three theories that were more relevant to this study and helpful in understanding the process of learning among the newly hired nurses. These theories include self-directed learning, experiential learning and reflection and reflective practice theories.

2.7.1.1. Principles of adult learning

The nurses involved in this study are also adult learners. Knowles, one of the pioneers in this field framed his approach as “andragogy” to highlight the distinction from pedagogy, which has historically focused on learning by children (112). Knowles focused attention on the adult learner’s self-concept, self-direction, and independence to differentiate adult learners from children (112,113). Two specific theories of adult learning are relevant to this study of learning among nurses: Knox’s Proficiency Theory, which stresses the life situation of the adults, and Mezirow’s Perspective Transformation theory. There is no single theory that can explain learning among the adult learners.

2.7.1.1.1. Developing proficiency

Knox’s Proficiency theory concentrates on adult learning that develops proficiency and personal growth. This theory focuses on purposeful and systematic learning among adults and also on the process of facilitating learning among adult learners (114,115). In his theory, Knox defines proficiency as “the capability to perform satisfactorily if given the opportunity” (114). Elements of proficiency include knowledge, attitudes and skills (114–116), and most of the adult learning activities include some combination of improvement in these elements (114). Proficiency is the level of competence, adeptness and confidence based on expertise, skill and knowledge resulting from experience and training (114). Fundamental to developing proficiency is the recognition of the gap between current and desired level of proficiency (114,116–118). Regular assessment of this gap is essential in effective facilitation of adult learning. Results of this assessment can be useful in identifying learning needs, developing learning objectives, planning learning activities and developing evaluation plan (114,116,117).

Significantly, adult learning from Knox's perspective is both developmental and transactional. In other words, it is a dynamic phenomenon influenced by the interaction of various factors. Adult learning is developmental since it happens over time and as part of a change process that includes interrelated developmental changes in the individuals' performance and personality (114,116). Learning is also transactional in two ways. First, motivation to learn and using learning activities are influenced by contextual factors (114), and second, change results from purposeful and systematic learning through interaction with other people (116). We will see that this is also consistent with the sociocultural learning theories discussed later in this chapter. Having a clear understanding of these two features of Knox's theory is very important in effectively facilitating adult learning. Furthermore, consideration of the developmental feature of adult learning will help the facilitators to consider adult people's life cycle and various aspects of their personality (such as self-concept, need for achievement, willingness to risk, openness to new experience and self-directedness) in developing adult learning activities. This will be very helpful in developing learning activities compatible with the adults' orientation towards change and stability, as well as tailored with their values and interests in various stages of life (114,116,118,119).

Another interesting feature of the theory of proficiency is the differentiation of change from ongoing progress. Knox believes that "merely *changing* (italic in the original work) the proficiency" is not enough; rather, adults generally try "*to improve* (italic in the original work)" their proficiencies on an ongoing basis. Therefore, he believes that adult learning is an ongoing process for purposefully improving proficiency (114).

2.7.1.1.2. Perspective transformation

Transformation of the learner's perspectives is the focus of Mezirow's theoretical approach (119). In this theory, "learning is understood as the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience in order to guide future action" (Mezirow, 1996: 162 cited in Taylor, 2007; p: 173) (120). In fact, transformative learning involves elaborating, producing and transforming schemes (beliefs, feelings, interpretation and decision) (121) and perspectives (web of schemes that form a larger world view) (119) of the individuals through reflection (119,121–123). Schemes are specific manifestation of perspectives (122). Mezirow's transformative learning is an individual learning even though transformation may originate from social changes or it may have social consequences (119). This theoretical approach is relevant to this study because we will see in the findings that Orientation and the Preceptorship taken together serve as a rite of passage in which the participants' identities are changed as they become full members of the PICU.

Mezirow considers reflection as a very fundamental concept in transformative learning theory (120–124). In his theory, reflection includes criticizing schemes acquired during previous stages of life (childhood) and to understand if these schemes are still functional in other stages of life (adulthood) (122).

From Mezirow's point of view, learning occurs through four venues: modifying or elaborating schemes, acquiring new schemes, transformation of schemes, and transformation of perspectives. Process and content reflection can lead to all four types of learning whereas reflection on the premises can lead to only perspective transformation (122). Mezirow believes that "The most significant behavior changes may be functions of perspective transformation, and such transformation is often an essential precondition for meaningful behavior changes." (123).

Transformative learning is very complex and challenging. Leaving the old non-functional perspective is hard for the learner, and normally the learner has a resistance for letting the old perspective go and moving to the new perspective.

Mezirow also believes that adult education should consider perspective transformation as the first priority and develop strategies for achieving this type of learning (123). One of the important strategical considerations for successful transformative learning is reconsideration of the role of educators. In transformative learning, educators take a reformist perspective, in which the educator is a co-learner. The educator should challenge, stimulate, and provoke reflection and critical thinking among the learners. The reformist role for the educator in transformative learning is different from subject-centered perspective in other forms of learning in which the educator has an expert role designing the learning event. It is also different from consumer-centered perspective in which educator is facilitating the learning and has a resource person role (121).

2.7.1.2. Self-directed learning

The increasing role of Self-Directed Learning (SDL) in professional development and competence preservation has been acknowledged by various researchers (121,125) . In fact, self-directed learning is a fundamental concept in adult learning and education (126,127). Self-directed learning is even more important for healthcare professionals such as nurses to keep up their knowledge and competence using overwhelming new evidence and adopting updated policies, procedures and guidelines in order to deliver better care (128). For Knowles, self-directed learning is “a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material

resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes” (125,128).

As we understand from the definition, in self-directed learning, learners have the control of their learning (121,128). They identify their learning needs, learning objectives, and method of evaluating their learning outcomes. In other words, learners plan, implement and evaluate their learning (128). Primarily, self-directed learning is considered more as a learner-focused model for achieving learning goals through various steps. Recently, it has been considered more as an interactive model of learning that considers various factors such as environmental learning opportunities, individual characteristics, cognitive processes, contextual factors, and opportunities for validating and confirming collaborative self-directed learning (121).

2.7.1.3. Experiential learning

Adult learners experience a wide range of situations that provide learning opportunities. Experiential learning evolved based on the work done by various scientists specially that of Kolb (113,121,129). It was originally called action learning in which there is a great stress on the essential role of reflection in learning and the learner’s own inquisitiveness and action (113). In experiential learning theory, learning is defined as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience.” (121,130).

According to Kolb’s experiential learning theory, experiential learning involves learning that occurs through concrete experience, reflective observation, abstract conceptualization, and active experimentation. These stages are represented in a cyclic model of learning. To have an effective learning, individuals should first do an activity and actively experience it (concrete

experience or do). Concrete experience is grasped through apprehension, through which the learner knows things “instantaneously without the need for rational enquiry or analytic confirmation (Kolb, 1984: 43).” (129). In the second stage (reflective observation or observe), they should consciously reflect on their experiences of the activity. In other words, in this stage, they reflect on what they observed.

In the third stage (abstract conceptualization or thinking), individuals produce new ideas (theories, models, frameworks, hypotheses, concepts or schema) based on their reflection on the previous stage. According to Kolb, individuals produce orders and ideas (theories, models, frameworks, hypotheses, concepts, or schema) through comprehension. In the fourth stage, active experimentation or planning, learners plan and test these ideas in practice in real world and gain more experiences. This leads to the next concrete experience and the cycle carries on. In order to have better learning, individuals need to go through all of these four stages of learning process (121,129,131). They can start from any stage; however, they need to follow each other sequentially as presented (121,129,131).

Kolb also identified four learning environments. These learning environments and their characteristics are as follows: First, affectively oriented environments, where learners respect feelings, believes, and values of the people in the team while they are working with people and actively engaging in a concrete experience in the team. Second, symbolically oriented environments (thinking) in which learners conceptualize their experiences, develop models, frameworks and hypotheses for solving problems or answering questions and use various quantitative [and qualitative] data to test their hypotheses. This phase is related to abstract conceptualization and primary source of information is conceptual. Third, the perceptually oriented environment inspires learners to analyze the data coming from various sources (observing,

thinking, and feeling), develop full action plans, make anticipations, and reflect on what has happened. Fourth, behaviorally oriented environments, where learners select and focus on specific problems or activities and apply their competencies to meet pre-identified objectives. This is related to transforming experience into active experimentation (121). This theory has been used as a tool for effective learning and developing skills among adults in workplaces.

2.7.1.4. Reflection and reflective practice

In general, the concept of reflective practice has been globally accepted as a valid and fundamental element of professional development (132). Reflective practice can be defined as “a learning and development process that includes the self-examination of one’s professional practice, including experiences, thoughts, emotions, actions and knowledge that enrich it.” (133).

Continuous learning from experience is a fundamental feature of reflective practice. The present and past experiences of the practitioners help them to interpret theory, which enlightens their actions and understanding. In this way, practitioners test and revise theories of themselves or others through practice and reflection. Through reflective practice, critical thinking and examination, they link theory to practice. Through this process, practitioners reformulate their envisioning of practice, problems, and problem solving. This re-envisioning is part of their learning and change. This is the way that practice helps to revise theory and reflective practice becomes a learning tool in clinical setting (121,133,134).

Schön, who is largely responsible for the development of reflective practice model, identified two types of reflection: reflection-in-action and reflection-on-action (121,133–137). Reflection-in-action takes place when the practice is being performed. It includes three activities, namely (a) re-envisioning and reworking the problem using various standpoints, (b)

conceptualizing the problem in the already known framework and fitting it in previously learned schemas, and (c) discovering consequences, solutions and implications for future actions (121). Reflection-on-action, on the other hand, is a retrospective approach that is done following practice; it is the process of retrospectively thinking about an event and its contributing factors - what has been learned, and how this learning will be helpful in the person's next activities. The reflective practice is a cyclic iterative processes (121).

Mezirow refines these distinctions and considers three types of reflection (121–123): (a) content reflection (reflecting on the content of the individuals' schemes), (b) process reflection (reflecting on the processes through which the individuals have learned them), and (c) premise reflection (reflecting on social context, history and outcomes of the schemes) (121,122). Through reflecting on the content and process of their schemes, individuals change their minds and transform their schemes on a daily basis. On the other hand, reflection on the premises (principles) can lead to transformation in the individuals' perspectives (122,123). Perspective transformation is very uncommon, but very fundamental and important learning experience. It may happen due to serious events in the individual's life, or it may be resultant from accumulative changes in the schemes (121–123). Reflective practice has been employed in studies of professional development including teacher education and nursing.

2.7.2. Sociocultural learning theories

Researchers in learning and practice change in clinical settings have focused primarily on the individualistic theories of learning (18,24,25,138). This bias towards individualistic theories of learning gives centrality to the isolated individual and limits our understanding of how learning occurs in a social environment such as a complex clinical setting like a multidisciplinary critical

care unit (18). Sociocultural theories consider learning a social and cultural phenomenon in which identity, knowledge and membership in the society require one another (138) and individuals are not isolated from a social context and divorced from supporting artifacts (9,138). Proponents of sociocultural learning theories consider the individual as subject to social and historical discourses (4,9,18,24,25,138).

Sociocultural learning theories stress the interdependence of social and individual processes (2,4,18,24,25,138). These theories assume that activities and practices occur in a cultural context, and are mediated by various artifacts. According to these theories, we can gain a clear understanding of human practices and activities if we study them in their sociocultural and historical development (2,4).

Contemporary sociocultural learning theories are largely derived from Vygotsky's theory of learning and development (1,3,6,139). Though he originally published his research in Russian in the 1920s, his writing did not receive attention in the West until the 1960s when his work was published in English. This spurred the development for two related theoretical approaches, Situated Knowledge, better known as Communities of Practice (16–18,25,140–142), and Activity Theory (2,6,8,10–13). Within Activity Theory, Engeström has developed a particular approach, Cultural Historical Activity Theory (CHAT) that is also known as Expansive Learning (7,10,11,24,111,138,143). These social learning theories share a common inspiration—the assumption that learning is a social activity, which will help to explain the learning process among clinicians such as newly hired nurses in the PICU (121).

2.7.2.1. Vygotsky's theory of learning and development

Vygotsky and his colleagues Luria and Leontiev systematized sociocultural approaches to learning (2–4). They believed that human activities occur in the cultural contexts, are mediated by tools and signs, and can be best explained considering their historical development (1,3,5,6). The power of this theory lies in its explanation of dynamic interconnection of social and individual processes (3). Two of the most important assumptions of Vygotsky's learning theory that are more relevant to this study are as follow:

2.7.2.1.1. Social origins of higher mental functions

Vygotsky believed that higher mental functions (also called cultural mental functions), such as abstract reasoning, originate from the interaction of the humans in the society and emerge from gradual changes in and transformation of elementary mental processes (5). The key issue here is to clearly understand an individual's functioning one must gain a clear understanding of the social relationships of an individual (6). According to Vygotsky, mental functioning appears two times during the development of a person, first at the social, interpersonal level between a novice and mentor, and later at individual, intrapersonal level (1).

The assumption of the social origin of higher mental processes (functions) is clearly presented in his concept, the Zone of Proximal Development (ZPD) which he defined as the difference between the actual level of development of an individual and the potential level of development that can be determined through guided problem problem solving (1,6). In other words, the ZPD is the gap between those tasks a person cannot perform independently but can be performed with the help of knowledgeable others (peer, instructor, preceptor etc.) (1,3,5,6,139). Thus, Vygotsky considers two distinct levels of development, namely actual development and

potential development. Vygotsky believed that instruction by the mentor should be progressively developed just beyond the actual level of development rather than at the potential level of development (6).

2.7.2.1.2. Mediation

In addition to the relationship between the novice and mentor, Vygotsky incorporated mediation into his learning theory (1,3,6,139). This assumption contends that tools (technical tools) and also signs such as language (psychological tools) mediate between the novice and mentor during the process of developing higher mental processes (1,3,5,6,139). According to John Vera, only by using psychological tools we can internalize knowledge (3). Werstch believes that the assumption of mediation is the only assumption that gives Vygotsky's theory a unique aspect. Mediation provides the link between the interpsychological and intrapsychological functions (1,5,6). Thus, mentors and the mediating tools are used in an individual's process of learning and cognition.

2.7.2.2. Communities of Practice (CoPs)

Communities of Practice or Situated Learning is a sociocultural learning theory that takes its lead from Vygotsky's notion that social interaction has an essential role in learning and cognitive development (144–146). The work of Lave, Wenger and others moves the focus from the dyad of the novice and mentor to relationships within a wider social network. Communities of Practice are ad hoc groups of people who join together in various forms of practice to share their concerns, problems, knowledge, experience and passions which enables them to develop and deepen their knowledge through ongoing interactions to solve their problems (16,17). This theory helps us study progression and movement of individuals from novices who engage in legitimate

peripheral participation, into established veterans who are involved in full participation. During this process learning through engagement in these Communities of Practice transforms professional knowledge and identity (16,17,138). Lave and Wenger (18) have explored the process of acquiring legitimate entry to a community of practice and the development of expertise.

2.7.2.2.1. Communities of Practice (CoPs) in healthcare

Theory of Communities of Practice has been widely accepted in healthcare. Researchers believe that Communities of Practice can be ideal learning models for learning, professional development and improvement in healthcare system. Communities of Practice can help healthcare professionals to share their tacit knowledge and experiences, and also discuss best practice in order to avoid mistakes and deliver better care (16,20,22). In fact, some researchers define learning in Communities of Practice as “the ongoing refinement of practices and emerging knowledge, embodied in the specific action of a particular community” (23).

Although Communities of Practice can have a crucial role in the outcome of healthcare system (20), both individuals and organizations must be aware of barriers that can get into the way of learning and professional development in Communities of Practice such as lack of open communication between members (specially between novices and experts), resistance to the transfer of knowledge over the boundaries, lack of consistent membership, lack of trust, as well as lack of organizational supports (16,20).

2.7.2.2.2. Learning in Communities of Practice (CoPs)

Learning in Communities of Practice is situated learning through problem solving in which individuals collectively explore situations and seek solutions to problems through interaction with others in social contexts. Learners gravitate to communities where they can benefit from

knowledgeable members (16,17,20,43,44,147).

According to Wenger the dominant learning method in workplaces is informal learning via socialization and participation in Communities of Practice (16,148,149). Knowledge produced in Communities of Practice is primarily shared orally through storytelling and narratives within and across disciplinary and geographical boundaries (150,151).

2.7.2.2.3. Legitimate peripheral participation

The process of socialization into a Community of Practice and entry into the learning community is described as Legitimate Peripheral participation (LPP). Legitimate peripheral participation explains how a novice and newcomer enters, grows and advances to the center of community to become an expert (16,43,152–154). Studies have found that a good communication between newcomers and established members gives novices a sense of belonging and job satisfaction (155,156). Grealish and others have shown that access to the Communities of Practice has a crucial role in learning among nursing community and in the smooth centripetal transition of the novice and newcomer to an expert in clinical settings (151,155,157).

2.7.2.2.4. Factors affecting learning in Communities of Practice

Various factors have been reported to affect learning in Communities of Practice in clinical settings. Most significant for this study is the acceptance by members of the Communities of Practice (151,157,158), assigning responsibilities to newcomers and trusting in their skills (158), high quality interaction and communication between members of the Communities of Practice, mutual relationship between members (155,157) and self-selection by newcomers for participation in the activities of the community all of which are essential in the successful learning in Communities of Practice.

2.7.2.3. Activity theory (AT)

The most significant progress in extending learning from individual learning to learning in a more dynamic social context can be seen in Activity Theory (18). Vygotsky established foundations of the Activity Theory and most recently Engeström greatly elaborated and developed this theory over time (14,15). Activity Theory (2,6,8–15) is a theoretical framework for studying human practice as developmental processes (12). In concert with Vygotsky, Activity Theory contends that the human mind comes to exist and develops in the "context of meaningful, goal-oriented, and socially determined interaction" between individuals and their social context (13). Activity Theory expands the social focus of Vygotsky's learning theory, by moving beyond the dyad of the learner and mentor, to consider the role of the larger sociocultural context in which learning takes place (9,12,13).

2.7.2.4. Assumptions of Activity theory

2.7.2.4.1. Activity: mind in the context

Unlike traditional theories of learning based on individuals' cognitive activity and where learning precedes action, Activity Theory assumes that learning and cognition emerge and exist as a consequence of human interactions within a social milieu; therefore, activity precedes learning (12,13).

2.7.2.4.2. Consciousness in the world

In Activity Theory, manifestations of consciousness can be observed in practice. According to this theory "you are what you do" (12). Human consciousness is embedded in a broad activity system surrounding the person so that the individual will internalize any kind of changes in any of

their physical, mental or social situations and environment, and will manifest them in their conscious activities (12,13).

2.7.2.4.3. Intentionality

The focus in Activity Theory is on intentional actions that individuals realize them via conscious intentions. Intentions arise from the contradictions between individuals and their sociocultural environment (12,143). After the emergence of the intentions and before their manifestations in the individuals' activities, individuals plan for these intentions even though sometimes these plans and related intentions are not firm and precise, and they are subject to modifications (12).

2.7.2.4.4. Object-orientedness

According to the Activity Theory, individuals direct their emergent intentions at objects. “An object (in the sense of ‘objective’) is held by the subject [an individual or a group engaging in the activity] and motivates activity, giving it a specific direction” (9). In other words, they use their emergent intentions to develop objects (or objectives) for themselves. Objects motivate the subjects and direct their activities to special directions (9). There is a dynamic relationship between object and activities so that any transformation in each of them affects the other one (7,12,143). For example, a nurse who intends to work in a new unit, develops object(ive)s for progress that will motivate his/ her activities and will give special directions to these activities. Any change in the nurse’s object(ives) will affect her activities and vice versa.

2.7.2.4.5. Community: a dialectic context

Activities are affected by their sociocultural context and we can explain an activity system only by addressing the sociocultural context in which this activity occurs (9,12,13). The

community affects the functions of the subjects through their formal rules and informal norms (7,12,143). In other words, the community mediates rules and norms that indicate how it functions, believes and supports various activities of the subjects (7,12,143). Various people in the community have various divisions of labor (roles in the community) that defines their tasks (12). Various work communities will have various rules and customs depending on their divisions of labor that mediate their activities (12). For example, activities of the newly hired nurse that we discussed above can be influenced by various sociocultural factors such as other nurses (nursing community), their departmental policies and procedures (formal rules), informal rules (norms of practice) among them and hierarchal system of the clinicians.

2.7.2.4.6. Historical-cultural dimension

Technically speaking, activities are historically evolved. In other words, activities undergo an evolution over the course of time in a culture. This is why Activity Theory believes that tracking and recording the transformation of any situation over the course of time is an essential step to acquire a clear understanding of dynamics of that situation (7,12,143). Practices of healthcare professionals like other higher mental functions are internalized forms of activities that are common in the community that they are working. To better understand these activities, we need to consider their related historical evolution (12). For example, consideration of cultural and historical factors in special unit such as the PICU would be very helpful in better understanding why newly hired nurses are instructed materials that they are and why they are instructed in a way that they be. Another example would be job leave among the newly hired nurses. We will need to consider various cultural and historical factors to understand why some newly hired nurses leave the PICU or why they even quit their job as a nurse.

2.7.2.4.7. Tool mediation

Tool mediation is one of the essential assumptions of the Activity Theory according to which artifact, technical tools such as various forms of media and equipment, and signs or psychological tools including language influence and change the nature and character of human activity and affect mental functions of the subjects after internalization (7,9,12,143). Tools and signs shape our experiences (12) and affect the ways that subjects interact with the real world (13). For example, various technical tools (such as various monitoring systems, complex medication administration machines and communication tools) and mental tools (decision making skills, problem solving techniques and communication skills) can affect newly hired nurses' practice. Furthermore, the newly hired nurses' practices can influence the tools (both technical and mental) that are used in their clinical practice.

2.7.2.5. Activity system

Unit of analysis in Activity Theory is the Activity System (9,12,13) which includes the subject or the main participant, object(ive) or goal, mediating tools, types of actions, and operations (9,12,13). A subject is defined as a person or group of people who are involved in the activity. The object of the activity is a physical or mental result that the subject is seeking for and reflects the intent and motivation of the activity (7,9,12,143). Anything that is used in the process of change and transformation are called tools (12,13) composed of physical tools and psychological tools that mediate higher mental functions and is part of activity system. Humans use the physical tools to manipulate the physical objects while they use psychological tools to affect other human beings or themselves (13). There are three generations of activity systems that represent three generations of Activity Theory (7,10–12,18,111,143,159). I will briefly describe

these three generations of Activity Theory, with a short focus on the first, which is the simplest to clarify the basic concepts and more on the third generation that is the most fully developed.

2.7.2.6. Three generations of Activity Theory

2.7.2.6.1. First generation of Activity Theory

The first generation of the Activity Theory is based on Vygotsky's original concept of mediation and represents how cultural artifacts mediate human actions. This generation is usually depicted as a subject, object, and mediating artifact triad in a triangular diagram (7,10–12,18,111,143,159) (Figure 2.1). The limitation of this generation of Activity Theory is that the unit of analysis is restricted to the individual level (143).

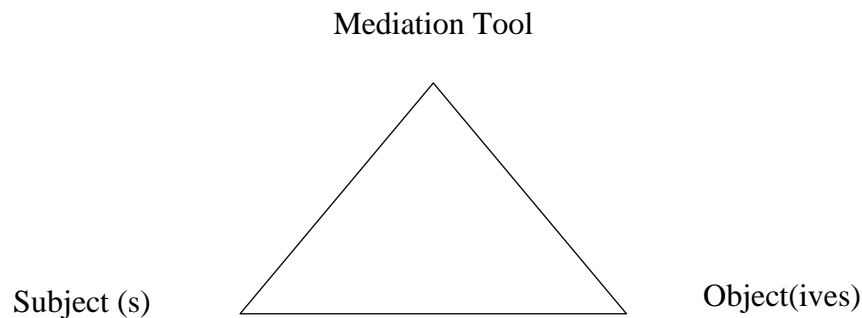


Figure 2. 1: First generation Activity Theory model

(Reproduced from Engeström Y., 2001)

2.7.2.6.2. Second generation of Activity Theory

Engeström expanded Leontev's first generation of activity system to represent the social elements of interaction in the activity system (Figure 2. 2). For this purpose, he included Communities of Practice, the division of labor and rules. In this way, the new generation of Activity Theory could help us study activity systems at a social or community level (7,10–

12,18,24,111,143,160). This model made it possible to include the activities of a community of practice, its division of labor, power relations, the distribution of resources among the community members, and the social conventions and rules that govern these relationships (7,10–12,18,24,111,143,160). Limitation of this generation is that unit of analysis is only one activity system (143).

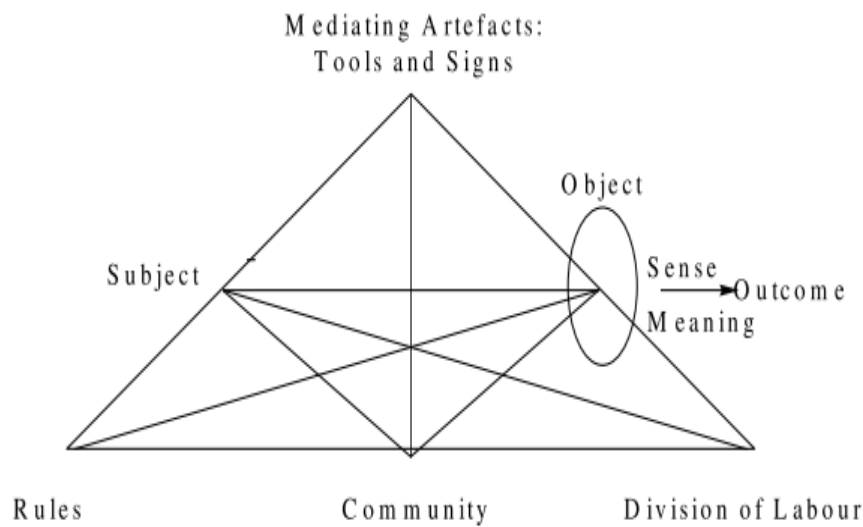


Figure 2. 2: Second generation of Activity Theory

(Source: Engeström Y., 2001)

2.7.2.6.3. Third generation of Activity Theory or Cultural Historical Activity Theory (CHAT)

The third-generation Activity Theory, also known as Cultural Historical Activity Theory (CHAT), recognizes a network of interacting activity systems. In this generation of Activity Theory, the unit of analysis moves from a single activity system to two or more interacting activity systems (Figure 2.3) (143). CHAT has five main principles that are, in fact, expansion of the assumptions of previous generations of Activity Theory. These assumptions are as follow:

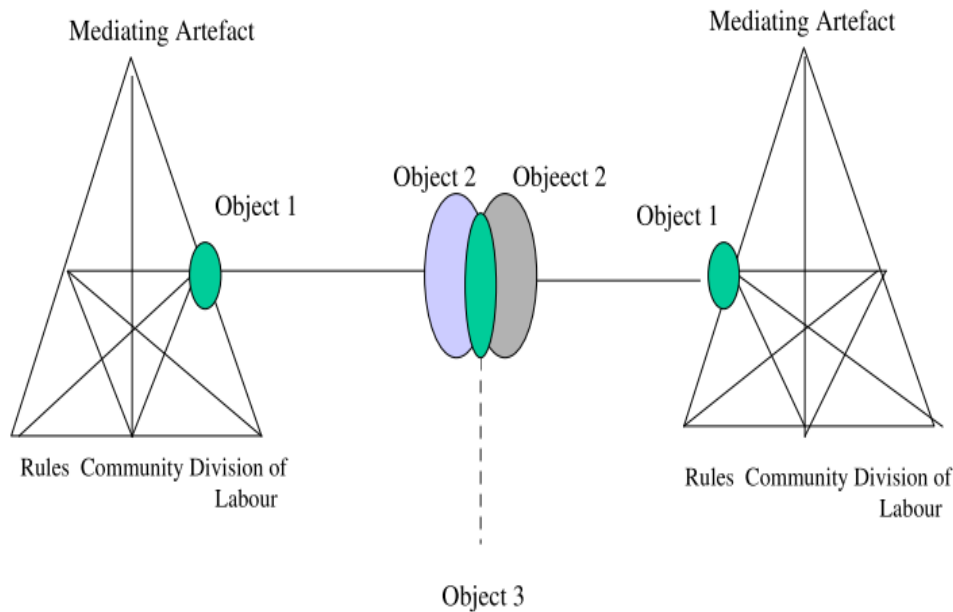


Figure 2. 3: Third generation Activity Theory

(Source: Engeström Y., 2001)

2.7.2.6.3.1. Mediated nature of activity

All activities are mediated by some cultural means called artifacts. These artifacts are not simply facilitators of mental processes, rather they are fundamentally shaping and changing mental processes. In other words, these artifacts are making and transforming humans (7,10–12,18,24,111,143).

2.7.2.6.3.2. Notion of activity system

The idea of activity system as the basic unit of analysis is used by Engeström to stress mutual relationship and strongly interdependent nature of these basic elements (7,10–12,18,111,143). In the third generations of Activity Theory, unit of analysis is minimally composed of two activity systems, as can be seen in Figure 2.3.

2.7.2.6.3.3. Object-oriented nature of activity

Like previous generations of Activity Theory, in CHAT also, all practices are inherently object-oriented. In this version, the object creates energy and cohesion, recognizes the emergent, fragmented and evolving dynamics of the system (7,10–12,18,24,111,143).

2.7.2.6.3.4. Historical and contradictory nature of activity

The CHAT model also introduces contradictions (10,11,111,143) which are sources of tensions and conflicts that produce energy for continuous changes and lead to the expansion of activity systems and their elements (7,10–12,18,111,143). Unlike other theories, CHAT does not look at these contradictions as mistakes or deviations from norm, rather it sees them as an integral part of the activity systems that lead to change and expansion of the activity system and its constituent elements. Contradictions are essential for self-movement and change. The metaphor of expansive learning is used by Engeström to express this process of change and transformation that leads to new patterns of cultural activity (7,11,111,143,159).

2.7.2.6.3.5. Interventionist and developmental nature of studying practice

As the contradictions increase, activity systems qualitatively transform over the time because some already established norms and conventions of the community are not supported by those of some people in the community (143). Re-conceptualization of the object(ive) and motive so that it includes a fundamentally vaster horizon of possibilities leads to expansive learning (7,11,111,143,159). Expansive learning starts from small changes and developmentally progresses. In addition to expansive learning, Engestrom introduces the notion of expansive interventions and believes that expansive interventions should go through a series of steps, namely questioning contradictions, modeling new solutions, testing the new solutions, implementing new

models and solutions, reflecting on the process, strengthening the new practice and appreciating the effects of new contradictions resulted from new solutions in other parts of the system. Interventions in CHAT are essentially focused on expanding the activity system in hand. These interventions solve some of the problems and contradictions in the system and produce some new contradictions that become the object of new cycle of work (7,11,143,159).

2.8. The Theoretical Framework of the Thesis

The Cultural Historical Activity Theory (CHAT) provides a comprehensive framework that can encompass individualistic and sociocultural learning theories. I will use Engeström's CHAT framework to describe the process of learning in the PICU. In so doing, the individualistic learning theories such as self-directed learning, experiential learning and reflection and reflective practice fall within the "subject" part of the CHAT. From this perspective, an individual's (subject in CHAT) intrapersonal learning can be explained using the principles of adult learning theories at individual level as subsequent to the interpersonal interaction of CHAT. The individual subjects learn to improve their proficiency that includes combination of knowledge, attitudes and skills (proficiency theory) within the social process (CHAT). They can also learn through self-directed learning and take the lead of their own learning by taking notes about their needs and using different resources available to them such as internet, policies and procedures, and textbooks. Working in the PICU, the newly hired nurses need to acquire numerous skills and tasks, as well. They learn these skills in different ways; they can learn using textbooks and reading through steps of each skill or task as it happens in self-directed learning. The use of different tools and resources that mediate between the nurses and unseen authors, or between nurses on the unit when these tools are used by colleagues working together exemplify the mediating tools found in the CHAT.

Newly hired nurses also need to learn these skills experientially with hands-on practice and demonstrations that are provided by other colleagues such as preceptors. This is also included in CHAT. In CHAT, individuals learn by participation in the real setting of the unit by accessing opportunities for hands-on practice while observing others while they work and provide demonstrations. By placing experiential learning in the “real setting” with access to “others” CHAT turns experiential learning into situated or “social experiential learning”. In this way, CHAT provides a supportive environment of other colleagues that facilitates the process of experiential learning and hands-on practice in the context of the community (unit).

Reflection and reflective practice can also be embedded in CHAT. At individual level, a person can reflect about his/ her own performance or about the situation and learn how to do the desired task differently. However, in CHAT, through sociocultural learning theories, the process of reflection and reflective process are upgraded and given extra features. In addition to individual reflection on the tasks, the individuals can be encouraged to be reflective by others who may also provide their own reflective comments. This social level of reflection is seen in the error detection systems that can be found in the hospitals (such as the Patient Safety and Learning System-PSLS).

As we can see, the CHAT framework helps us explaining the learners’ learning process at individual level, in the context of a sociocultural environment. In fact, the CHAT, as stated earlier, upgrades all the individualistic leaning theories described previously and adds extra dimensions that take them to a higher level.

Furthermore, CHAT looks at any activity as a goal oriented phenomenon mediated by variety of tools (physical and mental). Understanding learning in a setting like the PICU, with its varied technologies, cannot occur without taking into consideration the significance of mediating

tools. This feature hardly can be found in the individualistic learning theories. In fact, the mediating tools help the individuals to internalize what they are learning from the community as they transform interpersonal learning into intrapersonal learning. In any self-directed learning, experiential learning or reflection and reflective practice we can trace the role of mediating tools.

Additionally, the CHAT situates all the experiences in the real situation by adding the situatedness of Communities of Practice into the framework. The learner's experiences cannot be divorced from the actual setting in which they are to employ their new knowledge. Although simulations are close to the real situation, they still lack the complexity and of the real-life situation especially in the context of the PICU. However, in the CHAT model, this issue is solved by placing the person in the real setting of the unit. Individuals are embedded in the real PICU Communities of Practice and acquire the experience in the context of real PICU.

The CHAT framework also considers the rules (formal and informal) that govern these experiences and practice, as well as division of labor within the community. As we will see, the hierarchical division of labor among disciplines within the PICU must be taken into consideration in explaining learning in the PICU whereas individualistic learning theories lack the ability to account these factors that affect learning.

Other important features that the CHAT adds to the individualistic learning theories include attention to the dynamic interactions among the subjects (learners), their objects, the expected outcomes of their learning, mediating tools, rules, Communities of Practice and division of labor in the teams that provide care for each individual patient. Moreover, individual learning theories fail to consider the interaction among activity systems that arise as staff work together on patient after patient, or when staff work together in groups defined by their discipline. These interactions

play important roles in individuals' learning and practices, which are factors that we cannot find in the individualistic learning theories.

Also lacking in individual learning theories is attention to the contradictions and potential disagreements among participants. In CHAT, interactions can be the sources of contradictions, which can provide the motivation for learning and change. Additionally, the interaction between multiple activity systems facilitates access to the knowledge distributed among the staff belonging to different activity systems, working in different units and different shifts (distributed cognition) that is very important for continuity of care, a feature that can never be found in individualistic learning theories.

To summarize, the Cultural Historical Activity Theory (CHAT) embeds all the individualistic learning theories relevant to this study (such as self-directed learning, experiential learning, reflection and reflective practice), as well as sociocultural learning theories (such as Communities of Practice and distributed cognition) and provides a comprehensive framework that I will use for explaining the learning process in the PICU setting.

Chapter 3: Methodology

My research was mainly informed by sociocultural learning theories with a special focus on theory of Communities of Practice (16–23) and Engeström’s Cultural Historical Activity Theory (CHAT) (7,10–12,18,143). My purpose was to understand what and how new nurses hired to the PICU learn to deliver care in the context of a complex dynamic unit such as PICU, who they learn from and who learns from them (if any), how they conceptualize learning and quality of care and how they relate learning and quality of care in the context of the PICU.

In this chapter, I describe how I conducted my research. For this purpose, first, I elaborate on the conceptual Orientation of the research. Next, I describe study design. Then, I elaborate on the research setting. After that, I describe research participants, process of gaining access and timeline of the study. Then, I describe my stance and reflexivity, and recruitment process. This is followed by a description of data collection and data analysis. Finally, I elaborate on the methodological strengths and limitations of these methods.

3.1. Conceptual orientation

As described in Chapter Two, this study was informed by sociocultural learning theories specifically theory of Communities of Practice (16–23) and Activity Theory (7,10–12,18,143) , more specifically Cultural Historical Activity Theory (CHAT). Sociocultural learning theories helped to interpret the beliefs and practices of the newly hired nurses and their learning process.

3.2. Study design

This is a prospective study of three cohorts of newly hired nurses in the PICU over the period of 40 months. I used a mixed methods approach (161–163) in which ethnographic

observation, semi-structured interviews, and document analysis were supplemented by Social Network Analysis (SNA) (164–168) which is used to describe the development of informal learning networks of these nurses in the PICU. Social Network Analysis (SNA) (164–168) provided more detailed description of patterns of social interaction and was coupled with descriptive and inferential statistical techniques to further investigate the social networks.

3.2.1. Mixed method

Mixed method research enables using both qualitative and quantitative approaches for pragmatic and practical purposes (161–163,169). It enables me to understand the process of learning from different angles through different kinds of data (161,163). Mixed method research is especially helpful in those healthcare researches that focus on knowledge translation, quality improvement and policy changes in the clinical settings (161,169).

3.2.2. Ethnography

Ethnography is the description of a specific culture, community, problem or phenomena in context (161,170–172). In other words, ethnographic research investigates the patterns of social interaction, values and assumptions of a group or a subgroup and the ways that the beliefs and practices are transferred to successive generations (161). In this study, ethnography is concerned with examining the social interaction of the participants, the division of labor, the physical and psychological mediators they employ, and the community rules and norms that contribute to an understanding of the PICU as a Community of Practice and an Activity System (161). An ethnographic approach may also identify various contradictions that result from two or more communities or cultures' interaction (161,171,172). Thus, ethnography is the method of choice when designing a study based on sociocultural learning perspectives (4,9,18,24,25,138).

3.2.3. Social Network Analysis

In addition to ethnographic descriptions of social relationship, patterns of interaction and their impacts on perceptions and practices of the individuals can also be studied using Social Network Analysis (SNA) (164–168). Social Network Analysis is designed to examine individuals' relationships and provides a basis for understanding how social connections to others and the division of labor may affect perceptions, behaviors and the way these perceptions and practices diffuse in their community of practice (164–168,173–175). Social network analysis helps my analysis move beyond the participants' individual attributes to gain better understanding of who newly hired nurses interact with, who they learn from, and who may learn from them. In other words, it provides an analysis that helps to gain a better understanding of nurses' social learning network within their PICU community. This method fits well with my sociocultural conceptual orientation in this study, as well as with the ethnographic methods I use, both of which try to contextualize individuals in their community of practice.

3.3. Setting

This study was conducted in the Pediatric Intensive Care Unit (PICU) of a leading university affiliated Western Canada Hospital (we will call it WCH)¹. WCH is the leading teaching and research healthcare facility for the child health (176).

The PICU is a 22-bed unit that provides critical care to children from across the province serving more than 1200 critical care patients on an annual basis. The unit accepts critical patients from variety of specialties including, but not limited to cardiology, surgery, neurology,

¹ WCH is a pseudonym to secure the confidentiality.

neurosurgery, infectious diseases, respiratory, metabolic, oncology, and home tracheostomy and/or ventilated patients. About one third of the patients are admitted through the Emergency Department. Most of the critical care visits are related to seasonal injuries or disease processes; respiratory cases are more frequent in the winter or in the beginning of the spring and trauma patients are mostly related to summer. Around 40% of the patient population is related to the cases following cardiac surgery. The PICU admissions and discharges are done on a daily basis, and patient flow includes both planned and unplanned admissions. Furthermore, the PICU houses Transitional Care Unit (TCU) which is a specialized subunit that provides healthcare to chronic, technology dependent pediatric patients such as tracheostomy and Bilevel Positive Airway Pressure (BiPap). It also supports children receiving home care throughout province.

Care in the PICU is provided using an interprofessional model. The PICU multidisciplinary care team encompasses various health professionals from variety of disciplines that include physicians, nurses, allied health, support team and other professional staff. Composition of the PICU interprofessional team has been shown in Table 3.1.

Table 3. 1: Composition of the PICU interprofessional team

Discipline	Number of staff	subgroups	Number of staff
Medical group	15-17	Medical director	1
		Critical care intensive care physician	6
		Clinical assistant	1
		Fellows	4
		Residents	4-6
Nursing group	98	Program manager	1
		Clinical nurse coordinators	4
		Clinical nurse coordinator for outreach	1
		Clinical nurse leaders (charge nurses)	5
		Clinical nurse educators	1
		Clinical nurse specialist	1
		Clinical resource nurses	3
		Quality and safety leader	1
		Front line nursing staff	81
Allied health group	19	Respiratory therapists	14
		Social worker	1
		Physiotherapist	1
		Occupational therapist	1
		Dietician	1
		Pharmacist	1
Other professional staff	4	Spiritual care	1
		Ethicist	1
		Child life support	1
		Music therapist	1

Table 3. 1 (Continued)			
Discipline	Number of staff	subgroups	Number of staff
Other professional staff (Continued)	7	Psychologist	1
		Speech language therapist	1
		Education- Onsite School	1
		Informatics nurse	1
		Research & quality coordinator	1
		Equipment and supply	1
		Infection Control	1
Support staff	12	Care aides, porter aides, unit clerks, housekeeping, receptionists/ assistants	1
Total			155-157

3.4. Participants

The main participants in this study were the registered nurses hired to work in the PICU. Hiring in the PICU and the WCH more generally occurs in January, May, and October. However, in 2013, instead of May, hospital had July intake. Therefore, for this study, I followed three consecutive cohorts of new nurses hired between July 2013 and October 2014. I also studied people from whom new nurses learned, which included: instructors of the Orientation sessions, their individual preceptors, other experienced nurses (such as bedside nurses, clinical nurse coordinators, charge nurses, clinical nurse educators and clinical nurse specialists), allied health staff such as respiratory therapists, physiotherapists, perfusionists, pharmacists, attending physicians, as well as administrative staff of the PICU such as clerk. Trainees in many of these disciplines, as well as clinical staff from other services from elsewhere in the hospital were included in observations.

3.5. Gaining access

In order to gain access to the unit, I obtained permission from stakeholders and gatekeepers (161,177) of the hospital and the PICU, including the Vice President of Medical Affairs (VPMA) of the hospital, program manager of the PICU, medical director of the unit, as well as facilitators of the educational events in the unit – the Clinical Nurse Educators (CNEs).

Before starting this study, I had previously conducted research in the unit for about 2 years as part of a study of quality improvement Participatory Action Research (PICU PAR) that employed mixed method research (51,53,178). In the PICU PAR study, my co-supervisor and I did the data collection using interviews and naturalistic observations in the unit for about two years. This enabled me to gain access to conduct the present study.

My previous experience in the PICU helped me to establish a trusting relationship with newly hired nurses. The support that I received from the PICU CNEs was very helpful in streamlining the recruitment process. The CNEs included a short introductory session (15 minutes) in the agenda of the Orientation sessions of each cohort of newly hired nurses (in total three sessions for three cohorts). In these sessions, my co-supervisor and I described the scope and purpose of the study, the type of the information I am interested in, confidentiality of information and what was expected from potential participants. In addition, new nurses were given a hard copy of an information package that included information about both PICU PAR 1 and my research project in plain language (I will elaborate on this later). Together these helped me to gain their trust and obtain consent that provided access to them for observation in their Orientation sessions and during their Preceptorships in the unit.

3.6. Timeline

This research was conducted between September, 2012 and September, 2017. Protocol and ethics approval was acquired from September, 2012 until July, 2013. Data collection (observations, interviews and document examinations) and data analysis, as well as write up was conducted from the end of July, 2013 until November, 2016 on a constant basis. From November, 2016 until September, 2017, I organized formal thesis that was reviewed by the PhD committee.

3.7. My stance and reflexivity

My research question and my perspective in this study was shaped by my background in anesthesia and nursing, which included approximately 10 years of experience of working as a registered nurse in numerous international hospitals' departments including ICUs. While clinical knowledge in medicine, nursing, allied health and other disciplines are similar and many skills and capabilities are transferable across clinical settings, there were many differences in technology and clinical policies. Before starting research in the PICU and also during the first phase of the PICU PAR study (Description phase), I had spent two years (May 2011- May 2013) for becoming grounded in the PICU and quality improvement and policy implementation (52,179). Additionally, I orientated myself to various policies and procedures of the PICU.

In this research, my role was as a well-informed outsider who provided the opportunity for the staff to become reflexive practitioners by co-constructing interpretations of their practices in the dynamic setting of the PICU.

3.8. Recruitment procedures

I developed an information package that was distributed among new nurses of all three cohorts in their Orientation sessions. This package included one-page summary information about

the first phase of the PICU PAR study (“Description” phase) that my study was part of it, as well as the one-page summary of my thesis research. The information package included information about objectives and scope of both studies (the PICU PAR study and my thesis research), what was expected from participants and the fact that participation in the study was totally volunteer. This package was completed with a short oral presentation and question-answer event in which all their questions around the project were answered. Then, newly hired nurses were invited for participation in the study. I repeated the same process for the instructors of the Orientation sessions and invited them for participation before they start their teaching.

In order to recruit preceptors for observations, first, I acquired their names from the educational coordinators of the unit. Then, I approached them in person and used the same process that I had used for inviting the newly hired nurses and their instructors for participation in my research. In order to recruit other staff, patients and their families that were present in the learning-teaching opportunities that I observed during the Preceptorship, information package was also given to these more peripheral participants in this study. In addition, the package was included in the Friday Practice Update which is the weekly electronic newsletter sent to all PICU staff. This information package was also included in the charts of all patients admitted to the unit. Patient families were informed about the projects by unit clerks when they were admitted to the unit. In addition, I approached to the people that I was going to observe (including patient families, patients and the staff) and described both studies and invited them for participation, in the first encounter.

All the invitees agreed to be observed except for one of the new nurses from cohort 1. This nurse agreed to be observed during her initial Orientation but not during her Preceptorship. However, after starting to observe second cohort, she had learned more about the scope of the project and she felt comfortable for observation. All families agreed to be observed.

During recruitment for interviews, which the newly hired nurses had been informed about, I provided each person additional information about the nature of the interview questions.

To recruit preceptors and other staff involved in learning-teaching activities of the new nurses to the interviews, I approached them during the observations and gave them additional information about the project.

In total, 54 people participated in one or more of data collection steps (interviews) that was enough to achieve saturation (161,180–183). I studied all people in three consecutive cohorts of new nurses that totally included 13 newly hired nurses. These new nurses were: Cohort 1: 3 newly hired nurses; Cohort 2: 5 newly hired nurses, and Cohort 3: 5 newly hired nurses. I also studied their instructors including preceptors (16 nurses) and other staff from whom new nurses learned during their Orientation sessions or during their Preceptorship in the PICU (25 people). Among the instructors, the preceptors were my main focus, however, I did study other staff as well in order to gain clear understanding of the process of learning among newly hired nurses.

3.9. Data collection

As Spradley notes, in doing any ethnographic study (independently or as part of any other design) we can “make cultural inferences from three sources: (1) from what people say; (2) from the way people act; and (3) from the artifacts people use” (184). Therefore, I employed multiple approaches for collecting data to understand perceptions, behaviors and interaction of participants of my study. Therefore, I used both qualitative and quantitative methods for collecting data.

I used document examinations, naturalistic observation, semi-structured interviews, informal interviews during observations and network diagrams of the participants for data collection. The documents I examined included the policies and protocols that applied to the PICU,

particularly those provided to the newly hired nurses during their Orientation and Preceptorships. Document examination was used to help me learn about learning and teaching activities conducted in the unit for new nurses. Naturalistic observations were conducted during the new nurse's Orientations, PICU rounds, handovers and the consultations that newly hired nurses held with their preceptors, to learn about participants' behaviors in the context. Semi-structured interviews were conducted during the newly hired nurse's work shifts during breaks, or periods in which the Charge nurse was able to arrange for another nurse to cover for them. During the interviews, participants were asked to draw their network diagrams, and this helped me in understanding their learning networks and role of these networks in participants' learning. During informal interviews during observations, the newly hired nurses provided comments on their understanding of the care activities and their role in them. Moreover, in the informal interviews during observations, the newly hired nurses were asked to assign a score between 1-10 to the patients they looked after in the PICU and their previous workplace. This with the network diagrams formed my quantitative data source.

Application of multiple methods for data collection followed multiple purposes. First, using these methods complemented each other and gave me a better understanding of process of learning among the newly hired nurses joining to the PICU. Observations helped me to watch participants' behaviors and their interactions in the context of the clinical setting; in other words, it helped me to contextualize their behavior and understand how participants learn in the real situations of the PICU. Interviews helped me to understand their perceptions and beliefs using their own words. Interviews and observations together helped me to compare and contrast the participants' words and deeds (161). Second, my multi-method data collection helped me establish a partnership with my participants and construct the meaning and interpretation of reality in a

cooperative way (co-constructing the meaning) (161,184). It helped me move between participants' perspectives and my own perspectives (emic and etic perspectives, respectively) (161). Third, this multi-method data collection helped me triangulate the data and improve soundness of my findings (161,169,171,172,184,185).

3.9.1. Naturalistic observation

Observations of the Orientation sessions included a total of 60 hours and observation of the Preceptorship period in total encompassed 1980 hours of observations. Orientation sessions for each cohort of newly hired nurses included five days of 8-hour classroom education starting from 8 am until 4pm ($5 \times 8 = 40$ hours in total). For the first cohort, I observed entire Orientation sessions of all five days of 8-hour education (40 hours). The analysis of the data collected from observation of the first cohort and themes emerging from this analysis were the basis for the observation of the next cohorts. Learning from my observations of the first cohort, therefore, in the second and third cohort, I purposefully (161,183,186) observed those sessions of Orientation classes that (a) would give me more in depth information around things I discovered in the first cohort or (b) would help me discover new dimensions of learning among newly hired nurses during the Orientation sessions. These observations included a total of 20 hours for the second and third cohorts, and were identified in negotiation with unit CNEs.

Observational data during the Preceptorship was collected during an observation for a total of 30 months, which included 3 hours of observation for each day for the first 12 months (1080 hours), 2 hours for each day in the second 12 months (720 hours) and one hour for each day in the last 6 months (180 hours). Observation in the Preceptorship was conducted during various shift times from 0630 until 2100. I observed a few shifts at 2200-2300 with the presence of my co-

supervisor WM. This distribution of observation helped me include day shifts, evening and night shifts in my observations. Observations in the Preceptorship period were done during week including statutory holidays with a few observations during the weekends.

3.9.1.1. Data collection process for observation

I observed new nurses, people whom they interacted with, people whom they learned from or they taught. In the Orientation sessions, I observed interactions between the newly hired nurses and their instructors. In the Preceptorship, I observed their interactions with their preceptors or any other staff or families who they were interacting with for learning or teaching purposes. I shadowed them and observed various events in which the newly hired nurses were present. These events included events such as rounds including morning and evening rounds (cardiac rounds, PICU normal rounds and radiology rounds), various morning and evening handovers such as morning and evening nursing handovers (including central nursing handover and nurse to nurse bedside handover) and patient handovers from operation room (OR). In addition, I observed patient transfers from other units or from outside of the hospital and any other interaction that happened between new nurses and other staff including medical staff (attending physician, fellows, residents and medical students if any), nursing staff (clinical nurse coordinators, charge nurses and other nursing staff), allied health staff (such as physiotherapists and occupational therapists), pharmacists (including pharmacy doctor and their residents or students), clerks and all other staff from the PICU or outside of the PICU who came to the unit for giving care to the patients.

I also observed the setting, patterns of behavior, interaction and communication (161,170,177,184,187–189) in both Orientation sessions and Preceptorship in the PICU. During the observations, I collected data regarding the spatial layout of the place, time, instructors,

instructional and learning events, practices, methods, processes, as well as contents of teaching and learning during both Orientation sessions and Preceptorship. In addition, I collected data about engagement level of the staff in learning and teaching events and also various kinds of artifacts (any kind of tool) used in mediating any learning and teaching event. Any time that nature of an interaction was not clear (whether it was a learning-teaching activity or not), I approached to the partners of the interaction and verified and asked them to articulate about the nature of the interaction if it was about learning.

3.9.1.2. Field notes and memo writing

For collecting data during the observations, I first took brief and condensed notes in order to be able to follow the pace of the interactions. In the soonest available time (no more than 4 hours), I expanded my field notes. I did not use any special template for taking my notes, rather I tried to collect as rich data as possible.

3.9.2. Interviews

Interviews provided the major source of information for this study. Ethnographic interviews can help us acquire rich sources of deep data that can help us explore participants' critical insights and understanding, and discover how they construct reality (161,169,172,184,190). I used semi-structured interviews based on the approach suggested by Spradley (184) and informal short interviews in the form of short conversations during my observations for verification, and elaboration purposes (161,177). All interviews for this research were done by myself.

3.9.2.1. Sampling for interviews

I used purposeful sampling for the interviews (161,183,186) in order to identify and choose people who were (a) most knowledgeable or experienced about the process of learning among newly hired nurses, and (b) available and willing for sharing their knowledge and experiences in this regard (161,183).

I selected all three consecutive cohorts of newly hired nurses. To select people from whom new nurses learned for the interviews, I used purposeful strata specific subgroup sampling method (161,183,186) because people from whom new nurses learned were heterogeneous, as indicated earlier in the Participants section.

In combination with my field notes, this sampling method helped me maximize diversity of care providers participating in my study and consider their heterogeneity and maximum variation (191). Data and conceptual saturation (defined as no new information or themes or new dimension about a specific topic in three consecutive interviews) (161,180–183) over constant comparison analysis (161,183) was the basis of sample size. Purposeful sampling of the individuals and lengthy observations helped me to achieve saturation in the context of my diverse participants.

3.9.2.2. Data collection process for interviews

All the interviews were conducted face to face and by myself and mostly in in two rooms within the PICU. A few interviews were done in the clinical nurse coordinators or the clinical nurse educators' offices in the unit. These settings provided confidentiality and privacy.

After conducting my initial scheduled interviews with bedside nurses, I realized that it was hard to formally schedule interviews because nurses needed to respond to the changing demands of their patients. There were frequent situations in which patients deteriorated making pre-

scheduled interviews impractical. Consequently, I decided to spend more time in the PICU to be available to do interviews anytime that the newly hired nurses, preceptors or other interviewees were free and available in the unit.

All interviews were guided by the interview questions and prompts that were developed based on the research objectives (Appendix B). The interview questions had three sets of questions: one set for new nurses, one set for preceptors and another set for other staff (161,177). These sets of questions were used as guides for conducting semi-structured interviews and eliciting information from the participants.

Interviews were audio-recorded using a digital voice recorder. Each interview was 45-90 minutes long. Field notes were taken during the interviews in order to record emotions and reactions of the participants to assure completeness of the data regarding context of the interview and for the purpose of appropriate interpretation of the findings. During the interviews, I gave enough time to the participants to describe their perceptions, behaviors, experiences and how they make sense of things. Any ambiguity was clarified by asking for elaboration on their descriptions. At the end of each interview, I asked interviewees if there was anything important that would help me to better understand process of learning among new nurses that I might have not included in my questions. In answering to this question, some interviewees brought up interesting topics such as the conflictual feelings that they had in the beginning of their job in the PICU. I will elaborate on this issue in the findings.

3.9.3. Social Network Analysis

Social network analysis (SNA) is a specific approach that provides insights based on sociometric characteristics of learning networks and Communities of Practice among care

providers (16,17,164–168,192). Twelve out of 13 of newly hired nurses provided data for network analysis.

During the interviews, they were asked to draw their own network of social relationships including the people whom they went to when they needed information, consultation, advice or any kind of support for learning and performing any kind of task related to their job in the PICU. New nurses were asked to include names and positions (roles) of the people within their networks. However, being new in the unit, they often referred to people by their positions rather than by name.

3.10. Data analysis

For the analysis of interview recordings and transcripts and other qualitative data I employed techniques from cognitive linguistic discourse analysis (193) to describe the themes and identify information schemas (194). The data was entered into Atlas ti (195) and coded for analysis. Quantitative data analysis in the form of social network data was analyzed using descriptive Social Network Analysis techniques (164–168) and UCINET (196). Patient acuity scores collected during observations was analyzed using simple descriptive and inferential statistical techniques.

3.10.1. Qualitative data analysis (analyzing interview data, field notes and documents)

3.10.1.1. Transcribing the interviews, expanding field notes and managing document text

Each interview was fully transcribed verbatim (161,169,184) that were edited to remove all the identifiable information. During this process, pseudonyms were assigned for identifiable names in the transcripts. Field notes were expanded from brief field notes the day of each observation in maximum four hours. Furthermore, documents were treated as text, and along with

expanded field notes and transcripts were entered into ATLAS ti (195) qualitative data analysis software for analysis.

3.10.1.2. Coding

While immersing myself in the data, I identified the portions of discourse that were thematic based on their syntactic structure and the use of information units (194,197,198) using techniques from cognitive linguistic discourse analysis (193,197,198) to describe the themes and identify information schemas in the interview data (194). I used line by line, stanza by stanza, block by block coding moving between micro and macro parts of speech as recommended in cognitive linguistic discourse analysis literature (193,194,197,198). Normally each small spurt out of which speech is made, is defined by a phonological intonation pattern and carries one salient piece of new information that is focus of attention. Sometimes this is called idea unit, intonation unit or line. Each stanza includes a group of lines about one important event, happening, or state of affairs at one time and place, or it focuses on a specific character. I used the same process for coding the field notes and document texts that I did for the interview transcripts (197,198). I analyzed interview data using constant comparison analysis moving from text to codes and back. Coding was done inductively to give primacy to the data (161,169,184,185,199,200).

After coding, I read and reread codes and compared and contrasted similar codes. Through this process, I iteratively recoded, merged or removed some of the codes. Sometimes, new codes emerged from the data indicating new aspects in the data. This entire process helped me to move to higher level of abstraction and conceptualization and identify categories and sub-categories, themes and schema. This iterative process continued until I was able to make assertions that describe the participants' reality and perspectives.

3.10.1.3. Saturation

Data collection and analysis was carried on until the point of data and theoretical saturation. For this purpose, data were collected and analyzed until no new information or themes or new dimension about a specific topic appeared (161,180–183). In other words, I continued data collection, coding, categorization, sorting the codes and categories, as well as comparing and contrasting the codes, categories and sub-categories until no new dimension was discoverable (161,180–183,201).

3.10.2. Quantitative approach

3.10.2.1. Social Network Analysis

Social Network Analysis (SNA) was used for identifying informal learning networks within the newly hired nurses and the role of these networks in new nurses' learning in the PICU. Network data collected during the interviews were analyzed employing social network analysis techniques (164–168,174,202–206). Network diagrams drawn by new nurses included a mixture of positions/ roles and names. In order to make the data analyzable, I transformed names appearing in the network data into roles, because the majority of nurses used position or role in their diagrams.

This network data was used as the basis for quantitative analysis using social network analysis (SNA) techniques (164–168), using UCINET 6.504 network analysis software (196). Using this software, I calculated measures of centrality including Degree Centrality (the number of links to and from a person or a group of people) and Closeness Centrality (the average distance of a person or a group from all other people in the network) within a network (192,204).

Sociograms were generated to depict learning relationships among the participants and organization of these learning networks.

3.10.2.2. Patient acuity scores

Other quantitative data included scores that the newly hired nurses gave to the acuity of the patients they looked after in their previous workplaces and in the PICU. This data was collected during the observations and by asking the newly hired nurses what scores they would give to the acuity of the patient they looked after in the PICU and in their previous workplace. They were asked to give a score of 1-10, (10 to be the highest acuity) to the patients they looked after. This non-standardized data was entered into SPSS (207) and analyzed using non-parametric statistical tests to see if the acuity scores of the patients that newly hired nurses cared before and after coming to the PICU had significant difference. Due to small sample size (only 8 out of 13 people), Wilcoxon Signed Rank Test was used.

3.11. Methodological soundness

I used various methods in order to establish the trustworthiness or methodological soundness in my research. For this purpose, I used time (lengthy observations), triangulation and thick description (161,162,169,171,172,177,184,185,208,209). I spent a considerable amount of time in the unit before I started data collection for my own research and continued to conduct lengthy observations to provide long term continuity. My lengthy presence in the setting helped in establishing sense of trust resulting in rapport which is a harmonious relationship between researcher and participant with positive feeling in both sides that leads into smooth flow of information and data collection (161,184). Long term observations eliminate oversensitivity and reactivity to isolated incidents.

I used triangulation to check my findings of one type of data and methods by reference to another (161,162,169,208,209). Data from observations of Orientation and Preceptorship periods made at a variety of times, coupled with interview data from various groups of the staff, including new nurses, experienced nurses, allied health staff and physicians helped to provide multiple perspectives to confirm my data and interpretations. This qualitative data was also augmented with the analysis of nurses' social networks. For researcher triangulation, I involved three other researchers in the process of my research, namely JPC, WM, and NK as my co-supervisor, supervisor and thesis committee member, respectively. For theoretical triangulation, I used both individualistic and sociocultural learning theories as my conceptual Orientations and in each of them, I considered multiple learning theories for explaining findings of my research (161,162,169).

The multiple forms of data employed in this thesis and the methods of analysis have provided a unique perspective on the learning activities of newly hired nurses and the contribution of learning to their ability to provide quality care for their patients.

Ethnographic Findings: Chapter 4 through Chapter 11

Overview: Chapters 4 through Chapter 11

In the previous three chapters, I introduced my research topic (Chapter 1), presented literature review and my theoretical framework (Chapter 2), and described my methodology (Chapter 3). The following 8 chapters include an ethnographic description of the PICU based on my research. Chapter 4 describes characteristics of the newly hired nurses participating in this research. Chapters 5 through 11 describe two teaching and learning opportunities that the PICU organized to help the newly hired nurses become grounded and learn how to deliver care in the PICU.

Chapter 4, analyzes and describes characteristics of the participants by focusing on their educational background, work experience, why they liked to work for children needing critical care.

The Orientation sessions which introduce the newly hired nurses to the PICU are described in Chapter 5. These Orientation sessions are the first teaching and learning opportunities organized for the newly hired nurses. The first section of this chapter describes prototypical format of Orientation sessions, followed by an elaboration on the teaching activities and tools used for mediating these teaching activities. I end this chapter by exploring the contents of instruction during the Orientation sessions.

Chapters 6 through 11 describe and analyze the Preceptorship which is the second opportunity organized to help the newly hired nurses. Each of these six chapters focuses on a

different aspect of the Preceptorship. Chapter 6 provides a brief description of the Preceptorship that includes a definition of Preceptorship and a prototypical 24-hour day of the Preceptorship with particular attention to the activities that were identified by the Clinical Nurse Educators (CNEs) as teaching and learning activities. Chapter 7 describes and analyzes the more structured and directive *teaching* aspects of the Preceptorship and the particular activities used for teaching the newly hired nurses. This includes events such as rounds, simulations, and short instructional sessions called EduQuicks. Additionally, this chapter examines the instructional equipment used as mediating tools for teaching, including computers, mannequins, and educational videos. In Chapter 7, I also identify analytical concepts derived from teaching and learning theories that helps to explain the teaching activities in the Preceptorship.

Chapters 8-11 examine the less directive *learning* aspects of the Preceptorship, making use of concepts from Activity Theory and Communities of Practice Theory to structure the presentation. Chapter 8 gives particular attention to the activities identified as learning opportunities such as handovers, rounds and simulations. It will also examine mediating tools that are regularly used as mediating tools in care and learning such as computers, iPads, smart phones, policies and procedures. In addition, in this chapter, I identify analytical concepts derived from learning theories that helps us explain the learning processes occurring during the Preceptorship. The last section of Chapter 8 focuses on learning outcomes of the Preceptorship.

Chapter 9 explores the relationship between social interaction and learning in the Preceptorship by examining the newly hired nurses' informal learning networks. Chapter 10 describes and analyzes the newly hired nurses' perceptions of learning, quality of care and the relationship between learning and quality of care. Chapter 11 describes and analyzes learning goals of the newly hired nurses in the Preceptorship. This chapter starts with the participants' individual

learning goals, then focuses on their professional identity, as an important factor in understanding shared learning goals within the PICU, and it ends with an exploration of shared learning goals.

Chapter 4: Characteristics of the newly hired nurses

Overview

The newly hired nurses who are the focus of this study are nurses who were recently employed to work in the PICU. This does not mean nurses that have just graduated from college or university, but that were recently employed by the PICU. This chapter describes the newly hired nurses' educational background, work experience, and information on why they decided to work in pediatric critical care.

4.1. Educational background of the newly hired nurses

This research focuses on the experiences of 13 newly hired nurses who were hired to work in the PICU. It traces their Orientation to the PICU, their Preceptorship in the unit, and their continued learning while at the bedside. Each group of the newly hired nurses in the PICU was considered one cohort. In total, I studied 3 cohorts of newly hired nurses. Cohort 1 included three nurses, cohort 2 included five nurses, and cohort 3 included five nurses. All the newly hired nurses were female. Educational background of the newly hired nurses has been summarized in Table 4.1.

Table 4. 1: Distribution of the newly hired nurses by their cohort and educational level

	Diploma in Nursing		Bachelor of Science in Nursing		Master of Science in Nursing		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Total	1	7.7	11	84.6	1	7.7	13	100

4.2. Work experience of the newly hired nurses

Majority of the newly hired nurses (12/13) had experience of working in pediatric units and/or pediatric intensive care units. Only one new nurse did not have experience of working in pediatric unit or pediatric intensive care unit. This new nurse, however, had experience working for high acuity patients in adult ICUs.

4.3. Reasons for working for children

The newly hired nurses mentioned various reasons for working for children. These reasons fell under three factors: (a) characteristics of the patients (children), (b) characteristics of the work, and (c) characteristics of the staff working for children. The newly hired nurses preferred working with children over adults because they believed that children were resilient and would rebound faster if they got sick. These patients were considered to be innocent and honest and to have different interpretation of pain. They considered children cute, lovely, always happy and people who did not feel bad about themselves.

They also believed that working and caring for children offered a holistic approach that needed considering patients, care providers, as well as families, additional to other aspects of care (such as patient safety). These nurses desired to be supportive and advocate for children, parents and family members, as well as for themselves. They believed that it was easier to be compassionate when working for children, while they felt this was more difficult in adult care. In general, they liked these features of working for children, and they believed that they could find more satisfaction working and caring for children. The newly hired nurses also believed that staff working for children were more friendly.

4.4. Reasons for working for the PICU

The newly hired nurses liked working in the pediatric intensive care unit (PICU) because of: (a) the characteristics of work in the PICU, and (b) lots of learning opportunities (Table 4.2). Work in this unit was considered challenging by the nurses. The acuity of the patients, complexity of their multi-system failures, their variety, and the fast pace and multidisciplinary, multi-tasking staff were some of the challenges that attracted these nurses with considerable qualifications to the PICU. In addition, the newly hired nurses liked the one-on-one nurse-patient staffing in the PICU. Another feature of work that attracted the newly hired nurses for work in the PICU was the resourcefulness of this unit. They believed that resources and physicians in the PICU were faced with challenges that they met with more resourcefulness compared to other units. In general, they found working in PICU more enjoyable and stimulating. Furthermore, the newly hired nurses believed that the PICU has great amount of learning opportunities for them.

P61: Cohort 1_NN11_LACC_RTF.rtf - 61:7 (55:57):

I: What do you like most about critical care?

P: Um, the acuity, the learning. Uh the fast-paced environment. Um, I really enjoy that about both ICU and emerg[ency department]. Um, I like that kind of challenge. And um, from the learning perspective you get to see tons and tons of things. Um, you're able to have your resources really accessible to you.

Table 4. 2: Reasons for working for children and pediatric intensive care

Why working for children	Why working in the PICU
<ul style="list-style-type: none"> • Characteristics of the children: Resilient, honest, innocent, have different interpretation of the pain, positive, little, cute, happy, more playful, excited and they do not feel bad for themselves, they are lovely. • Characteristics of work for children: Caring children is a holistic care, it engages families and considers all aspects of care, supportive of parents, family members and children. It is easier to be compassionate with children, it is dynamic, one finds more fun in it. • Characteristics of the staff working for children: staff are more friendly 	<ul style="list-style-type: none"> • Characteristics of work for PICU: Challenging (acuity of patients, complexity, multi system sickness, more details than other areas, multi-task, variety of patients and fast pace), one-on-one care, available resources, enjoyable and stimulating • Lots of learning opportunities

Summary and interpretation

In this study, 3 cohorts including 13 newly hired nurses participated. Almost all of them started their work by nursing for adults before shifting their interest to pediatric patients and then to work in pediatric intensive care unit. Some were interested in working in the PICU due to the challenges and opportunities to learn that characterized work in the PICU. Others liked working in pediatric critical care because they preferred to care for patients whom they characterized as diverse with high levels of acuity.

The nurses in the study gained considerable experience and tacit knowledge from their extensive work in different departments of numerous hospitals ranging from adult care to

pediatrics and finally pediatric critical care. This experience enabled them to feel capable of providing care to the most complex patients. Their backgrounds justified their claim to their professional identity as expert nurses. However, this expertise was challenged during their Orientation and Preceptorships as they entered the PICU. The Orientation reviewed basic nursing competencies. During their Preceptorship, they were assigned patients with simple conditions (I will elaborate on this in Chapter 10) and cared for patients in the TCU, the portion of the unit with more stable with less acute patients. They were also told that they might be re-assigned to general units in the hospital when there were few patients in the PICU. This would revoke their identity as PICU nurses as they would revert to novice status on units in which the personnel, procedures, and physical organization were unfamiliar. This placement situation is denying the newly hired PICU nurses' professional identities, and was a source of frustration, that created contradictions and undermined their place in the PICU Community of Practice, and reduced the unit's coherence as an activity system.

Chapter 5: Orientation sessions

Overview

In Chapter 4, I described the characteristics of the newly hired nurses participating in this research. In this chapter, I will describe the Orientation sessions as the first teaching and learning opportunity organized by the PICU to help the newly hired nurses learn how to work in the unit. The first portion of this chapter presents a brief description of the Orientation sessions, the role it plays in introducing the newly hired nurses to the PICU, as well as the prototypical format of the Orientation sessions. The second portion of this chapter explores the contents of instruction in the Orientation sessions. The third section focuses on specific aspects of teaching in the Orientation sessions. This portion of the chapter elaborates on teaching activities in the Orientation sessions. It also employs the analytical concepts derived from teaching and learning theories (Chapter 3) that help me explain teaching activities in the Orientation sessions.

5.1. Description of the Orientation sessions

5.1.1. Orientation sessions

Orientation sessions begin on the new nurses' first day of employment in the PICU. They generally take place outside of the PICU setting in a classroom setting within the hospital. The purpose of the Orientation sessions is to provide a shared baseline of understandings about technical aspects of nursing practices, learning and development in the PICU, research activities in the unit, work routines and information management in the PICU, quality improvement (QI) within the unit, cultural issues in the PICU, information management, as well as information about support that is available in the PICU. The instruction, which is largely didactic with some

discussion, was done by the Clinical Nurse Educators (CNEs) and the leads and staff from allied health professionals in the PICU. There was also additional instruction by staff from other clinical and administrative units of the hospital and the Provincial Health Service Authority (PHSA) concerning hospital and health authority policies and procedures. The content during these sessions varied from more policy and procedural information about the PICU and the hospital, to instruction and discussions about specific nursing activities, such as appropriate responses to codes (such as Code Blue and Code Red) and the use of specialized equipment and the interpretation of their results. Occasionally the newly hired nurses, who had experience in other hospitals introduced information that was new to the CNEs. These sessions also provided the newly hired nurses opportunities to socialize among themselves.

5.1.2. Prototypical format of the Orientation sessions

The prototypical Orientation sessions for each cohort of nurses included five consecutive day-long sessions of classroom teaching, that was distributed over one month. This distribution of Orientation sessions overlapped with the beginning of their Preceptorships. Classes started at 0800 and ended at 1600. Each class normally included 3-5 newly hired nurses.

5.1.2.1. Session 1

CNEs were responsible for all of the teaching activities during the Orientation. On day 1 of the Orientation sessions, the CNEs welcomed the new nurses, introduced themselves, and went over the entire agenda of five days of Orientation sessions (main topics covered in the agenda can be found in Table 5.1 and full agenda is available in Appendix C). After the newly hired nurses introduced themselves the CNEs delivered some printed educational packages that they had produced. Then, contents of Orientation package were described to the newly hired nurses and the

newly hired nurses' questions about the packages were answered. During the first day, also, the new nurses were introduced to some of the key staff of the PICU beginning with the Program Manager (PM) , the Quality and Safety Leader (QSL), Clinical Nurse Coordinators (CNCs), Respiratory Therapists (RTs), Physiotherapists (PTs), Clinical Nurse Specialists (CNSs), Registered Nurse (RNs) from another unit, RNs from the Transitional Care Units (TCU), Research and Quality Coordinator, Human Resource (HR) staff, End of Life Care specialist and Family Centered Care (FCC) staff. They were also introduced to an ergonomics specialist from the Provincial Health Service Authority (PHSA).

The Program manager started her instruction by introducing herself and then using PowerPoint slides, described the expectations of the unit, her role and availability, and offered to provide them with support. Then, the CNEs instructed the nurses about available resources in the PICU (such as Red Bedside Binder and Team Site) and logistics in the PICU including the location of lockers, Pyxis machine (an automated medication dispensing system) and various kinds of clinical equipment.

This was followed with a comprehensive tour of the PICU in which all the newly hired nurses had their first visit as members of the unit. During this tour, the CNEs showed them the patient rooms and beds, the nursing stations, the patient assignment board, the Tactical Center, the CNEs' office, the Clinical Nurse Coordinators' (CNCs') offices and patient family room. They also showed them where the supplies and equipment were stored in the PICU, including the crash cart, spare ventilators and related equipment, lockers, break room, Pyxis machine, Arterial Blood Gas machines, gowns, clean clothes, blankets and blanket warmer. They also were introduced to the High Five bulletin board and the nursing day bulletin board, used for communication among the nursing staff. The tour of the PICU was followed by a tour of the Transitional Care Unit (TCU),

adjacent to the PICU. The TCU, known as “back” of the unit among the staff, cares for technologically dependent patients who require chronic care, in contrast to the acute care patients of the PICU.

After lunch, the rest of the printed Orientation package was discussed and explained by the CNEs. Then, Quality and Safety Leader (QSL) made a PowerPoint presentation about Quality Improvement, as well as Patient Safety and Learning System (PSLS) (a system for reporting patient safety issues) and led a discussion of Quality Improvement (QI).

This was followed by a presentation by one of the Clinical Nurse Coordinators (CNC) who are responsible for administering the nursing staff of the PICU. She taught the newly hired nurses about routines, self-scheduling, and the distribution of workloads. The CNC also explained documentation procedures and the paper work in the unit.

After CNC, clinical nurse educators, introduced the professional development pathway (also known as critical care RN professional development pathway or color-coded system). They explained that this color-coded system represented different levels of nursing competency that corresponded to levels of patients’ acuity. All newly hired nurses in the PICU start from purple, caring for the less acute patients with the potential of advancing through the levels to grey, green and orange and the ability to care for the most acute patients. This final designation also makes them eligible to move into leadership roles such as charge nurse. This is the formal pathway that guides nurses in their professional development by setting learning goals and assessing performance for advancement in the unit. The clinical nurse educators also taught about expectations from the newly hired nurses in the Preceptorship period.

Although teaching in the Orientation sessions was directive and formal, frequently discussions developed among the instructors and learners. Occasionally, during these informal

discussions, newly hired nurses taught to the instructors or other new nurses based on their experiences in other units or hospitals. Informal discussions between the CNEs and the new nurses also conveyed informal and unspoken rules of the PICU.

Table 5. 1: Main contents of instruction in the PICU Orientation sessions

Session	Contents
Session 1	<ul style="list-style-type: none"> • Welcome! • Orientation overview
	<ul style="list-style-type: none"> • PICU Welcome and Overview • What/where are my resources?
	<ul style="list-style-type: none"> • Coffee
	<ul style="list-style-type: none"> • Logistics...to the unit!
	<ul style="list-style-type: none"> • Lunch
	<ul style="list-style-type: none"> • Quality and Safety in PICU
	<ul style="list-style-type: none"> • CNC role & Self scheduling
	<ul style="list-style-type: none"> • Professional Development Pathway • Expectations in Preceptorship
Session 2	<ul style="list-style-type: none"> • Check in • Exam
	<ul style="list-style-type: none"> • Ventilation/role of the RT
	<ul style="list-style-type: none"> • Coffee
	<ul style="list-style-type: none"> • Jet and Oscillation
	<ul style="list-style-type: none"> • Lunch
	<ul style="list-style-type: none"> • Chest Care
	<ul style="list-style-type: none"> • Artificial airways and suctioning • Mock intubation scenario • (emergency drug sheet) • Blood Gas Analysis • Respiratory Failure - Case study
Session 3	<ul style="list-style-type: none"> • ECG Interpretation
	<ul style="list-style-type: none"> • Coffee
	<ul style="list-style-type: none"> • Principles of Cardiac Output • Hemodynamic Monitoring (IA/CVP)
	<ul style="list-style-type: none"> • Lunch
	<ul style="list-style-type: none"> • Code Blue in PICU
	<ul style="list-style-type: none"> • Odds & Ends

Table 5. 1 (Continued)	
Session	Contents
Session 4	<ul style="list-style-type: none"> • Healthy Workplace
	<ul style="list-style-type: none"> • Oncology in PICU
	<ul style="list-style-type: none"> • Coffee
	<ul style="list-style-type: none"> • Lunch
	<ul style="list-style-type: none"> • TCU & Tracheostomy Care
Session 4 (continued)	<ul style="list-style-type: none"> • Medication Administration • MAR • Med Admin Case Studies
Session 5	<ul style="list-style-type: none"> • Issues? Questions? Concerns?
	<ul style="list-style-type: none"> • Research in the PICU
	<ul style="list-style-type: none"> • PAR Study
	<ul style="list-style-type: none"> • Human Resources
	<ul style="list-style-type: none"> • Coffee
	<ul style="list-style-type: none"> • End of Life Care
	<ul style="list-style-type: none"> • Lunch
	<ul style="list-style-type: none"> • Family Centered Care
	<ul style="list-style-type: none"> • Online Annual Certifications on the Learning Hub

5.1.2.2. Session 2

The second day started with an informal written knowledge test about the information given in the previous session and was followed by instruction by a Respiratory Therapist (RT) about ventilation and the role of RTs. The instructor used PowerPoint slides, handouts and real ventilators for teaching this section of the Orientation session. During this session, the nurses gave brief accounts of their experience of working with ventilators. Sometimes, this led to short group discussions and debates among the nurses, the RT and the clinical nurse educators. Sometimes, clinical nurse educators tried to clarify instruction of the instructors by sharing their own experiences and work-related stories. Informally, after lunch, the new nurses discussed their previous work experiences and shared some online nursing resources that they had used. During the afternoon session, a physiotherapist taught about chest care. This instructor used PowerPoint,

computer and real objects such as physiotherapy equipment in her presentation and performed some of the technics on the newly hired nurses, who were then asked to try the same technics on each other. This was followed by the CNEs' explanation of the role of simulations and mock situations such as mock codes as learning and training opportunities.

5.1.2.3. Session 3

The third day began with a presentation by a Clinical Nurse Specialist (CNS) on the Healthy Workplace. The two questions she addressed were: "What are your stressors in your new workplace? What are your approaches for managing these stressors?" She used question and answer and group discussion methods. She did not use any computer for teaching. She started answering the questions herself and then asked the newly hired nurses to answer the questions, which led to discussions by the new nurses of their concerns and personal approaches they used for managing stressors. They told stories about their stressful experiences and how they dealt with the situations. The CNS said that she was available to talk with the new nurses if they had concerns during their work in the PICU.

This presentation on health in the workplace, was followed by a nurse from oncology, who taught about "Oncology in PICU". The remainder of the morning was devoted to the CNEs' presentation about cardiac care and hemodynamic monitoring in the PICU. They used PowerPoint and some handouts during their lecture. Sometimes, questions and answers, short group discussions, short debates and sharing experiences happened, like other classes.

After lunch and some informal socializing, the CNEs instructed the new nurses about Code Blue and some other contents such as technical subjects (including nursing, respiratory therapy and physiotherapy) and learning and development in the unit that I will elaborate on them in the

future sections when I am describing contents of instruction in the Orientation sessions. The session continued through the afternoon, with the new nurses adding narrative accounts of their previous experiences as part of the discussion. At times, the new nurses' accounts provided information that was new to the CNEs, effectively becoming the CNEs' instructors.

5.1.2.4. Session 4

Increasingly, the newly hired nurses socialized and came to informally share their professional experiences and personal lives with their new colleagues. Once again, the CNEs led instruction about electrocardiogram (ECG) interpretation. Teaching included a presentation with case studies on ECG, using real ECG strips for the learners to interpret. Sometimes the CNEs asked multiple choice and short answer questions to test the new learners. As in other sessions, this day included both theoretical instruction and some practical shortcuts. The remainder of the morning was devoted to instruction by the clinical nurse educators teaching about cardiac related topics (Principles of Cardiac Output).

After lunch, a person from Human Resource (HR) department of the hospital spoke to them and provided them with brochures about online access to HR systems including access to their pay stubs, the respectful workplace, and available resources and support. Though the person from HR did not use a computer during her presentation, even when describing how to have online access to paystubs, the clinical nurse educators pulled up related website and showed it to the newly hired nurses.

The instructional session which followed was about Medication Administration. This section was taught by the CNEs themselves. They used PowerPoint slides and handouts to explain medications and provided examples of medication administration errors that had happened in the

unit. While teaching, the CNEs frequently commented on the need for safe medication administration and explained expectations of the unit and its attending physicians. After lecturing about medication administration, nurse educators asked the newly hired nurses to work on some case studies, in which they calculated medication dosages and infusion rates of medications for cases described in the sheets given to them. These activities generated frequent questions and responses for the CNEs and the other nurses.

5.1.2.5. Session 5

Session 5, the last of the day long Orientation sessions began with the CNEs asking the newly hired nurses if they had any questions, issues or concerns about the Orientation sessions or anything else they wanted to discuss. Since the Orientation sessions continued into the beginning of their Preceptorships, they began to discuss some of the issues, such as intimidation that got into their way of learning in the unit. This was followed by a short informal verbal test by the CNEs on topics covered by the instruction during the Orientation sessions. This was continued by a presentation by the Quality and Research Coordinator who described the research activities in the unit. He started his presentation by a short introduction about himself and his role in the unit. He gave a picture of involvement of the PICU in research activities at local, provincial, national and international levels. One of the projects about which the instructor described in his PowerPoint presentation was PICU Participatory Action Research (PICU PAR) and its history, logic and purpose. His talk spurred a considerable number of questions which he answered.

The next instruction was devoted to a presentation by the Family Centered Care (FCC) specialist who spoke about history and evolution of family oriented care and issues regarding End of Life Care. She used computer, PowerPoint, video clips (about FCC program), examples,

personal experiences and stories, as well as practical exercises. Sometimes the amount of information communicated in this teaching session seemed to overwhelm the nurses. There was good learner engagement in the discussions. At the end of the day, the clinical nurse educators took over and explained online annual certifications using the Provincial Health Service Authority (PHSA) learning hub.

5.2. Contents of instruction in the Orientation sessions

In the previous section, I described the Orientation sessions, their role in introducing newly hired nurses in the unit and prototypical format of the Orientation sessions. In this section, I describe contents of instruction or learning objectives of these Orientation sessions. For this purpose, first, I identify and outline these contents, and then I give more details about each of the contents.

During the Orientation sessions, the newly hired nurses were instructed about various topics that can be categorized into the following subjects: (1) technical subjects, (2) learning and development in the unit, (3) research in the PICU, (4) routines of working in the PICU, (5) quality improvement, (6) cultural issues, (7) information management, (8) knowledge of available support.

5.2.1. Technical subjects

Technical subjects were one of the most important topics that the newly hired nurses were instructed during their Orientation sessions. In this regard, the newly hired nurses were taught about three types of technical subjects: (1) nursing, (2) respiratory therapy, and (3) physiotherapy. These will be briefly described in the following sections.

5.2.1.1. Nursing technical subjects

Nursing technical subjects were one of the most important contents that the newly hired nurses were instructed in their Orientation sessions. Though the newly hired nurses were experienced and expected to be familiar with these procedures, the Orientation sessions provided an opportunity to explain and practice the assumptions and standard ways of performing these procedures in the PICU. They were instructed in various subjects of nursing science that included following topics: nursing care for patients with respiratory problems (care in respiratory failure, airway care, artificial airway, artificial airway suctioning, tracheostomy care, nursing and intubation, as well as arterial blood gas analysis or ABG), cardiac nursing (ECG interpretation, essentials of cardiac output, hemodynamic monitoring and IV therapy that included preparing an IV infusion, priming an IV set and using infusion pumps in IV therapy), critical care oncology nursing, hemodialysis, performance of procedures for various types of codes (Code Blue, Code Red) and end of life care. They were told that they needed to learn and update their knowledge of all of these subjects regardless of the level of care they were going to give in the unit since “it is PICU and you don’t know what will happen to your patient at any moment”.

5.2.1.2. Respiratory Therapy technical subjects

The newly hired nurses were instructed about various aspects of respiratory therapy (RT) that included essentials of medical knowledge for RT (such as physiology of respiratory system and pathophysiology of lungs diseases), RT science (such as basics of mechanical ventilation) and RT equipment (including the various ventilators such as Jet Ventilator, Oscillation, Bilevel Positive Airway Pressure (BIPAP), Continuous Positive Airway Pressure (CPAP) and ABG machines. As I will elaborate later, the newly hired nurses were instructed not to do any of the

tasks that were in RTs' scope of practice. The instruction was only to provide them with information that will help them to collaborate with RTs and not to enable them to do tasks that were not in their scope of practice.

5.2.1.3. Physiotherapy technical subjects

Similarly, the newly hired nurses were instructed in technical subjects related to physiotherapy (PT) to enable them to work effectively with PTs in the PICU. In this regard, they were taught about topics such as physiology of respiratory system, chest care, chest physiotherapy and some physiotherapy- related equipment. They were encouraged to respect role boundaries and their scope of practice and not to do any of the tasks that fall in the scope of PTs' practice.

5.2.2. Learning and development

During their Orientation sessions, the newly hired nurses were instructed about subjects related to learning and development in the PICU. In particular, the following themes emerged in the presentations and discussions by instructors: (1) importance of learning for delivering better care, (2) learning as a team work activity, (3) interprofessional learning opportunities, (4) barriers to learning.

5.2.2.1. Importance of learning for delivering better care

From the first day of Orientation, the newly hired nurses were instructed that ongoing learning was a crucial aspect of working in the PICU. In particular, they were told that learning from others' experiences and mistakes was very important for preventing the same mistakes that others did. In this context, they were introduced to the Patient Safety and Learning System (PSLS) as a learning tool, rather than as the system used to report clinical errors:

P38: _Orient_Obs 1_Session 1__RTF.rtf - 38:37 (42:43); QSL:

Instructor: *It's all about learning. In the PICU, continuous learning is important and purpose of PSLS is learning. Learn from other's mistakes. When we read other's mistakes [and consequences of them] we learn from these and do not commit the same mistake.*

The newly hired nurses were also taught that various important Quality Improvement (QI) meetings occurred that were valuable learning opportunities that they should participate in.

5.2.2.2. Learning as a team work activity

The CNEs also emphasized that learning in the PICU was a team activity with three important features: interpersonal, participatory and collaborative action. As demonstrated by the incorporation of presentations by RTs, PTs and others the multidisciplinary aspect of teams was important. Consequently, learning in the PICU happened in teams, with joint participation, interpersonal interactions and collaboration being essential components to learning in the PICU.

P39: Orient_Obs 2_Session 2_RTf.rtf - 39:15 (28:28):

Instructor (Respiratory Therapist): *You will see in the unit that we work as team and learn in team. We work collaboratively and learn collaboratively. It's completely fine to ask [questions] when you need. Double check when you need. RTs can also help you anytime you need and you can help us. Any time you need help, ask us and we will be happy to help.*

5.2.2.3. Interprofessional learning opportunities

In the Orientation sessions, morbidity and mortality rounds (patient review) were described as opportunities for interprofessional learning. The newly hired nurses were instructed that in these rounds, cases were presented in the unit with participation of all disciplines involved in their care in order to analyze and learn from these experiences and to deliver better care. They were taught that the purpose of these teaching was merely learning by all disciplines and persons

as multidisciplinary learning, not blaming any specific discipline or person. They were considered as change ideas and start points for delivering better care in the unit:

P48: Orient_Obs 5_Session 5_ RTF.rtf - 48:31 (74:75): Instructor (QSL):
Interprofessional teaching is very important in the unit and unit has great amount of interprofessional teaching and learning. Physicians, residents, fellows, RTs, RNs and everybody in the care are involved in these sessions. Case presentations [pause] [or] morbidity rounds are interprofessional teaching events that happen in the unit and the purpose of interprofessional teaching is only learning [not blaming]. Try to participate in these.

5.2.2.4. Barriers to learning

As it was indicated, the Preceptorship had overlap with the Orientating sessions. In this time, the newly hired nurses encountered various barriers to learning in the unit. They shared these barriers with other in the Orientation session. Some of the barriers that newly hired nurses discussed in the Orientation sessions were as follow: individual barriers, such as stress, cultural barriers including intimidation, organizational hierarchies that created barriers related to the different roles of people in a teaching hospital, and barriers related to the quality and quantity of teaching tools.

5.2.3. Learning about research in the PICU

The newly hired nurses were instructed about importance of research activities in the PICU and the importance of research and Evidence-Based Medicine (EBM) in delivering better care. Information about current research in the PICU further supported the importance of evidence based practice in the PICU. Together, the presentations and discussions emphasized that working in the PICU incorporated team work, ongoing learning and development with research to deliver quality care in the unit (Figure 5.1).

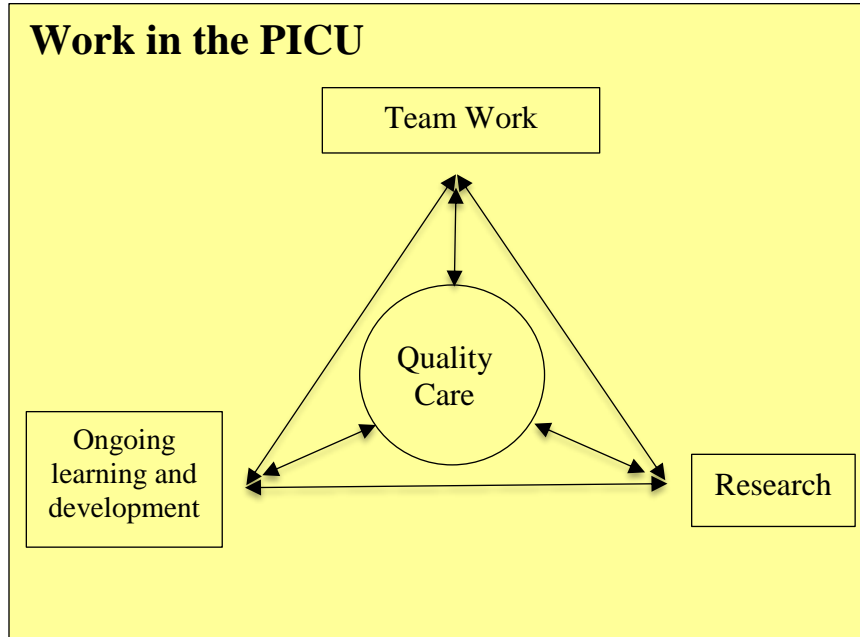


Figure 5. 1: Contents of teaching in the orientation sessions: interplay between team work, learning and research to deliver quality care

5.2.4. Routines of working in the PICU

The routines of the PICU was another important topic that were taught to the newly hired nurses during Orientation sessions. In so doing, they were instructed about the following topics: (1) routines of clinical teams, (2) personal routines and preferences, (3) routines and expectations related to the families.

5.2.5. Quality Improvement (QI)

Specific instruction about Quality Improvement (QI) was another important topic during the Orientation sessions. The newly hired nurses were taught about following topics regarding QI: (1) theoretical knowledge of QI, (2) good practice, (3) two QI approaches, (4) QI projects in the PICU, (5) patient safety, (6) QI and learning, (7) role of digital mobile devices in QI.

5.2.5.1. Theoretical knowledge of QI

The nurses were taught that change is an essential part of personal and professional life. Therefore, the staff need to be open to this ongoing phenomenon. They were even told that even the models used for quality improvement in the unit have changed and the unit was using a participative model for QI at the time.

The nurses were taught about different models of QI with special focus on models used in the PICU. In so doing, they were instructed about quality improvement models such as the Institute of Healthcare Improvement (IHI) model, imPROVE model, Lean methodology, Rapid Process Improvement Workshops (RPIW), audits and curiosity model. They were instructed that these models treated as top-down strategies and were not helpful enough in the PICU. Therefore, the unit started to adopt a participatory model for quality improvement in which projects are developed by frontline staff and supported by the managers.

5.2.5.2. Good practice/ best practice

The nurses were taught that good practice/ best practice was considered practice based on evidence coming from research, particularly evidence that supports pediatric:

P42: Cohort 2_ Orient_ Obs 5_Day5_Jan 31_2014_RTF.rtf - 42:12(18:18):

Instructor: *[Good/] Best practice is working based on the evidence that comes from the research. The McMaster University has done a study in which they have seen that only 267 [limited number of] published randomized controlled trials have been done in Pediatric Critical Care. This means that whatever we are doing in the unit for kids is not [kids'] evidence based [i.e.: based on evidence coming from research on kids].*

While instructors were teaching the newly hired nurses about good practice/ best practice, they also taught them about unit policies and procedures as a way of engaging in good practice.

5.2.5.3. Two QI approaches

The CNEs described two approaches to QI that PICU has experienced recently: top down approach (old approach) and participatory approach (down-to-top approach). They were instructed that in the top-down approach, QI projects were developed by managers and pushed down to bedside in the unit. While in the participatory approach (down-to-top approach), which was a new approach in the PICU, QI projects started by frontline staff and were supported by managers. While the newly hired nurses were told about the two approaches to QI in the PICU, they were also taught about staff attitudes towards these two approaches. Recently the unit had shifted towards a participatory approach as a new way of envisioning Quality Improvement.

5.2.5.4. QI projects in the PICU

In the Orientation sessions, the newly hired nurses also were taught about various QI projects implemented in the PICU such as various Rapid Process Improvement Workshops (RPIWs), Friday Practice Update, Purple Sheet and the PICU PAR. RPIWs were described as workshops in which PICU staff were instructed and mentored to implement changes in the unit at a fast pace in workshops that lasted 3-5 days. Two changes that resulted from this approach were the institution of the Friday Practice Update emailed to staff to inform them about updates of activities and policies in the unit. The Purple Sheet was a checklist used during rounds to improve quality of care by systematically reporting information about patients and their care. It was developed by a physician in the unit and was very well integrated in the system of rounds. The PICU PAR project was the first participatory initiative for Quality Improvement in the unit.

5.2.5.5. Patient safety

Patient safety was another important topic related to QI that was part of the Orientation of the nurses. In general, they were taught to pay more attention to patients' safety and prevent any possible harm to patients. In this regard, safe medication administration was one of the important safety issues that they were instructed. They were asked to adhere to guidelines, policies and procedures of safe medication administration in the unit. For this purpose, they were recommended to double check the orders, pay attention to high alert medications, administration of electrolytes, standard infusions, and related documentations.

The newly hired nurses were also taught about “Stop the Line” initiative as a patient safety initiative. This was an initiative based on which if any of the staff felt that tasks were being conducted in a way that were harming or endangering any of the patient(s), they had to ask healthcare team to stop line of the actions under implementation as soon as possible. The newly hired nurses were instructed to adhere to the guidelines related to this initiative. These guidelines encouraged them to be brave and interrupt care processes at any time that they would perceive patients' safety was in danger. They were also instructed about Patient Safety and Learning System (PSLS). This topic seemed more related to learning aspect of Quality Improvement; therefore, it will be described in the next section.

5.2.5.6. QI and learning

In the Orientation sessions, the newly hired nurses were taught about learning aspect of QI and patient safety. In this regard, they were instructed that learning was an essential component of any QI related activity such as QI projects (for example RPIWs), QI meetings, patient safety initiatives such as safe medication administration, medical error management and Patient Safety

and Learning System (PSLS). They were instructed that this learning was crucial in the PICU and contributed in delivering high quality care.

For example, regarding PSLS they were taught that PSLS was a tool for learning, improving patient safety and quality of care. They were taught that in fact the main purpose of PSLS was learning; PSLS was a system for learning from mistakes and errors and a tool for delivering high quality care:

P38: Cohort 2_ Orient_ Obs 1_Day1_Jan 09_2014_RTF.rtf - 38:37(42:43):

Instructor: *It's all about learning. In the PICU, learning is important and purpose of PSLS is learning. Learning from other's mistakes. When we read [about] other's mistakes [and consequences of these mistakes] we learn from these and do not commit the same mistake[s]. I read the reports of PSLS. Some people ask me in the unit 'did you read that report?' this means 'give me some feedback [, and I want to learn]'. And I give them some feedback then. As I said, it's all about learning.*

5.2.5.7. Role of digital mobile devices in QI

In the Orientation sessions, the newly hired nurses were instructed about the role of digital mobile devices such as iPads in QI. In this regard, they were taught that iPads could facilitate process of reporting medical errors to PSLS because they could do PSLS reports using iPads while working in those bedsides that did not have access to desktop computers.

P48: Orient_ Obs 5_ Session 5_ May 29_ 2014_ RTF.rtf - 48:41 (84:85):

Instructor: *iPads are going to facilitate the PSLS report system. You will do it when you are in the bedside using the iPads. iPads will make it simple and easier. ...In iPads, drop downs are slow, but they are working.*

5.2.6. Cultural issues

In the Orientation sessions, the newly hired nurses were taught about various cultural aspects of the PICU including the (1) culture of participation, (2) culture of anticipation, (3) siloed care, (4) blame culture, (5) culture of Family Centered Care (FCC).

5.2.6.1. Culture of participation

In the Orientation, the CNEs discussed the existing culture of team work in the unit and new nurses were encouraged for participating in team work with other disciplines such as RTs. Team work inside RT group and the need for more team work and cooperation for information transfer between nurses and RTs in specific times such as mornings were other things that the newly hired nurses were instructed:

P39: Orient_Obs 2_Session 2_Jan 23_2014_RTF.rtf - 39:16 (29:29):

Instructor (RT): *We have a good unit now. Before this it was hierarchal, now we have good situation we are working in teams and we share everything. Ask help and give us help or offer us help. I have also helped nurses and they have done it for us. Changing the dipper [they laughed]. Ask us 'can you help us giving bath to this patient?' We can help you and take care of the respiratory issues [or other things].*

Additionally, the new nurses were encouraged to get involved and participate in various activities in the unit. For example, they were taught to get involved in QI activities, changes in the unit, interprofessional teaching and learning, as well as research activities. They were also encouraged to share their ideas with others the unit.

The culture of communication was a major issue within the unit. They were taught that impaired communication was one of the barriers to quality improvement and patient safety in the unit, and therefore, there was a big need for improving communication. Therefore, they were encouraged for participating and engaging in improving communication in the PICU:

P48: Cohort 3_Orient_Obs 5_Day 5_May 29_2014_RTF.rtf- 48:16 (53:53):

Instructor: *Top down approach, [lack of] engagement, [lack of proper] communication and siloes are issues in QI in the unit. Give your voice and ideas. Any time you see and feel [that] you have ideas for improvement you can come to us and openly talk about your ideas.*

5.2.6.2. Culture of anticipation

The newly hired nurses were instructed about culture of anticipation in the unit. They were instructed to anticipate their needs and the work to be done in the unit and adopt anticipation as a normal practice for themselves.

They were also taught that some attending physicians anticipated that the staff would need interdisciplinary skills for working in the new hospital that was under construction at WCH and the PICU was going to move there soon. This was because of the spatial design of the new unit in the new hospital. For this reason, they (attending physicians) recommended the staff to learn various skills from each other in order to be able to deliver high quality care in the new unit in the near future:

P46: Cohort 3_Orient_Obs 3_Day 3_May 22_2014_RTF.rtf-46:14(16:16):

Instructor (RT): *We should bundle our care. ... we will learn from each other collaboratively. DR. Z wants RTs learn some works from RNs and vice versa. He is thinking of the new hospital.*

5.2.6.3. Siloed care

In the Orientation sessions, the newly hired nurses were instructed about culture of siloed care and siloed teams in two forms: direct instruction and indirect instruction. Some instructors (such as instructors of research activities in the unit) directly taught the newly hired nurses that siloed care and siloed teams were issues in the unit that impeded delivering high quality care, therefore, recently the unit started moving towards culture of participation. In order to improve this situation, the newly hired nurses were encouraged to work in teams and participate and help the unit in improving culture of participation.

Direct instruction about culture of silo functioning and siloed teams could also be seen when the newly hired nurses were taught about inter-professional teaching in the PICU:

P48: Orient_ Obs 5_ Session 5_ RTF.rtf - 48:38 (82:82):

The newly hired nurse: *Nurses and staff involved in the care are involved in the case presentations in my previous workplace. They are not physician lead; they are led by people involved in the care as team.*

Instructor: *Ours are physician led mostly.*

Some instructors such as allied health instructors (for example, RTs) instructed the newly hired nurses in this regard in an indirect form. In so doing, they taught the newly hired nurses that they should adhere to their own role boundaries and restrict their scope of practice to nursing tasks only. In other words, they instructed the newly hired nurses that they should not do any task that was outside of nursing field even though they were taught about tasks and techniques related to allied health in their Orientation sessions or even if they had great amount of knowledge, skills and experience regarding allied health from their previous workplace. The instruction about adherence to role boundaries were very strong inducing the feeling of siloed teams. In other words, the impression was that nursing team and other allied health teams were functioning in silos.

The importance of adhering to professional role boundaries was taught when some instructors were teaching about their own specialties, tasks, roles and duties in the unit to the newly hired nurses. In so doing, these instructors emphasized at the newly hired nurses' scopes of practice and stressed that nurses could not and should not attempt to do those tasks that might seem common between nursing team and the instructors' specialty. In other words, they taught the newly hired nurses what nursing team were allowed to do and what they were not allowed and should not do:

P39: Cohort 2_ Orient_ Obs 2_Day2_Jan 23_2014_RTF.rtf - 39:49 (84:84):

Instructor (PT): *None of these are prescriptions. Neither of them are nurses' job. They are for your information and teaching [in the Orientation session]. Nurses only need to be aware of them and ask the PT [strong stress on ask and PT] to do it." [The connotation was like creating a strict boundary around the PT discipline.]*

5.2.6.4. Blame culture

There were instances in the Orientation sessions where the newly hired nurses were taught that blame culture existed in the unit. When the instructors were teaching about QI and patient safety topics such as safe medication administration, the stories that instructors told indirectly carried a strong message of presence of blame culture in the unit:

P32: Cohort 1_ Orient_ Obs 3_Day3_July 23_2013_RTF.rtf - 32:25 (22:23):

Instructor: *There was a medication error that a kid received an IV medication with a dosage of 10 times normal. [As soon as explaining this, the instructors mentioned that:] It was pharmacists' mistake. It was pharmacist's fault. The nurse had controlled the label [and barcode] and everything was fine on nurse's side [in terms of controlling the dosage], but the medication had been prepared in higher dosage in the pharmacy [level]. The mistake was not caught in the PICU. When the patient [was] moved [to] upstairs, the problem was discovered [by the pharmacist]. The way that it was discovered was that they were discussing to prepare the medication for the patient for the time that patient will be in the unit. One pharmacist tells that we have the medication for this. And then when they were checking the ordered dosage and the dosage of the bottle, they figured out that there was such a mistake so that the kid should have been given 0.1 mg [per kg] while the patient had been given 1 mg [per kg].*

5.2.6.5. Culture of Family Centered care (FCC)

In the Orientation sessions, the newly hired nurses were instructed about existing culture of family centered care (FCC). In this way, they were first taught about history, evolution, significance, existing culture of FCC in the unit, and ideal model of FCC. Regarding the importance, as an example, they were instructed that due to significance of culture of FCC and in order to establish this culture more than before, hospital had involved families in the project of

development of the new hospital. They were instructed that families had great amount of productive input in this project from the beginning, when it was in designing phase. In terms of existing culture of FCC in the hospital, the newly hired nurses were instructed that the existing culture of FCC in the unit was “doing your best to deliver family centered care” and this way they were encouraged to do their best for achieving best possible FCC in the unit. The newly hired nurses were instructed that an ideal model of FCC was not practical and the existing FCC model in the unit was the best possible model of FCC.

5.2.7. Information management

Another thing that the newly hired nurses were instructed in the Orientation sessions was information management. In this regard, they were taught about (1) tools used for information transfer and (2) finding information.

5.2.7.1. Tools used for information management

In terms of tools used for information management, the newly hired nurses were instructed about patient assignment board and the Purple Sheet. The newly hired nurses were taught that patient assignment board was a glassy board located on the wall between nursing station and the Tactical Center and was used for communicating various information about the patients and staffing to the staff. For example, they were taught that it was a tool showing which patient was assigned to which nurse, which service each patient belonged to, who was clinical nurse coordinator (CNC), who were other staff members, and if there was any patient planned to move in or out of the unit. Therefore, they were taught that they needed to check it in the beginning of each shift to learn about the patient they should look after, their colleagues in that shift and other

information that would help them in planning their daily activities. They were instructed that on this board, they could also see some information about the staff working in the next shift.

The Purple Sheet was another information management tool that the newly hired nurses were taught about. They were instructed that this tool was a double sided one-page purple form produced by a physician in the unit. It was created since there was a big variation in presenting information in the rounds that led to loss of great amount of useful information in the rounds. After creation, this tool was used as a systematic way of transferring consistent patient-related information in the point of care in the unit. It was also a checklist for improving continuity of care, quality improvement and learning, and it would be their best friend while working in the unit:

P48: Cohort 3_ Orient_ Obs 5_ Day 5_ May 29_ 2014_ RTF.rtf - 48:32 (76:76):

Instructor: *It [purple sheet] is a tool for presenting accurate and consistent information in the point of care. It started because some people were missing some parts of the information that needed to be presented by them. Each person presents information that they recall. Some people miss some information that are very important for others in patient care. This leads to the point that various parts of important information are lost. To make presentation of relevant information consistent, this tool [purple sheet] was created and used. It is a standard process for presenting information. It is a tool for learning. All the information presented in all rounds are presented in a consistent way using this tool. Everybody in the team are expecting same order of information as [in the purple sheet]. It is a systematic way; it has information and checking what is missing. All the points in the purple sheet are for discussion. The logic behind the points in the purple sheet is discussion, but it is used as a checklist [as well].*

P30: Cohort 1_ Orient_Obs 1_Day1_July 16_2013_RTf.rtf - 30:32 (24:24):

Instructor: *Purple Sheet will be your best friend.*

5.2.7.2. Finding information

In terms of finding information, the newly hired nurses were taught where and how they could find the information they needed for giving care to their patients (while working in the unit).

They were instructed that this would help them to predict what they would need for helping the patients coming to the unit.

5.2.8. Knowledge of available support

They newly hired nurses were instructed about the available supports (such the staff around them), resources (such as other people, policies and procedures) and logistics (such as clinical equipment) to them in the unit. They were instructed that they were not left alone in the unit. The unit and all the staff were there to support them. Additionally, they were instructed that there were enough logistics out there in the unit for delivering care in the unit. The newly hired nurses needed to learn where to find them.

Summary and interpretation

Thus, during Orientation sessions, the newly hired nurses were informed about Hospital and PICU policies and procedures, as well as learning and development in the unit, research, routines of working in the PICU, quality improvement initiatives in the PICU, the cultural issues in the unit (such as culture of participation, anticipation and culture of Family Centered Care), information management and support that is available to them.

Perhaps of more significance, they were instructed in more technical aspects of critical care nursing, respiratory therapy, and physiotherapy by the respective professional who employed more complex teaching strategies. The goals of each instruction were to provide shared understandings of the ways that nursing procedures were performed in the PICU, and to provide the basis for multidisciplinary team work with RTs and PTs. All the instructors emphasized on respecting their role boundaries and scope of practice.

During the Orientation sessions, the newly hired nurses were taken back to the basic competencies of nursing. The didactic instruction fit the information transfer model of teaching with limited interaction and engagement. The apparent goal was to make knowledge about basic procedures that was assumed to be tacit, explicit as an assurance of the competencies of the new nurses and assure the CNEs that the new nurses shared a common understanding of procedure that may vary from hospital to hospital.

Some forms of simulations were used in the Orientations, as I will elaborate in the next section, to teach the newly hired nurses specific skills. These limited simulations fell well short of emulating the experience or knowledge that is the product of working in a PICU with real patients. This latter kind of knowledge was acquired in the Preceptorship, which is described in the next section of the thesis. It requires the newly hired nurses to participate in the PICU setting with real patients who are treated by a multidisciplinary team of care providers.

5.3. Specific aspects of teaching in the Orientation session

This section looks more closely at specific aspects of teaching during the Orientation session. It explores particular teaching activities that are characteristic of adult education such as experiential teaching, modeling (cognitive and behavioral), and reflection (in and on action). It also examines a more general strategy of scaffolding. This portion of the chapter also considers the role of the instructional tools used for teaching (such as computer, mannequins, teaching videos). Additionally, this section identifies analytical concepts that help us explain teaching activities in the Orientation session.

5.3.1. Teaching activities during the Orientation sessions

5.3.1.1. Presentations

Presentations were the most frequent teaching activities used for instruction during the Orientation. Presentations were made by the CNEs and staff from other units and administrative units. The objective of these presentations was to prepare the newly hired nurses for work in the unit. This was made explicit by a statement by one of the CNEs at the beginning of the Orientation sessions. The instructors used various tools during their presentations including computers (for PowerPoint slides), video projectors, and the internet and whiteboards for mediating learning among the newly hired nurses. However, not all the instructors used PowerPoint slides in their presentations.

Instructors involved their learners in the process of their presentations at different levels; however, majority of the instructors used high levels of learner involvement in their teaching by asking questions, encouraging the learners to or ask questions and asking them to share their experiences.

5.3.1.2. Simulations

Simulations were another teaching activities in the Orientation sessions. The newly hired nurses were the only participants in the simulations. Various forms of simulations were used in the Orientation sessions. These include basic activities in the PICU such as drawing blood from the patient, blood glucose testing, setting up an infusion pumps, setting up a Bilevel Positive Airway Pressure (BIPAP) machine, endotracheal intubation and doing physiotherapy. Before simulations, the process was verbalized and various steps were demonstrated. The purpose of these simulations was to help the newly hired nurses eventually be able to use the simulated techniques and skills in

a real-life situation of the PICU. These simulations, employed various equipment as learning tools. To simulate drawing blood this included mini bags and a red liquid imitating blood, equipment to represent blood vessels, and syringes. They also used real infusion pumps during the simulation. To simulate BIPAP machine, they used a functioning BIPAP machine. For intubation, they used a laryngoscope, Endotracheal Tube, a mannequin took the place of a patient and ambo bags functioned as ventilator machine compressor for ventilation.

The newly hired nurses were asked to perform the techniques and experience them in the simulated situation. While practicing these techniques and skills, they were given feedback and asked to reflect on their performance. The entire process was repeated several times and the more they practiced, the less they needed comments and support from the instructors. At the end, they were able to perform the tasks and techniques without any support from the instructors.

5.3.1.3. Case studies

Cases studies were other teaching activity that were used for instructing the newly hired nurses in the Orientation sessions. Detailed descriptions about some cases were given to the newly hired nurses. These description(s) included information about the diagnosis, past medical history, medications, lab results and diagnostics related to the patients. Then, the newly hired nurses were asked to answer questions based on the patient's situation presented in the cases studies. The tools that were used in these activities were print outs of the cases, and in some situations computer and PowerPoint slides and the video projectors and TV screen used to display the presentations. During the sessions that used case studies, the newly hired nurses were asked questions by the instructors. Additionally, the instructors asked them to reflect on their answers. While reflecting, they taught them more about various aspects of these cases and additional issues related to the cases, such as

the relevant pathophysiology, medications, and the type of nursing care that would be appropriate in the PICU. Several times the newly hired nurses started to demonstrate their own knowledge with the instructors that created a mutual teaching and learning atmosphere.

5.3.2. Analytical concepts underlying teaching activities

This section examines the underlying analytical concepts derived from teaching and learning theories such as experiential learning theory (113,121,129), reflection and reflective practice theory (121,133–136). In so doing, I will examine face to face interactions, experiential (hands-on) teaching, modeling (including cognitive and behavioral modeling), articulation, reflection (in and on) practice and scaffolding.

5.3.2.1. Face to face interaction

In general, all the teaching activities in the Orientation sessions happened through face to face interactions in a classroom outside of the context of the PICU. This way, the Orientation session missed situatedness of teaching and learning which is an important aspect of learning among the PICU nurses, as I will elaborate later in my findings about the Preceptorship. Through these interactions, instructors presented, described and demonstrated various steps of numerous procedures and asked the newly hired nurses to actively engage in the skills and procedures. They also provided feedback to the newly hired nurses. Most of the instructors involved their learners at high level in the process of their instruction by asking questions, encouraging the learners to ask questions and by asking them to share their own experiences.

5.3.2.2. Experiential teaching

The newly hired nurses also were taught through experientially (hands-on) in the simulations, which provided opportunities for active experimentation of various skills (such as

drawing blood in simulated situation). This prepared the nurses to use these skills later in real setting. This is significant since nursing (in general and PICU) is a practical profession and is supported by experiential learning theory.

5.3.2.3. Modeling

Teaching in the Orientation sessions also happened through Modeling. Two kinds of modeling were used in the Orientation session that included cognitive modeling and behavioral modeling. Cognitive modeling means demonstrating the thinking process and behavioral modeling means demonstrating behavior process. Cognitive modeling was used more frequently than behavioral modeling. In cognitive modeling, instructors described the theory, process and steps of each process, while in behavioral modelling, such as simulation, the instructor's performance serves as the model. For example, when the instructors were teaching about calculating medication dosages, or how to use the Pyxis machine, infusion pumps, interpreting Arterial Blood Gas (ABG), Electro Cardiogram (ECG), or how to do self-scheduling, they described the principles behind each of these, how to interpret these tests (if it was a test) and how to perform the procedures. Thus, they verbalized their thinking process about each of these instructional topics. I have copied here a typical example from my field notes that describes an instance of cognitive modeling:

P32: Orient_Obs 3_Session 3_ 32:43 (25:25):

Before starting to do dosage calculations, the instructors reviewed some theory and formula about medication dosage calculation. Theory of medication under instruction were described. Elements of drug calculation formula or sometimes simple math formula were reviewed verbally. They also orally described the steps in using the formula, and then they asked the nurses to use the formula for calculations. The newly hired nurses used calculators for this purpose. Instructors also asked some questions that required short answers. When the newly hired nurses were answering their questions, instructors gave rapid verbal reinforcement feedback such as "correct; good". Meanwhile, more questions and answers happened.

Instructors also used behavioral modeling during the simulated situations. In simulations, the instructors demonstrated the process and steps of doing the desired task and the nurse were then asked to perform the same procedure. For example, in teaching how to draw blood for ABG analysis in the PICU or how to set up a BIPAP machine, they demonstrated various steps of doing ABG sampling or setting up the BIPAP.

In some situations, the two processes of cognitive modeling and behavioral modeling were combined so that, first, the thought process and steps were described. Then, the instructors demonstrated the task by showing the newly hired nurses how the task should be done. Sometimes they described it while doing the procedure. There were also situations in which they did the task practically and description happened right after.

5.3.2.4. Articulation

Articulation was another process through which instruction occurred in the Orientation sessions. This means that learners benefited from the instructor's stories and experiences and this made the learning more concrete and authentic. It also means that the instructors reinforced concepts already taught or concepts that they were teaching by connecting theory to practice (210). In articulation instructors combined explanations with stories they told about their own experiences. In this way, learners benefitted from concrete examples. Sharing experiences to articulate instruction was not limited to main instructors of the Orientation sessions. The newly hired nurses as well frequently shared their experiences and stories during both the Orientation sessions and informally in conversations outside of Orientation. One example of supporting principles with stories was a story of medication error. In this story, the instructors used story of medication administration error (that had occurred in the unit) as a concrete example to consolidate

their theoretical teaching while they were teaching about theory of safe medication administration. One of the CNEs recounted an instance of one of the most common medication errors, a mistake caused by a misplaced decimal point that resulted in a patient receiving 10 times the prescribed dosage. Fortunately, the patient was not harmed.

P32: Orient_Obs 3_Session 3_RTF.rtf - 32:25 (22:24):

Instructor: *There was a medication error that a kid received an IV medication with a dosage of 10 times normal. [As soon as she explained this, the instructors mentioned that:] It was pharmacists' mistake. It was pharmacist's fault. The nurse had controlled the label [and barcode] and everything was fine on nurse's side [dosage wise], but the medication had been prepared in higher dosage in the pharmacy. The mistake was not caught in the PICU. When the patient [was] moved [to] upstairs, the problem was discovered [by the pharmacist]. The way that it was discovered was that they were discussing to prepare the medication for the patient for the time that patient will be in the unit. One pharmacist tells that we have the medication for this. And then when they were checking the ordered dosage and the dosage of the bottle, they figured out that there was such a mistake so that the kid should have been given 0.1 mg [per kg] while the patient had been given 1 mg [per kg].*

5.3.2.5. Individual reflection in and on action

Instruction by the CNEs in the Orientation sessions encouraged individual reflection. Reflection is “a learning and development process that includes the self-examination of one’s professional practice, including experiences, thoughts, emotions, actions and knowledge that enrich it.” (133). Schön introduced two types of reflection: reflection-in-action and reflection-on-action (121,133,134). Reflection-in-action is a kind of reflection that happens during the time that the practice is being performed. Reflection-on-action, is reflecting on a practice that has been performed and finished (retrospective reflection) (121). Reflections were encouraged by the instructors during simulations and case studies. Two forms of reflection (reflection **in** action and reflection **on** action) were identified in the Orientation session. Reflection in action was used when the newly hired nurses were practicing tasks

during the simulations or when they were discussing case studies. Reflection on action occurred when the newly hired nurses had finished the activities that they were instructed (such as dosage calculation, setting up a machine and drawing blood). In fact, after simulations, such as setting up the BIPAP machine, participants in the education including the newly hired nurses and the instructors started reflecting on what the newly hired nurses had done, what they could have done and what they learned from it.

5.3.2.6. Scaffolding

During the Orientation, the CNEs and other instructors also employed scaffolding. Scaffolding means temporary assisted guidance using variety of techniques to provide support to help learners progressively move towards understanding and skill levels that is beyond their current abilities and gradually gaining greater independence in the process of their learning (210). Learning objectives during the sessions were progressively increased in complexity and difficulty as the nurses demonstrated their understanding and abilities to master new information. Additionally, instructors of Orientation sessions demonstrated and explained processes to the learners. They also helped them practice the desired skills in the presence of and with the help of the instructors. The more the newly hired nurses learned, the less support they received from their instructors and the more independence they acquired in doing the activities. This continued, until they reached a point where they were able to do the tasks without any help from their instructors. In this way, the instructors helped the new nurses to reach a deeper understanding of the activities. Scaffolding was limited by the short duration of the sessions (1-2) hours. I observed situations in which the transmission of information happened without scaffolding due to time limits of the sessions.

A typical example of scaffolding occurred when two of the instructors taught hemodynamic monitoring in the Orientation sessions. They used real equipment and described and demonstrated the process of setting up an IV tube and priming an IV. Then, they asked the newly hired nurses to try to set up an IV tube and prime it. While the nurses were practicing these activities, instructors supported them by providing more verbal information and short practical helps during each part of the process. This way, they provided successive levels of temporary support for the newly hired nurses. In so doing, the instructors helped learners reach higher levels of understanding and mastering the skills and tasks being taught. This continued until the newly hired nurses were able to do the activities independently.

Summary and interpretation

The Orientation sessions were the first teaching opportunity organized for the newly hired nurses in the PICU. Teaching in the Orientation sessions happened in a classroom setting outside of the context of the PICU that was about five-minute walk away from the unit. The purpose of these instructional activities was to orientate and help the newly hired nurses get ready for working in the PICU. Various instructors from the PICU, other units of the hospital or from the Provincial Health Services Authority (PHSA) taught things to the newly hired nurses during teaching activities such as presentations, simulations and case studies. Variety of tools were used to mediate instruction in these teaching activities commonly including a computer, TV screen, mannequins, and task-specific clinical equipment such as BIPAP machine and infusion pumps.

Most presentations, the primary type of teaching in the Orientations session, occurred in a traditional classroom format detached from the real and authentic context in which the knowledge and procedures would be practiced. Similarly, interactions in case studies were limited to

decontextualized discussions between instructors and the newly hired nurses. Interactions in the simulations, however, were slightly different from presentations and case studies.

Simulations offered situations in which the newly hired nurses had access to the equipment that they would have in the real-life setting. In simulations, instructors (a) provided an environment that respected knowledge, experience, feelings, beliefs and values of the newly hired nurses during their teaching and during the time that learners were in practically doing some skills and activities in the simulations. (b) They provided an environment in which the newly hired nurses could conceptualize their experiences, develop hypotheses for solving various problems presented in the simulations, and answering questions related to their skills and activities in simulated situations. (c) They provided an environment in which the newly hired nurses could observe the skills and activities that were being performed in the simulated situation, reflect about it, reflection on the activity, and modify and improve their skills and activities. (d) Simulations also provided an environment in which the newly hired nurses could select and focus on specific problems, skills or activities to test and develop their competencies, as well as experiment in the simulated situations.

While the newly hired nurses were encouraged to reflect on their learning and experiences, I did not explore their reflections in depth nor did I discuss with them the role of reflection and reflective practice in their learning. I have relied on their accounts of reflection during more general interviews and observations.

In providing such a supportive environment for helping the newly hired nurses in their experimentation in the classroom and simulated settings, instructors used various forms of scaffolding. They: (a) showed the process and sequence of various skills and activities (behavioral modeling), (b) described and verbalized their way of thinking and the logic behind it (cognitive

modeling), (c) sometimes they added more details into their instruction whenever necessary. In so doing, they used their own experiences and stories, asked for the learners' experiences and stories, brought examples, and sometimes added more detailed theory regarding the subject to their instruction (articulation). This way, instructors helped the newly hired nurses progressively improve their skills and activities and finally be able to do the instructed skills and activities with minimal supervision in a simulated situation. Gradually, the instructors faded away and the newly hired nurses did their skills and activities independently.

Scaffolding, however, was limited by the amount of interaction that nurses could have over time. This was clear in the Orientation sessions in which instructors were trying to transfer great amounts of information to the newly hired nurses in short and focused instructional session of 1-2 hours. The clinical nurse educators, however, had ongoing interaction with newly hired nurses over the entire Orientation sessions which offered the opportunity to answer questions and augment in the instructional sessions which provided a form of scaffolding.

Even though simulations were the most interactive teaching activities, they were focused on skills that were done on a simulated patient in a simulated context that hardly resembled the real-life context of the busy, complex setting of the PICU.

Instruction in the Orientation sessions was dominated by didactic teaching, mainly in the form of presentations, that took place in decontextualized classroom settings. These sessions provided opportunities for the instructors to transfer explicit or evidence-based knowledge from nursing and other related disciplines such as respiratory therapy and physiotherapy to the newly hired nurses. However, this instruction simplified the tasks by extracting the activity from the complexity of the actual PICU setting. Lack of access to real setting with patients and team members simplified teaching some facts and skills but it also deprived them of the situated learning

that could occur in the PICU. They did not learn the full spectrum of tacit knowledge that is very important in jobs such as nursing in critical care. The simplified setting also limited their access to the real mediating tools used for the tasks.

More importantly, these classes also limited the interactions between the staff, and the dynamics of the social hierarchies which could influence their activities and learning. In short, the simulations of the Orientation sessions, offered activity systems composed by the learning subjects, their objectives, the mediating artifacts, the roles, division of labor, and the rules, that were pale imitations of the activity systems they would encounter when working in the PICU. Thus, although some simulations in the Orientation classes provided opportunities for experiential learning environments as characterized by Kolb in experiential learning theory, these simulations themselves lacked the true complexity of the PICU.

In conclusion, learning in the Orientation sessions is dominated by didactic teaching consistent with the learning as knowledge acquisition metaphor and the individualistic learning theories such as proficiency theory, experiential learning theory and reflection and reflective practice, which are reflected in this mode of instruction. The Orientation sessions, though they do include simulations, are missing important elements that contribute to effective learning such as situatedness and social interaction. Even in the simulations, where there are limited instances of scaffolding, the instructors do not determine each learner's Zone of Proximal development and develop scaffolding to suit their needs. Scaffolding requires the time and depth of interaction that is not found in the Orientation sessions, but does occur during the Preceptorship.

Preceptorship

Overview of the Preceptorship

In the previous chapter (Chapter 5), I described and analyzed the presentations and learning that occurred in the Orientation sessions as the first learning opportunity for the newly hired nurses in the PICU. In so doing, I described the prototypical format of Orientation sessions, contents of instruction, as well as activities and tools that were used for teaching newly hired nurses in the Orientation sessions.

In the following six chapters (Chapter 6 through Chapter 11), I describe and analyze the Preceptorship which is the second opportunity organized to help the newly hired nurses learn how to work in the PICU. This is a prelude and a necessary pathway to their work as an independent PICU nurse during which they will receive in depth learning about specialized PICU tasks such as Extracorporeal Life Support Program (ECLS). Findings about learning in the Preceptorship are presented in six chapters (Chapter 6 through 11) each of which elaborates on different aspects of learning activities within the Preceptorship. I have used different theoretical components of Activity Theory and Communities of Practice for organizing these chapters since as I will elaborate in the Discussion (Chapter 12) these are two major sociocultural learning theories that are explaining findings of this research.

Chapter 6 gives a thick description of the Preceptorship that includes a definition of Preceptorship and a prototypical 24-hour day of the Preceptorship with particular attention to the activities that were identified as teaching and learning activities among the newly hired nurses.

This description helps the reader gain a clear idea about the real and authentic context of the PICU setting and will be very helpful in understanding rest of the findings.

Chapters 7 and 8 explore various activities focused on teaching the newly hired nurses and learning among them. These activities are core elements about learning in Preceptorship and having a clear idea about these activities help us better understand how learning happens among the newly hired nurses in the PICU. Chapter 7 describes and analyzes the teaching aspect of the Preceptorship and the specific activities with the objective of teaching the newly hired nurses and facilitating their learning in the Preceptorship. These activities include rounds, simulations and short educational events (called EduQuicks). It also describes the instructional tools (such as computer, mannequins, educational videos), which are used for mediating and facilitating teaching. In addition, this chapter identifies underlying analytical concepts (such as modeling, reflection **in** practice, reflection **on** practice, articulation) explaining teaching activities happening in the Preceptorship. This helps us better understand how social and experiential learning theories explain teaching activities used for facilitating learning among the newly hired nurses. Chapter 8 analyzes the learning activities within the Preceptorship, giving particular attention to the activities identified as learning opportunities (such as simulations, handovers, overhearing other colleagues' discussions) by the newly hired nurses. This chapter also describes tools used for mediating and facilitating learning (such as computer, iPad, smart phones, policies and procedures). Using various learning theories (such as experiential learning, Communities of Practice and Activity Theory), this chapter also identifies underlying analytical concepts that help us explain learning activities in the Preceptorship. In addition, by describing what the newly hired nurses learn, this chapter describes and analyzes learning outcomes among the newly hired nurses during the Preceptorship.

Chapter 9 explores the relationship between social interaction and learning in the Preceptorship and helps us understand how learning happens in the PICU multidisciplinary community of practice through interaction. This chapter, first, describes and analyzes the role of social interaction in learning. Then, it explores the newly hired nurses' informal learning networks and tries to dissect who they learn from.

Chapter 10 describes and analyzes the newly hired nurses' perceptions about learning, quality of care and relationship between learning and quality of care. This exploration helps us easily connect the analytical concepts describing teaching and learning activities together and make better sense of their learning. Chapter 11 describes and analyzes learning goals of the newly hired nurses. In other words, this chapter focuses on their future Orientation for learning and what is next for them. This Chapter starts with describing and analyzing the participants' individual learning goals, then it addresses their professional identity (as an important factor for better understanding collective learning goals) and ends with their shared learning goals.

Chapter 6: Description of the Preceptorship

Overview

In Chapter 5, I described the Orientation sessions (as the first teaching and learning opportunity). This included descriptions of the prototypical format of Orientation sessions, the teaching activities and the tools used for mediating these teaching activities, as well as the contents of instruction during the Orientation sessions.

In this chapter, I will provide a brief description of the Preceptorship, which serve as the second teaching and learning opportunity. I will characterize the Preceptorship and a prototypical 24-hour day of the Preceptorship with particular attention to the activities that were identified by the Clinical Nurse Educators (CNEs) as teaching and learning activities.

6.1. Preceptorship

Preceptorship is the second teaching and learning opportunity organized for the newly hired nurses in the PICU. It includes a 12-shift period during which they start working in the PICU and are buddied by experienced nurses in the unit. This period normally takes 3 months. The purpose of this period is to expose the newly hired nurses into real care delivery activities in the PICU and provide hands-on learning experiences for them in the unit. At the end of the Preceptorship, newly hired nurses are expected to learn how the PICU functions and the work routines in the unit.

The experienced nurses buddying the newly hired nurse are called preceptors. Preceptors are picked up by the clinical nurse educators (CNEs) who are responsible for organizing educational and learning events for nursing staff in the PICU. Basis for selecting preceptors is

volunteerism, positive attitude to work, desire to teaching and experience. The unit tries to engage all the eligible staff in the Preceptorship. All of the preceptors work in the PICU and after being selected, they work with the preceptee in the same shifts for the same patients. Normally, there is one preceptor for every newly hired nurse; however, some of them happen to have more than one preceptor.

The kind of activities that were identified as teaching activities among the newly hired nurses during the Preceptorship includes rounds, handovers, simulations, EduQuicks (short education), lectures, case based or incidental education all of which included great amount of group discussions, conversations, question-answers and feedbacks. The kind of activities that were identified as opportunities for learning among the newly hired nurses includes rounds, handovers, simulations, overhearing other colleagues' discussions, learning by teaching and self-directed learning. In order to set up the context for my analysis on teaching and learning aspects of the Preceptorship in the future sections, I will, first, describe a prototypical 24-hour day of the Preceptorship in the following section.

6.2. A prototypical 24-hour day of the Preceptorship

Each regular 24-hour day in the Preceptorship includes two 12-hour shifts that encompasses a 12-hour day shift and a 12-hour night shift. Nursing day shifts in the PICU are from 0700 until 1900 and night shifts are from 1900 till 0700. There is an overlapping 15 minutes in two shifts that enables handovers between the staff working in adjacent shifts. In each 12-hour shift, two 15-minute rest breaks and two 30-minute meal breaks are assigned to all nurses including the newly hired nurses and their preceptors. In the following sections, I will elaborate on each of these 12-hour shifts.

6.2.1. A prototypical Preceptorship day shift

A prototypical day shift during the Preceptorship in the PICU starts at 0700; however, nurses usually arrive at the unit before 0700 to learn about the patients assigned to them. Patient assignments are done by the Clinical Nurse Coordinator (CNC) or the charge nurse of the shift that is ending. Then, the assignments are transferred to the patient assignment board by the unit clerk. Therefore, at the beginning of their shifts, all nurses including the newly hired nurses and their preceptors learn from the patient assignment board about the patients to whom they are going to give care in their upcoming shift. At 0700 nursing handovers starts in the unit. Two types of nursing handovers happen in the PICU: central handovers (also known as central reports), and bedside handovers (or nurse to nurse handovers).

Central reports happen in the Tactical Center room. This is a room located beside nursing station, that is used for multiple purposes such as instruction, patient review, family meetings, staff meetings, and nursing handovers in the PICU. Central reports normally take five minutes. The CNC or charge nurse of the previous shift and all the nursing staff including the newly hired nurses, preceptors and CNC or charge nurse of the upcoming shift are expected to participate in these brief central reports. In addition to these people, clinical nurse educators, the quality and safety leaders, and sometimes even the program manager of the unit participate in the central reports. The purpose of this type of handover is to give a general instruction to the nursing staff (including the newly hired nurses and their preceptors) about the status of the unit and the most important events happening in the unit. This instruction is done by the CNC or charge nurse of the ending night shift to the staff of the upcoming shift (day shift). In the central reports, the instructors use mediating tools such as the notes that they collect from the staff over the night shift to give their reports. These notes are written in a notebook that is used for mediating central reports in the shift

handovers to the upcoming shift staff. At the end of this report, the staff acquire synopsis of the most important issues happening in the unit.

After central reports, all nurses go to the bedside where a comprehensive handover occurs between nurses. In the bedside handovers, night shift nurses give a detailed report to the day shift nurses including the newly hired nurses and their preceptors using different mediating tools such as patients' charts. The purpose of these handovers is to instruct day shift nurses about all aspects of care of the patients they are going to look after. This handover usually takes between 15-30 minutes.

At the same time, at 0700, medical trainees' handover takes place. All medical trainings (fellows, residents and medical students) of both night shift and upcoming day shift participate in these handovers. The purpose of this type of handover is to instruct medical trainees of the upcoming shift about the patients that they were going to look after. Sometimes nurses including the newly hired nurses and their preceptors get involved in the discussions happening in these handovers and this way these handovers turn into learning and teaching activities for them.

At 0715 or sometimes at 0730, cardiac rounds occur. These rounds focus on cardiac surgery patients. Participants in these rounds normally include: attending physicians of the cardiac service (cardiac surgeons and cardiologists), attending physicians of the PICU (critical care specialists), sometimes attending physicians from other services (such as nephrology, neurology etc.), nursing staff (including newly hired nurses, preceptors and sometimes CNCs, charge nurses, admit and relief nurse and even the PICU program manager), perfusionists or Extracorporeal Life Support Program (ECLS) staff (if any ECLS patient), allied health staff (such as respiratory therapists, pharmacists and dieticians), medical trainees (residents, fellows and sometimes medical students). There are situations in which the number of the participants in the morning cardiac rounds reached

at around 40 people. The purpose of these rounds is primarily to evaluate each patient and reflect on their condition and their previous daily care plan. Another purpose of these rounds is to create teaching and learning opportunities for all clinical trainees, attending physicians, nursing staff, allied health staff and almost all members of care team. Significantly, these rounds are one of the major teaching and learning activities for all staff, especially the newly hired nurses.

At 0745 radiology rounds begin in the unit. Participants in these rounds are radiologist(s), the PICU attending physicians, residents, fellows, physiotherapists and radiologists. The purpose of these rounds is to review images related to the patients. These images play the role of mediating objects that bring above-mentioned disciplines together. In these rounds, normally a radiologist reviews and instructs participants about the images of the patients. Nurses said that they generally do not attend in these rounds. Likewise, I did not detect any nurses (including the newly hired nurses or their preceptors) participating in these rounds although these rounds were open for everyone in the unit.

At 0800, normal PICU morning rounds start and usually continue until 1130 and sometimes later depending on factors such as the number of the patients, their statuses, and the staffing of the PICU. During rounds participants normally include the PICU staff from almost all disciplines working in the unit that can include following groups: nursing staff (including the newly hired nurses, preceptors and sometimes CNCs or charge nurses, admit and relief nurse and sometimes program manager), allied health staff (such as RTs, pharmacists and dieticians), attending physicians from the PICU and sometimes from other disciplines such as cardiac service (surgeons and cardiologists), nephrologists and many others. Additionally, in the rounds, we could find clinical trainees such as fellows, residents medical students, pharmacy students, RT students and nursing students. Among the participants in the PICU morning rounds, attending physicians, allied

health staff and clinical trainees form the rounding group whereas some people may merely participate in the rounds of some patients. In all the rounds happening in the bedsides, the bedside nurses including the newly hired nurses stay at their own bedsides and do not follow the group conducting rounds (rounding group) going bed to bed; rather they benefit from the rounds when they reach to their patients. Like cardiac rounds, the purpose of these rounds is primarily observing the patients, evaluating and reflecting on their conditions and previous daily care plans, as well as providing teaching and learning opportunities for the staff and trainees in the PICU. These rounds focus on all the patients in the PICU rather than focusing only on cardiac patients, and they normally start from the sickest patients of the unit or those for whom decisions should be made early in the day to leave time for procedures, and then they move sequentially on the order of bed numbers. In the rounds, this is the patient that functions as a mediating tool or object and connects all the disciplines participating in the rounds together and makes care related activities, teaching and learning activities possible in the Preceptorship.

Coffee breaks take place between 0830 and 1030. Nurses coordinate with their CNCs, charge nurses, Admit and Relief (A&R) nurse and their covering nurses for their break times. In general, coffee breaks are organized to avoid absences during morning rounds; however, lunch breaks are organized around 1130-1330. Like coffee breaks, nurses need to coordinate with other colleagues for their lunch breaks.

At 1600 evening rounds happen. These rounds are like morning rounds; same people participate in these rounds and the purpose of the rounds are the same as morning rounds. However, evening rounds are not as strict and detailed as morning rounds.

At 1800, the CNCs or the charge nurse running the unit starts collecting reports from each of the staff. The purpose of this activity is to collect information about the most

important issues related to the patients and their current condition. This report is written on a piece of paper or a patient census form or is memorized and transferred into a notebook by CNCs or charge nurses. This helps the CNCs or the charge nurses to produce their own reports for the staff of the upcoming shift that occurs in the Tactical Center, as described earlier (Central Report or central handover). To collect information for this report, CNCs or the charge nurses go to all of the bedside nurses of the shift, including the newly hired nurses and their preceptors, and receive a concise report of all the important issues about their patients. Nurses, including the newly hired nurses, provide these reports to CNCs or charge nurses using various tools to mediate their report. Some of these mediating tools include patients' flow sheets, their charts, Purple Sheet, monitors and other tools that they used for documenting information related to the patient care. Sometimes, the activity of collecting report from the newly hired nurses turns into good teaching and learning opportunities in which the CNCs or the charge nurses instruct the newly hired nurses about various issues related to patient care.

At 1800, nurses including the newly hired nurses and their preceptors total the volume of all the fluids given to the patients over the previous 12 hours. At the beginning of the Preceptorship, preceptors usually give reflections to the newly hired nurses while they are doing this task. After more practice, experience, and learning, however, they do this task independently, and their preceptors only observe them and give them feedback and correct them only if need. At 1900, nursing handover occurs as the day shift ends and the night shift begins.

In addition to the activities described above, there are other activities during day shift that are identified as teaching and learning opportunities for the newly hired nurses. These

activities follow different patterns of occurrence than the daily rounds. These events include operation room (OR) handovers, simulations, EduQuicks (short educational activities), lectures, case based instruction, incidental or opportunistic teaching, peripheral learning when overhearing the discussions of neighboring patients. In the following paragraphs, I will briefly describe these activities.

The most common of these activities are the operation room (OR) handovers. Some of the PICU patients are admitted from the operation room (OR). Patients coming from OR are handed over by OR staff to the PICU staff through a standardized process. This handover is called operation room (OR) handover. Participants of this handover include OR staff (including a nurse, anesthesiologist, surgeon and medical trainees) and the PICU staff including nursing team (such as the newly hired nurses and their preceptors, and sometimes CNCs or charge nurses), medical team and allied health staff. The purpose of this handover is to transfer the patient to the PICU staff and give them the most updated instruction about various aspects of the patient being handed over. These handovers are important teaching and learning opportunities for the newly hired nurses. In OR handovers, patient acts as a mediating object (tool) that gathers staff from OR and the PICU (including the newly hired nurses) and makes interactions about care, teaching and learning possible.

Simulations are another teaching and learning activity. Every two weeks on Thursdays at 1000-1200 the unit conducts simulations. One of the most frequent simulations is mock Code Blue or Cardio Pulmonary Recitation (CPR) simulation. Participants in these simulations are staff from almost all interdisciplinary teams working in the PICU simulating real situation. The purpose of these simulations is to provide hands-on learning opportunities

about various skills (including clinical skills and non-clinical skills such as team work) to the staff including the newly hired nurses.

EduQuicks are another teaching activity that the unit organizes for teaching all the staff including the newly hired nurses. These are short face to face learning events that happen frequently in the unit and normally take between 5-10 minutes. The purpose of these sessions is to update the PICU staff about new topics and issues relevant to the unit, such as instruction on new equipment or new medication procedures. EduQuicks are organized by the clinical nurse educators, and are instructed by various people (such as clinical nurse educators, unit quality and safety leader or even a person from outside of the unit and hospital) depending on the topic. They are done both at individual and group levels. Like simulations, participants of these short education are all the PICU staff including the newly hired nurses. EduQuicks are mediated by different tools that depend on the nature and purpose of the teaching.

Lectures are other activities for instructing the PICU staff including the newly hired nurses. These presentations, that cover various topics, happen at different times in the unit and are organized by various teams such as nursing team, medical team, as well as allied health team (RT group and pharmacists) in the unit. Lectures normally are mediated using tools such as computer, video projector and PowerPoint slides. Participants of these presentations are all the staff including the newly hired nurses. The purpose of these presentations is to improve knowledge and skills of the staff and to keep up with new knowledge. These presentations happen in the Tactical Center.

Case based educational activities are other activities for educating the newly hired nurses. These instructional activities happen based on the cases that come to the unit. Any

time a patient comes to the unit, various instructors including attending physicians and preceptors use it as an opportunity for teaching about that case to the trainees and staff including the newly hired nurses.

Incidental or haphazard educational activities are other activities for teaching and learning among all the staff including the newly hired nurses. Almost all the incidents that happen in the unit are used as opportunities for teaching and learning. For example, when a patient's situation deteriorates or when a Code Blue happens in the unit, preceptors and attending physicians use these situations as opportunities for teaching the newly hired nurses and other staff including medical trainees.

Overhearing the discussions happening in the next-door patients and all those conversations and teachings happening in their catchment area are other learning opportunities for nurses including the newly hired nurses during their Preceptorship. The newly hired nurses working in one bedside can always see and hear what is happening in the rounds and discussions of the next-door patients and in general in their catchment area.

Activities such as group discussions, conversations, questions and answers, as well as feedbacks are inseparable parts of all the educational and learning activities that I described. In most of these activities, there are situations in which the newly hired nurses instruct other staff such as their preceptors, other nurses, clinical trainees (such as fellows, medical students, nursing students), as well as patients' families.

6.2.2. A prototypical night shift in the PICU in the Preceptorship

A prototypical night shift in the PICU starts at 1900. Like morning shifts, nurses including the newly hired nurses and their preceptors come to the unit and learn about the patients they are

assigned before their shifts start (before 1900). At 1900, nursing handovers happen. These handovers include Central Report and bedside handover and have the same composition and pattern that I already described for morning shifts. Like morning shifts, nurses including the newly hired nurses, first, go to the Tactical Center and receive a very concise report about the most important issues happening in the unit (Central Report). Then, they move to the bedside for receiving a comprehensive handover from bedside nurses (nurse to nurse handover or bedside handover). First coffee breaks in the night shifts are organized around 2030-2230 and dinner breaks are organized around 2230—2330. At around 1000-1100, night rounds happen. These rounds are like evening rounds in that they are not as strict as the morning rounds. Night rounds mostly look like following up patients' daily care plans and getting more updates about patients' situations. However, still they are good teaching and learning opportunities for the newly hired nurses and all other staff working in the unit. At around 0330-0530, the second coffee break happens. At 0600, the CNC or the charge nurse running the unit for night shift collects reports from nurses including the newly hired nurses for making their own reports (central reports) that are going to happen in the morning. In addition, at 0600, fluid volumes given to the patients are totalled for the previous 12 hours and for the previous 24 hours, patients are weighed and any changes in the fluid balances are documented on new flow sheets. At 0700, the shift ends with nursing handover in the Tactical Center (central report) and bedside (nurse to nurse handover). Mediating tools in these teaching activities are almost the same as those of day time.

Summary and interpretation

Preceptorship is the second teaching and learning opportunity organized for the newly hired nurses in the PICU. It includes a 12-shift period during which they are buddied by

experienced nurses in the unit. This period normally takes 3 months. The purpose of this period is to expose the newly hired nurses into real care delivery activities in the PICU and provide hands-on learning experiences for them in the unit. Each regular 24-hour day in the Preceptorship includes two 12-hour shifts that encompasses a 12-hour day shift and a 12-hour night shift. A prototypical day shift during the Preceptorship in the PICU starts at 0700; however, nurses usually arrive at the unit before 0070 to learn about the patients assigned to them. A prototypical night shift in the PICU starts at 1900. Each of these shifts include various teaching and learning activities for the newly hired nurses, however, the newly hired nurses found more learning in the morning shifts compared to evening rounds and more in the evening rounds than the night shifts (I will elaborate on this later). Learning activities in the Preceptorship are mediated using numerous tools that include clinical equipment (such as mannequins), tools used for facilitating learning (such as computer and mobile digital media like iPads and smart phones), as well as patients as mediating objects around which interactions related to care and learning activities are organized.

The Preceptorship provides an opportunity for the newly hired nurses to give care in collaboration with their colleagues in the setting of the PICU, which enables them to participate in learning activities situated in the complex activity system of the PICU, in stark contrast to learning in the Orientation's decontextualized classrooms. Participation in the PICU during the Preceptorship gives newly hired nurses access to actual patients, the full complement of tools, staff from different disciplines, and the expectations that they will employ in treatments governed by the PICU's rules and norms within the established division of labor. In other words, participation enabled them to access a constellation of patient-specific and profession-defined activity systems interacting together to deliver quality care. They were able to access to the tacit knowledge

distributed among their colleagues in different disciplines and different shifts using a variety of complex equipment.

They also encountered with numerous contradictions that emerged between themselves and others from the different professional perspectives resulting from the division of labor within the PICU. This was demonstrated by the classic differences between nurses and physicians. The new nurses had opportunities to learn how to manage the more mundane bureaucratic aspects of the PICU setting to get lab results and document patients' care.

This Community of Practice became the setting in which the new nurses, with the assistance of the preceptors, identified their learning goals, and with the aid of scaffolded learning opportunities, moved through zones of proximal development, while also implementing individual adult learning strategies such as reflection.

Chapter 7: Teaching aspect of the Preceptorship

Overview

In Chapter 6, I gave a brief description of the Preceptorship and a prototypical 24-hour day. Chapter 7 describes and analyzes the teaching aspects of the Preceptorship and the particular activities intended to educate the newly hired nurses. Some activities are similar to those of the Orientation, such as simulations, and short didactic instructional sessions, called EduQuicks. However, these are adapted for performance in the PICU. Many of the same instructional tools were used for mediating teaching (such as computer, mannequins, educational videos). During the Preceptorship, the predominant educational activities are rounds and handovers. In this chapter, I will also identify analytical concepts derived from teaching and learning theories that help us explain teaching activities during the Preceptorship. In so doing, I will describe experiential teaching, modeling (cognitive and behavioral), reflection (in and on action) and scaffolding.

7.1. Teaching activities during the Preceptorship

This section describes and analyzes activities used for teaching the newly hired nurses during their Preceptorship, as well as tools used for teaching them. In terms of instructional activities, I describe rounds, handovers, simulations, short education called EduQuicks, lectures, case-based, or incidental educational opportunities.

7.1.1. Rounds

Rounds (including cardiac and the PICU normal rounds) were one of the most important instructional activities used to teach the newly hired nurses during the Preceptorship. As I mentioned earlier when describing the Preceptorship, who participated in rounds fluctuated,

depending on the patients' care. The participants commonly included cardiac physicians for Cardiac Rounds (cardiac surgeons and cardiologists), attending critical care physicians of the PICU , sometimes attending physicians from other services (such as nephrology, neurology etc.), nursing staff (including the newly hired nurses, preceptors and sometimes CNCs, charge nurses, the Admit and Relief Nurse and the PICU program manager), when appropriate the perfusionists or ECLS staff , allied health staff (such as RTs, pharmacists and dieticians), and various medical trainees (residents, fellows and sometimes medical students). The purpose of the rounds was primarily to review patients' status, evaluate and reflect upon their conditions and their previous daily care plans and assess their future care needs. Educationally, rounds created an opportunity for staff to share knowledge about the patient, the treatment options and the rationale for the treatment selected. The most obvious teaching activities during rounds were the questions that attending physicians posed for fellows and residents about treatments. However, rounds provided opportunities for continuous learning for all staff, attending, fellows, residents, nurses and allied health professionals as they made decisions about the care of each patient. While rounds were instructional for fellows and pediatric residents, their focus for nursing and allied health staff was to deliver quality care to the patients.

The staff participation in the rounds followed a predetermined order which is set out in the nursing documents, and it was included in the instruction of the newly hired nurses both in the Preceptorship and Orientation sessions and to pediatric residents. Rounds in the PICU followed standard format. The various participants are guided by a tool called the Purple Sheet, which is a two-sided purple page with the "System Report for Rounds", "Nursing Concerns," and "Patient Checklist on one side and the "Daily Action Plan" on the other. The presentation of each patient usually began with fellow or pediatric resident presenting the patient's medical history. Cardiac

patients' histories, were most commonly presented by fellows due to their complexity. If the patient is new to the PICU the full history of the patient is given, but if the patient is not new, only a short summary is presented. Medical trainees used various tools for presenting their information that included a printed version of the patient lists (a table with the names of the patients and basic information about their condition), patient charts, and patient flowsheet. Following the initial presentation by the fellow or resident, the patient's ventilation status was presented by a respiratory therapist (RT) using tools such as the RT's own notes and the patient's respiratory charts. The RT describes the ventilator set up, arterial blood gas (ABG) results, any changes and concerns about the patients' ventilation.

Next, the bedside nurse responsible for the patient, using the Purple Sheet for reference, provides a comprehensive review of the patient including lab results, medications, and specific nursing concerns. Depending on the situation, nurses used other tools such as the patients' charts, patient flow sheets, the Kardex, and they made reference to monitors while completing their reports during rounds. During the review and discussion of care plan the pharmacist, dietician, physiotherapist, or staff from other disciplines might provide their input. However, they did not get involved in all cases they were present. Following the review of the patient's status, the fellow or resident responsible for the patient made suggestions for the patient's care plan. They started by identifying the primary concern for the patient and then described what should be done for the patient during that day and their justification for the course of action. During the presentations about each patient, one of the medical trainees (normally a resident and sometimes a fellow or even a medical student) documented the confirmed changes of the daily care plan and recorded these changes as medical orders in the patient's chart. At this time, the Problem List checklist was filled. This was a checklist for entering any problems risen for the patient during the shift.

At the conclusion of the review of the patient's status and the development of a care plan, the trainee, who was documenting medical orders, was asked to read out the confirmed and documented medical orders to be followed. Then, the care plan and orders were quality controlled, finalized, and documented again as final orders. These orders were to be followed by the medical trainee (fellow, resident, or medical student) and the nurse caring for that patient. This care plan was followed during the day and reviewed in subsequent rounds during the evening and night.

Clinical instruction was an important part of rounds. Clinical education could happen at any time during rounds, however, there were two time points at which most of the clinical teaching occurred for all the staff including the newly hired nurses. These opportunities were right after the bedside RN responsible for the patient gave her comprehensive review about the patient and right after the medical trainee responsible for the patient presented his/ her suggested daily care plan. During observations (around 2000 hours), my field notes indicate that most of the clinical teaching and learning happened after these two events. These points triggered significant clinical instruction and learning in almost all the rounds, especially in morning rounds.

During most rounds, instructors normally started by teaching about the patient at hand and then moved to more general issues and guidance about patients with similar conditions. They then returned to their patient and developed a specific care plan for implementation. This provided an opportunity to discuss, comment, and reflect upon, the care of the particular patient and the more general issues that their care represented.

Instruction during the rounds was normally led by the attending physician responsible for the round. These attending physicians engaged the learners (including medical trainees and the newly hired nurses) in the process of teaching by asking frequent questions about the patient or care plan, and this created more lively teaching and learning situations. Usually, the person being

asked answered these questions. However, there were many situations that the person who was asked could not answer the question. In these situations, other people could step in and answer. If the question was asked from medical trainees, there were some unspoken rules governing who should have answered these questions. If the first medical trainee could not answer the question, other more junior medical trainees are expected to step in and answer the questions. Thus, rounds included a considerable amount of instruction by attending physicians or other members of care teams participating in the rounds.

The newly hired nurses observed the entire process of the rounds and participated in the review of the patients they cared for. In general, during the rounds, the newly hired nurses were taught in the following situations: they were instructed when the attending physicians were teaching medical trainees in the presence of the newly hired nurses and their preceptors. In these situations, the medical team (attending physicians and medical trainees) were the main and central people in the rounds discussing aspects of the patient and the care plan. However, the newly hired nurses and their preceptors were observing and hearing the teaching even though they had more a peripheral participation in the rounds. Sometimes, there were consultants from other services in the rounds that taught entire care team, including the newly hired nurses. Still, in these situations, the medical team was the main audience and central participants in the discussions and the nursing team including the newly hired nurses were participating in the discussions and teaching and learning peripherally. The newly hired nurses were more directly involved in teaching and learning activities when they presented the patients during rounds. They asked questions or raised concerns about their patients which gave the attending or more senior nurses the opportunity to teach them while addressing their questions and concerns. In these situations, the newly hired nurses were the central people in the discussions and learning, while the medical trainees were the peripheral

participants. These teaching opportunities only happened if they raised questions or concerns, and were short. In fact, for most of the time, the medical team was the center of attention in the rounds and the newly hired nurses engaged in peripheral participation and peripheral learning.

Rounds take place in the morning, evening and at night. Each of the rounds usually includes cardiac rounds and the PICU rounds. All of the rounds were considered important teaching activities. However, both the newly hired nurses and their preceptors found more teaching and learning opportunities in morning rounds since they considered other rounds as checking if the care plan was still effective.

New nurse:

P71: NN25_LADE_RTF.rtf - 71:6 (63:81):

I: Right. Which of these rounds do you find, in which of these rounds do you find more teaching and learning opportunities? Morning, evening, night?

P: Um, morning. For sure. I feel like, the afternoon rounds is just, it's touching base on if there is any problems. And so there's not a lot of teaching that's done by the physicians. And that same thing at night usually.

Preceptor:

P64: Preceptor1_LADI_RTF.rtf - 64:15 (240:250):

I: What about morning and evening and night rounds compared to the other. Which ones was having more teaching and learning opportunities?

P: Probably the morning one is the more in depth one. And, than the evening is more of like just a check in, same with the night.

7.1.2. Handovers

Nursing handovers were other instructional activities during the Preceptorship. Handovers happened in the morning and evening times and each time a shift change or staffing change took place. Handovers consisted of two types: central handovers (also known As Central Reports) and bedside handovers (or nurse-to-nurse handovers). Central report happened at the

beginning of each shift (at 0700 and 1900) and normally took five minutes. The purpose of this type of handover was to give general instruction to the nursing staff about the unit and the most important issues happening in the unit. At the end of this report, the staff acquired a synopsis of the most important issues happening in the unit. Participants in these handovers normally included the CNC or charge nurse of the previous shift and all of the nursing staff of the new shift including the newly hired nurses, preceptors and CNC or charge nurse. In addition to these people, CNEs, the quality and safety leader and sometimes even the Program Manager of the unit participated in these central reports. In these handovers, the CNC or charge nurse of the ending shift used instructional tools such as the notes they collected from the staff during their shift.

After the Central Report, all nurses went to the bedside of their patient where a comprehensive handover occurred. In the bedside handovers, each ending shift nurse gave a detailed report about the patient they cared for to the incoming shift nurse, including the newly hired nurses and their preceptors. This handover was longer and usually took between 15-30 minutes. The purpose of bedside handovers was to give detailed instruction to the incoming shift nurse about all aspects of care of his or her patient. In addition, they conveyed general issues related to the past 12- hour shift.

The instructing nurse used various tools to mediate his/her instruction. These included the Purple Sheet, medication administration records (MARs), patient charts, nursing progress notes, additional documents in the patient binder (such as lab results and consultation reports), as well as monitors. When this type of handover was happening in the unit, the whole unit turned into a teaching-learning event in which every single nurse at the bedside was teaching the nurse working during the incoming shift. The only thing that you could hear in the unit at this moment were whispers of nurses and sometimes noises of papers flipping over; it was the spirit of teaching and

learning in the unit (this scene with its whispers has cemented in my mind that steals my heart and soul any time I am thinking about it).

Both the newly hired nurses and senior nurses, including preceptors, confirmed that handovers were great instructional activities and they learned many things from handovers:

New nurse:

P69: NN22_LACN_RTF.rtf - 69:13 (205:215):

I: What do you learn from handovers? What do you learn from rounds? Do you find any learning in them?

*P: No, I think, um, especially at the point where I'm at right now, I definitely learn a lot from, **handover [i.e: they were instructional opportunities]**, cause, just things come up. Questions when you're talking about someone's history. Or if uh, a nurse says something that I haven't heard about, or I'm not familiar with a certain acronym, or something. Then it, that's where I learn a lot of things. And it's a, one-on-one time, where I have like a nurses attention and I can ask them questions. Usually they're, [pause] want to just go home, but [chuckle] so I don't ask too many questions. Um, but yeah, that's a good, time in the morning when I get report.*

Preceptor:

P79: Preceptor 13_LACJ_RTF.rtf - 79:16 (199:245):

I: Uh, what kind of learning opportunities do you, have you found? Or do you see in the unit? In the PICU?

*P: Oh, um, [pause] anything that you know, every, every opportunity... Oh, you learn, when, the first thing you do. You come on the unit. Who's your patient? You might go to **central report [central handover]**. You probably will, depending on if we have a central report, but then, the charge nurse. You hear, just snippets of what every patient's going to have happen.*

I: You mean in the handover. [inaudible]

*P: Yeah, like sort of, no like in the morning, like **the five minutes**... Before we go to bedside. We learn a little bit about each patient. So we kind of have an idea what's going on in our unit. And then you go to bedside and get your report. That's when you start learning. You start Ok, so what they're last twelve hours was been. Or why are they here. You know what's their, what's their diagnosis. All these things, right? So any previous history of admissions here.*

Medical trainees' handover was another type of teaching activity during the Preceptorship. This activity mostly happened in the nursing station near the entrance of the Tactical Center at 0700. The purpose of this type of handover was to instruct medical trainees who were on the incoming shift about the patients they would look after. Participants in these handovers were all medical trainings (fellows, residents, and medical students) of both those completing their shift and those taking over. Sometimes nurses, including newly hired nurses and their preceptors, overheard these handovers and got involved in the discussions. These handovers, then, turned into learning and teaching activities for the newly hired nurses. This happened more frequently when medical trainees (such as residents and fellows) came to nurses at the bedside to double check their information about a patient and ask question. Sometimes this interaction turned into an instructional discussion in which both sides (medical trainees and the nurses) instructed each other. These discussions were usually very short, due to the limited time and the intense nature of morning handover. Medical trainees and nurses involved in these discussions used various tools to teach each other that included patients' images and lab results, computer (to access patient information), patients' charts, flow sheets, medical trainee handover sheet and their own notes.

Operation room (OR) handover, was another teaching activity that happened in the Preceptorship. These events happened when the unit was admitting a patient from OR. The purpose of this handover was to transfer the patient to the PICU staff and give the PICU staff the most updated instruction about various aspects of the patient being transferred. The participants involved in this type of handover included OR staff (including a nurse, anesthesiologist, surgeon, and medical trainees) and the PICU staff including the patient's

nursing team (such as the newly hired nurses and their preceptors, and sometimes CNCs or charge nurses), their medical team, and allied health staff.

The Operation room (OR) handover was an activity with a standardized process with well recognized rules, roles and clear role boundaries. According to the rules of these standardized process, OR staff stood in the patient side, and the PICU staff in front of them without touching the patients. OR staff spoke in a specific order and handed their patient over to the PICU team while sharing their knowledge. In this handover, first the OR nurse instructed the audience, about the nursing related issues of the patient. He/she used patients' charts and flow sheet in his/her instruction. Then the anesthesiologist started teaching about related issues using the patient's chart and the anesthesiologist's progress notes. Finally, the surgeon instructed the PICU team participating in the handover about the patient. Some surgeons used surgery progress notes in patients' charts in their instruction, however most surgeons relied on their memory and presented without using patient charts. All the staff providing instruction used clinical equipment such as monitors, various catheters connected to the patients and Hemovac in their instruction. In these handovers, the roles and role boundaries of the OR nurses, anesthesiology team, and surgeons were respected by themselves, and by the PICU team. Role boundaries were clear and no member violated others' role boundaries in this standardized OR handover:

P11: AAY_RNQS - 11:40 [(442:443):

P: And so for instance one that we did that was um, an unbelievable um success and which we've sustained the change and we've published on and have had received um fairly good recognition for is, when you look at the process of admitting a cardiac patient it's a very standardized process. People stand in certain spots. People speak in a designated sequence. That's a process. It's a very defined process, and it lends itself to a see a structured framework. But things which are more fluid and have to move a little bit don't lend itself to that kind of or, or it has to be very well defined your

problem statement that you're trying to address with that framework. And quality of care is just too big.

7.1.3. Simulations

Simulations were another type of teaching activity during the Preceptorship. Simulations occur in the unit twice a month, normally on every other Thursday, for about 2 hours (1000-1200). The most frequent simulations that happened in the unit were mock codes, particularly Code Blue simulations in which a Cardio Pulmonary Resuscitation (CPR) situation was simulated which instructed staff how to behave in real Code Blue situations. The various tools used included a baby mannequin as the patient, real clinical equipment such as ventilators, as well as a laptop or a digital mobile device (tablet or iPad) that provided software that simulated real life critical situations requiring Code Blue. Participants of the simulations included the same groups of PICU staff that could be found during a real Code Blue situation. These people included medical team (attending physician and medical trainees), nursing team (including the newly hired nurses), and allied health team (such as RT team, pharmacists, physiotherapists etc.). The purpose of these simulations was to teach the staff how to work in multidisciplinary teams in a real situation with the hope of delivering better care in real life Code Blue situations.

The entire activity was led by an attending physician who programmed and managed the patient situation. Then the staff were asked to develop care plans, implement them, and evaluate the patient situation to see if it was successful. At the end of the simulation, participants came together and reflected on various aspects of the simulation including clinical skills, team work, communication, anticipating the needs of other members of the team, decision-making, and problem-solving skills. During this reflection, the attending

physician also instructed staff about various clinical issues to the participants of the simulation. There were also various forms of instruction conducted by the staff participating in the simulation for each other. The attending physician usually would generate informal discussions as part of these opportunities for reflection.

Thus, during simulations, the staff including the newly hired nurse were instructed about a variety of clinical skills such as resuscitation skills, as well as non-clinical skills including team work, communication, anticipation and cognitive skills (such as thinking process, decision making and problem solving) in an authentic situation. From the point of view of the clinical nurse educators who were the organizers of simulations for the nursing staff, these teaching activities were considered as the best opportunities for teaching the newly hired nurses about communication and team work in the unit other than their important role in teaching and providing opportunities for practicing clinical skills. From their perspective, simulation taught the newly hired nurses how to work with others such as attending physicians, fellows, RTs and everyone else in the multidisciplinary care team of the PICU:

P57: LACK and ABE 1 and 2_NE_RTF.rtf - 57:50 (929:935):

I: What do you see the role of mock codes in teaching these the newly hired nurses who are coming in the unit?

*P: Um, I think mock codes are, just the best time to, well first of all just basically **practice**, um resuscitation **skills**. And actually we're gonna [do] some more work on that, and, making it a lot clearer and standardizing the roles of everybody at the bedside during a, a uh resuscitation in [P]ICU. But also the **biggest thing, I think is, is um, communication and, team work and working well with, the physicians** and the fellows and the RTs and everyone on the team, to try and see where everybody fits. And, and make sure the **communication runs smoothly**, which I think is always, the issue **that's highlighted in all of our mocks**. So we definitely still have work to do there.*

The role of simulation as a teaching activity in instructing clinical and non-clinical skills to the newly hired nurses was widely supported by the newly hired nurses' interviews as illustrated in the following sample quotation:

P61: NN11_LACC_RTF.rtf - 61:23 (287:289):

I: Uh huh [affirmative] Can you give me an example that you have learned from interactions?

*P: Um, just like for example a **mock code um**, it's a great, less stressful. I mean it still is, but then a real-life scenario where a child's cramping or getting, you know getting worse, um, [inaudible] so it's sort of nice to, practice with those **communication skills and that team**. And, um, if you have those closed done in loops and you're really feeling good and you're both into, all **anticipating** what each other needs, like, it, it really can go smoothly. And you really have a good learning. I find **experience** from that. Yeah.*

7.1.4. EduQuicks

EduQuicks were other educational activities during the Preceptorship. These were short face-to-face teaching sessions that frequently happened in the unit and normally lasted between 5-10 minutes. EduQuicks were organized by the clinical nurse educators and were done both at individual and group levels. Depending on the topic, these sessions were taught by a range of people, such as the CNEs, the unit quality and safety leader, or even a person from outside of the unit. They used various tools such as a simple print outs about a medical error and clinical equipment such as an arterial line port (or art line port). Like simulations, participants of these short educational sessions included all the PICU staff including the newly hired nurses.

The purpose of EduQuicks was to update the PICU staff in a short period of time about new topics and issues coming up in the unit. For example, if there was a new tool to be adopted, or if there was a medication administration update, EduQuicks were used to give

updates for the staff and help them learn how to apply the new equipment or the new approach. This way, these educational activities helped members of the care team such as the newly hired nurses to keep up with changes. When the purpose of the EduQuicks was to teach the staff about new tools such as an arterial line port or a Burlin Heart machine, the staff were first instructed about the tool, and then they were given a simulated opportunity to practice the application of the tool. This was followed by an opportunity to reflect on their performance. Mistakes were fixed and then additional practice opportunities were provided. I have observed and documented frequent instances of these EduQuicks in my field notes. Here, I have copied a sample of my observations and followed it by a quotation from the newly hired nurses who confirmed their learnings through this educational activity:

P85: PRECEPTORSHIP_iCl_ Learning _ All field notes together for learning.rtf - 85:95 (1171:1181):

There was the same man in the unit who was teaching about new art line port to the staff. He was wearing formal dress with a tie and suit with a shirt. He was teaching one of the staff who holds a master's degree. He was using real ports and a bag of red color liquid pretending that it is blood. ...Meanwhile a new RN came to him [to learn how to use the art line port] and he started to teach her. He used the same approach that he said, for this person too. He first explained the process of getting blood from the port, flashing it for washing it. He explained two scenarios for this and showed various steps of each one. The learner tried it a few times. There were some questions, answers and some other reflections and feedbacks between them. Then the new nurse did a few more times and the education was over. While teaching, the instructor refereed to a protocol and he mentioned that is a pretty robust protocol. The entire education took less than 5 min this time.

P85: PRECEPTORSHIP_iCl_ Learning All field notes together for learning.rtf - 85:82 (1073:1074):

A new RN: We learn from different ways: EduQuicks that is education less than 10 min. Like the one that you saw about art line port.

7.1.5. Lectures

Lectures were another educational activity used for instructing the newly hired nurses during the Preceptorship. The purpose of these lectures was to instruct the staff about various aspects of care in order to help them keep up with the growing clinical knowledge so that they could deliver better care. Lectures were organized by various teams such as the nursing team (more specifically, clinical nurse educators), medical team (such as cardiac team and the PICU attending physicians), RT group and pharmacists. The audience for these lectures included the PICU clinical staff such as nursing group like the newly hired nurses. The participants and instructors varied depending on the topic. Instructors used various instructional tools in their teaching that included a computer (to access to patient images, as well as for presenting slides), video projectors, internet, whiteboard, and various medical equipment such as Berlin Heatch machine. Lectures took place in the Tactical Center which is a room used for education, meetings, and nursing handovers in the PICU.

Over the course of my observations, various lectures took place that included the nursing staff and the newly hired nurses. Some of the topics of these lectures were as follows: Anti-Microbial Stewardship (AMS), Quality Improvement in Sick Kids Hospital, regular weekly Academic Half Day presentations and regular presentations about cardiac topics conducted by cardiac surgeons.

Cardiac lectures, which were organized by the cardiac team, were given regularly in the unit. In these lectures, which were very similar in format, a cardiac surgeon instructed the staff (including the newly hired nurses) about cardiac topics. He used simple instructional tools such as a whiteboard and marker in his teaching. He drew very basic pictures and used very simple language to teach complex cardiac topics to the staff. Although these lectures

were mainly aimed at the medical team, participation in these presentations was open and encouraged for nursing team. Their participation depended on the workload and staffing situation of the unit. These lectures were video recorded and posted to the hospital intranet to make them accessible to the interested staff.

7.1.6. Case-based or incidental education

Case based instruction was another teaching activity during the Preceptorship. It occurred when staff made use of incidental learning opportunities that that arose during the treatment of patients.

Instructors and participants in these learning activities varied depending on the patients in the unit. When a patient came to the unit with a new or unusual condition, or when something happened in the unit, various staff including the attending physicians and the preceptors drew the attention of the nurses to the patient and used it as an opportunity for teaching. In fact, each case or each incident happening to a patient in the unit was recognized as an educational opportunity in which people with more expertise could teach to others including the newly hired nurses. The instructors used different tools in their case based or incidental teaching that included (but not limited to) the patient, patient images and lab results, computer (to access to images and lab results), patient charts, as well as clinical equipment such as ventilators, monitors, and infusion pumps. Some people including attending physicians, preceptors and clinical nurse coordinators considered case based, or incidental or haphazard teaching and learning as the best model of teaching and learning in the unit:

P85: PRECEPTORSHIP_iCl_ Learning _ All field notes together for learning.rtf - 85:48 (593:596):

*I: What is the **best method of teaching** in the PICU from your point of view? Especially, considering the newly hired nurses.*

*P (CNC): The **best way** that I would describe it is **haphazard**. Teaching and learning [pause] it's haphazard in the PICU.*

I: What do you mean by this? Can you tell me more about it?

P: Ye. It's mostly something comes up and something happens and you start teaching it to the new nurse. Or anybody. To residents, nursing students, RT students. Or us ourselves. Something happens or a case comes in and we start learning about it. It is always happening. Dawn to dusk. Learning is haphazard.

7.2. Analytical concepts underlying teaching activities in the Preceptorship

In the previous section, I explored various activities that were identified as educational activities among the newly hired nurses. This section identifies the analytical concepts derived from teaching and learning theories that helps us explain teaching activities in the Preceptorship. As I will describe in the following sections, teaching in the Preceptorship happened through face-to-face interactions, experiential (hands-on) teaching, modeling (including cognitive and behavioral modeling), articulation, reflection (in and on) practice, and scaffolding. Modeling, articulation, and reflection appeared as forms of scaffolding which itself is tangible activity of implementing the concept of Zone of Proximal Development. In the following sections, I will elaborate on each of these processes.

7.2.1. Face to face interaction

In general, all the teaching activities (as described in section 7.1) in the Preceptorship happened through face-to-face interactions in the PICU. Through face-to-face interactions, instructors described patients' conditions, procedures, and other information. They verbalized their thoughts, demonstrated steps of numerous procedures, asked them to perform tasks, and they

provided feedback to the newly hired nurses. Through face-to-face interactions, the instructors also helped them establish relationships with other staff and communicate with them. In this way, the newly hired nurses developed rapport with others in the PICU and progressively participated in patient care and expanded their contribution to delivering quality care within this multidisciplinary unit. Face-to-face interactions helped the new nurses to feel that they belonged to the community of professional PICU nurses. As one of the preceptors elaborated in the Preceptorship:

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:405 (3744:3745):

I: What do you see the role of interaction in your teaching?

P (A preceptor): It's everything. I think without interaction you couldn't even think of teaching. You talk, describe what you are doing, demonstrate, get them to watch you. Then, they do it. I give them feed back. Or ask questions. It's everything. [pause] They ask questions. Get help. Get connections. They click [with the staff] and get up to speed and gradually start [working] ...In fact some of them move faster. They start working alone very soon. Ya. I would say, it's everything. Ya.

This was widely accepted by the newly hired nurses in the interviews when they confirmed that they learned almost everything through interactions in the unit:

P75: NN32_ LADL_ RTF.rtf - 75:32 (407:425):

I: What was the role of interaction in your learning over the Preceptorship?

P: Basically, like all of my learning probably was through interaction. Yeah.

7.2.2. Experiential teaching

During the Preceptorship, most of the instruction of the newly hired nurses took place through experiential (hands-on) teaching. Preceptors and other instructors used hands on teaching in numerous situations while working in the unit. Regular patient care provided opportunities for the new nurses actively to test their skills in the real situations. My observations in the unit support this finding especially when the newly hired nurses were left to do their tasks under the supervision

of their preceptor or a neighboring bedside nurse. During the Preceptorship, most of opportunities for learning were experiential (hands-on) learning while they were caring for their patient on their own. Even after the formal Preceptorship was over, if they encountered problems and needed instruction their previous preceptors or other nurses taught them how to complete the tasks. I have documented numerous instances of experiential teaching by the preceptors and this has been supported by the interviews with the preceptors as illustrated in the following sample quotations:

P73: Preceptor 2_ LADT 1 - 2_ RTF.rtf - 73:4 (113:131):

I: How did you teach the newly hired nurses?

*P: Um, I like to kind of, let them be as **hands on**, as, as they want.*

P66: Preceptor3_ LACE_ RTF.rtf - 66:1 (99:101):

I: How did you teach this person?

*P: Um, more like resources that we have on the **internet**. That we have, um, a lot of our **resources**, **binders** that we have in our unit, and **more kind of hands on**, that we, that we kind of do. She has, she's been nursing for several, a couple of years. I think about three years. So, it wasn't more the, how to teach her how to nurse, it's more how to teach her **how to do what we do in our unit**. Cause every unit's so different in how they do their policies and procedures, their charting, their MARs and everything. So, it's a matter of just teaching her how to do what our people would expect. Cause she already had, most of the general, um, like how to nurse. So [chuckle]*

7.2.3. Modeling

Modeling was another dominant process through which teaching happened in the Preceptorship. Modeling included cognitive modeling and behavioral modeling. Cognitive modeling means demonstrating the thinking process and behavioral modeling involves demonstrating a behavior. Both processes of cognitive and behavioral modeling were used during the Preceptorship, however behavioral modeling was used most frequently. Through behavioral modeling, preceptors showed the sequence of the activities of tasks while the newly hired nurses observed them. Although behavioral modeling was used throughout the Preceptorship, it was used

more frequently in the beginning, or for new tasks or new situations. Any time that preceptors felt, it was necessary, they added theory into their descriptions and demonstrations. This way, they connected theory to practice.

Sometimes, preceptors also had to describe and verbalize their way of thinking and the logic behind it. In other words, during behavioral modeling, they also used cognitive modeling and demonstrated process of their thoughts and helped the newly hired nurses to get much better understanding of the phenomenon under instruction and related tasks. Put another way, behavioral modeling most of the time was accompanied by cognitive modeling as a complementary process. There have been frequent occasions in my observations in which I have observed preceptors to demonstrate the tasks, their step-by-step processes, and processes of their thoughts regarding these tasks and the logic behind it while the newly hired nurses were observing and listening. I have copied here a typical example of these situations:

P85: PRECEPTORSHIP_ICI_ Learning _ all field notes together for learning.rtf - 85: (148:158):

The preceptor showed all the steps of using Pyxis machine, a machine that was used for getting stock medications for the patients in the PICU. While the preceptor was showing how to use it, she was also describing steps of the task process to the new nurse. This kind of events happened frequently during Preceptorship and for most of the newly hired nurses. This happened when the newly hired nurses were instructed how to work with flowsheets for recording information, medication administration records (MARs), working with infusion pumps, monitors and even transferring patient from PICU to the unit.

Interviews with preceptors and the newly hired nurses confirmed that instruction in the Preceptorship happened through modeling. I have copied here a few quotations supporting this finding:

Preceptors:

P82: Preceptor14_LADM 1 and 2_RTF.rtf - 82:5 (141:147):

*I: You mentioned the previous time [that to teach the newly hired nurses] you had to **show and you had to do many things**.*

P: Yeah.

I: Can you explain, this uh previous time, process what does the process for [inaudible]

*P: I think usually what happens with, um, somebody who's brand new to the hospital, brand new to the unit, sometimes even brand new to peds, is you know the first, we do, with them we do 12 shifts. And uh, **the first shift, I find they watch you most of the time [while I am showing and telling them what to do and how to do]. You still do what you would normally do, and I find like that's the day that I lose my voice, because all day I'm talking. I'm doing stuff and I'm talking.** I'm telling them, and then the next day they take a little portion of it. And they do that. And then the next day they take a little bit more and a little bit more. Um, so it kind of is like they watch you and then, you do it together. And then they start doing it on their own and you're watching them. And then they end up doing it on their own, right? Um, whereas this time, we didn't have that progression. So it was just a little bit different. But, that's ok. [chuckle]*

Instruction through modeling (behavioral and cognitive) during the Preceptorship also happened in the simulations led by physicians. As we can see in the following excerpt from my field notes, the physician took the lead in the simulation to demonstrate how to perform the tasks. S/he was also describing the various steps, verbalizing her/his thoughts, and explaining the logic behind her/ his actions:

P85: PRECEPTORSHIP_iCI_ Learning All field notes together for learning.rtf - 85:310 (3345:3371):

The fellows and learners including the newly hired nurses came in and fellows started to run the code. One of the fellows took the leadership. Then she assessed the situation and led it. Others watched and listened to her and did the activities that she asked. RTs and RNs were part of team and other fellows also. Other people such as RT students were part of team as well. Almost 26 people in each of the codes were in the team.

The leader fellow was verbalizing her thinking process and rationale behind the decisions talking aloud. Sometimes, she was doing the task and meanwhile

describing what she was thinking. She was like: "Now we have saturation of this and BP of this. Left lung is like this ... We will do this and this because of ...".

This way she was verbalizing and explaining her thoughts, existing situation, problems, what to do and why. Others were listening and learning. Meanwhile attending physician was giving some comments, more details and more theory.

This way the learners including the newly hired nurses were seeing what is done, by whom, in which situation and why. These details gave more clarity about the logic behind the activities being done. Details, articulations, and reflections were sometimes completed with other case examples by the attending physicians and by some more theoretical teaching.

7.2.4. Articulation

Articulation was another process through which instruction occurred during the Preceptorship. Articulation means that the learners benefited from the instructor's stories and experiences and this made the learning more concrete and authentic. It also indicates instructors reinforced the concepts under instruction by connecting theory to practice (210). Through this process, instructors such as preceptors added more details into their instruction whenever necessary. In so doing, they used their own experiences and stories, asked for the newly hired nurses' experiences and stories, brought in examples, drew pictures and sometimes added more detailed theory to their instruction.

Articulation was used in various situations during the Preceptorship. It happened during rounds when an attending physician was teaching medical trainees while the newly hired nurses were observing and listening, when the newly hired nurses were learning tasks from their preceptors, and during simulations. For instance, in mock codes, attending physicians added more details into the instruction during their debriefings and articulated their instruction by giving more examples, experiences, and stories. I have copied here an example of my field notes about a simulation in which the newly hired nurses were participating:

P85: PRECEPTORSHIP_iCl_ Learning All field notes together for learning.rtf - 85:403 (3375:3375):

After simulation, while the attending physician was debriefing, she was giving some comments, more details, and more theory...These details gave more clarity about the logic behind the activities being done. Details, articulations and reflections were sometimes completed with other case examples, experiences, stories, and also with some more theoretical teaching given by the attending physicians.

7.2.5. Reflection in and on action

Instruction in the Preceptorship also employed reflection. Reflection occurred during teaching activities such as rounds, simulations, lectures, and handovers. Reflections took place two forms: (a) reflection while something was being done (reflection in action) and (b) reflection about something that was completed (reflection on action).

Reflection in action happened most often in the beginning of the Preceptorship when the newly hired nurses were conducting a procedure that was new or sensitive. However, instructors used reflection-on-action once the newly hired nurses were more grounded and had learned how to do the tasks in the context of the PICU. Reflection then encouraged more learning or more elaboration. Reflection in action was commonly used in instruction by preceptors, CNCs, and charge nurses.

Reflection on action was a common, normal practice during rounds and handovers. It happened when the care that had been planned and provided in the past shift or past few hours was described and analyzed to make decisions about continuing or changing the care plan. Reflection on action also happened as part of simulations. After simulations, participants in the simulation went to the Tactical Center and debriefed, reflecting on what they had done, what they might have done, and what they learned from the experience. According to my interviews, these reflections were led by the leader of the simulation team

with the active engagement of the participants in the simulations including the newly hired nurses.

Below is an example from my field notes that shows how reflection was used as part of a simulation in the Preceptorship:

P85: PRECEPTORSHIP_iCI_ Learning All field notes together for learning.rtf - 85:224 (2568:2575):

Right away after simulation (mock code), the nurse educators asked participants to go to the Tactical Center for debriefing and reflection.

There were nine people in the room: attending physician (medical leader), two nurse educators (one of them was leading nursing side of the simulation and the other one the administrative side of it), one person from simulation lab (she was the software leader of the code), fellow, three RNs (one new nurse and two experienced nurses) and finally one RT.

Nurse educators asked participants for their feedbacks. One of the experienced RNs who was bedside nurse of the dummy patient told: "Generally we did well. We only were short in staff. We asked for more hands, but nobody came in."

The RT said: "I needed more help as well. We called for another RT. Nobody came in. So, I did not know what to do. I could have got bagging and somebody could go on the CPR. I was doing everything for RT side."

The fellow said: "I also was confused too." She confirmed the RT.

Attending physician asked: "why did the patient needed code? Why did he deteriorate? What was the most important thing that you needed to do and you missed it?"

RNs and the fellow gave some answers while the new nurse was listening. Then the attending physician continued:

"You did a great job. This is not critic. This is education that I am going to give."

Then he started asking questions and discussing about the most important thing that needed to be considered such as calcium bolus, T sharp and the hemodialysis background of the patient etc. Meanwhile the fellow said: "I agree that I did not ask for the bolus dose of calcium." Then the attending physician taught them about real life situation and what they would have done and what they should have done or should do in the future, which vein they should use for bolus calcium and other things.

Then, they also reflected on communication during simulation (mock code). They said: It was good." Then the nurse educators asked the team what they learned for the next time that they will remember (take home message).

A fellow answered: “The more mock codes are done, the more we get used to it and learn how to do it in real life situation.” The RT said: “Clear communication and asking very clearly for help and then starting to work on one aspect very well.”

7.2.6. Scaffolding

Scaffolding was a common process woven throughout the Preceptorship. It makes use of the Vygotskyian concept of the Zone of Proximal Development, described in Chapter 2. In the context of this research, this concept means that each of the newly hired nurses could do some limited activities independently. However, with some support from preceptor, s/he could take on more complex activities that s/he could not do without support. Scaffolding by various instructors such as preceptors was the tangible activity of implementing the concept of zone of proximal development (ZPD) in the Preceptorship. Through scaffolding, instructors, such as preceptors, incrementally introduced more complex information and skills. They first demonstrated and described various steps of the task under instruction, verbalized their process of thinking and the logic of the activity, then the new nurses performed and experienced the task in the presence of their instructors. Sometimes supports such as reflection, and articulation were provided by their instructors. Once they had mastered this initial task and the new nurses gradually gained more experience, confidence, and independence, the instructor introduced more information and more complexity to the task, building on the previous stage. The more experience the learners gained, the more independent they became. In this way, instructors gradually withdrew as the newly hired nurses started working independently. Scaffolding included all processes of modeling (behavioral and cognitive), reflection, and articulation. Put another way, modeling, reflection, and articulation were examples and forms of scaffolding the newly hired nurses in the Preceptorship by their preceptors. Scaffolding was used by their preceptors, allied health staff, as well as people coming

from outside of the hospital. This was evident in the interviews, and my observations in the unit frequently supported this finding:

P82: Preceptor14_LADM 1 and 2_RTF.rtf - 82:5 (141:147):

P: I think usually what happens with, um, somebody who's brand new to the hospital, brand new to the unit, sometimes even brand new to peds, is you know the first, we do, with them we do 12 shifts. And uh, the first shift, I find they watch you most of the time. You still do what you would normally do, and I find like that's the day that I lose my voice, because all day I'm talking. I'm doing stuff and I'm talking. I'm telling them, and then the next day they take a little portion of it. And they do that. And then the next day they take a little bit more and a little bit more. Um, so it kind of is like they watch you and then, you do it together. And then they start doing it on their own and you're watching them. And then they end up doing it on their own, right? Um, whereas this time, we didn't have that progression. So it was just a little bit different. But, that's ok. [chuckle]

P85: PRECEPTORSHIP_iCl_ Learning _ All field notes together for learning.rtf - 85:69 (951:960):

They have got a new patient that was transferred by para med team. The new nurse and her preceptor had to help the patient. New nurse went to the patient and started working on some basic stuff. Her preceptor went beside her and started teaching her by doing, showing and explaining some tasks. She [the new nurse] observed, listened and worked. After that for a long time (5-10 minutes) the preceptor was still showing and explaining many things and the new nurse was seeing, listening and learning. Then the attending physician went to the bedside for IV insertion. The preceptor was still showing explaining a few things to the new nurse, and the new nurse was watching and listening.

It was mixed. Sometimes she did and explained. Sometimes explained and then the new nurse did while the preceptor was observing her. Sometimes they were just discussing details of the task, theory and some examples coming from instructors' personal experiences and sometimes experiences coming from the new nurse. Sometimes new nurse was only observing the procedures that were being done the preceptor (such as inserting IV line) and sometimes she was observing the procedures being done by attending physicians. After the attending physician left the bedside, preceptor and new nurse were still there working and teaching- learning. I verified my field notes later on by double checking with the preceptors after the teaching was over.

Learning by observing, listening and doing always happen in the PICU. The instructors or senior staff do the procedures, the newly hired nurses or trainees watch, listen and do them after. There were medical residents in the patient bedside and they were learning from attending physician by observing and listening to him. New nurse was sometimes observing. She was also learning from the CNC.

P66: Preceptor3_LACE_RTF.rtf - 66:1 (99:101):

I: How did you teach this person?

P: ... She has, she's been nursing for several, a couple of years. I think about three years. So, it wasn't more the, how to teach her how to nurse, it's more how to teach her how to do what we do in our unit. Cause every unit's so different in how they do their policies and procedures, their charting, their MARs and everything. So it's a matter of just teaching her how to do what our people would expect. Cause she already had, most of the general, um, like how to nurse. So [chuckle]

Put another way, preceptors collaborated with the newly hired nurses and provided some support in the forms of cognitive and behavioral modeling, and provided opportunities for experiential learning, articulation and reflection during the newly hired nurses' participation in the real setting of the unit. These were structured by scaffolding. In this way, the preceptors helped the new nurses to learn increasingly complex, higher-level tasks in collaboration with their preceptors and other staff that they could not do without this collaboration and support. Preceptors helped them to transfer their potential knowledge into action. This was not limited only to the preceptors, it included other staff who taught the newly hired nurses during their Preceptorship. I have documented multiple instances in my field notes showing that preceptors and other instructors implemented scaffolding within each nurse's the Zone of Proximal Development. Here, I have copied two typical examples:

P85: PRECEPTORSHIP_iCI_Learning All field notes together for learning.rtf-85:20 (288:295):

I: How do the newly hired nurses learn how to work in the PICU?

Preceptor: *It's a kind of "sink and swim" and Preceptorship helps them a lot. They are exposed to works in our presence over 10-12 buddy shifts. They do things and learn. **There are things that they can do it easily since they are experienced nurses. But, some things, they cannot do alone. They just need some support, some***

boost. If you give them this boost, they can do a lot. So, we help them to get there. Where they were before [coming here]. When they find it hard, we support them. They don't need baby sitting. We step in when they need. [Stay with them for a while and] then step back when they have control over it.

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:95 (1171:1181):

There was the same man in the unit who was teaching about new art line port to the staff. He was wearing formal dress with a tie and suit with a shirt. He was teaching one of the staff who is holding a master's degree. He was using real ports and a bag of red color liquid pretending that it is blood. ...Meanwhile a new RN came to him [to learn how to use the art line port] and he started to teach her. He used the same approach that he said, for this person too. He first explained the process of getting blood from the port, flushing it for washing it. He explained two scenarios for this and showed various steps of each one. The learner tried it a few times. There were some questions, answers and some other reflections and feedbacks between them. Then the new nurse did a few more times and the education was over. While teaching, the instructor refereed to a protocol and he mentioned that is a pretty robust protocol. The entire education took around 5 min this time.

Scaffolding was limited by the amount of interaction that people had available, as we also saw in the Orientation session. For example, if the handovers or other teaching activities such as EduQuics or lectures were limited to one-time activities, process of scaffolding was limited. However, if the same nurses cared for the same patient for an extended period, or if the EduQuics or lectures were conducted by the same people more often, this provided enough time for meaningful interaction and better scaffolding.

Summary and interpretation

During the Preceptorship, the newly hired nurses participated in a variety of teaching activities that employed a range of teaching and learning strategies. The Preceptorship enabled them to engage in activities such as rounds, simulations, and handovers with the PICU's multidisciplinary staff. These teaching activities emerged from the regular patient care activities

of the newly hired nurses or events such as simulations in which all PICU staff participated. Teaching activities were facilitated and mediated by various tools such as monitors, the Purple Sheet, medication administration records (MARs), patient charts, nursing progress notes, all other documents such as lab results and consultation reports.

Teaching activities followed various rules that included formal rules and informal norms. The different types of rounds, and handovers followed explicit, formal patterns. Handovers employed standardized routines which were also instructional activities with special sets of rules. In addition to these formal rules, there were informal rules or norms that newly hired nurses learned in less explicit ways through observation of other nurses and through participation. Examples of these informal rules were participation in the five-minute Central Handover and the nurse-to-nurse handover in the bedside. They also learned to participate in the rounds for their own patient. Additionally, they learned the division of labor among various health professionals and to respect role boundaries during rounds and handovers. This included learning the pattern of providing information and answering questions during rounds. Many of these rules, such as respecting the role boundaries and answering the questions reflect the hierarchal structure governing the instruction in the PICU.

During the Preceptorship, the preceptors and other staff employed a variety of teaching strategies such as face-to-face interaction, modeling and articulation during patient care, and reflection during their regular patient care, handovers and simulations. However, the participants did not engage in formal modes of reflections such as writing reflective journals, thus my analysis is based on my interviews and observations. These teaching activities and strategies facilitated learning by the newly hired nurses to gain increasing knowledge and ability to care for their patients.

This process also helped the newly hired nurses move from a merely marginal observer role in the beginning of their career in the PICU into a role where they were doing most of the expected nursing tasks and having central roles in patient care. This transition from marginal roles of peripheral learners to more central roles in the PICU's Community of Practice helped the newly hired nurses feel that they belonged to the PICU nursing community.

Providing care for patients with other members of the PICU during the Preceptorship provided the new nurses with access to numerous activities that helped the newly hired nurses gain access to both the tacit and the explicit knowledge distributed among the multidisciplinary staff. Collaboration in patient care brought together staff from different disciplinary Communities of Practice to form an activity system and Community of Practice when they attended to each specific patient. These collaborative activities provided them with access to this distributed knowledge and enabled them to learn how to work across disciplinary perspectives, within the rules and divisions of labor, mediated by the tools they used and their joint attention to the patient.

These shared experiences were extremely important in creating continuity of care. In such a complex unit, delivering quality care requires quality interaction and timely communication between numerous members of each patient-based Communities of Practice as well as the Communities of Practice that transcend the unit. Only by accessing this distributed knowledge could everybody obtain the full picture of patient's situation. However, the effective interaction and communication that is necessary for continuity of care was constantly challenged by disciplinary differences of knowledge and perspective, and the constant change of staff who rotated on different discipline-specific shift patterns to meet the demands of providing 24/7 care. In response to these challenges, the unit developed more formalized rules for handovers, and the

mediating tools like the Purple Sheet, which provided a shared means of structuring information during rounds. These reduced but did not eliminate these problems.

Teaching activities in the PICU, added social and cultural aspects to the teaching activities, which were missing during the Orientation. For example, although experiential teaching took place in the Orientation in the form of simulations, the simulations only approximated working with a real patient, and did not replicate the division of labor, the full range of social relationships, and the cultural norms and expectations of the PICU Community of Practice.

In contrast, instruction in the Preceptorship involved situated experiential and hands-on teaching and provided access to all of the clinical and social features of the PICU Community of Practice. In other words, experiential teaching turned into *social experiential teaching* activities. Not only did the PICU provide social teaching activities, the newly hired nurses benefitted from numerous instances where their learning was scaffolded to facilitate effective learning as they demonstrated their developing knowledge, skills, and judgment.

The importance of socially situated, scaffolded learning has implication for clinical education and quality teaching activities. Including multidisciplinary staff including preceptors, other experienced nurses, physicians and allied health staff, provides the appropriate setting for socially situated scaffolded learning that is not only oriented to the particular clinical task, but also teaches participants the rules and norms of collaboration that are necessary to provide quality care.

As I will elaborate in the next section, scaffolding has a significant role in facilitating learning among the newly hired nurses. It is one of the most important facilitating factors in social and experiential teaching and learning activities. The ability to scaffold activities for learning is an important skill for mentors – nurses, physicians, and other care providers.

Chapter 8: Learning aspect of the Preceptorship

Overview

In the previous chapter, I analyzed and described the teaching aspects of the Preceptorship in which various instructors externalized and shared their knowledge with the newly hired nurses. This chapter, describes and analyzes the learning aspects of the Preceptorship, giving particular attention to way in which learning opportunities enabled participants, including the newly hired nurses to internalize knowledge. Learning is considered any activity that leads to different forms of transformation of the learner at the individual level. Learning can also be a collective activity. At its best, learning transforms both the knowledge and the identity of the individual and the group. Teaching is a directive activity by a mentor for a learner (or group of learners). It is designed to facilitate these transitions (43,121,148). I will also examine the roles of the tools used for mediating learning, such as computers, iPads, smart phones, policies and procedures. In addition, I will identify analytical concepts derived from learning theories that help us explain the learning activities in the Preceptorship.

8.1. Learning activities in the Preceptorship

This section focusses on activities identified as learning opportunities, as well as tools used for learning among the newly hired nurses in the Preceptorship. This section will consider the various learning activities, rounds, simulation, handover, case based or incidental learning, learning by teaching, and self-directed learning from the point of view of the new nurse learner. While exploring learning activities, I also describe tools that were used for learning purposes in

the Preceptorship. Some examples of these tools include computer, mannequins, YouTube nursing educational videos, policies and procedures.

8.1.1. Rounds

The newly hired nurses identified rounds as one of the most important learning activities with numerous occasions to learn from the residents, fellows, attending physicians, more senior nurses, RTs, PTs and others who participated in rounds. The purpose of rounds was to determine if the care plans were meeting their goals and the patients' condition was improving. Learning in the rounds was mediated using various tools such as computer, digital mobile devices (such as tablets like iPads and smart phones), the Purple Sheet, patient flow sheet, and medical equipment. Participation in the rounds followed special rules that dictated the order of presentation and order of answering questions. Roles of the participants in the rounds were clear and staff needed to respect these role boundaries while participating in these learning activities.

The newly hired nurses learned by participating in various rounds such as morning, evening and night rounds and Mortality and Morbidity rounds (also known as case reviews). They believed that morning rounds had more opportunities for learning since these rounds were more detailed and thorough. The newly hired nurses believed that rounds were opportunities for learning things that might have been missed and also opportunities for learning about the questions that have not been answered in other learning activities such as handovers. They believed that learning in rounds was necessary for a productive team approach since it could improve continuity of care by streamlining information transfer between various members of the care team. By participating in the rounds, they learned various things such as team work approach, patient history, clinical issues related to the patient (what is going on with the patient), care plans, professional language (such

as terminology, acronyms and how to present a case), as well as self-confidence (feeling courage) to interact in the rounds (such as confidently asking and responding questions):

P75: NN32_LADL_RTF.rtf - 75:50 (314:321):

I: And what about uh, rounds? What is the role of rounds in your learning? Do you learn anything in the rounds?

*P: Totally. Rounds are really important. Um, I don't really like the way they do rounds here. But, **I think that it's important to do rounds in, anyway. So, it's definitely important for learning** because you get a little bit of a picture of how the **team works together and also what's going on with that patient.** [chuckle] cause a lot of times **you can ask questions that haven't been answered.** I'm constantly surprised. Like I'll ask the nurse handing over, a question about their care and they won't know the answer. Like someone hasn't asked that before. So, I feel like in rounds you can get a lot of like answers, to what you're doing. And **what the plan is.** Which is really good.*

P68: NN21_LACG_RTF.rtf - 68:46 (723:733):

I: What do you see the role of rounds in learning? Morning rounds, evening rounds?

*P: Um, I suppose **a team approach**, and together, make sure **everyone's on the same page.** With what's going on with the patient.*

I: Uh huh [affirmative]

P: I think they're good. good idea.

I: Which one do you find more helpful in learning? Morning rounds or evening rounds? In which one do you find more learning?

P: Morning, cause they're more thorough.

8.1.2. Simulations

Simulations, such as mock codes, were another learning opportunity for the newly hired nurses during the Preceptorship. In these activities, members of various clinical groups representing those who would be present in the actual events participated and shared their tacit and implicit knowledge with the newly hired nurses. Learning during simulations was mediated by the various tools mentioned previously. The norms or rules driving the

simulations were the same as real-life situation. Before starting simulations, roles were assigned and duties were clarified by the organizers of the simulation, who were normally CNEs or an attending physician. Everyone was expected to learn and respect the role boundaries. After the simulation, all participants were expected to participate in a debriefing and reflection session. My analysis of the newly hired nurses' reflections and reflective practices was based on my interviews and observations since I did not ask participants to write reflective journals about their experience of simulations.

The newly hired nurses looked at simulations as a way of learning in a context that was close to the "real-life situation". This they believed led to a deeper understanding compared to merely taking class-based courses. They believed that this method of learning was a better way to understanding the concepts and would help them "to cement" their learning.

P69: NN22_LACN_RTF.rtf - 69:52 (959:981):

I: Ok, what do you think about simulation? What do you see the role of simulations such as mock codes in your learning?

*P: Um, well, like I told you before things were, I feel like I really understand things that are really get a grip on something is when you have the **hands-on experience**. And so I've taken classes like we take PALS courses and, um, CPR we talk about all these emergency.*

I: What is PALS?

P: Scenarios. Uh Pediatric

I: Oh, Advanced Life Support.

*P: Advanced Life Support yeah. Um, so you go over all these scenarios, even in nursing school and talk about, each scenario. Even when we have a patient, like if it's the beginning of the shift and we think about scenarios that could come up and. But it's not until, I've had patients where, that scenario, or something has happened. Like, I, always remember, those patients where something's gone wrong, or it's been emergent situation. Like those kinds of things are **cemented in my brain**. So, I think the next best thing, cause we can't wait for us to have all these experiences and, um, you know we're all prepared to do these things, but most of us, or many of us haven't*

*been in an actual real, real-life situation. **But the mock code is, as close to a real-life situation**, we're gonna get. So, I think, **putting it into practice**, [pause] just.*

I: [inaudible]

*P: Just having like the **hands-on, experience**. I think **helps you, understand the concepts**,*

I: You mean [inaudible]

*P: **better**. Yeah, **cause hands-on**.*

The newly hired nurses learned how to function in real-life situations, how to communicate, team work, including what roles to accept in team work, and how to work with new people. They also learned to work efficiently, anticipate others on their team, and develop cognitive, problem solving skills.

P61: NN11_LACC_RTF.rtf - 61:23 (287:289):

I: Uh huh [affirmative] Can you give me an example that you have learned from interactions?

*P: Um, just like for example a **mock code um**, it's a great, less stressful. I mean it still is, but then a real-life scenario where a child's cramping or getting, you know getting worse, um, [inaudible] so it's sort of nice to, practice with those **communication skills and that team**. And, um, if you have those closed done in loops and you're really feeling good and you're both into, all **anticipating** what each other needs, like, it, it really can go smoothly. And you really have a good learning. I find **experience** from that. Yeah.*

I have copied a sample of my field notes here that shows the how the newly hired nurses learn by participation in simulations such as code blue through hands-on learning, as well as by participating in the debriefing and reflection session after the simulation:

P85: PRECEPTORSHIP_iCl_Learning _ All field notes together for learning.rtf - 85:224 (2568:2575):

Right away after simulation (mock code), the nurse educators asked participants to go to the Tactical Center for debriefing and reflection.

There were nine people in the room: attending physician (medical leader), two nurse educators (one of them was leading nursing side of the simulation and the other

one the administrative side of it), one person from simulation lab (she was the software leader of the code), fellow, three RNs (one new nurse and two experienced nurses) and finally one RT.

Nurse educators asked participants for their feedbacks. One of the experienced RNs who was bedside nurse of the dummy patient told: "Generally we did well. We only were short in staff. We asked for more hands, but nobody came in."

The RT said: "I needed more help as well. We called for another RT. Nobody came in. So, I did not know what to do. I could have got [ambo]bagging and somebody could go on the CPR. I was doing everything for RT side."

The fellow said: "I also was confused too." She confirmed the RT.

Attending physician asked: "why did the patient needed code? Why did he deteriorate? What was the most important thing that you needed to do and you missed it?"

RNs and the fellow gave some answers while the newly hired nurse was listening. Then the attending physician continued:

"You did a great job. This is not critic. This is education that I am going to give."

Then he started asking questions and discussing about the most important thing that needed to be considered such as calcium bolus, T sharp and the hemodialysis background of the patient etc. Meanwhile the fellow said: "I agree that I did not ask for the bolus dose of calcium." Then the attending physician taught them about real life situation and what they would have done and what they should have done or should do in the future, which vein they should use for bolus calcium and other things.

Then they also reflected on communication during simulation (mock code). They said: It was good." Then the nurse educators asked the team what they learned for the next time that they will remember (take home message).

A fellow answered: "The more mock codes are done, the more they we get used to and learn how to do it in real life situation." The RT said: "Clear communication and asking very clearly for help and then starting to work on one aspect very well."

8.1.3. Handover

Handovers were other activities identified as learning opportunities by the newly hired nurses. Interviews with the newly hired nurses showed that they learned by participating in mainly three types of handovers during their Preceptorship that included nursing handovers - the central report and nurse to nurse or one-on-one bedside handovers,

and handovers from operation room. In addition, as I elaborated earlier in the teaching aspect of the Preceptorship, they also participated in resident handovers when the medical trainees shared their knowledge about particular patients. The more time they spent in the unit, the more involved they were in medical trainee handovers.

Participants in the Central report were nursing staff including the newly hired nurses that came together in the Tactical Center in the beginning of the shift. The newly hired nurses and other staff had the learner role in these handovers and the CNC or the charge nurse of the previous shift were the instructors. However, there were frequent situations in which the handover addressed beyond the scope of instruction about each nurse's patient. Topics arose in discussions in which other nurses, including the newly hired nurses and their preceptors shared more general knowledge. The main tool that was used to facilitate the newly hired nurses' learning in these handovers were the CNC or the charge nurse's notes that included all the reports they had collected from the staff during the shift. At transition between shifts all of the nursing staff were expected to participate, but were limited into 5 minutes. Frequently the quality and safety leader of the unit and occasionally the program manager participated in these handovers.

Learning at the bedside after the central report was longer, normally taking between 15-30 minutes. Participants in these handovers included the handing over nurse and the nurse for the incoming shift. Either of these nurses could be the newly hired nurses and preceptors. The purpose of bedside handovers was to give a comprehensive update to the nurses of the incoming shift about the patient including demographic and clinical information, the care plans, the nursing assessment, and the doctors' assessment and the possibility of transferring

the patient to another unit or discharge. Newly hired nurses learned how to assess and anticipate changes from participation in these handovers.

P84: NN24_LACJ_RTF.rtf - 84:47 (207:237):

I: For example, do you learn from rounds, or other situations that you can see here?

*P: Oh, you learn, when, the first thing you do. You come on the unit. Who's your patient? You might go to **central report**. You probably will, depending on if we have a central report, but then, the charge nurse. You hear, just **snippets** of **what every patient's going to have happen**.*

I: You mean in the handover. [inaudible]

P: Yeah, like sort of, no like in the morning, like the five minutes

I: Yes. Five

*P: Before we go to bedside. We learn a little bit about each patient. So we kind of have an idea **what's going on in our unit**.*

I: Right

*P: And **then you go to bedside** and get your report.*

I: Right

*P: **That's when you start learning**. You start*

I: Right

*P: Ok, so what they're last twelve hours was been. Or why are they here. You know what's their, what's their **diagnosis**. All these things, right? So any previous **history** of admissions here.*

P68: NN21_LACG_RTF.rtf - 68:52 (811:817):

I: How was handovers for example?

*P: Well, uh, the nurse before hand, [pause] communicating, what she's done in her shift, **what needs** to be done, um, what the **plan** is.*

I: And do you find any learning in the, in these hand overs? That is shift to shift handover?

*P: Um, [pause] well you learn **about the patient**. Um, sometimes you can **learn if you haven't done something** that the patient's got to do, you can ask them **how to do it**. For example, giving [inaudible] from these [infusion] pumps. I haven't done, an, didn't do in my Preceptorship. So the nurse before me showed me how to do it.*

I: Uh huh [affirmative]

P: If that makes sense.

I have documented frequent instances of these learning opportunities in the PICU during handover. Below is a typical example that describes how the newly hired nurses participate and learn from nursing handovers as described above:

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:301 (3284:3286):

*It was 1845 and new shift RNs were coming to the unit. At 1900 the shift to shift handover started. Again they first started from **tactical center that was 5 minutes** long. Most of the nurses including the newly hired nurses working in new shift went to tactical center and the leader nurse (CNC) gave a **short report about** the unit in general and patients. Not all the RNs of the new shift participated in the five-minute handover in the tactical center. Some of them went directly to the bedside and started handover in the bedside. This is the case almost in all the shifts. Then the nurses including the newly hired nurses starting to work for new shift went to the bedside and started to take over the patients from the RNs of the previous shift.*

*In bed 7: It was new nurse LADF. She had admitted a patient for bed 7 and worked with nurse educator for this patient. Now, **she is handing it over to the nurse coming to the shift X who is an experienced nurse**. New nurse that was handing the patient over, was very relax and comfortable. She was doing the handover alone in the beginning, but at the end of handover, the **nurse educator joined her**. She used various papers and documents for her handover. She used green patient flow chart, medication administration records (MARs), and other documents. She gave a report of around 15 minutes. In last few minutes, nurse educator **observed her and corrected her a few times** by pointing to some issues in the sheets that she was using for report. In so doing, she pointed by her finger to some material written in the sheet **and asking her to talk about them** or to give more details about these points. The new shift RN was listening and asking questions and the newly hired nurse (LADF) was answering while she was very relaxed and talking very assertive and polite.*

During the bedside handovers, they made use of tools including Kardex, flow sheet, patient chart, lab results, images and other diagnostics, computer and monitors. Additionally, most of the newly hired nurses took notes using pen and paper in the handovers. In these handovers, the departing nurses had the instructor role and the nurses of the upcoming shift were the learners. However, sometimes mutual learning occurred. This happened especially

when the handing over nurses were newly hired nurses who shared their knowledge with experienced nurses of the incoming shift but also were assisted in communicating the relevant information by a more experienced nurse who was taking over care for the patient.

The newly hired nurses also learned by participation in the operation room (OR) handovers. The purpose of these handovers was to help the PICU team learn the most updated issues about the patient being handed over. In these standardized learning activities, the newly hired nurses learned from all the participants in these activities including the OR nurses, the anesthesiology, team and the surgeon. Learning from operation room handovers was facilitated using various tools such as patients' charts, flow sheet, anesthesiologist's progress notes and clinical equipment such as monitors. In these handovers, there was a clear order of presentation, well defined roles, and role boundaries. In these handovers nurses learned numerous things such as patient's diagnosis, history, patient's surgery, anesthesia and nursing issues related to the patient, issues that arose during surgery, and the patient's status at the time of handover. They also clarified how communication would take place with the surgeons who are not usually present in the PICU. I have copied here an excerpt from my field notes showing the dynamic of learning by the newly hired nurses in the OR handovers, and I have supported it by quotations from the newly hired nurses' interviews:

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:298 (3273:3277):

LADF, the new nurse was working for bed 7 that was a cardiac patient. She was working with a nurse educator who was a nurse as well. They were getting ready for admitting a patient from OR. She was setting up the bed and catheters, infusion pumps and doing some other activities. The nurse educator was working as well. There were some questions and answers back and forth between the new nurse and nurse educator. She was answering all her questions eagerly. It took a long time for the patient to come from OR (around an hour).

When the patient came from OR to the PICU, in the handover of the patient the PICU staff including the new nurse and the nurse educator stayed aside without touching the patient, and the OR team set up the patient, all connected catheters, tubes and serums and medications and connecting the patient to monitor. They did all works. Then, they started the OR handover.

*First a lady who was a nurse from OR team talked about nursing issues related to the patient. She explained about issues such as last vital signs, medications, catheters connected to the patient, medications and serums. Then, she selected the anesthesiologist who gave information about type of anesthesia that patient had received, anesthesia medications and other issues related to anesthesia. Then, the surgeon was selected by the anesthesiologist to report. He talked about patient's surgery, works done for the patient, events that happened to the patient during surgery and patient's situation at the time of handover. Then the anesthesiologist self-selected himself and added some more information to the report. Then the surgeon again. Then they asked if any questions, and they finished the handover. All this process was being observed by new nurse. I checked with the new nurse afterwards to see if she was learning or not and she mentioned: **"I definitely learn many things. I learn process, diagnosis, what has been done and should be done. Yea. Many things"**. In addition to the new nurse, the nurse educator who was an experienced nurse was observing while they both were behind OR team getting the patient from OR team.*

Right after that, new RN and the nurse educator started their works. New nurse was working with the nurse educator. She was very relaxed and working with confidence. A few times, she checked her works with the nurse educator. The nurse educator answered back her questions each time. While they were working, the nurse educator was giving practical hints about how to do things, frequently and very shortly. New nurse was working fast. She was setting up the catheters and fixing them, gave some medications to the patient. The nurse educator and the new nurse both were working in two different sides of the patient.

P68: _NN21_LACG_RTF- 68:47 (735:759)

I: Uh huh [affirmative] what about, handover? What do you learn from handovers?

P: Um, about what's happened throughout the day. So, what's going on with the patient.

*I: What about OR [operation room] handover? I mean at the patients that are being handed over, or, from **OR** to you.*

P: Yeah. From events that have happened.

I: Uh huh [affirmative]

*P: So what, [pause] **what, what's being going on with the patient.***

I: Uh huh [affirmative]

*P: So you can learn the **history** and*

I: Right.

*P: **What's being done.***

8.1.4. Case based or incidental learning

Case based, incidental or opportunistic learning was another learning activity in the Preceptorship. Newly hired nurses learned from patients who came to the unit and presented unusual learning opportunities or opportunities to re-enforce learning from previous patients.

In the case based or incidental learning activities, the newly hired nurses not only learned from their preceptors, but also, they incidentally learned from other nurses who were with patients in nearby beds, attending physicians and their medical trainees, as well as from other members of multidisciplinary care team (such as pharmacologists and their residents or cardiac surgeon and fellows). Incidental learning was facilitated by using tools such as computer, monitors, flow chart, Kardex, patient chart and sometimes Extracorporeal Life Support Program (ECLS) machine. Some of the newly hired nurses looked up and used policies and procedures related to the incident for learning. In these learning activities, the newly hired nurses were primarily learners; however, sometimes they shared their own knowledge with the people from whom they were learning. These learning activities did not follow special rules. Some people such as preceptors called these learning activities incidental learning or “haphazard learning” while others such as attending physicians called it “case-based learning”. I have documented frequent instances of incidental learning in my field notes and have copied an example here:

P85: PRECEPTORSHIP_iCl_ Learning All field notes together for learning.rtf - 85:308 (3335:3345):

Few days ago, a patient had deteriorated and had gone under ECLS. Today, when I was observing, I saw that the new nurse LACN was working for a patient beside

this patient. She went to the nurse taking care of the ECLS patient and asked if she could learn about it from her. The nurse happily accepted it. Then the new nurse started learning about ECLS from this ECLS nurse. She frequently went to the ECLS patient's RN and asked multiple questions about ECLS, its process and many other technical aspects of it. She was asking questions and was learning enthusiastically. This took a long time (multiple runs of 5 minutes) and the new nurse was still learning from ECLS nurse intermittently while she was checking and watching out her own patient. The new nurse's patient was very stable and she had enough time to spend for learning about ECLS.

Incidental, case based or haphazard learning was not restricted to the newly hired nurses, rather preceptors identified incidents that happened in the unit (regardless if they were safe or not) as learning activities:

P67: Preceptor4_LACA 2_Notes_RTF.rtf - 67:21 (20:20):

Learning happens through incidents that happen in the unit. You learn things through incidents that are not safe.

In fact, some instructors such as clinical nurse coordinators (CNCs) considered this learning activity as the model that could best describe model of learning and teaching among the newly hired nurses in the PICU:

P85: PRECEPTORSHIP_iCl_ Learning All field notes together for learning.rtf - 85:48 (593:596):

I: What is the best method of teaching in the PICU from your point of view? Especially, considering the newly hired nurses.

*P (Clinical Nurse Coordinator): The best way that I would describe it is haphazard. Teaching and **learning** [pause] **it's haphazard in the PICU.***

I: What do you mean by this? Can you tell me more about it?

*P: Ye. It's mostly something comes up and something happens and you start teaching it to the new nurse. Or anybody. To residents, nursing students, RT students. Or us ourselves. Something happens or a case comes in and we start learning about it. It is always happening. Dawn to dusk. **Learning is haphazard.***

Some preceptors moved beyond and believed that even the color-coded system of nursing that was considered as the learning pathway for the newly hired nurses in the PICU, was in fact an outcome of an incidental learning at the unit level. These people believed that something happened in the unit and the color-coded system was developed to guide learning from this accident:

P67: Preceptor4_LACA 2_Notes_RTF.rtf - 67:22 (26:26):

Few years ago, an accident happened and this color coding system for nurses was developed [s/he did not specify the accident unlike asking him/her].

8.1.5. Learning by teaching

The newly hired nurses considered teaching as a learning activity within the Preceptorship. They believed that teaching helped them learn in numerous ways. Teaching helped them to gain a deeper understanding of the topic they were teaching, and in order to teach, they needed to master the topic. As a consequence, they studied and updated their knowledge. When they were teaching, their audiences shared some information and experiences that was new to the newly hired nurses, which helped them learn while teaching. Among the things that newly hired nurses learned through teaching were appropriate and effective methods of communicating and transferring information to their audiences. When they were teaching, they also learned about other people's experiences including the staff, trainees and patients' families, "kind of a back and forth" teaching and learning:

P62: NN12_LACB_RTF.rtf - 62:12 (211:225):

I: Ok. You mentioned that you were teaching and when you are teaching you always, you are at the same time learning.

P: Uh huh [affirmative]

I: How do you learn at the same time that you are teaching?

P: Uh, I think in a lot of ways. I think I.

I: Do you have any examples, especially in this period that you have in here?

*P: Yeah. I think um, you **know you have to make sure that your knowledge is sound before you try to teach someone else. So, there's that. And often, you know you find yourself needing to refresh your knowledge before you go and teach a certain** subject. I think the other way that you learn is that you, you learn a lot about, um, sort of **the way to communicate appropriately and a way to actually convey that information so that it's absorbed. And, and appreciated by your students, or whoever you, you're teaching. Um, cause I think a lot of the times when you're learning, you think, oh I really wish someone else has does it this way, or that way. And then when you go to teach it you really have to like, keep that in mind. To, to make sure that you're effective.***

I: Uh huh [affirmative]

P: Um, and as far as so far here, like I've had a few students ask me questions about things. So, it's been nice to be able to explain things to them.

The newly hired nurses started teaching and sharing their knowledge with others as soon as they started their work in the PICU. In so doing, they taught experienced staff in the PICU. The more they worked in the PICU, the stronger the relationships they established with the staff, and the more others trusted their expertise. The newly hired nurses used various tools for facilitating their teaching-learning activities some of which included computer, digital mobile devices such as iPad, the PICU policies and procedures, flow chart, Kardex, patient chart, monitor, medical equipment, lab results, images and other diagnostics. I have copied here examples of my field notes showing how the newly hired nurses learned through teaching:

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:164 (2154:2167):

New nurse, LACB, was teaching a nursing student during her Preceptorship. After she finished it, I went to her and asked about her feeling about the experience of teaching a nursing student. She told: "It was good. It gives you the confidence that you have proceeded and understood what you are teaching. When I am teaching, I am learning as well."

8.1.6. Self-directed learning

Self-directed learning was another learning activity during the Preceptorship. The purpose of this activity was to “get a better understanding” of various topics of personal interest such as new diagnostics and new procedures, and topics that they felt they “did not have a full understanding of”. The newly hired nurses used variety of tools to mediate their self-directed learning. Some of these mediating tools included nursing progress notes written by other nurses, patients’ charts, lab results, images, computer, digital mobile devices (such as iPad), text books, internet (to access to medical and nursing data bases). Sometimes, they took notes about some of the topics they were learning. In addition, they got involved in interactions on these topics, asked for mentorship from others, asked other staff to model various tasks, and observe them when they practiced. They also reflected on their own tasks and asked for reflection from other staff such as clinical nurse educators and other knowledgeable and experienced colleagues. In this way, they got involved in advanced activities in the unit. Incrementally, they participated in giving care to very complex cases such as cardiac cases. As they gained more experience, they started working independently and developed mastery. This also developed more recognition and trust about their expertise, which resulted in more opportunities for participation in the unit and moving to more advanced roles. In other words, they used all available resources for self-directed learning which led to advancement in the unit and opportunities to doing more complex activities, care for complex patients such as cardiac cases, and taking a more central role in the unit:

P70: _ NN23 _ LACU _ RTF.rtf - 70:7 (91:97):

I: Uh huh [affirmative] perfect. And how do you manage your learning? Any self- direction? I mean, how did you direct your learning?

*P: [pause] Um, actually, [chuckle] you do. Well not. Uh, uh, I guess, reading books. And then I'll visualize, and I'll. [pause] I guess I use everything. I shouldn't say. Um, depending on, the scenario, I'll go do lots of **learning conventions** and stuff. And, or we **have our educators**, and then, but **I'll usually get somebody who has experience walk me through it once. And then I'm good to go.***

I: Uh huh [affirmative]

*P: And then usually they'll **observe me once**. I'll just **make sure, this is hey!** Watch me, don't tell me what to do, and then I'll do it and they'll tell me if I did it right or not.*

8.2. Analytical concepts underlying learning activities in the Preceptorship

In the previous section, I explored activities that were identified as learning activities among the newly hired nurses in the PICU. Using concepts derived from learning theories, in this section, I identify analytical concepts underlying learning activities in the Preceptorship. In so doing, I elaborate on various analytical concepts that include social interaction, experiential learning, scaffolding, legitimate peripheral participation (including participation in the periphery and moving to the center of community), change in the identity, learning through an expertise-centered process and learning at the boundaries of Communities of Practice.

8.2.1. Learning through social interaction

In general, learning in the Preceptorship happened through interactions and progressive participation in the PICU. Through interaction, the newly hired nurses established relationships with others, gained access to their knowledge, internalized the available knowledge and incrementally contributed in various activities in the unit by externalizing their learning. This way, they contributed more in the real outcome of the unit that gave them the feeling of belonging and becoming part of the PICU professional nursing team. Since the role of social interaction in learning will be covered in a separate chapter (Chapter 9), I move on and explore other process of learning in the following few sections.

8.2.2. Experiential learning

Experiential learning appeared to be one of the most dominant processes in the Preceptorship and all the nurses believed that hands-on learning was a major learning process. They believed that truly learning a task does not happen for them unless they practice and experience it:

P76: Cohort 3_NN34_LADH_RTF.rtf - 76:3 (57:83):

I: Ok, how do you learn [during your Preceptorship]?

P: Hands-on. Doing it.

I: Ok.

P: Yeah.

I: Can you give me some examples?

P: Um,

I: For example, you have those [inaudible] today.

*P: Uh, well, [pause] for instance there's um, like an **e-learning** online for how to use the, [inaudible]*

I: Right.

*P: it's fine doing that, but **it doesn't really sink in**,*

I: Right.

P: Until you start using them. In real life, not just, doing it on the computer.

Through experiential learning, during their Preceptorship, the newly hired nurses gained access to numerous real life situations and started doing nursing tasks and giving care to real patients. This way, they gained concrete experience in real-life and authentic situations. Concrete experience was complemented by various forms of reflection that happened either while the task was being done (reflection in action) or after the task was over (learning from reflection on action). The latter type of learning happened in various forms: (a) after doing the tasks, they received reflections from their preceptors, other general

duty nurses who were supporting the newly hired nurses and CNCs or charge nurses of the shift. (b) Reflection that they engaged in through the established system of Patient Safety and Learning System (PSLS). This was a system for reporting mistakes or medical errors for the purpose of learning. Staff received feedback and learned from the system after the mistake was reviewed. These reflections were normally given by the quality and safety leader of the unit who was responsible for PSLS. (c) They also received reflection through case presentations or morbidity and mortality rounds. These rounds were a specific system designed for staff to learn from mistakes. The cases were developed by the PICU medical team and the Quality Lead, who was a nurse, and presented by the medical staff, most commonly by the critical care fellows. All the staff from all of the disciplines who were involved in the care in which mistake happened were expected to participate. The newly hired nurses frequently participated in these presentations:

New nurse

P69: NN22_LACN_RTf.rtf - 69:26 (362:362):

*P: Well, but like, lots of things, like if I have a patient, something different that I've never done like a procedure and I go ask somebody to help me with it. And I watch them do it, or they step me through it, that's, learning. Or if I, have a day where I feel like **I didn't do something right, or, something happened, then I learn from that, like, mistakes made,** or, just things you forget to do, or and. And in this kind of work I think you have to be very open to learning and very humble about learning. Especially when you're, new um, and learning the way they do things here. Especially just being, teachable, and willing to, you know listen to other people and learn, for, you know I've learned a lot more at this beginning period I think than. I'll always be learning, but, you know being teachable.*

P84: NN24_LACJ_RTf.rtf - 84:26 (772:772):

*P: It's because we all learn by **trial and error**. And then it's, it's important to just keep, keep that positive. Uh aspect to it, so that you can, uh want, you keep wanting to learn.*

Concrete experience and reflection helped the newly hired nurses to develop new ideas (hypotheses, theories, models, frameworks, concepts or schema) or refine their previous ideas, and practice the refined ideas. They constructed and expanded their understanding on an ongoing basis. They continuously learned and expanded their scope of practice in the unit. For example, they believed that, by actually doing tasks and reflecting about the tasks, they could develop their hypotheses about potential challenges of a task - what could potentially go wrong, how they could troubleshoot and solve the problem in a way that it would not happen again. They believed that they could learn this only through practice:

P74: NN31_LADN_RTF.rtf - 74:5 (48:50)

I: Tell me more about it [hands-on and virtual learning].

*P: Hm, I think when **I actually do practice**, that's when **I see what are the potential challenges** with it and **what could potentially could go wrong**. Or um, it's not as set **clear as it states in the books**, or in the articles that, things could potentially could be different. **So how would you trouble shoot and those are**, those problems come up when **you actually do practice**. Um and at that point you can, I can ask question of, oh this happened. **So how can I, fix it?** Or how can I, do it differently? So if it's a problem it doesn't happen next time. I think that happen more, when you are **actually practicing** rather than reading something and from the book, or, from an article.*

The newly hired nurses believed that, through putting theoretical learning into practice in hands-on learning, their learning was consolidated in their minds. Therefore, they asked for more hands-on practice. However, since they could not experience and practice every single task in real life and authentic situation during their Preceptorship, they found that simulations could be very helpful for hands-on learning:

P69: NN22_LACN_RTf.rtf - 69:52 (959:981):

I: Ok, what do you think about uh simulations? What do you see the role of these kinds of mock codes in your learning?

*P: Um, well, like I told you before things were, I feel like I really understand things that are really get a grip on something is when you have the **hand-on experience**. And so I've taken classes like we take PALS courses and, um, CPR we talk about all these emergency*

I: What is PALS?

P: Scenarios. Uh Pediatric

I: Oh, Advanced Life Support.

*P: Advanced Life Support yeah. Um, so you go over all these scenarios, even in nursing school and talk about, each scenario. Even when we have a patient, like if it's the beginning of the shift and we think about scenarios that could come up and. But it's not until, I've had patients where, that scenario, or something has happened. Like, I, always remember, those patients where something's gone wrong, or it's been emergent situation. Like those kinds of things are **cemented in my brain**. So, I think the next best thing, cause we can't wait for us to have all these experiences and, um, you know we're all prepared to do these things, but most of us, or many of us haven't been in an actual real, real-life situation. **But the mock code is, as close to a real life situation**, we're gonna get. So, I think, **putting it into practice**, [pause] just.*

I: [inaudible]

*P: Just having like the **hands-on, experience**. I think **helps you, understand the concepts**,*

I: You mean [inaudible]

*P: **better**. Yeah, **cause hands-on**.*

Some of the newly hired nurses referred to hands-on learning as the “watch one, do one” philosophy (model) of learning. In other words, they considered it a process of internalization and externalization that happens in the community of the PICU. Later, when they started sharing their knowledge and teaching others about their experiences, they called it “watch one, do one and teach one”:

P75: NN32_LADL_RTf.rtf - 75:9 (87:97):

I: Let's switch the gear towards learning. How, do you learn during the Preceptorship?

*P: Um, I definitely like the combination of hands-on and like, the, **watch one, do one, kind of philosophy.** So, um, but with like a little bit of class study stuff is good too.*

I: Hm, uh huh [affirmative].

P68: NN21_LACG_RTF.rtf - 68:53 (831:841)

I: How do you learn during the Preceptorship?

P: Watch one, do one, teach one. [chuckle]

I: [chuckle] What does it mean?

P: As in you watch someone do something, you do some, you do it, and the you can teach it.

I: Ok.

8.2.3. The experience of scaffolding

Scaffolding appeared as the most common process for learning in the Preceptorship. Various forms of scaffolding (such as modeling, reflection and articulation) were used as tangible methods of implementing the concept of zone of proximal development in the Preceptorship. In the context of the PICU, Zone of Proximal Development is the difference between the newly hired nurses' actual functioning level at the beginning of their participation in the unit without any support and their potential functioning level that happened with some support.

The newly hired nurses came to the unit with great amount of knowledge and experience. However, due to various factors (such as being new in the unit, lack of clear understanding of the routines and how the unit functioned), they either could not do most of the expected tasks or they could function only at a very basic level.

Hands-on and experiential learning was facilitated by scaffolding. Through scaffolding, the newly hired nurses learned by listening to their preceptors (or other instructors teaching them) when they were explaining what to do, the logic behind the tasks, related theories and various steps

of the tasks (cognitive modeling). They participated in the actual setting, observed and internalized tasks (behavioral modeling), then they started doing the tasks under direct supervision and with the help of their preceptors (experiential learning). Gradually they expanded their knowledge and confidence by working independently and gaining more hands-on experience. Meanwhile, they received some feedback and reflections from their preceptors or other colleagues while they were doing their tasks (reflection in practice) or after finishing the task (reflection on practice). Sometimes they benefitted from the stories told by their preceptors, which made their learning more concrete and authentic (learning through articulation). In other words, through various forms of scaffolding such as modeling (cognitive and behavioral modeling), reflection (reflection in practice and reflection on practice) and articulation the newly hired nurses learned and constructed their knowledge and progressively expanded their expertise. The more independence they got, the less supervision they received and finally they were able to do more nursing tasks and have more contribution in the real outcome of the unit. This way, they became independent and a real member of the PICU nursing community. Learning through scaffolding was not limited to the newly hired nurses. As I will elaborate later in this section, various forms of scaffolding (such as modeling, reflection and articulation) were tangible methods of implementing the concept of zone of proximal development:

P71: NN25_LADE_RTF.rtf - 71:19 (375:397):

I: And how do they teach you about the routines and norms of the unit?

P: [pause] I think they just, [pause] do their job and you watch them, and learn the process that they use to, [pause] do what they need to do, and then obviously asking any questions. [pause] I feel like, in the beginning it was a lot of shadowing. And then, maybe like, not in [inaudible] I mean one or two days, of watching them and then sitting down and having them explain to me, what the routines are. And why those are the routines. And then, um, once you start taking over, the care of your patients, asking them for feedback. If they'd do anything differently, why they would do something differently. Um, [pause].

*I: Uh huh [affirmative] uh, I just want to ask your idea about this process that I explain. The way that I have seen here, correct me if I'm wrong, The way that I see here people are learning in their Preceptorship like the newly hired nurses who are coming is that, as you mentioned, first they stay and observe, then, they and their preceptors shows them, then in while they do some part and preceptor corrects them [inaudible]. **Then preceptor you know, continually fades away.** They start working alone and establish their own independence. Am I correct, or not?*

P: I'd say that's correct.

I: How would you add or reduce comment on.

P: Um, [long pause]

I: Nothing?

P: I don't know, yeah.

I: great [chuckle]

P: [chuckle]

P69: NN22_LACN_RTF.rtf - 69:8 (80:84):

*P: ... And then um, the second part is, the Preceptorship where you're actually with somebody, who can, like each time a new experience comes up **they can, walk you through it, or show you.** So that's actually **hands-on experience.** And, like now that I'm on my own, **I'm getting a lot of hands-on experience,** but it **would have been nice to have a little bit more time** with another, nurse. Um, or even just to be buddied with a nurse so there was always someone who would not. Like even now there's people always that I can ask questions with. Just having **more of that um, one-on-one teaching for a little longer.** Cause, **hands-on is the way that it really sticks in my head.** But. But for any extra learning now when I'm on my own, like I will, if I have a patient one day with something new, I'll make a note and go and just do some study. [inaudible].*

Collaborating with other members of the PICU care team (such as their preceptors and other experienced nurses) and various forms of scaffolding and support that they received from these people, the newly hired nurses soon could do many tasks in the unit that they could not do otherwise. In other words, their independent actual performance was very limited in the beginning, however, they could master and do many of the tasks in the context of the PICU after the collaboration, scaffolding and support they received. This was not limited to practical tasks, rather

problem solving and decision making followed the same pattern. Even though the newly hired nurses knew how to solve problems and make decisions about various aspects of caring for their patient in their previous workplace, they could not do it in the context of the PICU without collaboration, support and scaffolding from other staff.

In fact, participation in the PICU, connecting with the big network of clinicians, accessing to the knowledge distributed among these networks, support and scaffoldings that the newly hired nurses received from the PICU network and mainly from their preceptors helped the newly hired nurses master and do various higher level skills and tasks that “actually” they were not able to do otherwise. For example, making decision about the setup of a ventilator and negotiating it with other members of the team, doing physiotherapy skills, taking care of a kid with multiple organ failures, looking after a cardiac patient, teaching families about tracheostomy care, communicating with families about end of life care issues were some of the tasks that they could not do in the beginning. Collaborating with other staff and various forms of scaffolding that they received from their preceptors and other staff enabled them to do these tasks. In other words, scaffolding helped the newly hired nurses push boundaries of their actual functionality towards their potential functionality level. I have documented frequent instances of these situations samples of which have been copied here:

P74: Cohort 3_NN31_LADN_RTF.rtf - 74:18 (145:147):

I: Um, and who and how, uh, mm, who facilitated this learning and how did it happen? That you feel more comfy right now. How did you learn it?

P: So um, my preceptor actually, well from the beginning with documentation we had to go through it and, I had to keep asking questions, cause every time, maybe I did things wrong. Or, uh things weren't being done um, uh the way it was supposed to be. So we talked about those and we fixed the problems that was done. From system, from uh, equipment perspective, my preceptor actually asked me to talk to one of the uh, RTs. On a night shift. So, we went to the back and I forgot her name. I don't remember the RTs name. But she turned on a ventilator for me and we went through

*the different modes of it and, how they, each button works. And, cause the concept is the same. It's just the equipment is different. So that was very helpful that um, going through the ventilator is, outside of the patient's bed side. Yeah so we could play around with it. Um, [pause] everybody I would have to say has, had some input into it. And it's not even my own preceptor even the other nurses, um, around when I moved around to like, or uh [inaudible] for example is, new to me. **Because we don't have that system.** So, uh I've seen nurses that are around [inaudible] and say, am I doing this right? Or can you help me sign out a medication? The pharmacists being on the unit and asking them questions, cause again they um, **the way they distribute medication is different than what I'm used to.** So, I would say everybody had some sort of a hand in this. Um,*

P71: Cohort 2_NN25_LADE_RTF.rtf - 71:19 (375:397):

I: And how do they teach you about the routines and norms of the unit?

*P: [pause] I think they just, [pause] do, their job and you, watch them, and learn the process that they use to, [pause] do what they need to do, and then obviously asking any questions. [pause] I feel like, in the beginning it was a lot of shadowing. And then, maybe like, not in [inaudible] I mean one or two days, **of watching them and then sitting down and having them explain to me, what the routines are.** And why those are the routines. And then, um, once you start taking over, the care of your patients, **asking them for feedback.** If they'd do anything differently, why they would do something differently. Um, [pause].*

Scaffolding enabled the new nurses to take on increasingly complex patients and work more intensely with the multidisciplinary teams. In the process, they moved from the periphery of the PICU to more central roles in patient care. However, as stated earlier, the frequency and duration of interaction affected the process of scaffolding. Where newly hired nurses and their preceptors or other staff could interact frequently or over an extended period, there was more opportunity for scaffolding. In contrast, brief activities such as handovers allowed less opportunity for scaffolding. However, if the same people were repeatedly involved in handovers across multiple shifts, scaffolding could occur. In other words, process of scaffolding relies on the amount of interaction in teacher-learner relationship.

8.2.4. Learning from periphery to central PICU community

8.2.4.1. Participation in the periphery

The newly hired nurses started learning in their Preceptorship by participating in the community of the PICU. This participation started for many by working in the Transitional Care Unit (TCU), which was located in the back of the PICU and was a place for admitting chronic patients. Among the staff, TCU was normally called the “back”, and was considered a marginal (peripheral) part of the unit compared to the front of the PICU that was called “front” and was considered the central part of the PICU. Cases in the TCU were usually chronic patients that were simpler and more stable compared to the front part of the PICU which admitted more acute cases, including trauma and cardiac surgery patients.

In the beginning of their participation in the TCU, the newly hired nurses were merely observers. They observed what, when, how and why things were done in the TCU. Their preceptors described the sequence of the tasks to them and demonstrated how they were to do these tasks (cognitive and behavioral modeling). They observed and listened to their preceptors who helped them to notice important essentials in relation to their work. In the beginning, everything was stressful for the newly hired nurses. Then they gradually started taking care of patients and doing tasks (active experimentation and participative practice). At this stage, patients that they were looking after were simple and stable. They started doing simple tasks (experiential learning), and they received reflections from their preceptors which were given either while they were doing the tasks or after finishing the tasks (reflection in and on practice). They asked frequent questions from their preceptors while doing their tasks, and they were also asked questions by their preceptors (articulation). They gradually started participating in the rounds. However, at this stage, their participation in rounds was minimal; they either did not present their patients in rounds, or they

presented it partially and under close supervision of their preceptors. While presenting, they used the Purple Sheet and read the information off this form. The language they used was simple, they were stressed, and felt intimidation. They rarely asked questions of the physicians during the rounds, and their participation in the discussions was minimal. When they were doing handovers, they were supervised by their preceptors, and their handovers took longer than an average experienced PICU nurse. Consequently, the newly hired nurses had to stay over time to finish their nurse-to-nurse (one-on-one) handovers. At this stage, they had not established deep relationships with the staff, and communication with the PICU staff was not smooth and easy for them. Teaching others by the newly hired nurses rarely happened. In general, independent work by the newly hired nurses at this stage was minimal. At this stage, mostly they felt stressed out and were disappointed that they seemed to be starting from scratch and being considered beginner and novice (I will elaborate on the issue of frustration later in Chapter 11). In general, at this stage, they did not consider themselves real members of the PICU nursing community and did not feel like they belonged to this community.

8.2.4.2. Moving to the center of the community

Gradually, the newly hired nurses gained more experience and started doing more complex tasks. In so doing, first, they did complex tasks with help from their preceptors. As they spent more time in the unit, and the more they practiced, the more they were able to give care in complex situations, which gave them more confidence. Gradually, they felt more comfortable and worked more independently. They started presenting their patients in the rounds with more independence so that at one point they presented their patients with a minimal use of the Purple Sheet indicating that they were more expert and knew their patients very well. They felt less intimidated (especially

when they committed a mistake while presenting their patients) and they participated more in the discussions in the rounds and handovers, especially OR handovers. Not only did they ask frequent questions from attending physicians and other people in the rounds, they also easily answered questions in the more intense and complex rounds. They easily asked for help anytime, even in cardiac rounds. Handovers became shorter and faster, and they gave shorter, more efficient and comprehensive reports about their patients. They started teaching various groups of people, (such as patient families, students, and other staff more frequently. They were trusted for their skills by other staff and started covering their next-door nurse's patient in the break times. Gradually they established more trust within the unit and were occasionally assigned to less critically ill patients. Their relationships in the unit deepened, and communication needed to solve issues among other members of multidisciplinary team became much smoother. As they advanced in the unit, they felt less stressed, less disappointed or frustrated. They gradually progressed in their Preceptorship, moving from the "back" of the unit (TCU) to the "front" and were assigned much more complex cases. After gaining more experience and confidence, they took some educational workshops, moved up the color-coded system of nursing in the unit, and caring for truly complex patients such as cardiac patients. With time, they started thinking of taking more advanced roles such as Admit and Relief (A&R) and Charge Nurse roles. In this way, they progressed to the center of clinical community and became more engaged in daily care planning and leadership roles. This entire process has been described by both the newly hired nurses and preceptors in the following quotes. I have also documented frequent instances of this gradual progressive movement from periphery to the center of community of the PICU in my field notes:

New Nurse:

P70: _NN23_LACU_RTF.rtf - 70:19 (223:229):

I: How did you learn routines and expectations of the unit during your Preceptorship?

P: Just in the [Preceptorship], um, your buddy nurse, uh she just basically here's a day in the PICU. And, the first day you kinda, I, I'm an observer. I'll observe, see how, everything works. And then you just slowly start to get the skills.

I: In your Preceptorship [you mean]?

P: In your Preceptorship, yeah, day-by-day and then you slowly pick it up. The routine's, to be honest, routines in ICUs, adults to here weren't, it's pretty much the same.

Preceptor:

P82: Preceptor14_LADM 1 and 2_RTF.rtf - 82:5 (141:147):

I: You mentioned the previous time you had to show and you had to do many things for teaching the newly hired nurses.

P: Yeah.

I: Can you explain, this, the process of teaching and learning, what does the process for teaching and learning in the Preceptorship look like?

P: I think usually what happens with, um, somebody who's brand new to the hospital, brand new to the unit, sometimes even brand new to peds, is you know the first, we do, with them we do 12 shifts. And uh, the first shift, I find they watch you most of the time. You still do what you would normally do, and I find like that's the day that I lose my voice, because all day I'm talking. I'm doing stuff and I'm talking. I'm telling them, and then the next day they take a little portion of it. And they do that. And then the next day they take a little bit more and a little bit more. Um, so it kind of is like they watch you and then, you do it together. And then they start doing it on their own and you're watching them. And then they end up doing it on their own, right? Um, whereas this time, we didn't have that progression. So it was just a little bit different. But, that's ok. [chuckle]

8.2.5. Learning and change in the identity

Learning during the Preceptorship was not just grasping the information or skills. During this period, the newly hired nurses observed their community, absorbed the knowledge, skills (technical and interpersonal), beliefs, the language of work,

communication strategies, and all other aspects of the PICU culture. They internalized what they were observing in their community and performing while caring for their patients, and incorporated this into their identity in the community. Participation in the community transformed their identity and moved them into a more mature stage of their professional life. In other words, learning in the PICU during Preceptorship was transformative for the newly hired nurses as it transformed their identities, and it was developmental as they became more mature nurses. As one of the nurses elaborated:

P85: PRECEPTORSHIP_iCI_ Learning _ All field notes together for learning.rtf - 85:404 (3614:3619):

I: How would you describe process of learning in the Preceptorship? Very simply.

New nurse: It's a kind of shifting from asking a lot of questions to answering lots of questions. From asking lots of help to doing a lot of things. In fact, pretty much everything. You are not the same person. I mean you have put a lot of effort to be somebody who is their resource person. Um... You have moved. You have changed. You are not the same brand new nurse. You are kind of I would say, more expert to them now. A resource.

I: Can you elaborate on this?

New nurse: Like, they trust you. They ask you to watch their patients during their breaks. To give them some hands in their work. They ask your opinion. What do you think, they ask. That sort[of] things. It's a kind of, for me, this is being [considered] as an expert again. In fact, buddy shifts gets you there.

P61: NN11_LACC_RTF.rtf - 61:33 (375:413):

I: Right. Let me ask a simple question. From your own perspective, what is learning? How it happens in the Preceptorship?

P: [pause] learning is, [sigh] wow that's a pretty open question. Learning's um, essentially just, [pause] **building your knowledge** base on either whether it's a specific, um, [pause] [inaudible] something specific, or even more general. **Just expanding your knowledge** base, and, the information that you are holding.

I: Uh huh [affirmative]

P: Yeah, personally.

I: Uh huh [affirmative] can you explain more? And elaborate how it happens

in the Preceptorship?

*P: Um, [pause] learning's sort of the, I would say like the **progression of the individual, um, from going from novice to an expert.***

I: Perfect.

*P: You need that **learning process to happen in order to sort of build, both your knowledge and skills in practice.***

Learning through transformation, development and “becoming” a new person with a changed in identity was not restricted to the newly hired nurses. Even the preceptors had the same perception that learning is “becoming” a new person as one of the preceptors mentioned in the interview:

P72: Preceptor 8_ LACM_ RTF.rtf - 72:15 (297:305):

I: What is learning and how does it happen in the Preceptorship?

P: What is learning? I guess um, taking, um, information, data, um, um, and adding it to your, repertoire of things that you know or um, [pause] have a sense of.

I: Uh huh [affirmative] When you think that you are, you learn? And how?

P: I think you learn all the time.

I: Uh huh [affirmative]

*P: I think you learn the things that, I know for myself the things that, I want to do, like even the way, um, I mean it, it's not [chuckle] a great example, but. When we have patients that are dying, or that die. Um, I think that's something again where an **ever learning** process about how to help families go through the worst day of their life. And I think, a lot of what I do and say and how I act, well all of what I do and say and how I act **is taken from other people.** And, that's **not formal learning.** **That's me having observed, a particular nurse, or a particular physician or a particular social worker, and the way they, speak or phrases or things.** And **I just sort of take all of that and then, put it into myself and, and, that's how I.** Or just ways of just kind of being I guess with sort of families in that kind of worst, point in their lives. To try and make it, [pause] I want to say tolerable, but.*

8.2.6. Expertise based mutual learning

From the time the newly hired nurses entered to the unit, they started sharing their knowledge and expertise from work in other hospitals with their preceptors and other

members of the care team in the PICU. They considered learning as a mutual phenomenon. Though the newly hired nurses were learning from their preceptors, their preceptors and other experienced staff occasionally learned from them. In other words, learning in the Preceptorship took place through an expertise-centered mutual process in which any person who had expertise was able to share it with others. I have documented frequent instances of mutual learning in my field notes. Here, I have copied quotations from interviews supporting this situation:

P77: NN35_LADF_RTf.rtf - 77:18 (595:605):

I: You are touching my next question. What did they [your preceptor or other people] learn from you?

*P: Yeah. so then it, it's **you get a bit more of a mutual learning**. So you can go through and, they, can go through the runnings of things. So this is what we do.*

I: Uh huh [affirmative]

*P: And then, I could go through and explain **well you know, this is what I would look for**. And this is why I would look for that. And if we think about the anatomy or what you know,*

I: Uh huh [affirmative]

*P: then **I could go back and, do that with them**. Um, [pause] so yeah that, it's, was sort of not really, an issue in that sense. It was more, [pause] just the day to day running.*

Almost all preceptors and nurses in the PICU accepted that learning was a mutual and expertise-centered process. They believed that this kind of learning could have an important role in improving quality of care. However, open communication, respectful workplace and non-intimidating environment, acknowledgement of the new nurses' knowledge, patient's situation and time were considered important factors contributing in this kind of learning. For example, there were instances that the process of mutual learning

was interrupted by the resistance of experienced nurses or physicians to learn from newly hired nurses even though new nurses tried to share their knowledge:

Preceptors:

P80: Preceptor 16_ LADP_ RTF.rtf - 80: (72:82):

I: And was it all that you taught her? Or was there was other things that you helped her, or she learned from you?

P: Um, honestly, she could teach me things. Because she's been nursing in [inaudible] for a lot longer than I have. So, I think it was a mutual thing. And I was able to teach her some of the things that she, didn't know they had started doing here. And she was able to teach me things that she'd done in her previous workplace. She was a manager over there. So um, yeah it was it was a connect. Um, [pause] lots of mutual learning going on.

Experienced nurses:

P16: ABI_ RN - 16:53 (581:581):

Um, because I've, you know, I've been an ICU nurse for nine and a half years I know a lot. But there is a lot that I don't know. And there's a lot that I can learn from my colleagues, even the junior colleagues, there's a lot I can learn from them, because they've had different experiences.

The notion of mutual learning moved beyond senior nurses learning from the newly hired nurses. As I observed in the unit, everyone learned from anyone who had expertise. In other words, regardless of the degree of education and specialty, everybody in the unit tried to learn from those with more expertise. I have documented frequent situations in which doctors learned from the newly hired nurses, experienced nurses, respiratory therapists, physiotherapists, pharmacists and even from clerks. This learning occurs across disciplines. I have copied two typical examples of this kind of learning from my field notes here; the first excerpt is showing an attending physician learning from nurses and the newly hired nurses and second one is about a mutual learning between a clerk and other staff:

P85: PRECEPTORSHIP_iCI_ Learning _ All field notes together for learning.rtf - 85:386 (1410:1428):

There was a nephrologist with two trainees in the PICU. I talked to him in the hallway outside the PICU. Following excerpt is part of the conversation that I had with this attending about attending physician learning from nurses including experienced and the newly hired nurses:

I: How attending in the PICU can or are learning from you?

Nephrology attending: It's in the format of consultation that happens. Also in the form of discussions. For example, we had one in the unit today. We are well truncated about our own discipline. We provide knowledge about our own discipline to them. It's the same for us as well. I am well knowledgeable about my own area but not about other disciplines. I am not pulmonologist. I am not going to read a textbook to learn about pulmonary issues. But, I will be happy to hear and learn it in the form of a ten-minute discussion if they give me.

I: What about nurses? Especially the newly hired nurses? How can they learn from you?

Nurses, too. They can learn in these discussions. We do learn from them as well.

I: You mean from nurses? The newly hired nurses as well?

Nephrology attending: Yes. They have been there with the patient for 12 hours and I have been there for ten minutes. They know much about the patient. Honestly. Most of the time, not only me but also I think other doctors too most of the aha moments that we have found come from them. We learn from everybody. I don't care who they are. We learn from all. We are all story tellers. We are learning story from every body and tell that story".

*I: What about **the newly hired nurses**? Have you happened to learn from them?*

P: It doesn't matter. Nurses in the PICU come with a lot of experience. They could see some details that might have been ignored.

I: Thank you very much for your time.

P: No problem.

P85: PRECEPTORSHIP_iCI_ Learning _ All field notes together for learning.rtf - 85:162 (2141:2142):

Clerk: "I learn from everybody and they learn from me. I am in focal point. I may learn something even CNC does not know. I learn when the team is connected. For example, I should have known about the code blue, this patient. [When know it], then I will know what to do and what I should make ready. All are learning from me [as well]. They may come to me for very stupid things and for very serious things. I

may not know the answer but I will connect them to the right person or I will find them the information [they need]."

8.2.7. Learning at the boundaries of Communities of Practice (CoPs)

When two or more disciplines or professional Communities of Practice intersect, they share knowledge. The expertise of members of one discipline will be less familiar for the experts of the other discipline and this creates learning opportunities for members of both disciplines. In this situation, boundary objects are tools that help to mediate between the two communities (211,212). The various tools that I have identified, the Purple Sheet, test results, medication records, monitor read outs, serve as share points of reference for members of the different professional disciplines. They help to mediate or facilitate discussion between the members of multidisciplinary teams.

Care in the PICU was planned and delivered in multidisciplinary teams, therefore various aspects of care were presented and discussed by different disciplines in various activities such as rounds and OR handovers. The newly hired nurses gained more new knowledge when they were listening to the presentations, discussions, trainings and consultations done by other disciplines. Morning rounds, especially cardiac rounds, and OR handovers were thorough and normally more disciplines and more expertise were involved in these events. Therefore, more new knowledge could be found in the knowledge that was exchanged in these events, and more learning in the boundaries happened in these events:

P70: NN23_LACU_RTF.rtf - 70:55 (683:716):

I: There are different kinds of rounding in the, in unit. Morning rounds, evening rounds, night rounds. Which one do you like, do you find more, uh, learning? In which one do you find more opportunities for learning?

P: Morning [rounds]...

I: Morning rounds, so you learn there more?

P: Yeah

Learning in the boundaries was not restricted merely to the newly hired nurses. Instead, it happened at almost every interaction between professionals from different disciplines while trying to resolve issues related to patient care. The more diverse the expertise of the people involved in the rounds and operation room (OR) handovers, the more new and diverse knowledge that was shared. These complex situations provided complex learning opportunities. Each additional specialty, whose patients were cared for in the PICU offered a new range of learning opportunities. In addition to the many cardiac patients cared for in the PICU, patients from other services such as nephrology, orthopedics, oncology, and ENT provided new learning challenges for the new nurses. I have observed frequent instances of these kinds of interaction and learning at the boundaries of Communities of Practice in the PICU. I have documented numerous instances of learning in the boundaries of Communities of Practice in which fellows, residents and even attending physicians have learned from other disciplines such as nurses (new and experienced), respiratory therapists, dieticians, physiotherapists and pharmacists. Here is a simple example from my field notes in which a nephrology attending believed that he learned a lot from nurses including the newly hired nurses:

P85: PRECEPTORSHIP_iCl_ Learning _ All field notes together for learning.rtf - 85:386 (1410:1428):

There was a nephrologist with two trainees in the PICU. I talked to him in the hallway outside the PICU. Following excerpt is part of the conversation that I had with this attending about attending physician learning from nurses including experienced and the newly hired nurses:

I: How attending in the PICU can or are learning from you?

Nephrology attending: It's in the format of consultation that happens. Also in the form of discussions. For example, we had one in the unit today. We are well truncated about our own discipline. We provide knowledge about our own discipline to them. It's the same for us as well. I am well knowledgeable about my own area but not about other disciplines. I am not pulmonologist. I am not going to read a textbook

to learn about pulmonary issues. But, I will be happy to hear and learn it in the form of a ten-minute discussion if they give me.

What about nurses? Especially the newly hired nurses? How can they learn from you?

Nurses, too. They can learn in these discussions. We do learn from them as well.

I: You mean from nurses? The newly hired nurses as well?

Nephrology attending: Yes. They have been there with the patient for 12 hours and I have been there for ten minutes. They know much about the patient. Honestly. Most of the time, not only me but also, I think other doctors too most of the aha moments that we have found come from them. We learn from everybody. I don't care who they are. We learn from all. We are all story tellers. We are learning story from everybody and tell that story".

What about the newly hired nurses? Have you happened to learn from them?

P: It doesn't matter. Nurses in the PICU come with a lot of experience. They could see some details that might have been ignored.

Thank you very much for your time.

No problem.

Summary and interpretation

In the Preceptorship, the newly hired nurses participated in the complex environment of the PICU. They established relationships with members of various groups of the staff such as members of medical, nursing and allied health teams. They gained access to the knowledge distributed among the staff, their network of relations, the mediating tools they employed in learning, and experienced the differences between day and night shifts. This knowledge was shared in various activities such as rounds, simulations, and handovers that were identified as learning activities by the newly hired nurses. These activities followed various purposes in the unit such as revisiting the patient and rethinking about the previous care plans during (rounds, updating other groups of staff about the progress of the patient care during handovers, and empowering staff through the acquisition of various clinical and non-clinical skills through simulations. The final

goal of all these activities for each of the nurses was to learn how to deliver better care to their patients. Learning activities for the newly hired nurses which included rounds, handovers, simulations etc., followed formal and informal rules, such as the professional division of labor within the PICU that participants were expected to learn and incorporate into their knowledge and daily performances.

The newly hired nurses participated and started experiencing work in the PICU and used various activities as opportunities for learning. While participating and experiencing in the PICU, they observed, listened and absorbed what was happening in the unit(internalization). Then, they started concretely experiencing and doing the tasks in the unit (experiential learning). Meanwhile, they reflected about their own activities, and received reflections from others at the individual (from their preceptors), collective (morning rounds and mortality and morbidity presentations) and system level (PSLS system); as stated earlier, my analysis of reflection and reflective practice was based on my interviews and observations, not reflective journals. At the beginning of this process, concrete experiences and hands-on practice were limited, and the newly hired nurses were mostly observers and listeners while absorbing what was happening. At this stage, they made minimum contributions to patient care and the collective outcomes of the unit. Gradually, they practiced more, received various forms of support and scaffolding such as description, demonstration, reflection and articulation. This helped them to practice and experience more. The more they practiced, the more they contributed in delivering better care. As they demonstrated their ability to handle more complex patients' care, they did most of the tasks expected from a PICU nurse, gained a professional identity, developed more extensive relationships with other nurses and staff, and became full members of the PICU nursing team, and the multidisciplinary PICU. Once they are firmly established within the PICU they took more educational workshops and took on higher

status roles such as admit and relief nurse and charge nurse roles. In other words, they moved from being a marginal staff into staff who had central roles making greater contributions to the unit. Their professional identity transformed, they developed and became experts in the expected tasks.

The entire process of knowledge sharing (teaching and learning) was facilitated by using various tools that included patient flow chart, Kardex, computer, lab results, images and other diagnostics and nurses' progress notes.

The process of transformation and transition from periphery to the center of the PICU care community was not always smooth. When they first joined the unit, they were stressed out - they felt disappointed and frustrated because they were considered beginners and forced to start at a very basic level. However, the support and various forms of scaffolding (such as modeling, reflection and articulation) that they received from others, especially from their preceptors facilitated the process of knowledge construction and their centripetal movement and transition. Though scaffolding was limited by the duration and frequency of the interactions, over the course of the Preceptorship they became able to practice at their full potential and functionality level and move to the center of the PICU care community.

To sum up, participation in the unit provided opportunities for social experiential learning that included internalization and externalization of the activities happening in the social environment of the PICU. The entire process of participation, internalization and externalization was facilitated by various forms of scaffolding such as modeling, reflection and articulation. This was a tangible implementation of concept of zone of proximal development that helped the newly hired nurses move from the periphery to the center of the PICU multidisciplinary care community that enabled them to function at their full potential functionality level and deliver better care.

Participation during the Preceptorship moved learning by the newly hired nurses from individual-oriented learning divorced from an appropriate social context to collaborative sociocultural learning in the social milieu of the PICU. The theoretical approach to learning changed from the transfer and acquisition of knowledge metaphor, characteristic of individualist learning theories, to the social participation and collaborative learning metaphor, representative of sociocultural learning theories.

With a significant change in emphasis to social and collaborative learning, the newly hired nurses, who started with minor and marginal roles in the PICU, doing simple tasks and delivering care to uncomplicated patients were increasingly assigned more complex patients as they developed into fully-fledged PICU nurses. As they were mentored into these more complex care demands they internalized these skills and additional knowledge, which is consistent with Vygotskian sociocultural learning theory that contends that higher mental functions originate from interpersonal social interaction mediated by tools such as the medical equipment and language and other communication tools.

As they gained nursing knowledge and team skills, the newly hired nurses moved centripetally from the periphery of the PICU's Community of Practice closer to its core. This journey also transformed their professional identities from novice to expert, consistent with Lave and Wenger's theories of Situated Learning and Communities of Practice.

They, however, encountered obstacles and interruptions during this journey. Initially, the expectation that they would start "at the back" caring for the most stable patients created frustration and undermined their professional identity. Even after they began to care for more complex patients, re-assignment to other general units in the hospital (that was a norm in the PICU when the numbers of critically ill children needing PICU care dropped) would interrupt their

opportunities to learn and develop their critical care skills, and would remove them from interaction with their Community of Practice colleagues in the PICU.

8.3. Learning outcomes among the newly hired nurses in the Preceptorship

In the previous sections, I elaborated on the learning activities and analytical concepts explaining process of these learning activities. I described how participation in the PICU helped the newly hired nurses gain access to the setting of the unit, various members of the multidisciplinary care team of the unit, as well as their networks of relationship. In this section, I will analyze and describe the accounts of learning outcomes. I will outline their desired learning outcomes during their Preceptorships, and then I will elaborate on each of these outcomes in the remainder of this chapter.

During their Preceptorship, the newly hired nurses became involved in the clinical activities, learned clinical and technical knowledge and developed knowledge of people (staff) involved in the clinical activities and knowledge of available resources. They also learned the routines of working in the PICU, and became enculturated in the PICU. This contributed to the development of good professional practices and recognition of professional role boundaries. The whole process contributed in the experience of transformation in their identity. I will elaborate on each of these topics in the following sections.

8.3.1. Clinical activities, nursing skills and technical knowledge

For some newly hired nurses, some activities and skills that they learned during the Preceptorship were altogether new. Providing epidural analgesic for the post-operative pediatric patients and how to nurse a patient connected to Berlin Heart machines rarely occurred outside of tertiary care PICUs. For others, the Preceptorship was an opportunity to fine tune their previous

skills. In my field notes, I have documented multiple instances of learning various nursing skills by the newly hired nurses during Preceptorship. Below, I have copied sample quotations from the newly hired nurses' interviews showing that they learned new nursing skills in the PICU during their Preceptorship:

P75: _NN32_ LADL_ RTF.rtf - 75:28 (275:313):

I: What did you learn in the Preceptorship?

I learned about [inaudible] to provide epidurals to post op patients here. And, um, that was also my first cardiac round.

8.3.2. People involved in the clinical activities (“knowing who” knowledge)

In addition to learning about technical aspects of nursing involving nursing skills, medications and equipment, the newly hired nurses started learning about various people involved in delivering care in the multidisciplinary team of the PICU. They learned about various teams, their members, their network of relationships, and their roles in the unit. For example, they learned about the roles of different professionals during simulations of different procedures such as codes, and how to work with non-clinical members of the PICU such as clerks and other administrative staff. They also learned about various networks that the staff belonged to such as leadership groups, who interacts mostly with who, who works with who, as well as the social network of the staff. Additionally, they learned who does/ does not have what knowledge. Last, but not least, they learned to work with family members and the hospital staff who assisted patients' families.

8.3.3. Knowledge of available resources

The newly hired nurses also learned about various mediating resources including different tools (physical and mental), logistics and supports that could facilitate their nursing activities, mediate these activities and enable the newly hired nurses to deliver better care in the PICU. They

learned what resources were available to them, how they could access to these resources and how they could use them for conducting their activities and tasks. In terms of tools, they learned about various physical tools such as clinical equipment, the Purple Sheet, patient safety and learning system (PSLS) and related website and paper forms:

P74: _NN31_LADN_RTF.rtf - 74:14 (112:126):

I: Uh huh [affirmative] over your Preceptorship, what did you learn from your preceptor?

P: Um, a lot of things actually, [chuckle]. So it was uh.

P: It was a combination of um, getting familiar with the new equipment. For example, the ventilators was new. That was new to me, cause we had different ones. And, in our other hospital. A lot of the equipments actually were different. Um, looking up where to find. So my resources and how to access them basically.

8.3.4. Routines of working in the PICU

One of the most important things that the newly hired nurses learned during their Preceptorship was the routines of the PICU. They learned procedures, norms and expectations of the unit were. They learned how nursing activities, nursing skills and technical knowledge was implemented in the context of the PICU. Put another way, even if the newly hired nurses already knew most of the nursing activities, skills and technical knowledge they needed, in their Preceptorship, they learned how this knowledge should be implemented and used in the context of the unit that they were going to work. In fact, they learned how to contextualize their existing knowledge and skills considering routines of work in the PICU. For example, they learned about routines of nursing team in the unit in general, documentation and paper work related to nurses in the PICU, format of rounds and routines of communicating and presenting in the rounds, as well as routines and expectations regarding patient transfer to other centers such as SH (to secure

confidentiality, name is not spelled out). In general, they learned “how things were done in this unit on a day-to-day basis”. Some of the newly hired nurses called this as “procedural” knowledge:

P62: Cohort 1_NN12_LACB_RTF.rtf - 62:45(605:607):

P: *I think most of what I learned was, procedural. So, you know how things are done in this unit on a day-to-day basis. Who you speak with, when rounds are, what people want to know from you, where to find equipment. Things like that. It was all the very um, sort of the routines, and the tasks for this unit. Very little about, um, you know how to care for, you know a certain type of patient. Because that was already background knowledge that I had.*

P76: Cohort 3_NN34_LADH_RTF.rtf - 76:33 (617:627):

P: *[pause] Um, [pause] well I obviously learned um, I learned, **how, how they do things here.** Which is, I mean I’ve had PICU experience but, everywhere you work they do things differently. So, I think the main thing that I learned from, my preceptor was, you know the routine of the unit. Um, and, how they do things here. Um, [pause] because basic nursing care is basic nursing care.*

The finding that the newly hired nurses mentioned mostly what they learned included norms, expectations and how to do things in the context of the PICU was confirmed by their preceptors. They mentioned that they mostly instructed the newly hired nurses about how to do things in the context of the PICU:

P66: Cohort 1_Preceptor3_LACE_RTF.rtf - 66:1 (99:101):

*So it wasn’t more the, how to teach her how to nurse, it’s **more** how to teach her **how to do what we do in our unit.** Cause every unit’s so different in how they do their policies and procedures, their charting, their MARs [medication administration records] and everything. So it’s a matter of just teaching her **how to do what our people would expect.** Cause she already had, most of the general, um, like how to nurse. So [chuckle].*

8.3.5. Cultural issues of the PICU

The newly hired nurses used the term “culture” for patterns of practice and perceptions in the PICU. During the Preceptorship, the newly hired nurses learned about

various cultural issues in the PICU, by which they meant the culture of responsibility, norms of interaction, with staff, patients and families, the cultural norms of communication that encompassed who it is appropriate to communicate with and issues of confidentiality, and the cultural scenarios of the PICU which enabled them to anticipate the needs of their patients and wishes of their colleagues.

In the Preceptorship, the newly hired nurses observed and internalized cultural issues about responsibility and hierarchy. For example, they learned that intimidation and blame still existed in the unit, and how some issues such as staff shortage affected their ability to fulfill their responsibilities:

P75: NN32_LADL_RTF.rtf - 75:28 (275:313):

*... I guess I learned some of the **cultural stuff**, because, over the last couple of days, I've been in the back [i.e.: TCU]. And there's been a couple of issues with **staffing**, and, there not being enough people to help with breaks and all that stuff. And, so I learned, from one of the other nurses, like she had a meeting with the manager about what had happened and, she was writing a form about like, what had happened and stuff. So, I learned a little bit about **the culture of how people feel about that area**. And how people feel about, [chuckle] break relief, and all that stuff.*

They also observed and internalized culture of interaction among and between members of various disciplines participating in the multidisciplinary team of care. For example, they learned how nurses were interacting with each other and with other clinicians such as physicians:

P71: NN25_LADE_RTF.rtf - 71:18 (363:373):

*P: Um, I think you learn, a lot about, [pause] the workplace environment. Um, **how, nurses interact** with different members of the **team** while you're here. And then, obviously, work being clinical related.*

They also learned how various clinicians interacted with patients and their families. In fact, they used other clinicians' patterns of interaction as a guide for their own practice in this regard:

P68: NN21_LACG_RTF.rtf - 68:19 (271:277):

I: What else did you learn in the Preceptorship?

P: Um, [pause] like physical tasks? I can learn everything [pause] [inaudible] anything through physical interaction.

I: Give me some examples.

*P: Um, so, [pause] you can learn [pause] about patients' needs, and what how, someone else is **interacting** with the patient. [pause] that can give you a guide as to how you should **interact** with the patient. How the patient likes, things to be done.*

At the beginning, the interaction and communication with others was not easy and smooth for the newly hired nurses. Working together with other members of care team and gaining more experience with them, over time, they built deeper and stronger relationships. Gradually, they became more comfortable and learned how to communicate and work in a more effective and efficient way with other nurses and physicians:

P84: NN24_LACJ_RTF.rtf - 84:36 (926:977):

I: What else are you learning in your Preceptorship?

*P: So, there's a lot of eyes on you, right? You, you kind of, you're in, you're under the microscope for quite a while. And then over time, when you start working with the same people over time they get comfortable, you, you get comfortable with each other, right? Learn how to **communicate** with each other **and work together**. Um, problem solve. Um, and I think it just over time it just gets more comfortable. It's just like any relationship. You get, once you get to know each other, it's, it's less awkward, it's [chuckle].*

The newly hired nurses also learned about the culture of anticipation in the unit. They learned how to predict what would happen and what would be needed by other staff and their patients. They believed that the more experienced and expert they became, the better they

could do anticipate these needs. The newly hired nurses related the skill of anticipation to the notion of expertise and perceived anticipation as a feature of expertise:

P85: PRECEPTORSHIP_iCl_ Learning, All field notes together for learning.rtf - 85:406 (3747:3748)

I: What have you learned in the Preceptorship from your preceptor?

P:(NN11_ LACC): Well, a lot of things. Being able to um, anticipate and predict things better. As I said before, I feel that the more you get experienced, the better you can predict things. Trying to know what you will need for a specific patient or what a doctor will ask you in the round and that sort things. Predicting what you will need, or even others will need.

8.3.6. Good practice

Through their Preceptorship, they came to recognize what was meant in the unit, as good practice. Some of this notion of good practice was articulated in policies and procedures. They perceived policies and procedures as formally accepted rules for good practice - ways of reducing variation and enhancing consistency in their activities and safe clinical practice. They learned that compliance to and work based on the PICU policies and procedures was considered as the “best practice” in the unit, and the newly hired nurses needed to follow them as guiding rules for best practice:

P61: NN11_ LACC_ RTF.rtf - 61:47 (514:524):

*P: I learned mainly nurse skills or pro, protocols of procedures for this particular hospital. Cause like I said, there's a lot of fine-tuning when you've moved around a lot. Because everywhere, again, not any, like not necessarily anyone's wrong, but there is different, subtle differences that, oh, wait, ok, in my previous workplace did it this way, but BC Children's does it this way. I better follow this way. So we keep it, con, consistent. For families, for patients, for safety, whatever. **Or this is best practice for here.** I better continue that for [inaudible] in BC.*

P69: Cohort 2_ NN22_ LACN_ RTF.rtf - 69:46 (686:704):

*P: Um, [pause] from my preceptors I learned, [pause] **definitely some of the policies and procedures were, enforced.***

8.3.7. Roles boundaries

Newly hired nurses learned role boundaries of various members of different teams involved in delivering care in the unit. They learned that role boundaries and respecting these boundaries were very important for the staff. These boundaries defined their scope of practice and delivery of care in the unit. Some newly hired nurses felt that these boundaries had strong restricting influence on their scope of practice and activities, and this did not give good feeling to the newly hired nurses since they perceived it as a factor restricting team work:

P75: NN32_ LADL_ RTF.rtf - 75:5 (61:61):

P: Here [in the PICU] you'd be like you're stepping on someone's toes because that's someone else's job. Or, if you ask like, well can I do this pump that I'm finished with it. They'll say, oh just leave it there, so and so will come and do it. That's their job. And so that's kind of new. Um, I don't really like it as much. I prefer the way my previous workplace does it, where everyone just works together as a team to get stuff done. It feels better.

8.3.8. Change in the identity

As I elaborated earlier, during the Preceptorship the newly hired nurses observed the sociocultural environment of the PICU community, and absorbed, internalized the entire knowledge, perceptions and behavior and all the values they were observing. They internalized the entire paradigm presented by “the PICU” and integrated into their identity. Participation in the community of the PICU was a transformative and expansive process leading to the change, development and maturation of their professional identities:

P85: PRECEPTORSHIP_iCl_ Learning _ All field notes together for learning.rtf - 85:404 (3614:3619):

I: How would you describe process of learning in the Preceptorship? Very simply.

New nurse: It's a kind of shifting from asking a lot of questions to answering lots of questions. From asking lots of help to doing a lot of things. In fact, pretty much everything. You are not the same person. I mean you have put a lot of effort to be somebody who is their resource person. Um... You have moved. You have changed. You are not the same brand new nurse. You are kind of I would say, more expert to them now. A resource.

I: Can you elaborate on this?

New nurse: Like, they trust you. They ask you to watch their patients during their breaks. To give them some hands in their work. They ask your opinion. What do you think, they ask. That sort[off] things. It's a kind of, for me, this is being [considered] as an expert again. In fact, buddy shifts gets you there.

Summary and interpretation

During their Preceptorship, the newly hired nurses participated in the actual setting of the PICU, were involved in different tasks and learned about clinical activities, skills and technical knowledge, and the people involved in these clinical activities. They also learned about people working in the PICU, acquired knowledge of available resources, and embodied the routines of working in the PICU. Additionally, they acquired the culture of the PICU, and its concepts of good practice and role boundaries. They also experienced a change and transformation in their identity.

By participating in the PICU itself, the newly hired nurses learned about different types of nursing knowledge. In so doing, they learned about more advanced approaches to the science of nursing, such as the use of evidence-based practice or explicit knowledge, and procedural knowledge of how to get things done. Additionally, they also learned about knowledge of staff working in the PICU or “knowing who” knowledge, which had not been reported in the literature. This last type of knowledge and the finding that learning leads to transformation of the newly hired nurses’ identities indicates that learning in the PICU is a social, experiential, and transformative process.

This conceptualization of learning suggests that most learning for the newly hired nurses happens by participating and interacting in the PICU community of practice and it cannot happen in isolated classes. In other words, in the context of CHAT, Orientation and Preceptorship have different learning objectives. Orientation is about establishing competence and learning institutional procedures. The goal of the Preceptorship is patient care –different objectives, different methods.

Chapter 9: Social interaction for learning

during the Preceptorship

Overview

In the previous two chapters (Chapters 7 and 8), I explored teaching and learning aspects of the Preceptorship. In this chapter, I look more closely at the social relationships that underpin the Communities of Practice that emerge during the Preceptorship and facilitate learning. For this purpose, first, I describe role of interaction in learning. Then, I elaborate on the newly hired nurses' informal learning networks in the PICU during their Preceptorship.

9.1. To examine role of interaction in learning

Learning among the newly hired nurses during their Preceptorship primarily occurred through interactions with others in the PICU Community of Practice. The complexity of the patients assigned to new nurses provided a means of scaffolding not only the information they would learn, but also the people from whom they would learn. Patients of different complexity required physicians, nurses and allied health with particular types and levels of expertise. As the new nurses worked with more complex patients, they also worked with physicians, other nurses, and allied health who reflected the complexity of the patient. The new nurses claimed that most of their learning during this period happened through interaction in the unit; the newly hired nurses perceived interaction as “one of the biggest, ways to learn”:

P75: NN32_ LADL_ RTF.rtf - 75:32 (407:425):

I: What was the role of interaction in your learning in the Preceptorship?

P: Basically, like all of my learning probably was through interaction. Yeah.

Learning through interaction happened in numerous ways. They gained access to the staff and their network of relations. They also started establishing relationships with various members of the multidisciplinary teams within the unit. This provided opportunities for them to get involved in different activities, listen, and observe the interactions among the staff, while they cared for patients. Their preceptors and other staff purposefully demonstrated patient care for them. For example, while participating in different activities such as rounds, they observed how their preceptors, other experienced nurses, members of the medical team, allied health team and people coming from other units interacted with each other in morning rounds and in the care that followed. As they became more familiar with people from these other professions, they participated in numerous conversations and discussions and participated in interchanges during rounds, handovers and presentations. They also became more engaged in patient care activities, reflected about them, asked more questions, and sought support for the performance of their tasks. In this way, they gradually progressed to performing more tasks and gaining more interaction in the unit. Then, they shared their stories about various experiences or listened to stories narrated by other staff who were more advanced in the unit:

P69: NN22_ LACN_ RTF.rtf - 69:39 (568:582):

I: How do you learn from interaction?

*P: Most of it is, me going to people **asking** for help. Either asking questions, or asking can you **show me** this? And people are usually, they know that I am, [pause] newer. So, people are pretty understanding and very supportive about, helping. Or if someone doesn't know I just say, I'm new. I don't know where this is, or, I don't know*

what this is. Um, [pause] and then, yeah again, like, in, uh, **handover** and, **rounds** and stuff, just, [pause].

Interviews with the instructors such as preceptors and other staff showed that they facilitated process of learning for the newly hired nurses through describing their conceptualization of activities, explaining the steps of various tasks, demonstrating these steps, and reflecting about the tasks. They also articulated the processes by adding more details during or after the newly hired nurses performed these tasks.

P80: _Preceptor 16_ LADP_ RTF.rtf - 80:17 (204:210):

I: As a preceptor, what do you think the role of interaction is in learning?

P: Um, I guess through um, through discussion definitely. Through um, reviewing things with another person asking questions. Um, also if I am, if I'm teaching it helps me learn, as well because I'm um, going over things that I, I haven't, it's my knowledge and I can piece things together while I'm explaining it to someone else. Um, and through doing so um, I'm going over a procedure, or learning a procedure from someone, seeing them do it. And getting in um, having them to do it as well.

Through interactions, the newly hired nurses also learned communication skills, team work, the ability to anticipate other people's needs (including those of the staff and patients) and how to overcome conflicts. Interaction with others also helped them to assess the quality of the care they were providing:

P68: NN21_ LACG_ RTF.rtf - 68:19 (271:277):

I: Alright. What are the things that you mostly learn through interaction?
[pause]

*P: Um, [pause] like physical tasks? **I can learn everything** [pause] [inaudible] anything through physical **interaction**.*

I: Give me some examples.

*P: Um, so, [pause] you can learn [pause] about patients **needs**, and what how, someone else is interacting with the patient. [pause] that can give you a guide as to*

*how you should **interact** with the patient. How **the patient likes**, things to be done. Um, [pause] you can learn **processes** through interaction, just watching what people doing [pause] so, that might be a good way for you to do it. Um, [pause] people can tell you **if you're doing something wrong**, or if there's a better way to do it. Um, I think interaction's, probably one of the **biggest, ways to learn**.*

The newly hired nurses' learning through interaction was influenced by the PICU staff's attitudes and norms for communication. They believed that the unit generally was proactive in creating opportunities for learning and improving care in unit. However, poor communication and compromised interaction had a restrictive role in the newly hired nurses' learning, which led to newly hired nurses trying to limit their interaction and learning to a minimal level:

P75: NN32_LADL_RTF.rtf - 75:32 (407:425):

I: What was the role of interaction in the unit? In your learning over the Preceptorship?

P: Basically, like all of my learning probably was through interaction. Yeah.

I: How interaction with other people affected your learnings?

*P: Well I guess if you have like a positive, person on the other end of your question it makes a big difference. [chuckle] Um, I guess, I probably have a different opinion of it though, because it, is like my seventh time starting at a new hospital. So I understand, that **people aren't always gonna be like, in a great mood to ask things**. And, the bottom line for me is **I just need to get the information that I need** and I don't actually really care if that person's grumpy. I'm gonna keep asking **until I get the information** that I need to be able to move forward. And I know that I'm gonna feel uncomfortable for the first three months. And that's just the way that it is. So, **I've just accepted that**. So, the **interaction is really important**. Like **I'm gonna have a better experience**, [chuckle] **if someone's in a good mood and they're happy to teach me**. But if they're in a bad mood and **they just bark an answer at me**, [pause] ok.*

The significant role of interaction in learning was not limited to the newly hired nurses, rather, it appeared as a major way of learning for everyone who worked in the multidisciplinary community of the PICU. These staff learned about interaction styles, time

management, as well as the “unwritten rules that guided practice”. In the interactions, the experienced nurses learned “through seeing, doing and teaching”:

P85: PRECEPTORSHIP_iCI_ Learning All field notes together for learning.rtf - 85:344:

Preceptor: I learn from interactions like I see if they are doing slow, fast, this way, that way. I learn a kind of time management through unspoken language, through indirect cues ”

I: What is indirect cue?

Preceptor: Body language, their style and way of work, time management. I learn from the indirect [language], indirect cues. Indirect cues are implying a kind of unwritten rules that guide the practice.

Thus, social interaction had a crucial role in learning among the newly hired nurses during their Preceptorship. Almost all learning among the newly hired nurses happened through their interactions with other members of the multidisciplinary community of the PICU. Through interactions, they started communicating and establishing relationships with the staff. They constructed their knowledge by interacting, absorbing and internalizing various things such as clinical skills (explicit knowledge), routines of the unit, as well as ways of communication, interaction, team work and anticipation (tacit knowledge) within the social context of the PICU. The experienced staff including their preceptors facilitated their learning through interactive strategies such as scaffolding, describing various activities, demonstrations, and guiding reflecting about activities. Through their interactions, instructors helped the newly hired nurses move from doing basic works to giving more complex care to more acute patients and taking more central roles and responsibilities in the unit. Gradually they gained more experience and started sharing their knowledge with others in the unit. Good communication, non-intimidating environment and being proactive had a positive effect on the newly hired nurses’ learning through social interaction in the PICU.

9.2. To examine the newly hired nurses' informal learning networks

In the previous section, I elaborated on the role of interaction in learning in the Preceptorship among the newly hired nurses. In this section, I explore their prototypical individual informal learning networks by considering who they interacted with informally for learning purposes. Then, I elaborate on the collective informal learning network of all three cohorts of the newly hired nurses to see if there was any aggregate pattern among them regarding people who played central role in their learning.

9.2.1 Individual informal learning networks

Each nurse developed their own learning network. Their networks were shaped by those who worked on the same shift with them and thus were available for consultation. They also made use of their connections outside of working hours with other bedside nurses, particularly those who were members of their hiring cohort. The examples below demonstrate the development of their learning networks. These examples were selected in a way that give a clear picture of the prototypical informal learning network of individual newly hired nurse in the PICU. For this purpose, in this section, I will describe new nurses' informal learning networks and address five questions: Who instructed each new nurse? How central were preceptors in the newly hired nurses' learning? To what extent did each new nurse rely on other newly hired nurses for learning? To what extent did each of the newly hired nurses connect with nurses in leadership and support roles (such clinical nurse educators, clinical nurse coordinators, charge nurses and admit and relief nurses) for learning during Preceptorship? Who did each of the newly hired nurses receive less direct information from, in the form of peripheral learning?

9.2.1.1. Who instructed each new nurse?

The informal learning network for the new nurse LACC: NN11, obtained during an interview, has been illustrated in Figure 9.1 based on an analysis of the data with UCINET. As can be seen, this new nurse included patient families, as well as various people belonging to different care teams in the PICU. These teams included the nursing team (frontline general duty nurses, charge nurses and clinical nurse coordinators or CNCs), the medical team (PICU attending physicians and physicians from other services), the allied health team (physiotherapists or PTs, occupational therapists or OTs, social workers, dieticians, pharmacists), as well as administrative team (clerks).

This nurse's network demonstrates the range of people that this person reported as contributors to his/her learning network. As one would expect, it involves nurses, physicians, and allied health professionals. Of particular interest, however is this nurse's inclusion of physicians from services outside of the PICU, patients' family members, and the unit clerks. This range of network participants is not unusual.

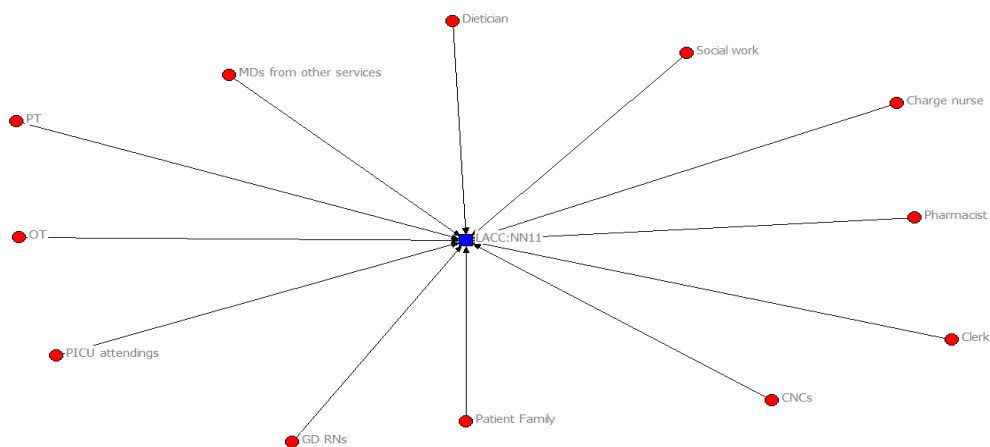


Figure 9. 1: Individual learning network of the new nurse LACC: NN11

The requests for advice and in instruction were usually based on the particular task, rather than necessarily searching for another nurse, as noted by one of the newly hired nurses:

P62: NN12_LACB_RTF.rtf - 62:49 (121:125):

I: Who did you learn from during your Preceptorship?

P: Everyone? [chuckle] *I really like, I I'm happy to use whatever resources are available. So, if it.*

I: Alright.

P: If I needed the help of an RT I'll have an RT. If I need the help of a physician, I'll ask a physician. If I need a nurse, I'll ask a nurse. Like I think, I think that's the whole, sense of the PICU team is that you need to be comfortable using all of [them].

Many newly hired nurses identified other more senior nurses who cared for patients nearby as their mentors:

P70: NN23_LACU_RTF.rtf - 70:10 (103:117):

I: Perfect, yeah that's the here, that's the same that I hear a lot here. [chuckle] *And, uh, who do you learn from in the unit mostly?*

P: Fellow nurses. [pause] *like other nurses around, like what's their tricks of the trade, or, [pause] yeah mostly.*

I: Uh huh [affirmative] *and what about other staff in the unit? Do you learn from other people too?*

P: Well we have the educators there, *that um, can be a good resource and, um, [pause] usually I'll ask the doctors, or the technicians that come around. I love learning and I love, asking why?*

I: Uh huh [affirmative]

P: So, if they walk up to me *and they're doing a scan, I'll ask exactly what am I looking at? [chuckle] and so usually my tests take a little more time because, they end up teaching me and I'm like, oh that's cool ok.*

I: [chuckle] yeah you have told me that you are a why person. [chuckle]

P: Uh yeah, exactly and I um, I'll uh, if it doesn't make sense I'll ask why, until, either they get upset at me, or, [chuckle]

New nurses also reported that additional sources of knowledge included both their near-by “buddy” nurse and others who had become friends:

I: Yes, when you have a question, when you, in other, in other words who are your informal learning network?...

*P: Go, internet, [chuckle] **buddy nurse**, or the nurse next to you. [pause] Uh, resident, [pause] the fellows are really good actually too. Fellows, and then, friend nurse.*

I: What does friend nurse mean?

P: Uh not the nurse that’s stationed next to you, but maybe somebody

I: Oh right.

P: Your friended that might be on the other side of the unit. Friend nurse.

I: Can you give me some example of those if you have any?

*P: Uh **LACG** [**who is a new nurse**], uh **ABC** [an experienced nurse], [pause] oh [inaudible] I find that I’ve connected with um, I’m really bad with names. **LACO** [another experienced nurse who was a preceptor as well]. [pause] obviously.*

9.2.1.2. How central were preceptors in new nurse’s learning?

Although many new nurses did not initially list their preceptors in their informal learning network during their preceptorship, my interview and observational field notes indicated that they did learn from their preceptors during this period. Preceptors did play significant roles in the newly hired nurses’ learning networks. The preceptor’s availability to continue to assist the newly hired nurse was determined in part by the shifts that the preceptor and his/her mentee worked. During this study, the PICU developed a policy to enable preceptors and perceptees to work in the same shifts.

The formalization of the preceptor role included a change in staffing during the research. At the beginning because the preceptors and new nurses both self-scheduled, they were mostly on the same shift throughout the Preceptorship. A change in staffing policy made it easier for both the preceptor and the new nurse to serve on the same shift.

The following new nurse included her preceptor in her informal learning network during her Preceptorship. In fact, she considered her preceptor as a central person for informal learning during her Preceptorship:

P74: NN31_LADN_RTF.rtf - 74:19 (149:151)

I: Actually, this touches my next question. Who did you informally learn from over your Preceptorship? Was it only your preceptor, or other people that you learned from?

P: It was um, pretty much, well mostly I would have to say my preceptor, because we were, buddied together for those um, eleven, eleven shifts we worked together.

Some nurses reported that they benefited from the instruction of both their own preceptor and other nurses who were preceptors for other newly hired nurses.

P68: _NN21_LACG_RTF.rtf - 68:14 (159:185):

So, who did you, in an informal way, learn most from?

*P: Uh, well X was my main, [pause] **preceptor**. Um, [pause] but I also worked with, person Y and, [pause] person Z? Um, I felt person Z was really good, in terms of, thoroughness. Um [pause] she's very by the book [pause] nurse. Um, [pause] whereas person X's teaching process is much more laid back. Um, kind of this is how I do it. This is how you should do it. [pause]*

I: Right.

P: You can do it however you like. [chuckle]

9.2.1.3. To what extent did each new nurse rely on other newly hired nurses for learning?

Collaboration in learning among newly hired nurses occurred, but was limited by the shifts they worked together. However, even when they worked the same shift, it was difficult for them to communicate while at their patients' bedsides. Nevertheless, there were many instances in my observations that showing newly hired nurses contributed to each other's learning:

P74: _NN31_LADN_RTF.rtf - 74:19 (149:151):

I: Actually, this touches my next question. Who did you informally learn from over your Preceptorship

*P: It was um, pretty much, well mostly I would have to say my preceptor, because we were, buddied together for those um, eleven, eleven shifts we worked together. Um, but again I had the other **nurses to ask, so if [my preceptor] had to stay at the bedside and I would have to go and grab something.** Other nurses, the care aides, they would help me out. The RTs um, [pause] so **all those people**, they would ask me or even if they had, **if we had to do a procedure, um, I would ask the doctors.** Like, what's the routine of doing? I know how to do this procedure, for example. **But what's the routine for this specific unit? How do you guys practice it here?** So, um, and I think because we came as a group, and it was uh, **everybody knew that we're new to the, to the unit, they've been really helpful.** And, um, they really encouraged us to ask questions. Which is, which is really nice.*

Similarly, this nurse also commented learning from the nurses who joined the unit with them, as we can see in the following quote:

I: Alright, ok, and um, [inaudible] is about. This is for informal relationships that you have in the unit. In this period, have you established enough, you know informal relationships? Who are the, you know, most, who are the people who you mostly go to them informally when you have any question about doing something.

P: Um,

I: Again, you are in the middle please. Then you can write, [pause]

P: Um, [pause] so that's probably plus, plus, plus.

I: So, this is preceptors?

P: Preceptors.

I: Ok.

P: So like we're on, and Z. Um,

I: Uh huh [affirmative].

P: Colleagues I started with so like [new nurse] LACU.

I: Can you write their names please? LACU? Oh those people who were with you

P: Yeah.

I: [inaudible] alright.

P: Yeah so, the people who began at the same time as me [i.e: the newly hired nurses].

I: LACU?

P: [The newly hired nurses] LACU and LACN. And LADE.

I: LADE.

*P: Um, [pause] and **educators**, [pause]*

9.2.1.4. To what extent did each newly hired nurse connect with nurses in leadership and support roles for learning during Preceptorship?

Some new nurse considered charge nurses and clinical nurse coordinators or CNCs as members of their informal learning network. Again, the shift schedules of the CNCs and the new nurses constrained this type of interaction.

P85: PRECEPTORSHIP_iCI_ Learning Aug 4th_ 2015_ All field notes together for learning.rtf - 85:398 [LADS NN33] (3421:3422):

*New nurse LADS did the evening report to CNC, independently. There was some information exchange between the CNC and the new nurse LADS. When new nurse was giving her evening report, CNC taught her **about some routines after asking** some questions. After finishing the report, I went back to the new nurse and asked if she was learning from the CNC. She mentioned that she was learning from her about routines of reporting to CNC (what to report, how to report etc.).*

P69: _ NN22_ LACN_ RTF.rtf - 69:51 (750:900):

I: Ok. In the other one, again yourself in the middle,

P: Uh huh [affirmative]

I: When you have a question, and you need some information about it, who do you go to, mostly, informally?

P: Uh huh [affirmative]

I: Imagine that you need a, in other words, your learning, informal learning network, when you have a question, when you are willing to ask something and you want to, go to them and ask this. Who do you go to mostly?

P: Who do I go to mostly?

I: Yes, and,

P: Um,

I: and draw them for me.

P: So, [pause] CNEs [i.e.: clinical nurse educators].

I: Uh huh [affirmative]

P: [pause] Um, other nurses, like whoever I'm working next to that day.

I: Uh huh [affirmative]

P: [pause] Um, ok, A&R [i.e.: admit and relief] nurse.

I: Uh huh [affirmative]

*P: [pause] Leslie, um, [pause] charge nurse, but more A&R [i.e.: admit and relief] . [pause] and then if it's a question, not about nursing, like respiratory, or, I do allied health before [inaudible] working with. [pause] Um, and, medical staff, mostly residents cause usually they're the ones coming around. [pause] [throat clear] **really whoever is the appropriate person.** [chuckle] **sometimes the unit clerk.** You know?*

9.2.1.5. Who did each newly hired nurse receive less direct information from, in the form of peripheral learning?

As we can see in the network diagram of prototypical newly hired nurse LACC: NN11 (Figure 9.1), this new nurse included variety of people in her informal learning network. Interviews and observation showed that a very important factor determining who this new nurse would learn from was the tasks she was doing at the time. Other important factors in this regard included approachability of the staff, their competencies, good communication and duration of work experience (being or not being new) in the unit:

P61: NN11_LACC_RTf - 61:9 (107:121):

I: Perfect, thank you so much, alright. Uh, my second, my other question is about who do you informally learn from? Mostly?

*P: Hm, [pause] Um, I would say a lot of the IC[U] **physicians.** Uh, like from a **nursing perspective** I mean and I'm junior certainly involved and we're in the Orientation process, and providing sort of resources or examples of how they do it here. But from **a diagnosis, um, trending, uh treatment, sort of uh critical thinking pieces** it would be also, I would say certainly the, **intensivists.***

I: Uh huh [affirmative] Are these people uh, those that you interact mostly with? With them as well?

*P: Uh, yeah, yes and I think, **with time that progresses a certain**. Certainly there's a element when you're new especially in that first three to six months, where, uh on both sort of sides,*

I: Uh huh [affirmative]

*P: You lack a bit of confidence or you don't know, **where the competency is, of that person**. So, um, and also **personality types**. But at the same time, um, you know you do connect also off the bat with some easier than others. Or,*

I: Right.

P: Are able to communicate or ask questions easier. Does that make sense?

Peripheral learning also came from interaction with allied health professionals who provided contextually relevant information that was not part of the nurse's practice:

P75: Cohort 3_NN32_LADL_RTF.rtf - 75:44 (543:671):

*P: Yeah. Nurses. Um, who else did I learn from? Informally? **I learned from the RTs, but more like about, what their policies and procedures were, around like what I was allowed to touch and what I wasn't allowed to touch**. Um, [pause] and, the unit clerks for sure, like, you can ask a lot of questions about, processes from the unit clerks. Even the cleaners [chuckle] like will know, like the cleaners and the um, [pause] uh what do they call them here? Cleaners and? HCAs I think they call them?*

I: HC?

P: The health,

I: A?

P: The health care assistants.

I: What about morning rounds, or rounds?

P: Um, [pause] only like what was going on. And that meant they knew like no, no new information. Um, [pause] yeah.

LADH is another newly hired nurse who included variety of people in her informal learning network. According to her informal learning network diagram and my interview with this new nurse, she learned from almost all people working in the PICU depending on the situation and the tasks she was doing. She believed that everybody has something to offer for learning:

P76: NN34_LADH_RTF.rtf - 76:6 (125:155):

I: Perfect. And, who do you learn from? I mean informally? Over this period of Preceptorship?

P: Everybody.

I: Can you give me an example?

P: Um,

I: for example, one of them would be your preceptor.

P: Yeah.

I: Who else?

P: Um, [pause] the doctors.

I: Uh huh [affirmative]

*P: So it's quite interesting, you know if you listen to them when they come round, and review your patient, and they're throwing ideas in the air and they're talking about well why would you do this? And why would you do that? So I find that that's really good um, way to learn. [pause] Um, [pause] any, do you know, it's, **it's silly things like, um, learning where stuff's kept that you might learn from the housekeeper, everybody and the respiratory, um, technicians.** We didn't have those, back in our previous workplace, so [pause] I mean I learn quite a lot from them about their role.*

I: Uh huh [affirmative]

*P: So you can learn, **bits of, everything from them.***

I: Yeah this is [inaudible]

P: Everybody has something different to offer you.

I: Uh huh [affirmative]

P: In terms of advice and experience. So

Thus, many different people and professions contributed to the newly hired nurses' learning during the Preceptorship. Their learning experiences were shaped by the patients they cared for and the people that this drew into their social learning network. These networks also grew from the formal organization of preceptor and new nurse, and new nurse and the nursing leaders. The hiring cohort also had an effect on the collegiality that developed. Finally, the patterns of staffing brought some people together and made interactions with others more difficult. The

individual patterns of interaction that formed each nurse's learning network contributed to making the PICU a learning system.

9.2.2 Collective informal learning network

In the previous section, I described individual learning network of a few new nurses that helped us to have a clear idea about prototypical individual informal learning networks of the newly hired nurses. In this section, I analyze and describe collective informal learning network of all three cohorts of the newly hired nurses during the Preceptorship in the PICU. The purpose is to see if there were any aggregate patterns among the newly hired nurses regarding people who played central roles in their learning.

The informal learning networks for all of the newly hired nurses has been illustrated in Figure 9.2. As can be seen, the newly hired nurses identified various groups of staff, as well as patient families in their informal learning network. In total, various groups of staff that could be found in the collective informal learning network diagram of the newly hired nurses during their Preceptorship included following teams: (a) nursing team (including their preceptors, clinical nurse educators, clinical nurse coordinators, charge nurses, admit and relief nurses and other frontline general duty nurses), (b) medical team (PICU attending physicians, cardiac surgeons, cardiologists, physicians from other services, fellows and residents), (c) allied health team (including social workers, respiratory therapists, dieticians, occupational therapists, physiotherapists, child life support staff and care aids), (d) administrative team (including clerks), and other staff such as cleaners. In general, the newly hired nurses' collective informal learning network diagram showed that they learned from different groups of people including variety of staff members and patient families.

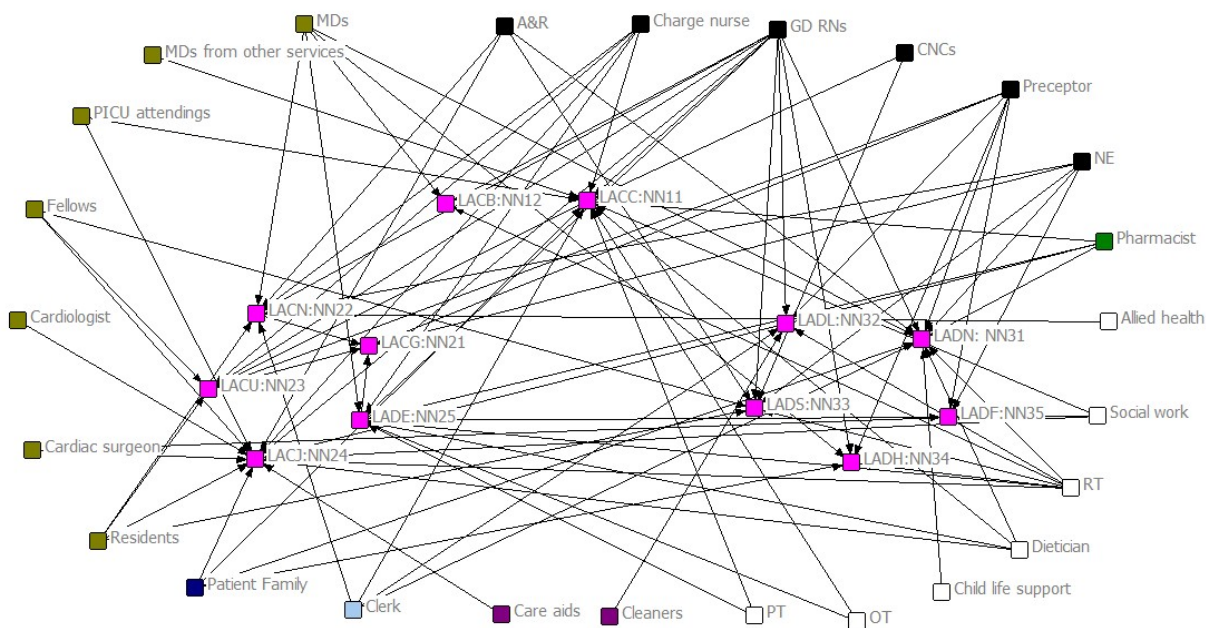


Figure 9. 2: Collective informal learning network for all three cohorts of the new nurses

In order to identify people who played central roles in the collective informal learning network of the newly hired nurses during their Preceptorship, I calculated two centrality measures based on the data coming from individual informal learning network diagrams drawn by the newly hired nurses in their interviews. These measures included Degree Centrality and Closeness Centrality measures, findings of which will be presented in the following two sections.

9.2.2.1. Degree Centrality

Degree Centrality is the number of links to and from a person (or a group of people). The more connections an individual or a group in a network has, the more central they will be, and the greater opportunities and power they will have for interacting and sharing knowledge in the network (192). Assuming that the relations between people is symmetric, the mean Degree Centrality score for the newly hired nurses' informal learning network in general was 7.7 (Std.= 4.9). In other words, each person in this network interacted on average with 7.7 persons. Since the

Degree Centrality score is not a symmetric measure, using this score we cannot say if the interactions were for learning or teaching. In order to have better idea in this regard, I re-analyzed the data considering it as an asymmetric (directed) data. This would help me to understand if the interaction was for teaching or learning. Results of this analysis showed that the mean In-Degree (number of times a person or a group was selected for interaction) was 3.9 (Std.: 2.4). ***Frontline general duty nurses (GD RNs) showed the highest In-Degree s score*** (In-Degree: 10.0) (Table 9.1). Preceptors had an In-Degree of 6. In this context, people with high In-Degrees were those who were selected more frequently by the newly hired nurses to learn from in an informal way. In other words, groups with high In-Degrees were the most central people in the informal learning network of the newly hired nurses from whom they learned most frequently in an informal way during their Preceptorship.

As can be seen in the informal learning network diagram (Figure 9.2) and Degree Centrality table (Table 9.1), during their Preceptorship, the newly hired nurses also selected other groups of nursing team to learn from. Among nursing team, general duty nurses were the most central people (In-Degree: 10.0), followed by preceptors who had the second highest In-Degree scores (In-Degree score: 6.0). Charge nurses and clinical nurse educators both had In-Degree scores of 5. Clinical nurse coordinators (CNCs) had the lowest In-Degree scores among all nursing groups (In-Degree score: 2.0) (Table 9.1). In-Degree is considered a very useful measure, and probably the most useful measure available in social network analysis. This measure helps us identify opinion leaders in a network, people with the most information, and in friendship networks it indicates popularity. General duty nurses had the highest centrality in the collective learning networks of the newly hired nurses and can be considered as the most important source of information and opinion leaders for the newly hired nurses.

The informal learning network diagram (Figure 9.2) and Degree Centrality table (Table 9.1) also showed that the newly hired nurses learned from other groups of people who did not belong to nursing team. Some of these people had very high In-Degree scores that were very close to those of frontline general duty nurses and much higher than those of some members of nursing discipline. For example, respiratory therapists had an In-Degree score of 8.0 that was the same as fellows and residents. The PICU attending physicians and cardiac surgeons had an In-Degree score of 7.0. This indicates that medical team in general had more centrality in the newly hired nurses' learning than all members of nursing team except for frontline general bedside duty nurses (Table 9.1).

Mean Out-Degree (number of people that each newly hired nurse selected to learn from) was 3.9 (Std.: 6.00). New nurse LACN had the highest Out-Degree (Out-Degree score: 18.0). In other words, this new nurse (LACN) selected highest number of groups to interact with and learn from (Table 9.1).

Table 9. 1: Degree centrality measures of the newly hired nurses in asymmetric learning network

People in the network	In-Degree	Out-Degree
LACN: NN22	2.0	18.0
LACU: NN23	1.0	16.0
LADN: NN31	2.0	16.0
LADE: NN25	2.0	14.0
LACJ: NN24	2.0	14.0
LACG: NN21	1.0	13.0
LACC: NN11	2.0	12.0
LADH: NN34	2.0	10.0
LACB: NN12	2.0	8.0
LADS: NN33	2.0	7.0
LADL: NN32	2.0	5.0
LADF: NN35	2.0	3.0
A&R	4.0	0.0
Charge Nurse	5.0	0.0
GD RNs	10.0	0.0
CNCs	2.0	0.0
Preceptors	6.0	0.0
CNE/ NE	5.0	0.0
Pharmacists	4.0	0.0
Social Work/SW	4.0	0.0
Respiratory Therapists/ RT	8.0	0.0

Table 9. 1 (Continued)		
People in the network	In-Degree	Out-Degree
Dieticians	5.0	0.0
Child Life Support Staff	2.0	0.0
Occupational Therapist/OT	3.0	0.0
Physio Therapist/PT	3.0	0.0
Cleaners	1.0	0.0
Care Aids	2.0	0.0
Clerks	4.0	0.0
Patient Families	4.0	0.0
Residents	8.0	0.0
Cardiac Surgeons	7.0	0.0
Cardiologists	6.0	0.0
Fellows	8.0	0.0
PICU Attending physicians	7.0	0.0
MDs from other services	6.0	0.0

9.2.2.2. Closeness Centrality

Degree Centrality only considers the immediate connections of each member or the connections of a member's neighbors rather than indirect connections to all other members.

However, one member might be connected to many other members who are rather disconnected from each other. This makes the member to be central only in his/ her local neighborhood. Closeness centrality, on the other hand, stresses on the distance from each member to all other members in the network. In other words, closeness centrality measures the average distance of a person (or a group) from all other people in the network (192). There are various forms of measures that can be used for calculating Closeness in the networks (such as Farness, Closeness, Integration and Radiality).

I used Integration (calculated on in-distances) and Radiality (calculated on out-distances) in order to calculate closeness in the newly hired nurses' informal learning network during their Preceptorship in the PICU. The reason for this selection was that research has showed that these measures better correlate with desired outcomes such as influencing changes in behavior or adoption of a new behavior which are important from learning and professional development perspectives (192).

The findings of my analysis showed that the mean Integration score for collective informal learning network of the newly hired nurses was 0.26 (Std. 0.15). Frontline general duty nurses (GD RNs) showed the highest integration scores (Integration score: 0.62). The Integration measures and shows how well connected a member is in the network and Radiality measures and shows how well connections (ties) of this member reach out into the network. Considering all other things equal, integrated members are on average closer to everyone else in the network. Therefore, these people should have earlier opportunities for exchanging information (192). The finding that frontline general duty nurses (GD RNs) had the highest integration in the informal learning network of the newly hired nurses indicates that this group was closest group to them and had the

opportunity for earliest knowledge exchange within the informal learning network of the newly hired nurses.

Average radiality score in the network was 0.26 (Std. 0.43). The highest radiality was for new nurse LACU (Radiality: 1.47). All other things being equal, radial individuals should better be able to interact and exchange information with many other connected members in the network (192). In this context, this indicates that the new nurse LACU was able to interact with many other connected people than every other new nurse for knowledge share.

Summary and interpretation

Putting findings from all data sources (interviews, field notes and network diagrams) together indicated that the newly hired nurses learned from various groups of people including the staff and patient families that formed their informal learning network in the PICU. Further analysis of the core-periphery of informal learning network of the newly hired nurses helped to gain more clarification about the determinants of core-periphery of various groups of the PICU in this network. There were various factors that determined which person or group played the most central role in the informal learning of the newly hired nurses during their Preceptorship. These factors included the tasks that they were doing at the time that they needed learning, as well as closeness, accessibility and approachability of the persons or groups for learning. However, the most important factor determining who would play the most central role in the newly hired nurses' learning was the tasks that they were doing at the time.

The newly hired nurses' tasks determined what they needed to know for accomplishing their tasks and who could be the most central person (or team) they needed to go for learning how to perform their tasks. The essential role of tasks in determining central people in the newly hired

nurses' learning not only was reflected in the interviews and field notes, but also appeared in the finding that various teams in the informal learning network of the newly hired nurses showed high In-Degree scores. This indicated (a) multidisciplinary aspect of the care in the PICU, (b) need for inputs (learning) from various teams for doing nursing tasks and giving care and (c) centrality of various teams (in different situations) in the newly hired nurses' learning.

The finding that frontline general duty nurses had the highest In-Degree centrality scores indicates that the tasks the newly hired nurses did were nursing tasks, and nursing team was expected to have the highest centrality in their learning. In addition, general duty nurses appeared to be the most integrated, as well as the closest people to the newly hired nurses (highest Integration Centrality score).

In fact, the tasks determined the central persons or teams (specialties or expertise) the newly hired nurses needed to go for seeking knowledge for performing their tasks while closeness, accessibility and approachability were factors helping to find the closest, most accessible and most approachable person(s) to learn from how to do the desired tasks. Since the tasks the newly hired nurses did were nursing tasks, three groups of people who played more central roles in their learning for doing their tasks were general duty nurses (who played the most important role and had the highest In-Degree score), respiratory therapists and medical team (including residents, fellows and attending physicians). However, care in the PICU was delivered in multidisciplinary teams and nursing tasks needed inputs from various other teams as well. Therefore, other teams also contributed in the newly hired nurses' learning with various levels of centrality depending on the type of the tasks they did and the type of expertise they needed help from.

To keep it short, the tasks that new nurses were doing determined which group or person would play central role in their informal learning. Various teams with high centrality

scores appeared to have central role in their learning, with nursing team to be the most central since the tasks were nursing tasks. In addition, general duty nurses were the closest people to the newly hired nurses with the highest integration scores (closeness). Therefore, the newly hired nurses mostly learned from general duty nurses; most central and closest people for learning appeared to be general duty nurses.

The newly hired nurses accessed to the staff, established relationships and communicated with them by participation in interactions during patient care in the PICU, which provided a foundation for learning and professional development in their centripetal journey in their Community of Practice. People with whom the newly hired nurses interacted for learning and knowledge sharing purposes, formed their informal learning network with different people providing important nodes in this learning network. Frontline general duty nurses were the people who played the most important role in this learning network and therefore, they could be considered as source of information and central in the learning of the newly hired nurses. At the same time, the finding that some groups such as clinical nurse coordinators (CNC) had more peripheral roles in learning is significant. Although they may be peripheral in the informal learning network of the newly hired nurses, the CNCs played a central role in the PICU main Community of Practice by bridging between different Communities of Practice such as medical and nursing communities. The central people in the learning network (such as frontline general duty nurses) are considered important in practice change, whereas people those who bridge between different communities are considered significant in information dissemination and spreading the new knowledge and practices between communities. Therefore, depending on the goal of any initiative, both frontline nurse and general duty nurses should receive enough attention.

Chapter 10: Perceptions of the newly hired nurses about learning, quality improvement (QI) and the relationship between learning and QI

Overview

In the previous chapter (Chapter 9), I described and analyzed the role of social interaction in learning in the Preceptorship. In this chapter, I explore perceptions of the newly hired nurses regarding learning and the quality of care. I describe and analyze their perceptions around learning and examine their perceptions about the quality of care. Finally, I also explore their perceptions about the relationship between learning, the quality of care, and quality improvement (QI).

10.1. Perceptions of the newly hired nurses about learning

In this section, I describe the six ways that newly hired nurses conceptualize learning. These conceptualizations were as follow: (1) learning as a social activity, (2) learning as an experiential process, (3) learning as an ongoing activity, (4) learning as transition from novice to expert identity, (5) learning as an adaptive process, (6) learning as a learner driven process. In the following sections, I will briefly describe each of these means of conceptualizing learning, and I will support them with quotations from the newly hired nurses' interviews.

10.1.1. Learning as a social activity

The newly hired nurses conceptualized learning as a social activity, consistent with Activity Theory and Communities of Practice, in which they learned by participation and practicing in the social setting of the PICU. They participated, got involved, observed, and learning

occurred as various competent people performed tasks in the context of the PICU. They observed the interactions, performed them on their own or with assistance and in the process internalized this knowledge and skill. Sometimes, they asked the competent staff, such as their preceptor or another mentor, to demonstrate how to perform various activities, then they practiced it in the actual context of the unit and received feedback to improve their performance. In this way, the newly hired nurses engaged other staff in various learning activities in the social context of the unit where everyone was a potential mentor:

P62: NN12_LACB_RTF.rtf - 62:9 (179:181):

*P: I think anybody who, who demonstrates, you know, a competency, and a willingness to teach, or even just a competency, such that **I can observe them in what they're doing**. Then I would learn something from that **situation**. So, I mean **I'll watch, you know** a new physician, the way they do a procedure. I might learn the right way to do it. And I might also learn how not to do a procedure. And whatever it is, like **I take that information forward with me**. Um, as far as who I prefer to learn from. Like, you know, like I said anyone who seems like, they know what they're doing. [chuckle] basically. Or if they don't know what they're doing then I, **I take that and I internalize that as well**. As how, you know as a, reminder for myself, as to how not to practice. Because, you see that as well.*

Having a social conceptualization of learning, they believed that efficient interaction with the staff and open communication encouraged them to be willing to learn and improve care in the PICU:

P69: NN22_LACN_RTF.rtf - 69:25 (340:362):

I: Can you give me some examples that you call them learning? And you learn?

*P: Well, but like, lots of things, like if I have a patient, something different that I've never done like a procedure and **I go ask somebody to help me** with it. And **I watch them do it, or they step me through it, that's, learning**. Or if I, have a day where I feel like I didn't do something right, or, something happened, then I learn from that, like, mistakes made, or, just things you forget to do, or and. And in this kind of work I think you have to be very **open to learning and very humble about learning**.*

Especially when you're, new um, and learning the way they do things here. Especially just being, teachable, and willing to, you know listen to other people and learn, for, you know I've learned a lot more at this beginning period I think than. I'll always be learning, but, you know being teachable.

The conceptualization of learning as a social activity is engrained in PICU culture, and was not limited to the newly hired nurses. Even their preceptors conceptualized learning as a social phenomenon in which they learn from others' patterns of action and through listening to them and watching as they perform a procedure and through interaction with them. These were externalized in their work performance:

P72: Preceptor 8_ LACM_ RTF.rtf - 72:15 (297:305):

I: What is learning?

P: I think you learn the things that, I know for myself the things that, I want to do, like even the way, um, I mean it, it's not [chuckle] a great example, but. When we have patients that are dying, or that die. Um, I think that's something again where an ever-learning process about how to help families go through the worst day of their life. And I think, a lot of what I do and say and how I act, well all of what I do and say and how I act is taken from other people. And, that's not formal learning. That's me having observed, a particular nurse, or a particular physician or a particular social worker, and the way they, speak or phrases or things. And I just sort of take all of that and then, put it into myself and, and, that's how I. Or just ways of just kind of being I guess with sort of families in that kind of worst, point in their lives. To try and make it, [pause] I want to say tolerable, but.

10.1.2. Learning as an experiential process

The newly hired nurses perceived learning as an experiential process. They believed that learning happens by doing and actively experiencing in the real social context of the unit. Actively experiencing various activities in the real social context of the unit after observing others doing the activities would deepen their learning and cement it in their brain. They believed that active

experimentation (applying and practically doing), mistakes and reflections that they would receive from others in the social context of the unit would consolidate their learning in the unit.

P79: Preceptor 13_ LACJ_ RTF.rtf - 79:19 (113:117):

Tell me about learning. What is that? How it happens?

*P: So, and hands on. So, I'm a very, I'm quite um, well rounded in my learning. Um, [pause] I think that, I like to hear about something first. Uh and then, **apply, apply it in practice**. So, either hearing or reading about something. But I prefer something, to be told to me. Um, and then I can process it. I'm a, I'm very, auditory. I'm a musician. So, I can see it in my head. I can hear it. I can read it on the page. But it, you know it, it makes more, impact on me if I hear it. **And then, if I go and actually practice it. You know hands on. That really consolidates it for me.***

10.1.3. Learning as an ongoing activity

The newly hired nurses conceptualized learning as an ongoing and continuous activity. They believed that things were always changing, especially in the intensive care units; therefore, they had to continuously learn. Every day and every patient was a new learning opportunity. They believed that they would never know everything about their work. Different patients, new co-workers, more advanced procedures and equipment required that they continued to learn on an ongoing basis. They believed that continuous learning was intertwined with care for their patients:

P71: NN25_ LADE_ RTF.rtf - 71:23 (431:437):

*P: I'd say **every day is a learning opportunity. Things are always changing, especially in intensive care**. So, [pause] I don't think I'll ever feel like I know everything there is to know about working here. Or caring for the kids that I care for here.*

P61: NN11_ LACC_ RTF.rtf - 61:36 (423:429):

*P: ...Um, me saying oh, I have ex[perience] you know, I come with this experience, I'm done with learning, does not. That would be completely fictional, because **learning especially in medicine continuously happens**. I'm sure even the physicians would say that. **So, it's just continually updating, getting the new information, and not stopping**, like keep looking for different courses, and expanding, expanding on that as much as you can. There's never a, disadvantage to learning more. I think, to, in order to provide that quality of care. We all [inaudible].*

Not only did the newly hired nurses conceptualize learning as an ongoing and continuous process, so did their Preceptors. They conceptualized learning as a “lifelong process”. They believed that without continuous learning they were prone to mistakes and low quality work:

P65: Preceptor2_LACO_RTF.rtf - 65:7 (181:181):

*P: Um, and in my job, it is **lifelong learning**. Um, I say to people all the time, if you ever find a nurse or a doctor that tells you that they know everything, [pause] to go the other way. [chuckle] Cause, you’ll never ever know. **You’ll never know everything**. And if you have an attitude of knowing everything, then that’s when **you’re going to make mistakes**. So, you have to be open, to learn. And learn from different people. And I take rounds and I listen and I learn at rounds. Right? Whether it be this baby or this baby, or, whoever. You just take that, and, for me I, I enjoy learning. Right?*

10.1.4. Learning as transition from novice to expert identity

The newly hired nurses also believed that learning should expand their knowledge and expertise. Learning transformed them from novices to experts. In this way, they perceived learning as a way of “**becoming**”. Learning was perceived as gaining a new identity. For them, learning was a way of “becoming and getting better” at what they did, on an ongoing basis:

P61: 1_NN11_LACC_RTF.rtf - 61:33 (375:413):

I: Right. Let me ask a simple question. From your own perspective, what is learning? How it happens in the Preceptorship?

*P: [pause] learning is, [sigh] wow that's a pretty open question. Learning's um, essentially just, [pause] **building your knowledge** base on either whether it's a specific, um, [pause] something specific, or even more general. **Just expanding your knowledge** base, and, the information that you are holding.*

I: Uh huh [affirmative]

P: Yeah, personally.

I: Uh huh [affirmative] can you explain more? And elaborate how it happens in the Preceptorship?

*P: Um, [pause] learning's sort of the, I would say like the **progression of the individual, um, from going from novice to an expert**.*

I: Perfect.

*P: You need that **learning process to happen in order to sort of build, both your knowledge and skills in practice.***

P76: _NN34_LADH_RTF.rtf - 76:20 (417:423):

I: How would you define learning? This is a very really hard question. [chuckle] On your own perception, how do you define learning? [pause] What is learning?

*P: Uh, [pause] well it's a way to, um, [pause] to expand your knowledge, and your skills. And **become better** at what you do. Um, [pause] and I think, definitely you **always want to do the best that you can, especially in this job.***

I: Right.

*P: And, **without learning you wouldn't be able to do that. You wouldn't be able to progress.** Wouldn't be able to, to **get better** [i.e.: become better]. You wouldn't be able to care for your patients with the, **full, you know potential that, you could.***

10.1.5. Learning as an adaptive process

Learning is also the process of adapting oneself with the environment. This environment included complex patients who are in acute conditions, multidisciplinary care teams, and changing procedures, protocols, equipment, and policies. From this perspective, learning was perceived as adaptive – it helped them survive, and was considered by some as the only way that they could do their work:

P75: NN32_LADL_RTF.rtf - 75:24 (247:257):

I: And uh, how do you define learning?

P: Um, I don't know, as a process of [chuckle] [pause]

*P: Yeah, **it's just like, the way you learn to adapt to your environment** I guess. Like **it's an adaptive.** It's like a survival technique really. It's the only way that you can, do the job that is in front of you. So.*

10.1.6. Learning as a learner driven process

The newly hired nurses conceptualized learning as a learner driven process. They believed that learners had to actively seek learning and for this purpose they had to be self-motivated. From their perspective, learners needed to be proactive and self-directed and not intimidated. They also wanted to be a role model for the junior staff:

P77: NN35_LADF_RTf.rtf - 77: (775:781):

I: How would you define learning?

*P: For me? [pause] it has to be, **you have to drive it.** [pause] so you have to be the one, that wants to find out that information. You, have to be the one, to, push it. It can't be someone else coming up to you and saying, here this is what you need to learn. **You need to be the one to say, I, I want to know that.** And, I want to be like that. So, one of our biggest drives at home, as a senior nurse and once you got to that level was, you wanted to be the person that they junior girls or guys would turn around and go, I want to be like that. **Not to be intimidated,** not to sit and be at all poppy about it, but to say I want to know what you know. I want to be as good as that, when I grow up.*

The conceptualization of learning as a learner driven process was shared with their preceptors who also conceptualized learning as a learner driven process. Clinical Nurse Educators (CNEs) were perceived as good resources and support for learning:

P73: Preceptor 2_LADT 1 - 2_RTf.rtf - 73:14 (295:305):

*P: Um, well, [pause] **a lot of it, like is self-directed,** but at the same time you have a lot of support from our educators as well.*

Clinical Nurse Educators (CNEs) who were the organizers of the teaching and learning activities for nurses in the unit also conceptualized learning as a learner driven process. They believed that the CNEs had supportive roles in this process, making sure that the learners, including the newly hired nurses were in right track and moving along the correct paths. However, they believed that learning should essentially be driven by the learners themselves:

P56: LACH 1 - 2_NE_RTf.rtf - 56:29 (273:277):

*P: Um, it's **totally, driven by the nurse[s] themselves**. We're just kind of the **gatekeepers** of it and we, try and encourage people to kind of either move along if they're not, or, um, check in with people to make sure they're doing what they need to. Or to make sure that the, their uh goals are clear, what they can [inaudible] so we're kind of like the people that help them along it. But it is essentially, driven by them, because if they don't want to keep moving then, ...*

I: Right.

P: I can't force them to.

Summary and interpretation

The newly hired nurses conceptualized learning as a social activity that was continuous and based on interaction in the social context of the PICU. By participating in the community of the PICU, through efficient interaction, open communication and willingness to learn, the newly hired nurses could observe, practice, absorb, and internalize a variety of new skills and knowledge. These findings were in line with my findings about role of social interaction in the newly hired nurses' learning, as I elaborated earlier (Chapter 9).

Learning was also conceptualized as an experiential process in which learning happens by doing and actively experiencing the processes of a procedure in the real social context of the unit. Active experimentation (applying and practically doing things), mistakes and reflections from others in the social context of the unit consolidated learning in the unit. Participation in the social context of the PICU, actively experimenting and doing various activities and receiving reflection from others helped them expand their expertise and gain a new identity, as they moved from a novice to expert. The newly hired nurses considered learning as a way of "becoming" an expert and "becoming" better at patient care on an ongoing basis. The newly hired nurses considered learning as a way of adapting to the challenges posed by new critically ill patients and new procedures.

Additionally, the newly hired nurses, their preceptors, as well as CNEs perceived learning as a learner-driven phenomenon. They all believed that the learner (the newly hired nurses) should be driving their learning with support from members of their community of practice, such as their fellow bedside nurses, their preceptors and the CNEs.

Simply put, learning, was conceptualized as an ongoing social and experiential activity through which the newly hired nurses could evolve and move from novices to experts in the care of patients in the PICU. In other words, we can define learning as an ongoing, social and experiential, learner driven activity that leads to movement from novice to expert identity through an adaptive process.

This conceptualization of learning in the PICU is in line with other studies conceptualizing learning as a sociocultural phenomenon. This indicates that learning in the PICU is social and experiential learning supported by sociocultural learning theories such as Vygotsky's social and developmental learning theory, Communities of Practice, Activity Theory and more specifically, Cultural and Historical Learning Theory (CHAT). Learning in this sense, cannot happen in didactic classes happening outside of the real setting of the unit, rather it should happen in the context of the Community of Practice. This indicates that there is a need to create more opportunities for sociocultural learning in the PICU.

Additionally, sociocultural conceptualization of learning is another important implication for significant role of numerous scaffolding strategies in implementing the Zone of Proximal Development (ZPD) and origination of higher mental functions in the society through transformation of primary mental functions. Although, social and experiential aspect of learning had been reported in other settings, my literature review indicated that it has not been reported in pediatric critical care setting.

10.2. Perceptions about quality improvement and quality of care

In the previous section, I analyzed and described the newly hired nurses' conceptualization of learning. In this section, I explore their understandings of quality improvement and quality care. In so doing, I describe newly hired nurses' process-centered and outcome-oriented perspective to quality improvement, in which achieving high quality outcomes was only possible through high quality processes that were standardized and shared among members of the PICU. Then, I will examine the newly hired nurses' perspectives on quality of care as a multi-dimensional phenomenon. The various aspects of quality of care from the newly hired nurses' perspective included the following: social activity, ongoing learning, effectiveness, communication, compassion, safety, timeliness, appropriateness, holistic, as well as being classic.

10.2.1. Process-centered and outcome-oriented perspective

The newly hired nurses had a process-centered and outcome-oriented perspective on quality improvement and quality of care. Hence, a high quality of care was the result of constant quality improvement. They believed that quality improvement had two main pillars: processes and outcomes. From their perspective, both processes and outcomes were equally important in achieving high quality care. They believed that achieving high quality clinical outcomes were not possible without having rigorous and high quality processes that were standardized and consistent. In other words, high quality process outcomes were perceived as the prerequisites for achieving high quality clinical outcomes. They focused on maintaining quality clinical processes and procedures because "standardization and consistency in process outcomes, guarantees safe [clinical] outcomes":

P62: Cohort 1_NN12_LACB_RTF.rtf - 62:27 (421:423):

*I: Alright. So, [pause] another thing is **how do you define quality [improvement], or quality of care?***

*P: Um, I think it's, probably, you know **two main things to do with quality of care**. I think one is a quality process. Um, and then the other is a quality outcome. And I think both are equally important. A lot of people think that outcomes are more important than the process. But **you can't guarantee outcomes without a quality process**. You can, you can gamble and maybe achieve high outcomes, um, but really to ensure, a quality outcome you need to **have a rigorous process**. And it **needs to be***

***standardized** as much as possible. And, I mean like the literature is, is pretty clear on that as well. If you look at any, any standard process whether it's an assembly line, or an airline checklist or anything like that. Like, **standardization and consistency, guarantees safe outcomes as often as**, you know statistically possible. So, I think sort of both facets each should be regarded equally.*

10.2.2. Quality of care as a multi-dimensional phenomenon

The newly hired nurses considered quality of care as a multi-dimensional phenomenon. In so doing, some nurses called quality care as an “umbrella” that covered many things. From their perspectives, various aspects of quality care included social activity, ongoing learning, communication, compassion, safety, timeliness, appropriateness, holistic, effectiveness, as well as being classic. They believed that a high quality care was the type of care that considered all of these aspects. In the next few sections, I will elaborate on each of these aspects of quality of care. Here, I have copied a prototypical quotation from the newly hired nurses' interviews that supports the multi-dimensional perspective about quality care:

P84: NN24_LACJ_RTF.rtf - 84:27 (782:788):

I: Mm, how do you define quality improvement and quality of care?

*P: Quality of care? Wow. Um, it's a, [pause] it's a fairly **big um**, [pause] **umbrella** thing. It's, [pause] [sigh] quality, what you think of quality is, it's safe, it's something that you know, things are, checked properly, like, you think about all the medication and demonstrations, like all the different rights? Right? Um, [pause] giving uh timely, timely care done, in, the right amount of time. Um, **communicating the needs**, uh is really important. **So if you're observing something**, uh, about a patient and, [pause] you're not quite, you know, you're not quite sure about, that outcome.*

*You **need to tell your**, colleagues about that. The doctors. Or your call, your, the other nurses. So that, maybe you can find a different way, for solu[tion], for a different solution for something. Um, evaluating, [pause] like, the use of analgesic for example, if you think that your patient's in pain because of the symptoms and, you know you do your, chart of, [pause] you know [pause] you look at their um, vital signs and, if they're beyond a certain point. You would give analgesic based on, you know the math, reading or whatever. And um, the evidence to show that, oh this, this medication worked, because this, now the heart rate has come down to a nice level. They're resting. They're no longer having, grimace on their face, things like that. Quality of, showing that you're, [pause] showing, or you're thinking about, or your observing that the things are working. Or things are, you know the medication is effective. Right?*

I: Uh huh [affirmative]

*P: Um, [pause] what other quality things? Being able to, [pause] I don't know, be thorough in your care, not rushed, you, you don't want to, no, I don't think anybody likes doing uh, [pause] half hearted job on something. I think you get a lot of, I get a lot of confidence from knowing that I've done a good job of something, because some, other, uh the results are good. Like the outcome is good for, the patient, or [pause] the family feels, more relaxed and, you know **there's a lot of communication going on with what's the plan**. Um, [pause] and, you're, your colleagues are, all, you know, everybody knows what's going on. Um, [pause] yeah and, and, yeah if you feel, I, I don't, I never feel, that I, [pause] you know at my best when I'm, rushing my work.*

10.2.2.1. Social activity and quality improvement

The newly hired nurses perceived quality improvement as a social and collective activity that takes place in the actual clinical setting and requires strong engagement of all members of the PICU multidisciplinary community. In such a perspective, the front-line staff members pick up and collaborate in small situationally relevant projects, they dissect existing processes, analyze the outcomes, learn, revise the processes, and rule out less effective alternative processes. Gradually, they internalize the idea of frequent and continuous small changes and quality improvement. In this way, they progressively establish a culture of change and quality improvement. They establish patterns of beliefs and actions that support continuous changes that are conducive to better care and internalize and establish a paradigm of quality improvement. In other words, quality improvement was perceived as a scaffolded

social activity that members of the PICU engage in as a Community of Practice. They believe that in this way a culture of quality improvement can be promoted without encountering strong resistance. Put another way, they believed that scaffolded changes in the clinical context of the Community of Practice would face the least amount of resistance and would be a good way to establish a culture of quality improvement in the unit. In other words, this perspective is suggesting that culture of quality improvement can be established through implementation of the concept of zone of proximal development at the social level in the Community of Practice without encountering significant resistance from the staff:

P62: NN12_LACB_RTF.rtf - 62:30 (441:447):

I: Alright. Perfect. How quality improvement can create learning opportunities for us?

*P: Well I think through that process that we had, you would have more **front line staff picking up small projects**. And so those are individual learning opportunities for those people with how the organization works. How to do a quality review. How to implement a new process. How to roll out a new process. **Um, and then for the entire staff group, we're constantly, you know improving what we do. And you get used to the idea of changing more frequently.** And you get used to the idea of implementing a new improvement. So there's a lot of um, of **inertia**, you know against, change. Right? People like to get set in their ways. And if you're **constantly making small changes**, then you get **more used to the idea, of making small improvements** more frequently. Which I think **then creates a culture of, of quality improvement**.*

*I: Uh huh [affirmative] Do you mean by this that a **small and gradual changes are less facing actually barriers and are better for uh overcoming the inertia?***

P: I think so. Yeah.

P84: _NN24_LACJ_RTF.rtf - 84:55 (784:784):

So if you're observing something, uh, about a patient and, [pause] you're not quite, you know, you're not quite sure about, that outcome. You need to tell your, colleagues about that. The doctors. Or your coll[eagues], your, the other nurses. So that, maybe you can find a different way, for solu[tion], for a different solution for something. Um, evaluating, [pause] like, the use of analgesic for example, if you think that your patient's in pain because of the symptoms and, you know you do your, chart of, [pause] you know [pause] you look at their um, vital signs and, if they're beyond a certain point. You would give analgesic based on, you know the math, reading or

whatever. And um, the evidence to show that, oh this, this medication worked, because this, now the heart rate has come down to a nice level. They're resting. They're no longer having, grimace on their face, things like that. Quality of, showing that you're, [pause] showing, or you're thinking about, or your observing that the things are working. Or things are, you know the medication is effective. Right?

10.2.2.2. Ongoing learning

The newly hired nurses believed that quality care is based on an ongoing learning-the product of constant quality improvement. In other words, they considered learning as one aspect of quality care. In so doing, two types of perceptions were identified that were as follows. In the first perspective, the newly hired nurses believed that quality care required adequate ongoing learning, empowering oneself and “becoming” more empowered. This required a rich and supportive social context that included good preceptors, good tools and good models. The newly hired nurses believed that ongoing learning would help care providers maintain their competencies, boost their confidence and enable them to become more expert and better able to provide high quality care. This first perspective focused on the development and maintenance of an individuals’ ability to provide quality of care with the support of other members of the PICU.

In the second perspective, the newly hired nurses considered the same processes, but the focus was more on the role of the Community of Practice in developing and supporting quality improvement through collectively reflecting on both processes and outcomes. They shared in the process of learning from collectively dissecting, analyzing the real outcomes, as well as revising the processes, actively experimenting and implementing the revised processes. In other words, learning in the social context of the PICU community was considered a key aspect of the social process of quality improvement which produced quality

care by individual nurses. The newly hired nurses believed that this learning should be collective learning and include “whole staff group”, be ongoing and be “very closely tied to the education”.

Put another way, social learning was considered an important aspect of quality improvement with a goal of quality care:

P62: NN12_LACB_RTF.rtf - 62:28 (425:427):

I: Uh huh [affirmative] how do you find the connection between uh, learning and quality? In other words, how connect, how, learning is connected to quality improvement?

*P: Um, I think **learning is a key facet of quality improvement**. Um, I don't know so much education, but **I think learning from our processes and dissecting our processes, and, analyzing our outcomes, to then take that information back and revise the process**. So I think **learning in that sense is really important for quality improvement**. Um, as far as education goes, I, I don't know, how things are done here. If there's such a quality improvement education. Um, I now where I came from like we had, a process that **involved the entire staff** in quality improvement. Like three times a week. So, **it's a whole staff group**, so. That was **very closely tied to our education**.*

10.2.2.3. Effectiveness

A central aspect of quality care or best care was effectiveness. The newly hired nurses believed that the best quality care was effective for both patients and families. In other words, it was a type of care that helped the patients get better, and helped their families relax:

P71: NN25_LADE_RTF.rtf - 71:21 (411:425):

I: Uh huh [affirmative] what is best care? How would you define it? That was one of my other questions that you touched. [chuckle]

*P: Um, well I think there is **first providing safe care** for your patient. Um, **effective** so, [pause] are you **helping them get better**? How are you helping them get better? I guess um, be **compassionate, support** the family to assist you in providing better care for the patient.*

I: Is this the same way that you would define quality of care? Or is it, how would you define quality of care? High quality?

P: I guess they're the same for me.

I: They are the same?

P: Yeah.

10.2.2.4. Communication

The newly hired nurses believed that communication was another aspect of quality care; in other words, they believed that quality care involved quality communication and social interaction. This included communication with members of other teams involved in delivering care, as well as communication with the families. They believed that providing quality care required ongoing effective communication among various teams and between members of these teams. Clear, positive and ongoing communication could improve continuity of care, align the unit with other units, and improve quality of care delivered in the unit. For example, the newly hired nurses believed that clearly communicating enough information about patients, their needs and care plan on an ongoing basis was crucial for quality improvement and quality care, and could help them find better solutions when they were experiencing uncertainty. Additionally, they believed that continuously communicating information with families was an important aspect of quality care:

P84: _NN24_LACJ_RTF.rtf - 84:54 (782:784):

I: Mm, how do you define quality, quality of care?

*P: Quality of care? Wow. Um, it's a, [pause] it's a fairly big um, [pause] umbrella thing. It's, [pause] [sigh] quality, what you think of quality is, it's safe, it's something that you know, things are, checked properly, like, you think about all the medication and demonstrations, like all the different rights? Right? Um, [pause] giving uh timely, timely care done, in, the right amount of time. **Um, communicating the needs, uh is really important.** So if you're observing something, uh, about a patient and, [pause] you're not quite, you know, you're not quite sure about, that outcome. You need to tell your, colleagues about that. the doctors. Or your coll[eague], your, the other nurses. So that, maybe you can find a different way, for solu[tion], for a different solution for something.*

10.2.2.5. Compassionate care

From the newly hired nurses' perspective one of the important aspects of quality care was compassion. They believed that quality care was compassionate, considerate, kind and supportive care. It is a type of care that one would provide to loved ones such as their own grandparents or children. To achieve this, they believed that they might need go beyond what was expected from them just to make the patient and families' days better:

P70: _NN23_LACU_RTF.rtf - 70:50 (635:641):

I: And, let's think about quality of care. How do you envision quality of care?

*P: [pause] **How I would like to be treated, or my grandparents, or my kids, to be treated. So quality of care for me is, [pause] compassionate, kind, considerate, knowledge, explanations. Um, going out of your way, to make the person smile. To make their day better. Cause nobody wants to be here. We see, especially in the hospital, we see people on their worst days ever. And, in so, they're gonna feel crappy. They're gonna treat, unfortunately treat you probably pretty bad most of the time. Um, not most of the time, I should say, but. [pause] Quality care is just trying to make them, you might not be able to cure them, but you can make their day better.***

I: Uh huh [affirmative]

P: Um, doing the extra mile, like ice water first thing in the morning. Just get them ice water first thing in the morning. Something like that.

10.2.2.6. Safety

From the newly hired nurses' perspective, another important aspect of quality care was safety. They believed that quality care was a type of care that was the safest care possible:

P71: NN25_LADE_RTF.rtf - 71:21 (411:425):

I: Uh huh [affirmative] what is best care?

P: [chuckle]

I: How would you define it? That was one of my other questions that you touched. [chuckle]

*P: Um, well I think there is **first providing safe care** for your patient. ...*

10.2.2.7. Timeliness

From the newly hired nurses' perspective, another important aspect of quality care was timeliness. Quality care was provided in a timely manner, in right amount of time and without any rush:

P84: NN24_LACJ_RTF.rtf - 84:27 (782:788):

I: Mm, how do you define quality, quality of care?

*P: Quality of care? Wow. Um, it's a, [pause] it's a fairly big um, [pause] umbrella thing. It's, [pause] [sigh] quality, what you think of quality is, it's safe, its something that you know, things are, checked properly, like, you think about all the medication and demonstrations, like all the different rights? Right? Um, [pause] giving uh **timely, timely care** done, in, the **right amount of time**. ...*

10.2.2.8. Appropriateness

From the newly hired nurses' perspective, another aspect of quality care was appropriateness. The newly hired nurses believed that quality care or best care depended on available resources. From their perspectives, high quality care was not an imaginary idealistic care. Rather, it was the best and safest possible care that one could provide depending on the available resources. In other words, quality care was considered a type of care that was appropriate to the existing situation with regard to resources:

P74: _NN31_LADN_RTF.rtf - 74:30 (333:343):

I: Let's um move ahead and, switch the gear to, quality of care. How would you define high quality care? Or quality improvement?

*P: [pause] Hm, [chuckle] Well I guess it's depending on, [pause] tsk, depending on **what's available, at that time, in that specific moment. Doing the best you can**. Basically, in the, in a certain area. So, um,*

I: Can you be more specific? Of doing the best you can?

P: So, for example, like you, can't, we can't be uh just live in an imaginary role then say the, the best care would be, having a big room with a TV and, these equipment and, that many nurses. Or you know what I mean? Like, um, [pause] so [pause] understanding what you've been given, and what's provided for you in that specific

setting, using those, to the best you can to provide a safe, a safe practice for the patient. Do you know what I mean?

I: Yeah, yeah.

P: So, um, [pause] so for example, uh, this is a great hospital. But if you move to a smaller unit, for example, uh they may not have certain equipment, but just being able to um, provide the best you can with those given equipment, for example.

10.2.2.9. Holistic

Quality care is also holistic care, meaning that it should considering all of those involved in care including the patient, the family and other healthcare providers. While the newly hired nurses believed that concern for the patient should be central, families and healthcare professionals should also be provided high quality care as well. Quality care for families could be provided through advocating for families. They believed that nurses should be families' advocates which required knowledge and continuous learning. Additionally, quality care was considered a care that guaranteed the healthcare professionals' safety:

P76: _NN34_ LADH_ RTF.rtf - 76:29 (545:567):

I: How would you define quality of care?

P: [pause] Well, says it already, quality of care doesn't it. [pause]

I: Can you give me [inaudible] Can you give me an example of high quality care?

*P: **Patient first and foremost.** [pause] I mean in everything that you do, for your patient, you should know why you're doing it. **You should be safe,** [pause] in your practice. And you should provide quality care, um, **not just to the patient but to the family as well.** You should be their advocate.*

I: Uh huh [affirmative]

P: Um, and I think, the other thing about learning is that if you're gonna advocate, for a patient, you need to know why.

I: Uh huh [affirmative]

P: For instance, the example about the BiPAP that I gave you. Um, I know that I didn't think the patient would manage half an hour off BiPAP.

I: Right.

P: That was me advocating, for my patient. Trying to improve quality of care.

I: Right.

P: Obviously to do that you have to have knowledge. And knowledge comes through learning.

10.2.2.10. Classic

The newly hired nurses considered quality care or best care a type of care that was classic. What they meant by this was care that was systematic, based on critical thinking and evidence based. It should be comprehensive, but at the same time concise enough so that it is feasible:

P61: _NN11_LACC_RTF.rtf - 61:34 (415:421):

I: What is quality of care? Quality improvement?

P: [Quality care is] Thorough, Thorough, um, systematic, concise, critical thinking based. Um, [pause] evidence based practice I should say. And the most, [pause] um, best researched you know what have been results. We've come a long way. [chuckle]

Summary and interpretation

The newly hired nurses had a process-centered and outcome-oriented perspective to quality improvement which was the foundation for quality care. Quality improvement was considered as scaffolded social activity that in the best form happens in the PICU community of practice, which requires strong engagement of the all members of the PICU multidisciplinary community. Quality improvement was a collective process that enabled each member of the PICU to individually, provide quality care to their patient.

From their perspective, quality care was a multi-dimensional phenomenon. Various dimensions of quality care included social aspects, ongoing learning, effectiveness, communication, compassion, safety, timeliness, appropriateness, holistic, and providing

classic evidence-based care. In order to achieve high quality care in all these aspects, the newly hired nurses believed that everyone needed to pay as much attention to the processes of providing care as they pay to the outcomes. Processes are as important as clinical outcomes, they believed, because it is impossible to guarantee consistently high quality clinical outcomes without having quality processes. These processes should be rigorously standardized and consistent.

Quality improvement and hence quality care were also perceived as care based on ongoing learning. The newly hired nurses believed that ongoing learning in the social context of the unit through collectively reflecting on both processes and outcomes, revising existing processes, experimenting revised processes, collectively reflecting again and expanding the changes, is an important aspect of quality improvement.

Put another way, the newly hired nurses perceived quality improvement as a social activity, and they considered social and experiential learning as the basis of the quality care that they as individuals provide to their patients. Through social and experiential learning over time the newly hired nurses would be able to deliver a care that is effective, safe, timely, appropriate, and holistic. This care is based on critical thinking and is supported by evidence and effective ongoing communication among the clinical staff, the patient and the family. Simply put, the newly hired nurses believed that quality improvement is a social activity rooted in ongoing social and experiential learning, which enables nurses to provide continuously high quality care.

From the perspective of the newly hired nurses, quality improvement and quality care are social and experiential activities that require participation in the PICU Community of Practice and engagement with other staff who belong to different communities in the unit.

In other words, quality improvement and quality care cannot happen by teaching staff about quality improvement in didactic instructional classes detached from the real setting of the unit and returning them to the unit and expecting them to implement quality improvement and deliver quality care. This explains the limited success and sustainability of the existing culture for quality improvement and quality care that is based on change and improvement initiatives initiated by managers and other leaders who then push them down to be implemented by frontline staff who are instructed in didactic classrooms (called Rapid Process Improvement Workshops or RPIWs) which are divorced from the PICU Community of Practice. Quality improvement and quality care are situated social and experiential activities requiring participation of all the staff in the context of the PICU community. This is a transformative process that changes the identity of a unit doing top down improvement projects into a unit with the culture of full participation in development and implementation of variety of improvement events on a daily basis. In such a perspective, ongoing social and experiential learning from small changes or small change initiatives through reflection and reflective practice in the context of the community leads to gradual changes with least amount of resistance and this way, establishes the culture of continuous quality improvement. In this perspective, the patient is the main mediating object common between numerous communities interacting to treat the patients and his/her ongoing changing condition creates a dynamic zone of proximal development at individual as well as at collective level that stimulates all the staff learn on an ongoing basis at individual level (from each other) and group level (from other disciplines). In this context, numerous forms of scaffolding have a significant role in learning, movement in the zone of proximal

development at individual and collective level that leads to the establishment culture of quality improvement.

10.3. Perceptions of the newly hired nurses about the relationship between learning and QI

In the previous sections, I explored the newly hired nurses' perceptions about learning, the social nature of quality improvement, and their contribution to quality care. In this section, I explore their perceptions about the relationship between learning and quality of care. In general, the newly hired nurses believed that there was a strong relationship between learning and quality improvement. From their perspectives, learning and quality improvement went hand in hand. I detected two types of direct relationship between learning and quality improvement: (1) learning leads to high quality care, (2) quality improvement leads to learning. In the following sections I elaborate on each of these relationships.

10.3.1. Learning leads to quality improvement

The newly hired nurses believed that there was a direct relationship between learning and quality of care; in order to achieve the best outcomes for their patients, they believed that they needed to learn on an ongoing basis. They believed that the more they were exposed to learning opportunities, and the more they learned, the higher quality care they could provide. Therefore, in order to have continuous quality improvement, one would need to learn on a dynamic, ongoing basis:

P68: _NN21_LACG_RTF.rtf - 68:22 (299:305):

I: Hm, what are the relationships between? How do you see the relationship between learning, in the unit and quality of care?

P: [pause] Um, well you need to learn to be able to, [pause] give quality care.

I: Uh huh [affirmative]

*P: Um, [pause] so if you're **continuously learning**, new ways and better ways, then you can deliver, and continue to. [chuckle]*

Some newly hired nurses considered an even much stronger relationship between learning and quality of care. In so doing, they moved further and considered learning as another aspect of quality of care. They believed that continuously learning and expanding their expertise was their personal contribution to quality improvement and quality care within the PICU. However, the newly hired nurses were aware of the restrictive role of some contextual factors such as lack of sufficient functional human resources, enough time and limited support to incorporate and use their knowledge to deliver better care. Therefore, they believed that more learning could lead to high quality care provided that contextual barriers would have been minimized or eradicated:

P75: NN32_LADL_RTF.rtf - 75:27 (271:273):

I: Uh how do you think learning and quality of care, or high quality care are related?

P: Um, well the more learning you do, [chuckle] the better quality of care you're gonna give. Well, given like the right circumstances, right? So like, you need to have the right person and the right amount of time and the right support, and then, if you have also, got a good learning, like base behind you, you're gonna, be way more successful than.

10.3.2. Quality improvement activities lead to learning

Some of the newly hired nurses believed that learning was an essential facet of quality improvement initiatives. From their perspective, quality improvement was learning by active experimentation in the social context of the unit and reflection on what had been done and how it could have been done differently. Analyzing activities, processes and related outcomes in the social context of the unit at the presence of other members of the teams would help them collectively reflect on the previous activities and learn what worked in which circumstances, and how they could revise these processes to achieve better outcomes. They believed that quality improvement should involve entire staff rather than specific people in the unit and should be closely incorporated into staff education:

P62: _NN12_LACB_RTF.rtf - 62:28 (425:427):

I: Uh huh [affirmative] how do you find the connection between uh, learning and quality? In other words, how connect, how, learning is connected to quality improvement?

*P: Um, I think learning is a key facet of quality improvement. Um, I don't know so much education, but **I think learning from our processes and dissecting our processes, and, analyzing our outcomes, to then take that information back and revise the process.** So, I think **learning in that sense is really important for quality improvement**. Um, as far as education goes, I, I don't know, how things are done here. If there's such a quality improvement education. Um, I now where I came from like we had, a process that **involved the entire staff** in quality improvement. Like three times a week. So, **it's a whole staff group**, so. That was **very closely tied to our education**. Um, and I don't know, [inaudible]*

As elaborated earlier, the newly hired nurses believed that participation and collective engagement in small quality improvement projects in the unit could create individual and collective learning opportunities for frontline staff. These projects are considered implementation of zone of proximal development at unit (social) level, and would gradually contribute to the culture of quality improvement in the unit. At individual level, they would gain organizational knowledge (how the system works), knowledge of quality improvement processes, and the role of participation in these collective activities. They would commit to small changes learned in these small projects, which would help them internalize, routinely employ them, contributing to persistent, gradual change. This process gradually would create a culture of quality improvement. In other words, they believed that by participating in small quality improvement initiatives, they would internalize small gradual changes, externalize and show them in their practice, and become accustomed to them as these new practices became habits and standard work patterns engrained in the culture of the PICU. This way, they could create new patterns of actions and perceptions in the unit conducive to better care. The newly hired nurses believed that small changes and gradual transition of perceptions and practices would encounter less resistance in the unit and could

overcome the inertia to change. This way, they believed that by participating in small quality improvement projects, they could incrementally have greater contributions in improving quality of care and promoting a culture of quality improvement in the unit:

P62: Cohort 1_ NN12_ LACB_ RTF.rtf - 62:30 (441:447):

I: Alright. Perfect. How quality improvement can create learning opportunities for us?

*P: Well I think through that process that we had, you would have more **front line staff picking up small projects**. And so those are individual learning opportunities for those people with how the organization works. How to do a quality review. How to implement a new process. How to roll out a new process. Um, and then for the **entire staff group**, we're constantly, you know improving what we do. **And you get used to the idea of changing more frequently**. And you get used to the idea of implementing a new improvement. So there's a lot of um, of **inertia**, you know against, change. Right? People like to get set in their ways. And if you're **constantly making small changes**, then you get **more used to the idea, of making small improvements more frequently**. Which I think **then creates a culture of, of quality improvement**.*

*I: Uh huh [affirmative] Do you mean by this that a **small and gradual changes are less facing actually barriers and are better for uh overcoming the inertia?***

P: I think so. Yeah.

Summary and interpretation

The newly hired nurses believed that learning and quality improvement were directly related. They viewed quality improvement as the tangible manifestation and product of social and experiential learning that is shared within their Community of Practice, the PICU. In this regard, they identified two types of relationship between learning and quality improvement: (a) learning leads to quality improvement (learning as QI), and (b) quality improvement activities lead to learning (QI as learning). In the first perspective (learning leads to QI), the newly hired nurses believed that learning would help them expand their expertise and gain a more expert identity and deliver better care. In the second perspective (QI activities lead to learning), they believed that participation in small quality improvement projects in the clinical setting would help them as

members of the PICU to collectively reflect on existing activities, processes and outcomes, revise them, practice and experiment small changes in the setting of the unit, internalize new patterns of perceptions and behaviors, transform their identity via this internalization and externalize and show them in their future practice. Gradually, they could establish new improved shared patterns of practice in their daily work and collectively with other staff they could progressively transform collective identity of the unit and individually have more role in improving culture of quality improvement in the unit. In other words, learning and gaining expert identity would help them deliver better care. The entire process contributes to the newly hired nurses' move from a minor and peripheral role in delivering high quality care to a major, central role in the PICU where they have an enhanced ability to deliver professional, high quality care. Gradual increase of complexity of experiential learning in the Community of Practice, that is to say, ongoing assessment and adaptation of learning to individual's and a unit's Zone of Proximal Development leads to the establishment of a culture of continuous quality improvement and reduced resistance to change.

The newly hired nurses conceptualized their own learning as a social and experiential activity that contributed to quality care. As they learned through their interactions with others while treating a patient, they improved not only the care for this particular patient but also contributed to their ability to provide quality care for all of their patients. Thus, learning was a transformative process through which the novice nurse became an expert nurse. The entire process of learning and quality care was facilitated by scaffolding. Scaffolding enabled them to move from their initial limited functional ability to reach their potential functional abilities to treat more complex patients.

Similarly, the unit collectively learns socially and experientially. As each nurse in collaboration with their multidisciplinary colleagues learns while caring for an individual patient and in turn takes this knowledge and experience with them to treat successive patients, the PICU

as a unit increases its knowledge and skills in treating patients. Not only do members increase their individual knowledge and skills, they also learn how to work collaboratively as a team for each patient. This ability also carries over to the treatment with other patients, as team members can anticipate how to interact with their colleagues.

The process of social learning and quality improvement is facilitated by scaffolding at collective level and the use of mediating objects that mediate among the staff providing care for a particular patient, which then provides a basis for collaboration across many patients. Just as each individual new nurse is mentored through their Zone of Proximal Development by their mentors, collectively members of the PICU identify the gap between their actual performance and their potential and find means of assisting the members of the PICU to reach their potential as a unit.

As an example of unit and collective learning in the PICU, we can consider the case of the Purple Sheet that is part of my observations. This is a simple tool for improving quality of information transfer during the rounds. This tool was developed proactively by one of the attending physicians of the PICU after detecting flaws in information transfer in the rounds. After developing the tool, she started using the tool and introduced it to the unit. She encouraged the staff and medical trainees to use the tool for communicating during the rounds when they were introducing their patients. The tool would help the staff and the trainees to communicate systematically about the patient and treatment related to the patient. It created an opportunity for systematic learning, teaching, and communicating about the patient. At the same time, it improved continuity of care by improving information transfer. Gradually, the tool was adopted by other attending physicians and nursing teams. Now, the Purple Sheet, is one of the fundamental mediating tools in PICU rounds and it is a part of the PICU communication culture. It is used at every morning round as well as evening, night, and cardiac rounds in the PICU. It mediates among people of different

levels of expertise for the purpose of teaching, learning, of different areas of expertise in care and intervention, and across staffing shifts to assist with the continuity of care. We may say that it is a typical example of collective (unit) learning and a mediating tool for movement in the zone of proximal development at collective level. In fact, it is an interesting tool that scaffolds newly hired nurses' learning at collective level.

Incrementally increasing collective learning in the unit transforms the identity of the unit from a unit with the culture of conducting top-down improvement initiatives to a unit with the culture of full participation and engagement in ongoing development of improvement projects by the unit and pushing it to the management and leadership level for more supports. In other words, gradual change and ongoing implementation of zone of proximal development at collective and unit level leads to the establishment of culture of quality improvement. The relationship between learning and quality of care at both individual and collective level can be seen in Figures 10.1 which is simplified in Figure 10.2.

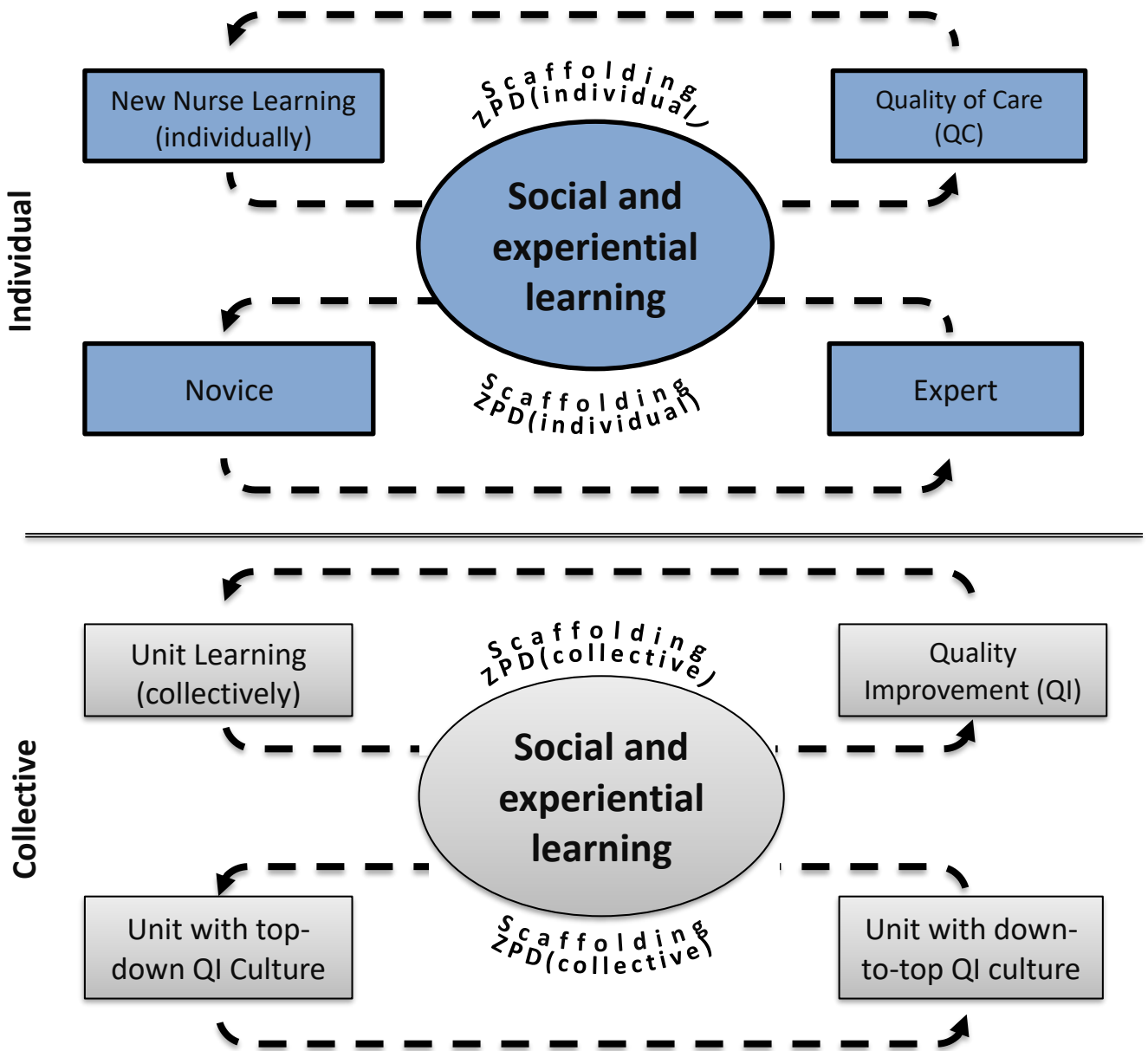


Figure 10. 1: Sociocultural learning and quality of care at individual and collective level in the PICU

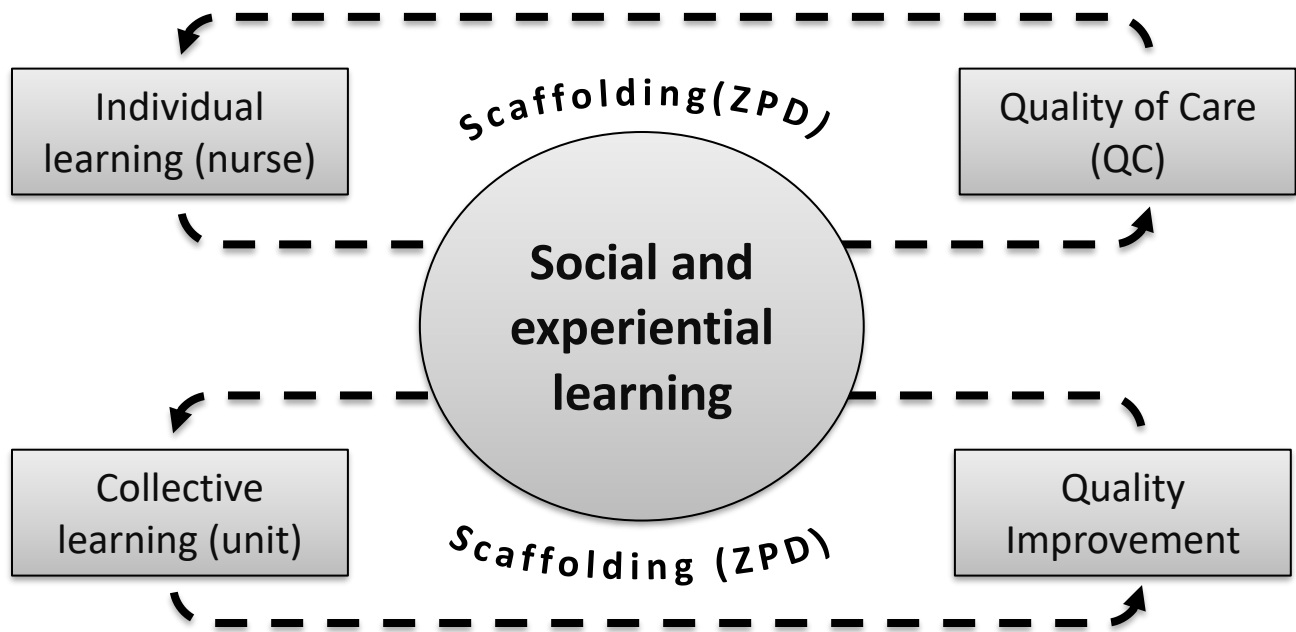


Figure 10.2: Sociocultural learning and quality of care at individual and collective level in the PICU (simplified)

Chapter 11: Learning goals of the newly hired nurses in the PICU

Overview

In the previous section, I explored the newly hired nurses' perceptions about learning, quality improvement, and quality of care and the relationship among them. In this section, I examine the learning goals of the newly hired nurses in the PICU. For this purpose, first, I explore their individual learning goals and the relationship of these goals to their identities as nurses. This will uncover the dynamics of their professional identities in the PICU, and it will provide a context to frame the discussion of the newly hired nurses' shared learning goals. Afterwards, I elaborate on their shared learning goals, which are shared by the learning objectives of the PICU as an organization.

11.1. Individual learning goals

In this section, I briefly present each of the newly hired nurse's personal learning goals. This is based on 10 people who agreed to answer the question during the Preceptorship.

11.1.1. Newly hired nurse LACC: NN11

This first set of learning goals was presented by a nurse who was assigned very simple cases at the beginning of her work in the PICU, in contrast with her responsibilities in her previous workplace in which she gave care to very complex patients. This gave her the feeling of regression to the level of a novice in her work. She considered two types of learning goals for herself: short-term and long-term learning goals. In the short-term, she was trying to learn how to be able to take

care of the patients of the same acuity level that she had cared for in her previous workplace:

P61: NN11_ LACC_ RTF.rtf - 61:26 (311:317):

I: Hm, what are your learning goals?

*P: Um, [pause] just basically, [pause] um, I mean I've had similar patients and I think that happens at the get go. So I feel fairly confident in sort of your intubated typical stable patient. Um, but then move, I'd like to **move forward to sort of the more complex and more multi system, um, patients.** So that I can sort of, put more things together. And, work on stuff that **I'd done in the past.** And refresh it. That's sort of a learning goal for me, **getting back to where, I was,** I have, when I had left critical care in my previous workplace. To that point. And then going forward. **But, my short-term goals would be that.***

In terms of long-term learning goals, she mentioned that she was planning to move to more central roles such as leadership roles (i.e charge nurse). In so doing, she had planned to participate in the learning activities developed for this purpose in the unit:

P61: NN11_ LACC_ RTF.rtf - 61:38 (437:437):

*Um, you know the, I would like to eventually look into **being charge on nights,** or, **eventually.** These are all, these are more **long-term goals,** but, they at least, there's workshops and things and the learning [inaudible] that are able to facilitate that.*

11.1.2. Newly hired nurse LACB: NN12

The second nurse was assigned very simple tasks in the beginning of her Preceptorship in the PICU that gave her the feeling of being a novice, though she had practiced at a very professional level in her previous workplace. Therefore, this newly hired nurse was following two sets of learning goals. Her short-term goal was learning the routines of the PICU, which were different from her previous workplace. In the long run, she was planning to improve her knowledge and expertise, to enable her to move to more central roles in the unit and to engage in more meaningful participation:

P62: NN12_ LACB_ RTF.rtf - 62:18 (283:289):

I: Right. Let's talk about our learning goals.

P: Uh huh [affirmative]

I: What are your learning goals in the unit?

*P: Um, I mean **initially** I wanted to, **learn the routines and procedures of this unit**, being different from where I came from. Um, and I think that at this point, like I'm, I've pretty much achieved that. And I think **going forward, um, my learning goals would be**, very similar to what they were when I was in PICU in my previous workplace. And that's just to **continue to develop my skills and my knowledge**. So you know whenever there's a new, um, you know a new patient type, or, a new technology, or a new anything that I can learn, **or a new role to take on**. Like yeah, to continue with that, versus to, stay stagnant.*

11.1.3. Newly hired nurse LACG: NN21

Being assigned to simple cases in the PICU brought a contradictory feeling to this new nurse as well. She was considered a novice in the PICU, whereas she perceived herself a very competent nurse who had taken care of very acute patients in her previous workplace. Therefore, this nurse considered two sets of learning goals for herself. Her short-term learning goal was to prove her expertise to the people in the PICU. This would enable her to look after more acute patients and have a more central role in giving care to critically ill patients, and contributing to the outcomes within the PICU community:

P68: NN21_LACG_RTF - 68:11 (107:117):

What are your learning goals? And, what are your learning goals for rest of your career?

*P: [pause] Here is **to prove to, people that I have knowledge and skills**.*

I: Uh huh [affirmative]

*P: Um, [pause] and, to **be able to look after complex patients**, um, and, [pause] goals wise, uh, [pause] I don't know just to fit in with the, the team, um, [pause] and, yeah I suppose that's the **major goal is to [pause] get people to realize I have got experience and skills***

I: Right.

P: That are transferable.

Long-term learning goals for this the newly hired nurse was to move up in the color- coded

system of the nurses in the PICU and take more central roles in the unit instead of being given a marginal role and delivering care to children with simple conditions:

P68: NN21_LACG_RTF.rtf - 68:31(459:473):

I: What are your long-term learning goals?

*P: Um, [pause] to do the grey and the **green study days [workshops]**? So, [pause] **climb the hurdles to**, [pause] look after more complex patients.*

I: Uh huh [affirmative] what are green study days?

P: So that's like the cardiac, study day.

I: Oh, I see.

P: And the, grey one is like I think like [inaudible] burns.

11.1.4. Newly hired nurse LACN: NN22

This newly hired nurse had the same feeling of being considered a beginner. To advance in the unit, this new nurse also considered two sets of learning goals for herself. Her short-term learning goal was to learn the routines and how procedures were done in the PICU. She was trying to contextualize her previous knowledge and experience, to improve her confidence level in taking care of deteriorating patients and to make more significant contributions in delivering quality care to more acute patients in the unit. In this way, she could advance in the unit and have a more central role in delivering better care in the PICU:

P69: NN22_LACN_RTF.rtf - 69:30 (456:462):

I: What are your learning goals?

P: My learning goals? [pause] Um,

I: Do you have any? [chuckle]

*P: Well I have a lot. [chuckle] like I, I have, very specific ones and then general ones. I don't think, I've like, thought of specific ones but um, [pause] you know in general, my goal is to, um, **feel confident and, competent to be able to take care of the patient that's deteriorating**. Um, and feel, comfortable in knowing exactly what kind of resources to get and, um, where everything is. And who to call [inaudible] so every day is my goal is to, slowly learn about little pieces of information for that.*

In the long-term, this nurse was planning to participate in various educational activities and move up in the hierarchal color- coded system of the PICU. For this purpose, she was determined to participate in the educational activities organized for the newly hired nurses to move up in the “hurdle” of the color- coded system:

P69: NN22_ LACN_ RTF.rtf - 69:31 (464:472):

I: Can you elaborate more on your long-term learning goals?

*P: Oh, we have the levels of education you know. And, um, **eventually to get to the, highest level [of color- coded system]**. Like I think we’re all, is one of our goals. But um, [pause]*

I: Can you tell me more about that?

P: Getting into the, the high level? Uh, well, I think, for me, um, [pause] I, may be more slower than other people. Cause I want to make sure I feel really comfortable in one situation before I move on to another. So, um, like I think it goes grey, and then green and then orange.

I: Uh huh [affirmative]

11.1.5. Newly hired nurse LACU: NN23

Experiencing the feeling of being considered a beginner in the unit, this newly hired nurse also had two sets of learning goals. As the short-term learning goal, she was trying to expand her experience, become more comfortable in taking care of pediatric patients, and eventually being able to give care to more complex patients such as cardiac patients. In long-term, she was trying to develop the self-confidence to move up to higher levels of color- coded system:

P70: NN23_ LACU_ RTF.rtf - 70:28 (351:361):

I: What is your learning goal for, near future?

*P: [sigh] My learning goal is **to be comfortable [pause] in kids**. Um, [pause] I would, [pause] I just want to be challenged. [pause] um, [pause] **moving up the steps**, it’d be lovely to take care, and be **comfortable taking care of a cardiac kid here**. Um, and having the **staff confidence in you**. [pause] [inaudible] **my colors and stuff and, [inaudible]***

11.1.6. Newly hired nurse LACJ: NN24

Experiencing the common feeling of being considered a beginner, this nurse's goal was to be able to take care of the patients that were more acute and complex, such as ECLS patients. This nurse did not differentiate between short-term and long-term learning goals:

P84: NN24_LACJ_RTF.rtf - 84:21 (656:668):

I: Tell me about your learning goals.

P: For, you know like I want to be able to be a, a nurse that takes care of patients with, who's on ECLS, you know that's one of my goals.

I: Right.

11.1.7. Newly hired nurse LADN: NN31

Coming to the PICU and starting from "zero", this newly hired nurse had the same feeling of being considered a beginner in the PICU. To advance, her short-term learning goal was to prove herself to the PICU staff and establish trust. She believed that building trustful relationships was important in her new workplace. Therefore, she was focusing on building up trust and a trustful relationship with the staff:

P74: NN31_LADN_RTF.rtf - 74:34 (383:389):

I: What are your learning goals at the moment?

*I: Um, coming to here and starting from zero it's hard, because **I have to prove myself, right?** Um, whereas in the other hospital they would walk in and they [would] say, oh **LADN** is here, so. So there's no worry about it. **Like they, they trust you.** They already know that, um, uh what you're capable. Capable [inaudible] So, for me that's, **that's one of the most, and one of the important things to build that relationship** and. Um, I don't want to prove anyone anything, but just um, be able, and it, it goes both sides, for, for the nurses too. Cause we have to learn, um, we have to trust the other, we have to trust each other and the other uh other members as well. Like the physicians. And building that relationship, it will be. It's, it's on my list. [chuckle].*

Long-term goal for this the newly hired nurse was to move up in the color- coded system of the PICU nursing. This way, she could have more central role in the unit:

P74: NN31_LADN_RTF.rtf - 74:42 (441:451):

I: Uh huh [affirmative] how can you get to that point, that to get that patient with acuity level of ten [on the scale of 1-10, 10 be the most acute]?

P: So that's exactly one thing I talked with the uh educators about. I said, uh I like to take care of, because they. For example, in my previous workplace, they signed me up for the dialysis course. For example. And I said I felt like I'm losing opportunities that I've had over there. By just moving here. And they, it, they helped me through it. color

I: Can you tell me more? Does that mean that you sat and set goals for moving up?

*P: I do it, yeah, I, I told them from the beginning that I want to, for example take the, **be in the next, color**, with the next, class that's offered. So they for example, told me that it's going to be in July. And I said, yeah, sign me up for it. So then I'm gonna push myself to, get there.*

11.1.8. Newly hired nurse LADL: NN32

This newly hired nurse had the same feeling mentioned by others - being considered a beginner. To advance in the unit, she set two groups of learning goals. Her short-term learning goal was to give care to the patients at the level of acuity that she looked after in her previous workplace. In other words, her short-term learning goal was to get back to the level of nursing that she was accustomed to. For this, she would like to develop a comfortlevel with procedures in the PICU, as well as with its policies. Her long-term learning goal was to plan for more advanced goals after achieving the comfort level that she felt in her previous workplace:

P75: NN32_LADL_RTF.rtf - 75:34 (447:453):

P: Ok.

I: Uh, what were your learning goals for Preceptorship and how did you set these learning goals?

*P: Uh, I guess **my learning goals are just to be able to get back to the level of nursing that I was doing, previously**. So, being comfortable enough with the way that they do things, and the policies and procedures to feel as comfortable and competent in my care as I was then. And that, that's the only goal I give myself **for the first three months**. And then, um, after three months, like once I start to feel comfortable in that*

*environment and I know who people are, and how things are done, **goals.** then **I tend to look into other, learning goals.***

11.1.9. Newly hired nurse LADH: NN34

Being considered a beginner was not easy for this newly hired nurse either. Therefore, her short-term learning goal was to prove her capabilities and expertise to the unit:

P76: NN34_LADH_RTF.rtf - 76:17 (389:391):

I: What are your learning goals?

*Um, obviously I, you know **I do want to be able to prove myself and I am capable.** Um, I have got you know a fair bit of experience.*

This nurse believed the PICU, it was all about “color”. She was trying to move up the color-coded nursing system in the PICU that would allow her to have a more meaningful contribution in the unit:

P76: NN34_LADH_RTF.rtf - 76:22(429:451):

I: Interesting. And, what is your next goal? [inaudible]

*P: Um well, my **next goal is, um, here it’s all about um, when you start you’re placed into a color.** And, [pause] so my next goal is to progress to the next color band, so that I place.*

I: What is the next color for you?

P: Um, so, grey.

I: Grey? And then? [inaudible]

P: And then green.

I: Ok,

P: Yeah.

I: [inaudible]

P: Ideally, my aim is to, to get into green and to start being able to take the cardiac patients. And,

I: [inaudible]

P: Yeah.

11.1.10. Newly hired nurse LADF: NN35

Having given care to patients at the highest level of acuity in her previous workplace and assigned to very simple patients in the PICU, this newly hired nurse felt that she was perceived as a beginner. Although she accepted that she had to start from a lower level in any new job, she still believed that she could be caring for patients at a much higher acuity level. Therefore, she was determined to get back to the level of her previous work. Her learning goal was to get back to the functional level that she had before. This nurse did not differentiate between short-term and long-term learning goals:

P77: _NN35_LADF_RTF.rtf - 77:38 (1127:1161):

I: So I want to ask about your goals of learning.

P: Uh huh [affirmative]

I: And what are, what are your next learning goals?

*P: So for me, **my learning goal, was to get back to the function level that I was before I left here.** So I'm not asking to go back to what I was at home. I know that when you, go through that movement I can't expect that I would, get that level straight away. From consultants. And I, I understand that, but I at least want to be back to where I was, before I left [my previous workplace] last time, which was, looking after patients on ECLS. I was an ECLS tech [in my previous workplace].*

I: Right.

P: Um, and you know the, the highest acuity patient that you could possibly have.

I: Right.

P: That's the level I want to be able to, just pick back up again. And go back to working.

I: Right.

P: because, I know how to do that.

I: Right.

P: I did that before I left [my previous workplace]. Not that much has really changed in terms of paperwork and that kind of thing. [pause]

I: Hm,

P: I should be able to head straight back to that level.

I: Uh huh [affirmative]

11.2. The Evolution of professional identity during the Preceptorship

In the previous section, I explored individual learning goals of the newly hired nurses. Before describing the newly hired nurses' shared learning objectives, we need to have a clear idea about the dynamic of their professional identity during their Preceptorship. This will set up the context for better understanding of their shared learning goals. Therefore, in this section, I examine the dynamics of the newly hired nurses' professional identity in the beginning of their work in the PICU.

11.2.1. Claimed professional identity

All the newly hired nurses coming to the PICU possessed a considerable amount of knowledge, expertise and experience, which was to be expected of nurses working in the PICU. Though some may have lacked some specific critical care experience or knowledge of pediatric nursing when they started, they were all experienced and accomplished nurses when they were hired. This justified their claim to expert professional status and identity. Based on their previous employment, they could claim knowledge, skills, and experience necessary to care for very sick and unstable patients. Some even had worked at such a high level of professionalism that attending physicians sought them for professional consultations:

P77: NN35_LADF_RTf.rtf - 77:23 (691:713):

I: Ok, alright. And, uh, meanwhile uh, [pause] during the time that you have been in the unit, and you have been learning, how do you feel about it? How did you find it?

P: I'm, finding it a little bit hard. [pause]

I: In what aspect?

*P: Um, I, came from **being, a very high functioning practitioner**. To and, it's like that for anybody. It's you know that whole learning curve. You go from novice to expert. And, I'm not a novice, but you're kind of going back to being **treated a little bit like a novice**. Um, and, I bring with me **a great deal of skill and knowledge**. And skill and knowledge that they know, because I had it when I was here before. In fact, I have more now, than when I was here before. I was at the level where the um, **attendings would come into my office at home and say, I'm having trouble with a patient, can you come out and assess them for me?** And, **I need some senior nurse eyes to look at it**. And we would go through and we would do, a head to toe assessment and I would say, have you tried this? Have we? And **they would, like if they were having trouble with a patient, that's the level I come from**.*

11.2.2. Denied professional identity

In each of the cases previously presented the newly hired nurses came with extensive knowledge, high degrees of expertise, and considerable amounts of experiences in critical care, yet they began their work in the PICU by delivering care to patients at a very basic level of acuity. They were assigned to the patients with significantly lower level of acuity compared to the patients that these nurses had cared for in their previous workplace. The unit denied the newly hired nurses' expert professional identity (that they had enjoyed) by assigning them to more stable patients. While the newly hired nurses had previously claimed an expert identity, the unit considered all of them as novices and denied their previous expert status. This redification of their statuses was unexpected:

P71: _NN25_LADE_RTF- 71:8 (151:185):

I: Right. You mentioned that you are not taking care of the cardiac patients. This reminds me one of the issues that we always hear from some people. Uh, when you came here, did you have PICU background before coming here?

P: Yeah.

I: When you came here, how much your specialty was appreciated and recognized?

*P: Um, [pause] I think, [pause] well, I think it's, it's maybe appreciated but it's, **they make you start at the bottom. It doesn't matter where you come from**.*

In order to gain a clear understanding around this issue, during my observations, I asked the newly hired nurses to compare the levels of the acuity of the patients that they had looked after in their previous workplace with those of the patients that they were assigned in the PICU in the beginning of their Preceptorship. The simple scale ranged from 1-10, with 10 being the most acute patient. Results of this comparison for 8 the newly hired nurses who answered this question have been shown in Table 11.1.

Table 11. 1: Comparison of the level of acuity of patients assigned to the newly hired nurses in their previous workplace and WCH PICU

The newly hired nurse		Level of acuity of the patient (on the scale of 1-10; 10 being the most acute)	
		Previous workplace	The WCH PICU
LADN: NN31		10	2
LADL: NN32		8	5
LADH: NN34		8	2
LADF: NN35		8	1 or 2 or 3 (2 was used for calculations)
LADE: NN25		7	3
LACG: NN21		7	4
LACB: NN12		7	4
LACU: NN23		7	4
Mean		7.8	3.3
Median		7.5	3.5
Std.		1.0	1.2
95% Confidence Interval for Mean	Lower Bound	6.9	2.3
	Upper Bound	8.6	4.2

The non-parametric Wilcoxon Signed-Rank Test revealed that median score of the acuity of the patients that the newly hired nurses cared for previously was significantly higher than of the patients that they were assigned in the PICU during their Preceptorship (Median: 7.5 versus 3.5, respectively; Z: -2.555; p: 0.011).

This was also reflected in the interviews of the newly hired nurses. In the interviews, they mentioned that they started their first shift by giving care to the patients that were so stable that they were ready to be discharged and cared by their parents:

P74: NN31_LADN_RTf.rtf - 74:38 (405:423):

I: How would you rate, uh the complexity and acuity of the other patients that you are getting now compared to the previous time, from one to ten. Ten being the most acute?

P: I used to get tens.

I: Here?

P: In my previous workplace.

I: What about here?

P: Um, well today is my first shift, and, um, [pause] he's quite stable actually. Cause tomorrow, parents are supposed to take care of him. They're, he's on parents um or care by parents.

I: How would you rate him?

P: So rating? [pause] I would give him a two. Just because he has a trach. [chuckle].

This lack of recognition of the newly hired nurses' expertise, treating them as novices led to a feeling of regression, denial of their expertise, and a loss of their professional identity. This was frustrating for the newly hired nurses, which one described as "soul destroying" and another mentioned that she felt that her soul was dying:

P77: NN35_LADF_RTf.rtf - 77:23 (691:713):

I: Ok, alright. And, uh, meanwhile uh, [pause] during the time that you have been in the unit, and you have been learning, how do you feel about it? How did you find it?

P: I'm, finding it a little bit hard. [pause]

I: In what aspect?

*P: Um, I, came from **being, a very high functioning practitioner**. To and, it's like that for anybody. It's you know that whole learning curve. You **go from novice to expert**. And, I'm not a novice, but you're kind of going back to being **treated a little bit like a novice**. Um, and, I bring with me **a great deal of skill and knowledge**. And skill and knowledge that they know, because I had it when I was here before. In fact I have more now, than when I was here before. I was at the level where the um, **attendings would come into my office at home and say, I'm having trouble with a patient, can you come out and assess them for me? And, I need some senior nurse eyes to look at it. And we would go through and we would do, a head to toe assessment and I would say, have you tried this? Have we? And they would, like if they were having trouble with a patient, that's the level I come from.***

I: How do you feel about it?

P: So it's very hard to go from being at that level, where the consultants would come to you and say can you just come and have a look, cause I can't figure this out. Or I'm not getting anywhere with this patient. I'd really like your input,

I: Uh huh [affirmative]

P: to suddenly not even being asked for your opinion.

I: Uh huh [affirmative]

P: It's a little bit soul destroying.

They felt that the time that they had invested in learning, developing expertise, and improving their skills and competencies was wasted:

P77: NN35_LADF_RTF.rtf - 77:42 [I: Uh huh (1243:1249):

*I: Uh huh [affirmative] uh huh [affirmative] Uh, when you are talking about this appreciation, I, remember, it reminds me to ask another question. **That, do you feel a kind of skill loss?***

P: Yes.

I: And how you would? How would you describe it?

*P: How I would describe it is like **a little piece of my soul dies**. Mainly because I've spent so many years, refining and honing and, so many hours and, time spent. And, and also the time spent by others to teach me about it. And I just, I think of all of that sharedly and I think it's just being wasted.*

The issue of loss of professional identity created tension and contradictions between the newly hired nurses and the unit. They were dissatisfied with their newly assigned novice identity. Personally, they felt frustrated. The experience was soul destroying, and made them dissatisfied with their choice to move to the PICU. They reacted to the contradictions in various ways. The most common response to this situation was to learn. They accepted the reality of their new status, changed their vision, and set some learning goals that would help them establish themselves in the unit and recover the expert professional identity that had been taken away when they joined the PICU.

They also started advocating for themselves. They discussed these issues with the PICU CNEs and sought their support to advance through the color-coded system of skills to acquire a new expert identity. The second type of reaction was to consider leaving the PICU and returning to their previous workplace where they had had greater respect for their expertise:

P77: _NN35_ LADF_ RTF.rtf - 77:24 (715:773):

I: So you, they give you a basic uh, case. Then you start to build up and, then uh, it goes ahead. How did you experience?

P: So going back down to the basics, how do I feel about?

P: It's really hard.

I: Uh huh [affirmative]

*P: It's, um, [pause] it's like going back to being treated like **you don't know anything. And, [pause] that's really hard to take.***

*P: Um, but there's also an element to it where you think, **I just wish I could go back home. [pause]***

I: [pause] How come?

P: Um, [pause] cause I was respected there.

I: Uh huh [affirmative]

P: And I was treated with respect. And, [pause]

11.3. Shared learning goals

The newly hired nurses followed the path of other nurses who had preceded them – to acquire the recognition for their expertise within the PICU and the hospital that allowed them to care for the most complex and challenging patients. In order to reach to that point, they all shared two sets of learning goals that were shaped by the culture of the PICU. In the short term, each nurse wanted to get back to previous level of functionality, and in the longer term they each wanted to move up in the nursing system. I will briefly describe each of these learning goals in the following sections.

11.3.1. Short-term shared learning goals: getting back to previous level of functionality

The first priority for the newly hired nurses was to take care of the patients that were at the level of acuity that they cared before coming to the PICU (caring for complex patients). In other words, they wanted to get back to the level of nursing functionality that they used to do before moving to this unit. They wanted to move from a professional identity of novice, assumed for them in the PICU to a professional identity of expert that they had claimed before coming to the PICU; they correlated this expert identity with skills such as time management and anticipation:

I: Right. How can we uh use, if I ask about, what do you expect as outcome of this learnings? You have learning goals, what are your out of, what are the outcomes that you expect from these learning goals?

*P: Well from going from like **novice, here as a staff to a more, um, expert** on some level. Um, being able to um, you know time manage, anticipate, predict things better. And, um, yeah again feeling more confident and **seeing potentially where my career goes from here.***

In order to reach to their previous level of functionality, their first short-term specific learning objective appeared to be learning the routines, policies and procedures of the PICU. This way, they would learn how the things worked in the PICU, and they would achieve a level of

comfort and confidence. Another important short-term specific learning objective for the newly hired nurses was to establish a trustful relationship with the staff in the unit. This way, they could gain others' trust in their expertise and get back to the level that they were before.

11.3.2. Shared long-term learning goal: moving up in the nursing system

The newly hired nurses also shared a long-term learning goal of progress in the nursing system. In so doing, their first long-term specific learning objective was to participate in various learning and educational activities and progress in the PICU nursing color-coded system, and eventually to reach to the highest possible level. For example, they planned to participate in educational workshops that would allow them move up to green and orange levels of the color-coded system and be allowed to take care of cardiac patients, as well as work in leadership roles such as charge nurse. The newly hired nurses associated all of these higher level activities with additional learning and an expert identity.

Simply put, through various general and specific learning objectives, the newly hired nurses tried to acquire the expert professional identity that they claimed, but was denied in the PICU. Table 11.2 summarizes these learning goals.

Table 11. 2: Shared and individual learning goals of the newly hired nurses in the PICU during their Preceptorship

New nurse	Shared learning goal	Individual learning goals			
		Short-term		Long-term	
		Theme	Example of quotation	Theme	Example of quotation
NN11	Acquiring denied expert professional identity	<ul style="list-style-type: none"> Previous level of functionality 	<ul style="list-style-type: none"> Getting back to where, I was 	<ul style="list-style-type: none"> Moving up in color code system to leadership role 	<ul style="list-style-type: none"> Being charge on nights
NN12		<ul style="list-style-type: none"> Learning the routines 	<ul style="list-style-type: none"> Learn the routines and procedures of this unit 	<ul style="list-style-type: none"> Improving knowledge and expertise Taking new roles 	<ul style="list-style-type: none"> Continue to develop my skills and my knowledge Or a new role to take on
NN21		<ul style="list-style-type: none"> Prove expertise 	<ul style="list-style-type: none"> To get people to realize I have got experience and skills 	<ul style="list-style-type: none"> Moving up in color code system 	<ul style="list-style-type: none"> To do the grey and the green study days? So, [pause] climb the hurdles to, [pause] look after more complex patients
NN22		<ul style="list-style-type: none"> Learning the routines Previous level of functionality 	<ul style="list-style-type: none"> Learning, how things worked at this hospital Feel confident and, competent to be able to take care of the patient that's deteriorating 	<ul style="list-style-type: none"> Moving up in color code system 	<ul style="list-style-type: none"> Eventually to get to the, highest level. Moving up in color-coded system
NN23		<ul style="list-style-type: none"> Previous level of functionality 	<ul style="list-style-type: none"> To be comfortable [pause] in kids Taking care of a cardiac kid here 	<ul style="list-style-type: none"> Moving up in color code system 	<ul style="list-style-type: none"> Moving up the steps Taking care of a cardiac kid here See a complex patient, that's my eventual, eventual goal
NN24		<ul style="list-style-type: none"> Previous level of functionality 	<ul style="list-style-type: none"> To be able to take care of the patients that are more acute and more complex 		
NN31		<ul style="list-style-type: none"> Prove expertise Establish the trust 	<ul style="list-style-type: none"> I have to prove myself, right? Like they, they trust you. 	<ul style="list-style-type: none"> Moving up in color code system 	<ul style="list-style-type: none"> Move up in color- coded system
NN32		<ul style="list-style-type: none"> Previous level of functionality Learning the routines 	<ul style="list-style-type: none"> Get yourself back to like that comfort level where you were in your last place of work Able to get back to the level of nursing that I was doing, previously How things are done 	<ul style="list-style-type: none"> To be planned later 	<ul style="list-style-type: none"> Then I tend to look into other, learning goals.
NN34		<ul style="list-style-type: none"> Prove expertise 	<ul style="list-style-type: none"> I do want to be able to prove myself and I am capable 	<ul style="list-style-type: none"> Moving up in color code system 	<ul style="list-style-type: none"> Next goal is, um, here it's all about um, when you start you're placed into a color
NN35		<ul style="list-style-type: none"> Previous level of functionality 	<ul style="list-style-type: none"> Get back to the function level that I was before 	<ul style="list-style-type: none"> Improving knowledge and expertise through external programs Leave the job 	<ul style="list-style-type: none"> I want to finish my nurse practitioner I just wish I could go back home

Summary and interpretation

The learning goals and objectives of the newly hired nurses reflected their own personal responses to their status in the PICU and the PICU's institutional expression of learning goals through its culture of quality improvement which sets the expectations for each of the staff, and the scaffolded learning goals represented by the color codes. Each newly hired nurse experienced a transformation of their status from a nurse whose expertise was acknowledged in their previous workplace into a novice in the PICU. Their previous knowledge, experience and expertise, and professional identity as an expert was unrecognized at the beginning of their Preceptorship. This novice status was demonstrated by assigning them to the patients who were significantly less acute compared to the patients that had cared after in their previous workplace. This lack of acknowledgement of the claimed expertise of the newly hired nurses by the unit and making them novices gave them the feeling of regressing, denying their expertise and losing their expert professional identity. In addition to the individual nurse's tensions between their previous and current identities, this issue created contradictions between the newly hired nurses and the unit.

The newly hired nurses reacted to the contradictions in different ways. The most common reaction was to accept their novice status and expanding their position by learning. Learning would help them to establish themselves in the unit and establish a new expert professional identity within this PICU. This learning goal of acquiring expert professional identity was achieved through the short-term goal of returning to their previous level of nursing functionality. Therefore, they started learning in the unit. The more they learned, the more they could participate in complex activities of the unit. As a consequence, they would feel more productivity, less frustration and more satisfied with their work and the care they could provide in the unit. The activity of learning was

complemented by starting to advocate for themselves. Advocacy and the support from other staff, enabled them to participate in various educational activities organized to facilitate their learning and advancement in the unit. This would also enable them to move up in the color-coded system of nursing in the PICU and be able to contribute in more central roles in the unit some of which would be leadership roles such as charge nurse. All things together would help the newly hired nurses to participate in the activities that were more complex, at the level of their previous nursing functionality and more central in the community of the PICU. The process of setting and meeting individual learning goals and, combined with the shared collective goals expressed in the color-coded system of the PICU contributed to helping the newly hired nurses to gain their expert identities and move to the center of the multidisciplinary community of the PICU. This way, they would feel that they belonged to the professional nursing community of the PICU.

Lack of acknowledgment of the newly hired nurses' previous knowledge and expertise led to contradictions that created intentions to change. The newly hired nurses directed these emergent tensions and intentions at objectives, that is one of the main assumptions of the Activity Theory (9). These objectives included re-gaining their denied professional critical care nurse identity. Their objectives motivated them and directed their activities to special directions of setting learning goals and expansion (9) although some of them also considered job leave and returning to their previous workplace.

They aligned and adjusted their learning goals with the nursing color coded system and received support from the unit. In this way the newly hired nurses moved in their centripetal journey through their successive Zones of Proximal Development in the context of the PICU community and gradually expanded their scope of practice to that of a fully-fledged PICU nurse, when their expertise were confirmed by the unit. In this way, the learning goals that they set for

themselves, as well as the nursing color-coded system scaffolded the process of learning and implementation of the Zone of Proximal Development in the PICU Community of Practice).

Chapter 12: Discussion

Overview

In the previous eight chapters (Chapters 4 through 11), I described the findings of my research. In this chapter, I briefly summarize the most important findings that contribute to the main focus of my discussion. Then, I will consider how researches' findings inform my ethnographic account and analysis, and the specific contribution of my research to understanding of the relationship between learning and quality improvement. I will also consider the limitations of this study and make some recommendations for future research. Finally, I end the chapter with a brief conclusion.

12.1. Learning in the PICU

The learning opportunities of the newly hired nurses during the Orientation and Preceptorship offered an opportunity to explore the relationship between learning and quality improvement. The PICU and other healthcare services have employed a number of Quality Improvement Models. The initial problem identified by members of the PICU was that, despite their involvement in quality improvement activities using some of these models, the PICU encountered difficulties in integrating targeted quality improvement projects and patient safety activities into regular sustainable daily practices (50,51,53). Focusing on the learning among the newly hired nurses provided an opportunity to discover how the PICU provided learning and quality improvement as one aspect of the nursing Community of Practice and multidisciplinary team works. As we have seen, PICU staff assume that research and Evidence Based practice are the foundation for quality improvement; both Orientation and Preceptorship were developed based

on that assumption. Learning during the Orientation and Preceptorship offered an ideal opportunity to observe the process by which effective teaching and learning activities can inculcate learning as a strategy to provide high quality care.

In the Orientation and Preceptorship, I discovered different models of learning and different strategies for engaging the newly hired nurses. The general process of introducing new nurse to the PICU exemplifies adult learning strategies that are common for individually targeted, competency-oriented learning objectives. Learning in Orientation sessions primarily used principles of adult learning (112,113) to establishing the competencies of each newly hired nurse. Socially situated learning strategies (43,44) were introduced near the end of the Orientation in the form of simulations, and dominated learning in the Preceptorship during which new nurses cared for patients, under the mentorship of more established nurses and other staff. Founded on Vygotsky's social learning theories (1–6), Activity Theory (7,10–12,18,143) and Communities of Practice (16–23,43,44) place social interaction at the center of the learning process. The learner and the learning are embedded in and contribute to collaborative team work and facilitate the development of multidisciplinary Communities of Practice (16–23,43,44).

The learning goals of the newly hired nurses were to become recognized experts within the PICU community of practice, and be able to meet the PICU collective goal of providing quality care: i.e., the most effective, appropriate, and compassionate care for their patients.

My study revealed that newly hired nurses considered quality improvement for the PICU as similar to the way they considered their own personal learning. Both were learning in clinical contexts and involved a recognition of the difference between what is initially known and practiced by each nurse and their learning goals, on one hand and the units' current procedures and practices, that the collective goals they set as a unit on the other hand. In both cases there is a recognition of

the Zone of Proximal Development (1,3,5,6,139). They described Quality Improvement for the unit as a learning through social interaction. Quality Improvement, from their perspective is the collaborative social process that employs scaffolded (1), experiential learning (121,130), shared within a Community of Practice (16–23,43,44).

Thus, the quality of care is not simply improved learning to perform procedures more competently, but by learning to adapt their competent performances to the constantly changing, complex, and specific needs of each individual patient in collaboration with other members of their multidisciplinary care teams and the child's parents.

In the following sections I will look more closely at the goals, processes, participants and mediating tools involved in adult learning, and the relationship between individual learning and quality care, and between collective learning and quality improvement.

12.2. Adult learning

Adult learning strategies (112,113) were apparent in the Orientation and Preceptorship. The Orientation sessions were the first learning opportunity for the newly hired nurses. In these face-to-face sessions dominated initially by presentations by instructors and later more interactions, the newly hired nurses learned through presentations and experiential learning in simulated situations that employed scaffolding, cognitive and behavioral modeling, articulation and reflective practice guided by the instructors. Each of these strategies was primarily designed for individual learners.

12.2.1. Individual learners

Learning in the initial sessions of the Orientation focused on individual learners. The sessions involved decontextualized didactic instruction in classrooms outside of the PICU. This

type of learning is in line with the acquisition metaphor of learning that considers learning as an individual process through which knowledge can be transferred from one individual to another, like passing goods. In this metaphor, learning is considered as accumulation of knowledge and acquisition of items- beliefs, skills, capabilities, competencies and values by individuals. It does not require participation of the learner and this treats the setting that he or she works in as irrelevant (18,25,110). This type of learning is in line with individualistic learning theories described previously (18,24,25). Three individualistic learning theories that were found helpful in explaining process of learning in the Orientation sessions are Knox's Proficiency Theory of adult learning (114–116), experiential learning (113,121,129,130) and reflection and reflective practice (121,132–134,213–216). I will elaborate on these in the following paragraphs.

12.2.1.1. Proficiency

As I elaborated earlier in my literature review, Knox's Proficiency Theory (114–116) focuses on purposeful and systematic learning among adults and the process of facilitating learning among adult learners (114,115) with particular attention on proficiency defined as “the capability to perform satisfactorily if given the opportunity” (114). From Knox's perspective, components of proficiency include knowledge, attitudes and skills (114–116). These were demonstrated in instruction during the Orientation sessions. For example, in the Orientation sessions, various instructors tried to improve knowledge, skills and attitudes with presentations, simulations and discussions of professionalism and workplace culture. The CNEs tried to improve the newly hired nurses' knowledge by systematically teaching them about technical nursing subjects such as ECG interpretation, cardiac output and hemodynamic monitoring and IV therapy. They were also introduced to technical procedures outside of their scope of practice to be familiar with the

expertise of other members of multidisciplinary teams, including respiratory therapy topics such as mechanical ventilation and RT machines, and physiotherapy subjects including chest care and, chest physiotherapy. In addition, the Orientation sessions addressed topics such as participatory approach for quality improvement, team work and the PICU rules and boundaries. This was designed to strengthen the newly hired nurses' attitudes of professionalism and concern with the collective responsibility for quality care and quality improvement.

12.2.1.2. Experiential learning

Experiential learning (113,121,129,130) also occurred during the Orientation sessions. In experiential learning, knowledge is acquired by a transformational experience. In this theory, according to Kolb, knowledge is the result of combination of grasping the experiences and transforming the experiences (113,121,130). In the Orientation sessions, grasping the experience by the newly hired nurses happened by two activities of concrete experience and abstract conceptualization and transformation of the experience happened through reflection-in-action and reflection-on (after) action. These contributed to newly hired nurses' abilities to produce new hypothesis or ways of conceptualizing tasks such as using infusion pumps or interpreting ECG results. In this way, learning during the simulations in the Orientation sessions was in line with the experiential learning theory (121,129–131).

12.2.1.3. Reflective practice

Reflection was specifically introduced and employed during simulation. The CNEs modeled reflection-in-action and reflection-on-action (121,133,134). Encouraging these aspects of reflective practice among the nurse inculcates continuous learning from experience (121,133,134). Through reflective practice, critical thinking and examination, the newly hired

nurses linked their theoretical learning to practice, to clinical care and this way, they could reform their envisioning of practice, problems and problem solving. This re-envisioning is part of their learning and change and has been demonstrated elsewhere to contribute to learning practices in clinical settings (121,133,134) and in improved beliefs, attitudes and professional care delivery by nurses (133). These individual reflective practice skills that were learned during Orientation carried over and were incorporated into both individual and nurse-preceptor practices during the Preceptorship.

To sum up, individualistic learning theories and strategies dominated the Orientation sessions. They addressed the concerns of regulatory bodies such as College of Registered Nurses of British Columbia (CRNBC) for whom competencies and competency-based education and evaluation is crucial for evaluating registered nurses practicing in British Columbia (217–219). CRNBC defines competency as “Statements about the knowledge, skills, attitudes and judgments required to perform safely and ethically within an individual’s nursing practice or in a designated role or setting.” (217,218) . This definition is consistent with Knox’s proficiency learning theory in which proficiency is considered the level of competence and confidence based on knowledge, skills and expertise resulting from experience and training (114).

12.2.2. Sociocultural learning

The Preceptorship was the second learning opportunity for the newly hired nurses. Learning in the Preceptorship, as opposed to the Orientation sessions, was mainly based on participation in the clinical setting of the PICU, and focusing on sociocultural learning through interactions among members of the PICU community. This type of learning is in line with the participation metaphor of learning and conceptualization of learning as a social phenomenon rather

than individual activity (18,138). In fact, as we will discuss later, the newly hired nurses conceptualized learning as an ongoing social and experiential activity. This interaction-based conceptualization of learning can be explained by sociocultural learning theories that assume that learning is embedded in the network of relationships and knowledge is constructed socially, not individually (24,138,143). Some of the sociocultural learning theories that were found helpful in explaining sociocultural learning in the PICU included Vygotsky's sociocultural theory of learning and development (1,3,6,139), Activity Theory (1,3,5,6,10,11,111,138,139,143) and Engestrom's Cultural Historical Activity Theory (CHAT) also known as Expansive learning (7,11,143,159), as well as Distributed Cognition (4,9,18,24,25,138) and Communities of Practice (16–18,25,140–142). In the following paragraphs, I will elaborate more on this.

12.2.2.1. Vygotsky's sociocultural theory of learning and development

In the Preceptorship, the newly hired nurses participated in activities set in the unit. They interacted with its staff, established relationships with them, and engaged in various social networks including both discipline specific networks, such as the medical team, the nursing team, the allied health team, and the administrative team. In addition, they also formed networks that crossed disciplines. These multidisciplinary networks formed and re-formed as the nurses, doctors, RTs and others developed care plans and treated individual patients. These networks also emerged as they communicated in handovers, rounds, and simulations. From the initial days of their Preceptorships to their recognition as full-fledged PICU nurses, they moved from simple tasks to more complex tasks that required higher mental functions such as problems solving for cardiac patients. This is consistent with Vygotsky's social and developmental learning theory that assumes that complex and higher mental functions originate from interactions in the community and emerge

from gradual changes in and transformation of elementary and simple mental processes (1,3,5,6,139). The assumption of the social origination of higher mental functions was well confirmed when we saw that the newly hired nurses who were not able to do most of the complex tasks alone in the PICU setting in the beginning of their Preceptorship, performing more complex tasks with the support that they received from their preceptors and other staff. For example, they developed skills to teach families about tracheostomy care, make decisions about the set-up of ventilators and negotiate it with other members of team (such as medical team and RTs), take care of a child with multiple organ failure, and look after cardiac patients. With the help and support that they received from their preceptors or other staff, they could do these tasks in the unit. The new nurses' step by step transition from novice to accomplished expert highlights the gap in knowledge that Vygotsky identified as the Zone of Proximal Development (ZPD) (1,3,5,6,139). The mentorship that the new nurses received and the scaffolding (such as modeling, reflection and articulation) of task by their Preceptors supports the social origin of the ability to master complex mental functions (1,6). Scaffolding helped the newly hired nurses push their boundaries of actual functionality in the context of the PICU (that was limited to very basic and simple tasks) towards their potential functionality level that was much higher than their actual functionality level. This is supported by studies of other researchers that found scaffolding as a way of implementing the notion of ZPD (1,3,5,6,10,11,111,138,139,143).

Scaffolding in the unit was mediated through various tools in addition to language as the main mediating tool. The instructors in Orientation and the Preceptors, other staff and new nurses during the Preceptorship used various tools for mediating and facilitating process of learning. For example, they used patient flow chart, Kardex, the Purple Sheet, SBAR, lab results, images and other diagnostics, text books, internet, computer, and digital mobile devices for mediating and

facilitating scaffolding, and as a result, learning. This is consistent with the role of tools as mediating objects in Vygotsky's sociocultural learning theory. According to this assumption, tools and signs (such as the Purple Sheet and language) mediate between the learner and the learning goal to enable higher and complex functions (1,3,5,6,139). A variety of symbolic, language-based tools mediate the process of scaffolding (modeling, reflection and articulation), as well as process of internalization of interpersonal functions (1,5,6). We will also see below that tools not only mediate between learners, such as the new nurses and their learning goals, tools also mediate between various actors and help to bridge the boundaries between professions.

12.2.2.2. Activity Theory

The most significant support for social and experiential learning happening in the Preceptorship was seen in the Activity Theory (1,3,5,6,10,11,111,138,139,143). The backbone of Activity Theory is the notion of unity and inseparability of consciousness and activity, implying that conscious learning is not preceding activity, rather it is an outcome of activity (12). In fact, this was one of the main differences between learning in the Orientation sessions and the Preceptorship learning. Instruction in the Orientation sessions mainly supported the idea that conscious learning precedes activity. This is why the new nurses were placed in a classroom outside of the PICU setting. However, learning in the Preceptorship mainly follows the assumption that learning is the result of activity and the interactions between activity and consciousness (12). Therefore, nurses are placed in the social context of real setting in which they work and are provided environments for internalization of various things, active experimentation, transformation and development in the context of the PICU. This is consistent with the strategy of

scaffolding based on Vygotsky's theory concept of the Zone of Proximal Development (1,3,5,6,139).

If we follow the components of activity systems (9,12,13) in Activity Theory, we see them composed of subjects, their object(ives) and mediating tools used for doing activities (in the first generation activity system) (143,220). The system also includes rules (formal and informal) and Communities of Practice that affect the subject's activities, as well as a division of labor and role boundaries (second generation activity system). The third generation of activity system includes multiple activity systems interacting with each other. For example, the newly hired nurses (subjects) with the objective of delivering care to the PICU patients (objective) and the use of various mediating tools such as medical equipment, creates one first-generation activity system. At the same time, clinical nurse educators with the objective of orientating the newly hired nurses, supporting their centripetal movement in the PICU and facilitating their learning made another first-generation activity system. Adding the PICU community of practice (and its sub communities such as medical community of practice, nursing and RT communities etc.), formal and informal rules regulating practice and division of labor and role boundaries into each of these activity systems formed second-generation activity systems.

We found the third-generation Activity Theory (11,143,159), as the most helpful sociocultural learning theory that explained process of social and experiential learning in the Preceptorship. In fact, this theory puts all the explanations that we have presented so far together and summarizes them very well in a systematic way. This theory addresses networks of two or more interacting second-generation activity systems such as the interaction of the newly hired nurses' activity system and the clinical nurse educators' activity system for explaining practice and learning. Each of these activity systems employs different components of each activity system

(subjects, objectives, tools, Communities of Practice, rules and division of labor). In addition, the activity systems themselves interacted together and influenced the newly hired nurses' practice and learning. For example, in the first activity system, the newly hired nurses (subjects) participated in the unit with the objective of delivering care to high acuity PICU patients (such as patients with multiple organ failure) using medical equipment (such as monitor) and non-medical tools (such as computer) as mediating tools for their activities. The outcome of this objective was patient recovery. A variety of formal and informal rules influenced and regulated the newly hired nurses' activities and consequently their learning. As elaborated earlier, some of these rules included policies and procedures, organization and order of presenting in the rounds and standard OR handovers (formal rules) and respecting role boundaries and personal preferences (informal rules). Additionally, their activities (and their learning) were influenced by the division of labor and professional roles and role boundaries that are evident during rounds and the OR handovers. Moreover, the routines of the PICU community of practice and its sub communities such as medical communities influenced the newly hired nurses' activities and learning. For example, in their practice, they needed to consider routines of nursing community, medical community, RT community, as well as personal preferences of members of these communities such as various attending physicians. On the other side, in the clinical nurse educators (subjects)' activity system, the objective was to orientate, facilitate and support activities, learning and centripetal movement of the newly hired nurses in the PICU community. The outcome of this system was the ability of the newly hired nurses to deliver better care in the PICU. They used variety of tools (such as medical equipment, policies and procedures) for this purpose. Additionally, their practice was regulated by policies and procedures, routines as well as Communities of Practice and division of labor.

The various mediating tools that I have described not only mediate within an activity system, but also serve to mediate across the boundaries of disciplines, when members of different professions come together in a common activity such as care for a patient. These boundary objects (211,212) provide a shared reference point for individuals from different disciplines, and different Communities of Practice, to discuss the same issue while maintaining their distinct disciplinary viewpoint. Thus, x-rays are viewed by both the radiologist and the pulmonologist with each paying attention to slightly different details and patterns depending on their disciplinary point of view. These boundary objects mediate between disciplinary cultures. The many objects used during simulations enhance the ability of participants in their multidisciplinary activities to work together with a common understanding of the tools and objects that focus their activities on a common object.

12.2.2.3. Contradiction and professional identity

The interaction between two activity systems of the newly hired nurses and clinical nurse educators led to significant contradictions. On one side, the newly hired nurses initially claimed great amount of pediatric, critical care and PICU experience that let them to claim a pediatric critical care professional identity. They perceived themselves as capable of providing care at the highest acuity level. On the other side, clinical nurse educators, as representatives of the PICU denied this claimed professional identity and required the newly hired nurses to go back to the beginning and start all over again in the Orientation and Preceptorship by asking them to do very basic activities for the most stable patients in the most stable section of the unit, namely, the TCU (The “back” of the unit). Three types of contradictions resulted from the interaction of these two activity systems could be explained by Cultural Historical Activity Theory (CHAT) (7,143,221).

For example, the feeling of frustration described as soul death by the newly hired nurses (contradictions within elements of activity system), questioning their selection of the West Canada Hospital (WCH) PICU as workplace (contradictions between elements of activity system such as contradictions between subjects and their objectives in this case), as well as contradictions and tensions between the newly hired nurses' activity system and clinical nurse educators or respiratory therapists' activity systems (for example, changing the setup of the ventilators by the newly hired nurses, while it is RTs' job, a role boundary issue that created tensions between the new nurses' and RT's activity systems) were consistent with primary contradictions, secondary contradictions (7,111), as well as contradictions between the central activity system and other activity systems addressed in Cultural Historical Activity Theory (CHAT) (111,143,221).

These contradictions could be destructive (for example some of the newly hired nurses thought of quitting their jobs) or constructive so that the newly hired nurses could accept them, change their vision and start a new plan (7,111,143). CHAT, considers contradictions as the main part of activity system and assumes they produce opportunities for change, transformation and expansion of the activity system and its components such as subjects, (for examples, new nurses), a process that is called expansive learning. In other words, for CHAT, contradictions are sources of change, development, and continuous improvement at individual, collective and system level (10,11,111,143) since they create tensions and conflicts that produce energy for continuous changes (16–18,142,160). As we saw in our findings, the main reaction among the newly hired nurses for these contradictions was accepting them, changing their vision and planning to move beyond by learning and expansion. The issue of contradictions and their role in expansion and continuous improvement of the activity system and its elements is in line with the assumption of “intentionality” as one of the main assumptions of Activity Theory. According to this assumption,

contradictions between individuals and their sociocultural context are sources of conscious intentions leading to intentional actions (7,12,143). As we saw, when the newly hired nurses experienced contradictions, the emergent conscious intentions led them plan and set goals for learning and improvement (12). They developed a learning goal that was to get back to the same professional level of work that they were practicing before coming to the PICU and to resuscitate their previous professional identity as an expert PICU nurse.

The issue of contradictions and professional work can also be explained by the notion of emergent professional identity addressed by Holmes (222,223). From his perspective, emergent identity is the outcome of interaction between individuals in the authentic setting of their workplace. In his “Claim affirmation model of emergent identity” also known as “Modalities of emergent identity” (222,223), Holmes describes four situations for professional identity: (a) the individual does not claim any professional identity and the staff in the workplace are not ascribing any professional identity to the individual (disclaimed and denied professional identity). For example, assume that neither the newly hired nurses claim to be professional PICU nurses, nor other PICU staff consider them as professional PICU nurses. (b) The individual claims professional identity, but the other staff deny their claimed professional identity (claimed, but denied professional identity). For example, as we saw, majority of the newly hired nurses claimed that they were PICU nurses who could manage the highest acuity patients such as cardiac patients, but the PICU did not accept it and denied this claimed identity. (c) The individuals do not claim any professional identity, but the other staff consider the individual as a professional person (disclaimed, but affirmed identity). For example, assume a situation in which the newly hired nurses do not claim to be professional PICU nurses, but the staff working in the PICU consider

them as professional PICU nurses. (d) The individual claims profession identity and other staff members confirm this person is a professional PICU nurse (claimed and confirmed) (222,223).

In the Preceptorship, we found that the newly hired nurses claimed a professional PICU nurse identity that was not accepted by clinical nurse educators. This denied professional identity was source of the previously discussed three types of contradictions. These contradictions created tensions that led to the emergence of conscious intentions for getting back to the professional identity that they claimed but the unit denied. This tension led to intentionally planning for learning and setting up learning goals that would be helping them to give care to the patients that were at the same level of complexity that they used to give care in their previous workplace. This whole process would lead to being considered as experts and getting back to the same professional identity that they claimed but was denied (7,12,143). As we saw in our findings, the newly hired nurses planned to achieve their long-term learning goal of professional identity of PICU nurse through achieving two learning goals of getting back to the same professional level of work that they were practicing before coming to the PICU, as well as moving up in the color-coded system of the PICU RNs (as I will elaborate later, this is in line with moving from periphery to the center of Community of Practice). In other words, the newly hired nurses used these tensions as sources of their intentions for change, development, and continuous learning and improvement (7,11,143,159). In this regard, they used the color-coded system as the framework for guiding them regarding the type of learning activities to participate for advancement.

To sum up, interaction between the newly hired nurses' activity system and clinical nurse educators' activity system each with different objectives was source of tensions for the newly hired nurses that produced a third objective that was getting back to the same professional identity that the newly hired nurses had before. Learning in the Cultural Historical Activity Theory (CHAT) is

the expansion of the objective of the activity system and reconfiguration of its practices. This learning is a combination of individual and collective expansion in perceptions, practices and interactions (23). This indicates that if the PICU is trying to promote collaborative learning and quality of care, it should acknowledge and reward collective efforts as well as the individual efforts (11,23,224).

12.2.2.4. Distributed cognition in the PICU

In bridging between individuals while performing tasks, the nature and design of mediating tools shapes their use and molds the performance of the users. The design incorporates the knowledge of previous users about the best ways to accomplish a task with the type of tool. In this way knowledge is not limited to the heads of learners and performers, ways of thinking are extended beyond our skin and skull and are present in the mediating tools people use (4,9,18,25,138). This is in line with the concept of Distributed Cognition which is an established concept in sociocultural learning theories indicating that learning and knowledge are sociocultural phenomenon. This concept indicates that cognition is not merely situated inside the persons, instead it is distributed among people, their mediating artefacts, places and time (4,9,18,24,25,138).

This can be seen in our findings of the PICU in several forms. For example, we saw that knowledge about patients is distributed among different staff members belonging to different disciplines or Communities of Practice. In order to learn and gain a clear idea about the patient and deliver safe and quality care, a newly hired nurse needed to learn from other nurses and variety of other staff. Patient knowledge is distributed among staff and shared through different activities such as handovers and rounds. Variety of tools used by nursing staff, as well as by members of

other disciplines and nurses, the Karrdex, Purple Sheet, patient chart, Ventilator-Associated Pneumonia (VAP) protocol (225), are examples of mediating tools that represent established knowledge and patterns of use and aid the distribution of knowledge within the unit. Knowledge acquisition among newly hired nurses and all staff in general, is dependent on the knowledge distributed among other people, tools, and places. Mediating tools and processes facilitate sharing over time, not only between shifts, but over days and weeks. Put another way, because of the dependency of the newly hired nurses to the knowledge distributed among other staff members and numerous tools, it is impossible for them to learn effectively and function efficiently without having access to this distributed knowledge. This attention to mediating tools is extremely important for effective learning and efficient functioning and delivering better care since it is implying an interdependency between the individuals, the social context and community in which they are acting, which is mediated by the tools they share (2,4,18,24,25,138).

This sets up a contrast between the learning that happens in the Orientation session, in classrooms outside of the PICU Community of Practice and its mediating tools, and the learning in the Preceptorship happening in actual setting of the PICU Community of Practice where new nurses work with other staff and with real tools and real patients. Knowledge production and learning in the Preceptorship happens through participation in the real community of the PICU. In addition, this explains why extracting the individual staff from the sociocultural context of the unit, teaching them about quality improvement and expecting them to perform in the unit and implement quality improvement change initiatives had limited success in transforming staff and improving quality of care in the unit. To further support this analysis, the notion of distributed cognition helps us to understand the importance of maintaining the care teams that share patient knowledge to provide continuity of care. If knowledge is distributed among members of the PICU and their

mediating tools, it becomes clear that newly hired nurses and in general all the staff need to have continued access to this distributed knowledge in order to deliver better care. The stability of staffing and the cohesive social interaction among staff contributes to an effective distribution of knowledge within the community of practice. Reassignment of the nurses to other units when there are few acute patients in the PICU to take care may interrupt the smooth distribution of knowledge within the unit. Additionally, reassignment makes PICU nurses give care to very basic patients, and it is interpreted as denying the PICU nurses' professional identity as PICU nurses by assigning a general unit nurse identity to them. This can create a crisis in professional identity and may block smooth knowledge distribution and knowledge share between experienced PICU nurses and other staff such as the newly hired nurses.

12.2.2.5. Social learning and Communities of Practice (CoPs)

While the newly hired nurses' learning during the initial Orientation sessions consisted initially of listening to decontextualized presentations, their learning experiences progressively moved to more involvement in simulations and engagement with other nurses. This prepared them to enter the outer fringes of the PICU Community of Practice (16–18,25,140–142) during the Preceptorship.

Learning in the Preceptorship was social and experiential learning. Participation in the actual setting of the unit helped the newly hired nurses to establish relationships with members of various groups of the staff in the PICU and gain access to the knowledge distributed among them. They developed networks of relationships and tools that transcended time through different activities such as handovers, rounds and simulations. Though initially on the periphery of the Community of Practice, with patients limited to those who were least complex, the newly hired

nurses began their peripheral learning. While providing patient care during the Preceptorship, the newly hired nurses performed and internalized the routines of the PICU and developed the ability to anticipate the needs of their patients, and the doctors and allied health professionals who also cared for the same patients. They collaborated in a common Activity System with shared objectives, mediating tools and norms about the division of labor. Meanwhile, they received different forms of support and scaffolding of tasks in patient care as well as during PICU based simulations that employed cognitive and behavioral modeling, articulation and reflection with the other members of the PICU. Interaction during patient care and unit-based simulations facilitated the social interaction that is the basis for social learning followed by internalization of knowledge. In this way, they were gradually transformed, as they did more tasks at higher levels of complexity and transitioned from merely being first observers and novice into fully engaged staff who were able to perform many of the tasks they were expected to do as pediatric critical care nurses. Later, by taking more workshops and gaining more experience, some of them planned to move to leadership positions such as charge nurse. The entire process of transition helped them to regain the independent level of practice that they were accustomed to in their previous workplace before coming to the PICU. This transformation and transition gave them the feeling of being part of professional community of the PICU.

Gradually, they moved to more complex activities. This indicates that, while working in the PICU, the newly hired nurses developed more contextualized skills, did more tasks, grew, transformed and moved from being considered as novices to be considered as experts. This way, they contributed more significantly in the outcome of the PICU Community of Practice. The social and experiential process of transformation helped the newly hired nurses have more meaningful contribution in delivering better care in the unit and let the PICU staff acknowledge their expertise

and their experiences. This way, they felt that “they belonged” to the community of the PICU expert nurses. As a result of this participation and centripetal movement, the newly hired nurses gained the expert identity that they had claimed at the beginning of their work in the PICU, but it had been denied by the unit (16,17,44,147,222,223).

We found that experiential learning through social interaction in the informal learning networks of the PICU community of practice played a major role in learning by the newly hired nurses in the Preceptorship (226). This is consistent with Wenger’s perspective that learning in the workplace mainly happens through informal social learning networks (16,148,149). This type of learning continuously happens through socialization and participating in the authentic setting of workplace Communities of Practice. This phenomenon (social and experiential learning) will continue after the newly hired nurses have gained their professional identity; it represents the most efficient way of, and in fact best model for, continuous learning, development and growth for the nurses and all PICU staff. New technology, medications and procedures are introduced in the PICU on an ongoing basis that continuously triggers contradictions at different levels, and the ongoing need and intention to learn. This is supported by the dynamic (rather than static) nature of Zone of Proximal Development, which is constantly changing in context of changing environment (16,148,149); it is also in line with continuous quality improvement (CQI) that requires continuous learning (62,63,70,83,227).

We found that the newly hired nurses’ informal learning networks in the Preceptorship included various groups of people such as nursing team, medical team, allied health team, administrative team, and other staff such as cleaners. In this learning network, general duty nurses were the most integrated and closest people to the newly hired nurses to learn from. All things equal, integrated members are on average closer to everyone else in the network and have more

opportunities for knowledge exchange (192). This indicates that general duty nurses' role in the newly hired nurses' learning in the Preceptorship was perceived to be greater than that of everyone else. This is extremely important from implementation point of view since it implies that all the general duty nurses should have strong understanding of scaffolding so that they can efficiently facilitate learning by newly hired nurses.

Additionally, we found that learning in the informal learning networks in unit was a mutual activity in which the experienced nurses including preceptors and other staff nurses, as well as other newly hired nurses also learned from the newly hired nurses. Not only did the newly hired nurses learn from everybody in the unit, with the general duty nurses having the biggest role in their learning, but also other staff learned from the newly hired nurses. This “learning together” (228–232) approach acknowledged the newly hired nurses' existing knowledge and experiences and was helpful in facilitating process of their transition through all forms of contradictions that the newly hired nurses experienced during the entire learning journey (Orientation and Preceptorship). Thus, “learning together” approach could be a good strategy for managing the crisis of emergent professional identity (17,44,145,146,226). The “learning together” approach will be very helpful in improving social interaction between all the staff especially general duty nurses and the newly hired nurses, their relationships and the process of legitimate peripheral participation of the newly hired nurses in the PICU Community of Practice.

Learning in the PICU was conceptualized a moving from novice to expert, a conceptualization that implies that everybody who is novice is learning from others who are experts. As the interviews showed, “always there is something to learn” in the unit even if it is a simple thing. In other words, this conceptualization implies that learning is continuous and everyone learns from everyone else. Everyone is continuously striving to gain additional expertise

regardless of their status and position in the unit. We have seen this in attending physicians coming from other units who mention that they were learning even from the newly hired nurses since these people were with the patients for 12 hours a day. In fact, “learning together” model can be seen as the most efficient way to use collective knowledge and distributed knowledge. Additionally, learning and quality improvement were both found to be sociocultural activities that have mutual association with each other in increasing the quality of care provided by individual nurses and by the unit as a whole. This indicates that the “learning together” approach is a continuous quality improvement approach (37,38,45–48). One example in this regard is the case of the Purple Sheet case that was stated in Section 10.3. The Purple Sheet provides a typical example where the unit has collectively learned how to interact in providing concise and coherent information about the patients to the group. They have learned how to use this tool over time and have developed strategies to use it effectively. So that the Purple Sheet became a template for providing formation and structuring interactions during the rounds.

While the learning model of Communities of Practice as a sociocultural learning process is effective in accounting for many general social aspects of social learning during the Preceptorship, Activity Theory, particularly Cultural and Historical Activity Theory (CHAT), provides the conceptual tools necessary to account for learning during interaction with the different teams of individual professionals who form an activity system or Communities of Practice that emerge to care for each individual patient, and the professionally-based Communities of Practice composed of physicians, nurses, and other professionals. By initially focusing on the goal-oriented activity of treating an individual patient, CHAT helps to articulate the specific relationships that emerge among the patient-subject, the care providers, their division of labor and norms of

interaction, and the ways that these relations are mediated by various tools within a patient-focused activity system.

Each of these individual patient-focused activity systems is then multiplied with the addition of new patients and together their activity systems contribute to a collective PICU Community of Practice, with its own dynamics that transcend the objectives of caring for individual patients. The PICU has, as a Community of Practice, or an activity system the objective of facilitating quality care for all patients. This requires different divisions of labor, rules and mediating tools that are different from the activity systems needed for patient care. The activity system of the unit is influenced by the interactions of the patient-oriented activity systems in the unit and the professional Communities of Practice and their activities which play a significant role in determining the division of labor and the rules of practice.

The division of labor involving the care of one patient is not seamless and easily replicated with other patients. Instead, each set of people who works together must renegotiate their relationships. This is sometimes easy among the people who work together and maybe difficult with people who either have worked together and have poor experiences or have not worked together at all. I was told about instances where groups of people had difficulties about defining their professional roles in dealing with particular patients, but I was not able to explore these in detail.

The dynamics of the newly hired nurses' professional identities can be explained within the CHAT model by examining different forms of contradictions arising inside the newly hired nurses' activity systems during the Orientation and the Preceptorship. The objectives of the Orientation are to establish competencies and instruct the newly hired nurses about the hospital's and PICU's institutional procedures, policies and practices, including professional divisions of

labor. In the Preceptorship, the goals of learning are secondary to the goal of providing patient care. Mutual learning can occur when the newly hired nurse and the preceptor share a common goal of caring for a particular patient and collaborate in care. Thus, while I did observe mutual learning during the Orientation when newly hired nurses described alternatives to the procedures taught, the most effective mutual learning occurred during the Preceptorship when both the newly hired nurse and the preceptor learned together while caring for a patient. In effect, the patient mediated between the knowledge and practices of the new nurse and those of the preceptor as the patient became the focus of shared attention.

Additionally, using CHAT, we can explain how participating in the PICU Community of Practice, which itself is a constellation of numerous Communities of Practice or activity systems, provides opportunities for the newly hired nurses to work with and learn from different Communities of Practice about the knowledge distributed among these communities while they were interacting in multidisciplinary learning activities such as PICU and cardiac rounds and inter-professional presentations.

To summarize, CHAT may be considered as the best framework for explaining process of learning in the PICU since it explains sociocultural learning process explained by Vygotsky's original social and developmental learning theory, and more recent Communities of Practice and Distributed Cognition theories. It also it embeds and advances individual learning theories such as proficiency learning theory, experiential learning theory, as well as reflection and reflective practice.

The "Learning together" approach also acknowledges the concept of distributed cognition and the knowledge distributed among all the staff members which emphasizes collective participation in learning, delivering high quality care and continuity of care (4,9,18,24,25,138).

Additionally, it indicates that quality improvement is a situated participatory phenomenon and should happen in real setting and actively led by the frontline staff. This is why top-down approaches (projects developed at leadership or management level and pushed down to the frontline) will not succeed especially in long run in such a dynamic unit in which quality improvement is a social and experiential learning situated in the authentic setting of the unit (50,226).

I found that delivering care, and consequently learning, in the PICU happens in multidisciplinary teams that includes medical teams, nursing teams, allied health teams, administrative teams and patient families. This indicates that there are multiple smaller Communities of Practice in the big PICU community of practice that are functioning to achieve the common objective of delivering better care and treating the patient. When different Communities of Practice come together, participants in each of these communities will have more opportunities for learning since members of each community of practice will find more novelty in the knowledge shared by members of other communities. For example, in the rounds especially morning rounds (and more specifically, in morning cardiac rounds), the newly hired nurse found more learning than in the activities that included only nurses (such as face to face nursing handovers). This is a typical illustration of learning in the boundaries of Communities of Practice which can be very helpful in pushing the upper limit of potential functionality level of the staff including the newly hired nurses (11,16,143,145,146,233). In other words, it can push the boundaries of the Zone of Proximal Development (ZPD). However, if the communities that are crossing are very different from each other or their knowledge is very complex (cardiac surgery and nursing, for example), this may restrict learning by members of each of the Communities of Practice unless there is effective scaffolding to facilitate learning (11,143,145,146,233). As a

result, we recommend effective scaffolding in the teaching or learning activities in which more disciplines come together to discuss different aspects of care for the patients specially if the disciplines (Communities of Practice) are very different from the nursing community of practice. This is in line with the recommended approach of “learning together” in which all the staff know methods of scaffolding and apply them when they are sharing their knowledge with others which itself emphasizes the role of scaffolding in quality learning and quality care.

In the Preceptorship, the newly hired nurses learned various types of knowledge by participating in the interactions in the PICU community of practice. Our findings showed that in this period, they learned about clinical activities, skills and technical knowledge, people involved in these clinical activities, knowledge of available resources, routines of working in the PICU, cultural issues in the PICU, good practice and role boundaries. These learning outcomes are consistent with two major types of knowledge addressed in the list of typology of nursing knowledge, namely, knowledge coming from research (evidence based knowledge) and knowledge coming from the experience (experiential knowledge) (102–108). The knowledge coming from research (such as nursing knowledge, skills and techniques) is also called science (102–106) or explicit knowledge (102) whereas the knowledge coming from the experience (such as routine of work in the PICU or how to get things done) are known as “knowing how” knowledge (102), tacit knowledge (102) or practical knowledge (103). In other words, while knowledge coming from research (such as science of nursing) is a theoretical knowledge, “knowing how” knowledge is a practical and experiential knowing (103) that happens in the authentic setting or in the simulations of the authentic setting. Interestingly, one type of the knowledge that we found in our findings was “knowing who” knowledge. The newly hired nurses learned about people involved in the clinical activities. This type of knowledge, to my best research, has not been

reported in the literature. Knowing who means having familiarity and social relationships with others, who have what type of knowledge, what they know and what they do not know about the desired area. In other words, “knowing who” knowledge will help the newly hired nurses know who are people participating in the community of practice and who they will or they should interact with in order to do their tasks. Put another way, “knowing who” knowledge will help them in understanding “who” are the people that would be holding the explicit and tacit (“knowing how”) knowledge required for doing their tasks in the context of the PICU community of practice. This way, “knowing who” knowledge appears to be a key feature for effective use of distributed knowledge. We can also interpret the “knowing who” knowledge as the “social or community” knowledge. Adding “social or community” knowledge to the experiential knowledge (knowing how or tacit) knowledge, supports the idea that learning in the Preceptorship is a social and experiential activity happening in the PICU Communities of Practice. In fact, in our study, the newly hired nurses conceptualized learning as an ongoing social and experiential phenomenon happening through a centripetal movement from periphery to the center of a community of practice through which they could evolve and gain expert identity. This is consistent with conceptualization of learning in Communities of Practice (11,43,143,145–147,233).

We found that the entire process of centripetal movement of legitimate peripheral participation in the PICU community of practice could be affected by sociocultural factors. These factors included culture of communication, respectful workplace, culture of non-intimidating environment, various formal rules (such as policies and procedures of the unit, standard format of participating, operation room handovers) and informal rules (such as being expected to respect role boundaries in the rounds and handovers), as well as role boundaries as indicator of division of labor. This indicates that, **first**, the newly hired nurses need more support at the beginning of

their Preceptorship since at this time they have not established strong relationships and rapport with other staff yet, and neither they know enough about the routines of communication and personal communication styles of various staff. This may create misunderstandings, and some behaviors and reactions may be interpreted as intimidating. Preceptors and other staff such as clinical nurse educators, clinical nurse coordinators and other general duty nurses can play important role by various forms of scaffolding and openly accepting the newly hired nurses, clarification, and creating a “learning together” (228–232) atmosphere and non-intimidating environment. This is very important in the learning activities such as multidisciplinary rounds especially cardiac rounds and operation room handovers that are intense and the newly hired nurses may find it stressful and embarrassing to present in these activities in the presence of around 40 people who may bombard them by multiple questions. Our findings regarding the role of these factors in affecting learning in the Communities of Practice are consistent with other researchers’ findings who have reported that centripetal movement and learning among nurses in the Communities of Practice is influenced by factors such as a high quality interactions and better communication between members of the community of practice, mutual relationship between members (155,157), willingness for learning, development and quality care, as well as reciprocity of knowledge share, none-competitive atmosphere and strong facilitation skills of the moderator of community of practice (155,157,234). Unlike these potential barriers, Communities of Practice in healthcare can be ideal places for learning, development and improvement (16,19–22). As elaborated earlier, Communities of Practice provide opportunities for continuous access to various types of knowledge shared between the expert and novice members, keeping up competencies, avoiding mistakes and delivering better care. This happens through interactions in the actual setting in the workplace (16,20,22) and leads to increased productivity in workplaces such as

clinical settings (150). This is consistent with Fenwick's definition of learning in the Communities of Practice as "the ongoing refinement of practices and emerging knowledge embodied in the specific action of a particular community" (23), a definition that is in line with the notion of continuous quality improvement.

Second, the finding that newly hired nurses' activities and learning in the context of the PICU community of practice is influenced by various formal rules and informal rules indicates that the PICU community and its sub-communities have their own rules and norms that (a) regulate how each of these communities (should) function, (b) what are the collective beliefs in these communities, (c) what are their perceptions about activities of the newly hired nurses, and (d) how they would support the newly hired nurses (7,11,143,159). Having a clear idea about these formal and informal rules in the community of practice is extremely important for the newly hired nurse since it will help them to have clear understanding about the unit's formal and informal expectations. We may call this sociopolitical knowledge (the context of nursing) that was addressed by White in expanding types of knowledge in nursing (106).

The issue of division of labor and role boundaries were other sociocultural factors influencing the newly hired nurses' movement from periphery to the center of the community, their experiences, activities and their learning. For example, in the standardized OR handover, roles and role boundaries of the OR nurses, anesthesiology team and surgeons were respected by themselves and by the PICU teams and vice versa. Role boundaries in these activities, were clear and nobody violated others' role boundaries in this standardized OR handover. This is consistent with other researchers' findings indicating that division of labor, and as we discussed earlier, a series of formal and informal rules and conventions affect and regulate all the interactions among the newly hired nurses and other members of the PICU community, as well as process of their

movement from periphery to the center of the community (7,11,18,143,160). Division of labor, division of knowledge and rules (formal rules and norms or routines) are interplaying with each other. This means that the newly hired nurses need to interact with the people who are sharing their knowledge, they need to acknowledge positions and role boundaries of these people, and they should also respect and follow formal rules and informal norms and routines related to these people. This is another implication for learning as a sociocultural activity that happens in the real setting of the community through various interactions and experiences and is influenced by different contextual factors such as rules and division of labor.

All things considered, learning in the Preceptorship was situated learning that was embedded in special set of social interactions and relations, and knowledge in this period was constructed socially rather than individually (138). In other words, learning in the Preceptorship is sociocultural learning in which the newly hired nurses were subject to social discourse (4,9,18,24,25,138) as opposed learning in the Orientation sessions that was a didactic learning in which knowledge was acquired individually. In the Preceptorship, learning happens through a social experiential process and over the centripetal movement of legitimate peripheral participation which is a transformative and developmental process, and it is in line with participation metaphor for learning. However, learning in the Orientation is based on transferring information from instructor's brains to those of the newly hired nurses which is a transmittive process and in line with the acquisition metaphor for learning (18,25,110,111).

12.2.2.6. Learning networks and core-periphery learning

The focus of the network paradigm is the relationships and connections among individuals. Everyone in the PICU community is embedded in a complex and extensive network of social

relations and social interactions. The connections between the nursing team (including the newly hired nurses), medical team, allied health team, staff coming from other units such as operation room (OR) team, administrative team, patients' families and other people in the PICU (such as paramedics) form the comprehensive social network of the PICU community. Interactions among these individuals and groups of staff open opportunities for sharing knowledge, as well as forming informal learning networks. These networks not only include people with specific clinically relevant information but also include information about the people who know the people with useful knowledge. Often people with the knowledge of others who have knowledge are at the core of these networks (192,204).

The notion of core-periphery is one of the most important issues in Communities of Practice and learning networks (43,44). Core-periphery analysis of the PICU community of practice and all other sub-communities, represented as different disciplines in the unit uncovered central and peripheral members of the newly hired nurses' informal learning network in the PICU community. This in combination with the interview data, gave me more information about the notion of learning at the boundaries of various Communities of Practice existing in the PICU. Using social network analysis measures (such as In-Degree and Out-Degree centrality, as well as Integration and Radiality), I found that the newly hired nurses and nurses in general were central learners in the nursing community of practice whereas they were peripheral learners in the presence of medical teams participating in the discussions and during teaching during rounds. When it came to the nursing community, the newly hired nurses were peripheral at the beginning of their Preceptorship; however, they were more central at the end of their Preceptorship. In other words, peripheral members in one community (the nursing community) may be members of other communities in which they have more central roles. Using interviews and social network data I

found the factors influencing the extent of core-periphery relationships of various groups in the newly hired nurses' informal learning network. I found that the factors that determined which group would be central in the newly hired nurses' learning included the tasks that the newly hired nurses were performing for patients, as well as the network closeness, accessibility and perceived approachability of other persons or groups for learning particular tasks to care for a patient. Improvements about these factors would facilitate centripetal movement of the newly hired nurse in the PICU Community of Practice whereas ignorance in this regard would lead to isolation of the newly hired nurses on the periphery of the community, followed by frustration and seeking other jobs (151,155,157,158).

A core periphery analysis using social network also uncovered which people were more peripheral and which were more central people in the newly hired nurses' learning informal learning network. Having the highest In-Degree Centrality scores, general duty nurses were the most central people from whom the newly hired nurses learned in the Preceptorship. This indicates that general duty nurses have the most significant role in the newly hires nurses' informal learning (192,204,235,236). Frontline general duty nurses (GD RNs) also had the highest Integration scores indicating that these people were on average the closest people to the newly hired nurse, had earlier opportunities for exchanging information and were the most connected people in the informal learning network of the newly hired nurses (192,204). This is very important from the implementation perspective. These are the people who are the most important resources for learning among the newly hired nurses. However, the unit will need to teach them different methods of scaffolding as scaffolding appeared to be one of the most important factors facilitating social experiential learning and quality improvement in the PICU community of practice.

12.3. Learning and quality improvement

The newly hired nurses perceived a direct mutual relationship between learning, quality improvement and delivering quality care. They believed that learning and gaining expert identity would help them deliver quality care. Additionally, they believed that working in the actual setting of the unit and participation in small quality improvement projects would help them reflect on existing activities, processes and outcomes, revise and change them, practice and experiment small changes in the real and authentic setting of the unit, internalize patterns of new perceptions and behaviors and externalize and show them in their future practice. This way, they believed that they would move from a more minor and peripheral role in delivering high quality care and culture of quality improvement to a more major and central role in professional and high quality care (moving to the center of community of the staff that deliver quality care). In fact, with this perception, the newly hired nurses considered quality improvement as a social and experiential activity that happens in the real and authentic context of the unit and requires strong engagement of the all members of the PICU multidisciplinary community and is based on ongoing learning in the authentic social setting of the PICU (237,238). In other words, they believed that quality improvement was a social activity and had it's rooted in ongoing social and experiential learning, that is to say, they considered a social and experiential origin for quality improvement.

Thus, my analysis takes quality improvement in the PICU to a higher level and is totally different from simple quality improvement activities such as rapid Process Improvement Workshops (RPIWs) that the unit was following. Quality improvement in the PICU is social and experiential and happens in the setting of the unit through participation and interaction that leads to the transformation of the individual's identity and will lead to change in the collective identity of the unit. This way, the "learning together" approach is also a way to change the collective

identity of the unit on an ongoing basis conducive to continuous quality care (228–232). The key for success in “learning together” approach, which is also a quality improvement approach (228–231), is successful scaffolding to reach identified goals at individual and collective level. With this perspective, scaffolding (210) turns into a very strong tool for quality improvement that helps the implementation of the concept of zone of proximal development (1). We can consider quality improvement as the recognition that both individuals and groups, such as the PICU, have Zones of Proximal Development that mark the progressive steps between their current capabilities and the care they strive to provide. My work and observation of new nurses’ learning fully supports that *quality improvement is the tangible manifestation and product of social and experiential learning that, in the best form, happens through scaffolding and recognition of individual’s and the unit’s Zones of Proximal Development in the community of practice on an ongoing basis.* In such an approach for learning and continuous quality improvement, there is a gradual increase of complexity of experiential learning in the Community of Practice, that is to say ongoing assessment and adaptation of learning to individual’s and a units’ Zone of Proximal Development which leads to the establishment of a culture of continuous quality improvement and reduced resistance to change.

12.4. Conclusions and recommendations

Findings of this research are presented in a synthetic way below with related recommendations to improve the learning experience in the PICU, and the progressive development of a Learning Community whose goal and motivation is to provide quality care through continuous quality improvement:

1. A major contributor to setting improved quality of care as an achievable goal, is to emphasize the importance of evidence based practices, and the research and application of research that this entails. This was the foundation for nurses' association of learning with quality improvement.

2. Rather than introducing new learning strategies for quality improvement, I have identified existing strategies that are already in practice in the PICU which can be enhanced and adapted to address specific quality improvement activities. By using existing strategies, more attention can be paid to addressing the substance of quality improvement objectives, and less energy to introducing new processes. Also, these processes being in place, they are less likely to be seen as an imposition and a burden to the learners. Thus, while individually oriented, competency based instruction may be appropriate to learn new procedures or skills, changes to the care provided by patients' teams of care givers require a social learning approach informed by the dynamics of Situated Learning in Communities of Practice and the organization of goals directed behavior captured by Activity Theory. By embedding learning to improve quality of care in social practices these practices are continuously supported by the ongoing interaction of the participants while they provide patient care.

3. Learning in the PICU is ongoing, mainly social and experiential and mutually related to quality improvement. I found that *quality improvement is the tangible manifestation and product of social and experiential learning that, in the best form, happens through scaffolding and implementation of individual's and the unit's Zones of Proximal Development in the community of practice on an ongoing basis*. In such an approach for learning and continuous quality improvement, there is a gradual increase of

complexity of experiential learning in the Community of Practice, that is to say *ongoing assessment and adaptation of learning to individual's and a units' Zone of Proximal Development which leads to the establishment of a culture of continuous quality improvement* and reduced resistance to change. Therefore, we recommend the unit to adopt a “learning together” approach. As discussed earlier, this approach will be very helpful in preventing and also managing the issue of crisis of emergent professional identity. Further, it supports the idea that quality improvement is a situated participatory phenomenon that happens in the actual setting and should be led by the frontline staff as opposed to a top-down approach led by PICU leaders.

4. Scaffolding appears as one of the most important factors in social and experiential learning and quality improvement, especially when multiple Communities of Practice are working together for delivering care and the newly hired nurses are interacting with these communities where different new knowledge is shared. For this purpose, the unit should have special plan for empowering the staff about using numerous forms of scaffolding and various tools, with particular attention to general duty nurses from whom the newly hired nurses learned most.

5. Patterns of social interaction in learning networks and “knowing who” appears as one of the most important types of knowledge influencing the centripetal movement of the newly hired nurses, their practice, learning and quality of care. This highlights the importance of facilitating the social relationships among nurses and between nurses and other professionals to provide an effective social network of knowledge and skills that individuals can draw upon while providing care. Social relationship may be one prime feature of a Learning Together approach.

6. Social and experiential learning was also a significant strategy, and in fact, the best model of learning, due to the multidisciplinary nature of care provided in the PICU and distributed nature of knowledge. The unit needs to develop special interventions for encouraging all the staff working in different shifts to share knowledge related to different aspects of care and use numerous tools for mediating this knowledge share. In this way, the care team of a patient contributes to a socially distributed approach to the care of a patient. Each staff member is dependent on the knowledge and ability of others, and is sufficiently familiar with the task of their colleagues to work collaboratively and effectively. This contributes to the continuity of care for a patient while they are in the PICU.

7. Various sociocultural factors affected social and experiential learning of the newly hired nurses that included culture of communication, culture of participation, respectful workplace and culture of non-intimidating environment. Therefore, the unit needs special interventions for improving culture of communication, participation, respect and non-intimidation in the unit. Additionally, due the vital importance of strong relationship, strong rapport and familiarity with routines of communication and personal communication styles of various staff at the beginning of the Preceptorship, the unit should consider developing a strong support system for the newly hired nurses at this period which is the period of professional identity crisis. Preceptors and other staff such as clinical nurse educators, clinical nurse coordinators and other general duty nurses can play important role by different forms of scaffolding and openly accepting the newly hired nurses, clarification, and creating a “learning together” atmosphere and non-intimidating environment.

8. It may also be helpful for the unit to adopt an approach in which the Orientation sessions are conducted in the actual setting of the unit instead of having them in the classes outside the unit. Conducting Orientation sessions in the Tactical Center which is a room beside the PICU nursing station seems natural as it is already used for learning and teaching activities. This way, (a) the newly hired nurses will have access to the PICU that will provide opportunities for hands on experience, learning and consolidating the contents of instruction of the Orientation sessions in actual setting (for example, working according to the routines of care teams and presenting patients in the rounds). (b) More importantly, new nurses will gain access to “knowing who knowledge”; they will learn who is who, who is doing what and who is holding/ not holding what type of knowledge and support. This knowledge is extremely important since it helps them identifying expert-people that can be consulted whenever they need help in their work. (c) Finally, they will communicate with others and their relationships with other staff will improve. This is very important since it takes Orientation sessions one step higher and moves it towards social Orientation sessions. This is already happening for medical trainees such as fellows and residents. Medical trainees’ Orientations could be a role model for the newly hired nurses’ Orientations.

9. Since learning mainly was social and experiential, simulations in the Orientation sessions should be as close to the real setting as possible. If there is any possibility for conducting Orientation sessions in the unit or even in the bedside, that would be another helpful strategy for participation, knowing who is who and establishing relationships, as elaborated earlier.

10. Learning from others changes practice which also contribute to learning within the collective (unit) that changes the culture. Therefore, to change the culture of care, individuals need more opportunities for peer-to-peer learning in the unit at individual level to improve practice and to support group and interdisciplinary learning. This can be facilitated by new mediators, like the Purple Sheet, that improve communication and interaction across disciplinary boundaries.

12.5. Strengths and limitations

This research has a variety of strengths that are as follows. It was conducted by the support of a team of well-known senior qualitative and quantitative researchers who have been working on learning, cognitive anthropology, discourse analysis, quality improvement, and epidemiology and nursing for a long time. Additionally, spending long period for multiple researches in the PICU as well as for the present study allowed me to do lengthy observations that led to establishing rapport leading to a cooperative relationship between the researcher and the participants and collection of high quality data. Involving peers such as two of my committee members (JPC and WM) in different steps of the study (development, implementation, analysis, review of the draft of findings and report), as well as involving another researcher (NK) in reviewing the pre-final and final report improved validity of the research findings. In addition, different methods of triangulation (including data, researcher, theory and method triangulation), audit trial and thick description were multiple approaches used for improving trustworthiness and methodological soundness in the study. Data triangulation helped me to collect data from various sources such as the newly hired nurses, experienced nurses, allied health staff, physicians in various settings such as Orientation session classes and real clinical setting of the PICU. Involvement of various

researchers in the research made the research more valid. Application of various learning theories from both individualistic and sociocultural learning theories as my conceptual Orientations helped me in theoretical triangulation. All these helped me to improve methodological soundness of my research.

In terms of limitations, this research was conducted in a single center among health care professionals with particular attention to the newly hired nurses in a high acuity center in a tertiary hospital. Though the PICU was relatively large by hospital standards, it had a very small number of members. The expertise, interests, and personalities of the senior staff (both physicians and nurses) could affect the dynamics of the unit in ways and make it difficult to make comparisons from one PICU to another. However, the small size of most PICUs and the influence of individual personalities is characteristic of PICUs and other small clinical units. I have focused on the learning activities of newly hired nurse that in part avoid engaging issues that are more directly affected by individuals. This focus also makes it possible to preserve confidentiality about the various participants.

I already noted in my ethnographic description instances where there appear to be inconsistencies, which require further consideration and investigation. The role and process of scaffolding, which plays an important role in my analysis needs additional investigation. I discovered that the time available for and the duration of scaffolding during interactions needs further investigation. Scaffolding will not occur if there is only a single short interaction between two nurses. It would be worthwhile to investigate how short interactions may be linked together by new nurses and preceptors over several hours or day.

Another example that could be considered as disturbing situation for scaffolding when the patient might deteriorate and there would not be time for scaffolding. The staff would need to react

as fast as possible and there would not be enough time for several interactions to form scaffolding. How, for example, do staff learn from situations such as Code Blue? Also, one-time short teaching-learning activities such as short question-answer activities or one-shot handovers should also be investigated. Furthermore, additional investigation is necessary to examine the effect of interruptions in scaffolding by changes to new nurses' and preceptors' schedules, and re-assignment to general units when the number of PICU patients drop.

We also need to recognize that I did not examine in detail my participants' reflective practices, which might have included examining reflective journals about their experience. Similarly, the issue of division of labor and hierarchy were not deeply investigated even though they appeared in the interviews and my observations. Unfortunately, the study of hierarchy within a small unit like the PICU is likely to compromise the confidentiality of the participants. The confidentiality of participants also restricted my ability to explore the historical relations that developed over time among the staff in the PICU Community of Practice. While this contributes an important dimension to understanding the division of labor in the unit, and is an important part of CHAT, I could not include this in the thesis. However, these will not affect findings of this research considering methodological consideration adopted during the research.

This ethnographic analysis is also limited in its ability to generalize about learning in PICUs. However, the goal was not to test the generalizability of a hypothesis, but to identify the patterns of interaction and to interpret their significance in the process of learning by newly hired nurses which contributes to quality patient care, and the contribution of learning to provide quality patient care to the improvement of quality throughout the culture of the PICU.

12.6. Future research

This research discovered that learning in the PICU is mainly social and experiential and *quality improvement is the tangible manifestation and product of social and experiential learning that, in the best form, happens through scaffolding and implementation of individual's and the unit's Zones of Proximal Development in the community of practice on an ongoing basis*. This opens a new horizon in quality improvement interventions, especially in context of PICU and Provincial Health Service Authority where quality improvement has been treated as individualistic change (classic Lean approach) even though team work and engagement had been emphasized. However, quality improvement as observed in this study, has not been addressed. My data support quality improvement as continuous product of social and experiential learning in the authentic setting of the unit through participation and interaction that leads to transformation of the individual's identity and changes in the collective identity of the unit. This new perspective of quality improvement shifts strategies and approaches for quality improvement towards social and experiential interventions based on participation in the context of the Community of Practice (participatory and down-to-top approaches with distributed leadership) as opposed to top-down approaches. Therefore, we recommend more research using interventions around our sociocultural conceptualization of quality improvement to see how findings of these interventions may compare with conventional quality improvement models such as Lean methodology, IHI (Langley's) improvement model and Six-Sigma. Additionally, my findings support the need for research on other professionals (such as medical, allied health and administrative teams), other clinical settings similar to the PICU (such as adult ICUs), as well as in general units of the hospital to see how findings of this research are comparable with those from other settings.

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Appendices

Appendix A: Detailed literature review

A.1. Evolution of Pediatric Intensive Care Unit (PICU)

A.1.1. Care in critical care and rise of PICUs

Intensive care units (ICUs) play an important role in healthcare. Many patients admitted in the hospital receive direct or indirect ICU care during their hospitalization. Due to factors such as high technology, high staff-patient ratio (one bed, one nurse and sometimes two nurses for one bed), as well as number of complex care procedures (which are costly), ICUs carry a big economic burden of healthcare cost. According to recent studies, 17.4-39.0% of all hospital costs and 0.56-1% of the gross domestic product in the United States of America (USA) are spent for delivery of care in ICUs (56).

The first person using intensive care units to save the life of critically ill patients was Florence Nightingale, the British nurse, who (serving in the war in 1854 to 1856) placed all critically ill patients injured in the war close to the nursing station in order to have a close supervision on them and deliver quick care to them if necessary (57,239,240).

The first Pediatric Intensive Care Unit (PICU) was founded by a pediatric anesthesiologist (Goran Haglund) in Goteborg, Sweden in 1955(55). Twelve years after, the first PICU was established in the USA in 1967 with six beds, separate nurses and 24-hour resident physicians covered by pediatric anesthesia fellows (56). Thereafter, PICUs started to develop all over the USA so that by mid 1970s they could be found in most hospitals presenting pediatric residency program (56)(55).

Pediatric critical care discipline emerged in 1960s (57) and has evolved over the last 50 years in parallel which the rise of modern PICUs has occurred (56). Pediatric critical care discipline was acknowledged as an independent subspecialty in the past 20 years (241).

In 1981(56,241) and three years after that, in 1984 (56), the pediatric section of the Society of Critical Care Medicine (SCCM) ⁴ and the critical care section of the American Academy of Pediatrics were respectively founded (56). Meanwhile, in 1983 a committee on hospital care and pediatric section in SCCM released guidelines of essential requirements for PICUs (241). After the first examination of the American Board of Pediatrics in 1987 for pediatric critical care medicine and publication of the first textbook in this field in the same year (56,241), the Journal of Pediatric Critical Care Medicine was published in 2000 (56,241).

A.1.2. PICU subspecialty care providers

In the course of the development and evolution of pediatric critical care medicine as a recognized subspecialty, 26 pediatric critical care training programs were accepted by the American Council on Graduate Medical Education in early 1990s as a three year subspecialty fellowship composed of clinical training (two years) and healthcare research (one year) (55). Likewise, during 1970s and 1980s, critical care nursing, (including adult and pediatric) developed as a subspecialty (55). SCCM acknowledged the subspecialty of critical care nursing (both adult and pediatric) from its beginning. The Society of pediatric critical care nurses with their specialty journal was established in mid 1990s and hereby were acknowledged as an essential subspecialty of pediatric nursing (55). Furthermore, advanced practice nurses and pediatric nurse practitioners initiated a specialization in pediatric critical care in 1990s (55).

A.1.3. Staffing in PICUs

After the establishment of the first multidisciplinary PICU in Goteborg, care provider team in PICUs and staffing patterns of the unit have undergone changes. The purpose of these changes has been to provide proper staffing in the unit considering workload and other issues related to delivering good care for critically ill patients (55–58,239,241).

In the first PICU developed in the USA in 1967 nurses were full time workers mostly with the experience of recovery room care, infant intensive care, cardiac surgery or respiratory intensive care (55). Although nurses, as essential elements of the continuity of intensive care for critically ill patients, worked for many years under direct order of physicians, they very soon recognized that delivering care in intensive care units needed special knowledge, skills and competencies. Therefore, they started to develop their own knowledge, policies and procedures (239). After the establishment of the American Association of Critical Care Nurses (AACN), protocols were developed and agreed upon by physicians and nurses. After this movement, nurses who were not allowed to conduct any medical intervention without direct permission of the physicians, not only were allowed, but also they were expected to conduct medical interventions in some situations (239).

Although in 1970s we could see multidisciplinary teams in the big PICUs, it was in 1980s that extensive use of full time critical care physicians, consulting physicians (including all pediatric medical and surgical subspecialties) and allied health professionals such as respiratory therapists, developmental and child life therapists, social workers and chaplains were included in PICU healthcare teams (55).

In early 1990s, specialization of advanced practice nurses and pediatric nurse practitioners in pediatric critical care was accompanied with some staffing issues. In this time lack of enough registered nurses led to a serious shortage in experienced pediatric critical care nurses. Consequently, nurses in most PICUs worked for long periods of time covering more patients; this caused issues such as burn-out, which restricted their professional development. Similar issue was seen among physicians and also trainees; physicians experienced increased clinical, teaching and research workload with higher stress levels (55). Telemedicine and regionalization have been addressed as two potential resolutions for this clinical staff shortage (56). However, staff shortage for pediatric critical care still continues to exist for two related reasons, the progressive shift towards general pediatrics by the graduating medical residents throughout 1990s (reduction from 57% in 1990 to 73% in 1998) and the belief that lack of enough critical care medical and nursing staff makes PICU workplace highly stressful which affects these care providers' personal lives (55). These staffing issues have affected quality of care and various related outcomes during the evolution of pediatric critical care over the past 25 years (55).

A.1.4. Patients and patient family

Patient population of PICUs has changed dramatically over the past few decades (56,57). Patients with fatal diseases nowadays survive more than before and this creates a new and increasing population of children, adolescents and early adulthood with complex chronic medical conditions that need recurrent admissions in PICUs (56). Moreover, the population of children whose life is dependent on technology has increased (57). This situation has created a very challenging situation for intensive care medicine and consequently for the healthcare system in general (56).

In addition to changes in patient population, visitation of patient families in PICUs has changed over the last decades. Visiting times for patients' families was initially very short; in the past few decades both the physical environment of PICUs and also care provider's attitudes have changed, and now patients' families can stay in PICUs easily and they are encouraged to have a good participation in their children's care (57).

It was in 1980s that provision of separate rooms for patients' parents for resting, special spaces for family consultations and also enough space for physicians and nurses for discussing around patient care became part of healthcare culture so that they were included in the structure of new or renovated PICUs (55). In late 1980s and 1990s, family-centered pediatric and adult critical care were considered as standards of care (55).

A.1.5. Technology and therapy

Likewise, technology and therapy have evolved over the decades of evolution of pediatric critical care, and these changes have been affecting care quality in PICUs (56). Technology of monitoring, medical information and clinical decision-making technology, as well as end-organ support have undergone great advancements. This advanced and sophisticated medical technology over the decades has advanced delivery of care to critically ill patients (56,57).

Advancement of medical technology has also changed the presentation of some of the critically ill patients so that it has led to “technology dependent” children. These patients are defined as children whose life is dependent on an important medical equipment as the substitute of a vital function that they lack and also on an essential nursing care to survive (55). Not to mention that advancement of medical technology has also produced some complications and medical errors, a situation that requires PICUs to promote a culture of continuous quality

improvement and patient safety, as well as considerations of humanitarian and caring environment in these settings (57).

In addition, knowledge translation and evidence-based medicine have been playing a great role in improving care in critical care units by bringing state of art treatment to the bedside (56).

A.1.6. Care processes

Process refers how the care is delivered in the intensive care units and includes how care providers are interacting and working together for delivering care. Over the course of evolution of healthcare delivery, process of care has evolved and various processes have been introduced for delivering better care in PICUs. For example bundles of care, checklists, structured communication in the interdisciplinary rounds and handoffs are some of these processes that have evolved to drive delivering better care and improving outcomes in PICUs (56).

A.2. Quality Improvement

A.2.1. Rise of Quality Improvement in the industry

The movement of Quality Improvement (QI) rose in the industry in 20th century. Walter. A. Shewhart, W. Edwards Deming and Joseph M. Juran are considered pioneers of this movement who set the ground works the movement. Shewhart introduced Specification, Production and Inspection cycle (SPI cycle) and also created control charts (59). He mentored Deming, who is well-known and recognized for his most significant role in the movement of quality improvement by the remarkable shift that he created in quality management in Japan, and later in the USA and Europe. Deming's unique contribution in quality improvement is his "system/ theory of profound knowledge" and "Plan, Do, Study, Act learning cycle (the PDSA cycle)" introduced in the industry and well-known internationally (59–61). The PDSA cycle is an improved version of Deming's

first learning cycle of Plan, Do, Check, Act(tion) cycle (or PDCA cycle) which is itself a transformed version of Shewhart's Specification, Production and Inspection cycle (SPI cycle) (59).

I will briefly describe Deming's system/ theory of profound knowledge in the next section.

A.2.2. System/theory of Profound Knowledge

The System of Profound Knowledge (SoPK) is “an effective theory of management that provides a framework of thought and action for any leader wishing to transform and create a thriving organization, with the aim for everybody to win.” (60). Deming's theory of profound knowledge is the backbone of continuous quality improvement (59). This theory has four interdependent components that include: (a) appreciation of a system, (b) knowledge of variation, (b) theory of knowledge, and (d) the use of psychology (59,61). In the following few sections, I will briefly describe these four components.

A.2.2.1. Appreciation of a system

Deming viewed organization as a system (59,60) A system is a combination of various interdependent components that are interacting in order to achieve the aim of an organization. A system should have an aim (242) and “the aim for any system should be that everybody gains, not one part of the system at the expense of any other” (60). In any system, everyone should have a distinctive understanding of: (a) the aim of the system (and commitment to achieving this aim) and (b) interdependence and interrelationship of different components of the system. This understanding and knowledge is necessary for managing and continuously improving the system. Appreciation of a system is, in fact, having a general understanding of the system, appreciation of all its components and their interdependence, as well as using this understanding for optimizing

all processes of the system in order to achieve its aim. Attempts of all components of the system should be arranged or managed towards accomplishing the aim of the organization (59,76,242).

A.2.2.2. Knowledge of variation

We will always see variation in different interdependent components of the system. For example, we can see variation in the inputs, processes, outputs of the system, in the service that are provided, and between people working in the system (60,242). Effective management of a system and continuously improving quality of the services need deep understanding of variation in the system and knowledge of its causes (59,76,242). Deming identified two kinds of variation, namely variation related to common causes and variation related to special causes. Common causes are those factors that are built into the system such as various defects, errors, mistakes, waste and redoing the works. On the other hand, a unique factor that is located outside of the system (for example, a natural disaster) is a special cause that leads to variation related to special causes. Knowledge of different types of variation in the system and related causes, as well as being able to anticipate practices are key factors in effective management and continuous improvement of the quality of services in the system (59,60). This knowledge will help us in improving processes in the system. Improved processes will have less variation, their outcomes will be more predictable and reliable, and this will lead to reduced costs. Without knowledge of variation, quality improvement is impossible (59,76,242).

A.2.2.3. Theory of knowledge

Deming believed that ongoing learning is crucial for continuous quality improvement (59,60). For ongoing learning, we need to continually develop theories or hypothesis about our system, make predictions about these theories, test out these theories, and check the results to see

if our theories are supported by the results. Developing knowledge by systematically developing theories, testing them, collecting and analyzing the data (the results) and revising and expanding our theories builds our practical scientific method for learning process (59,76,242).

Deming introduced the Plan, Do, Study, Act (PDSA) cycle as a short and focused form of the practical scientific method for learning (59,76,242). The PDSA cycle is a systematic and dynamic process for learning and knowledge creation and is used in quality improvement activities. “It is a means for achieving a never-ending cycle of valuable learning for the continual improvement of a process or product.” (60). I will briefly describe the Plan, Do, Study, Act (PDSA) cycle in the following section.

A.2.2.3.1. Plan (P)

In this step, a situation analysis is conducted that results in a thorough understanding of the system and things that need to be improved. Then, appropriate interventions are identified or designed considering contextual characteristics of the system. In addition, an action plan is developed and tasks are assigned. A comprehensive evaluation plan is developed that includes various indicators (such as structure, process and outcome indicators) and tools to assess these indicators. Furthermore, some hypotheses are developed that include anticipations about the indicators. This plan will be used for assessing the interventions and evaluating their effectiveness (59,76).

A.2.2.3.2. Do (D)

In this step, desired interventions are implemented in small scales using the action plan developed in the previous step. In addition, data related to the effects of the interventions on

various indicators are recorded based on evaluation plan. If the “Plan” step is conducted accurately, “Do” step will be easily conducted (59,76).

A.2.2.3.3. Study (S)

In this step, results of the “Do” step is studied by analyzing the data recorded in the previous step. The purpose is to see if the implemented interventions and changes have led to any improvement, and if the previously set hypotheses were confirmed or rejected. This is done by using the evaluation plan and tools developed in the “Plan” step. Variation in various structure, process and outcome indicators are analyzed and graphed in order to trace the impact of the interventions (59,76).

A.2.2.3.4. Act (A)

During this step and based on the learning from findings of the “Study” step, decision is made about whether the intervention(s) should be changed, stopped or if they should be expanded for implementing changes in larger scales (59,76).

A.2.2.4. Using psychology

In the theory of profound knowledge, the science of psychology (more specifically, change psychology) is used to addresses human nature and to explore interaction between individuals, systems and contextual factors (61). Using the science of psychology, this theory is trying to understand human behavior in the system and treat them properly in order to reduce resistance to change (61,242). This aspect of the theory of profound knowledge addresses motivation for work; it explores the role of intrinsic and extrinsic motivating factors and respects people’s right for enjoying their work and learning (59,76).

A.2.3. Quality and Quality Improvement in healthcare

Healthcare quality has been a big challenge and a subject of deep debate in recent years (64,65). Medical errors lead to tens of thousands mortality and hundreds of thousands morbidity annually that would have been prevented by improving quality of care (66).

The notion of quality improvement suggested by Deming, and application of Deming's ideas in healthcare system is much more recent. Most remarkable works concerning quality improvement in healthcare started in late 1980s in the USA as part of the National Demonstration Project on Quality Improvement in Health Care, led by Dr. Don Berwick. In 1991, Institute for Healthcare Improvement (IHI) was officially founded. Since its establishment, IHI has become an influential organization in promoting healthcare quality improvement in the USA, and has expanded its activities in other countries such as Canada, England, Scotland, Denmark, Sweden, Singapore, Latin America, New Zealand, Ghana, Malawi, South Africa and the Middle East (67).

A decade ago, The Institute Of Medicine (IOM) warned regarding low quality health care as one of the preventable leading causes of death (26,27). Meanwhile, through its twin reports of "To Err is Human" and "Crossing the Quality Chasm", IOM called for healthcare quality improvement and redesigning healthcare systems for this purpose (66,68). IOM defined quality as "the degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (27,69,70). Furthermore, IOM defined quality improvement as to bridge the gap between existing and desired levels of quality using special methods and tools (27).

After IOM's big bang warning regarding low quality healthcare (26,27), various healthcare organizations developed numerous initiatives in order to improve six aspects of healthcare quality

including safety, effectiveness, efficiency, timeliness, patient-centeredness and equity (66,68). In so doing, these organizations used various quality improvement approaches for improving quality of care. In the following few sections I will describe some of the most important quality improvement approaches conventionally used by these organizations.

A.2.4. Conventional approaches for Quality Improvement

Top most important models used in development, implementation and evaluation of quality improvement initiatives are five models: Total Quality Management (TQM) Business Process Reengineering (BPR), Institute for Healthcare Improvement (IHI) Model for Improvement (also known as Rapid Cycle Change), Lean thinking, Six Sigma and combined model of Lean Six Sigma that will be described briefly in the following sections. In working with these models, we learn that unlike differences in the structure of these models, they are all variations of Deming's theory of profound knowledge and PDSA cycle, and there is a great amount of similarities in implementation (32). We also need to understand that there is no best model, method or approach that can appear to be most effective above all other quality improvement models (32,72). Rather, this is the interaction between local context and the model that plays a central role in success or failure of improvement projects (32). Finally, research so far has shown that unlike various progresses in the field of quality improvement in industry, movement of quality improvement in healthcare systems has been facing various challenges due to special features of healthcare systems such as complexity of these systems, complexity of care processes, variety of stakeholders in these systems and various other challenges such as longtime inter and intra disciplinary tensions (28–35). Considering these features in the development and implementation of quality improvement

initiatives in healthcare systems is necessary for selecting and using various quality improvement models even though these models have been tested successfully in the industry (32).

A.2.5. Key conventional models of Quality Improvement

A.2.5.1. Total Quality Management (TQM)

W. Edwards Deming proposed Total Quality Management (TQM) philosophy for the first time (75) in the industry in Japan in 1950s (32,72,75). This model later on was adopted in healthcare system, and in 1990s its application in health care increased (32,72). Although sometimes the two terms of TQM and continuous quality improvement (CQI) are used interchangeably (72,243) CQI is a technique for TQM (60). TQM is a holistic approach for improving quality through identifying root causes of poor performance. Fundamental element of TQM include, in the first place, strong emphasis on quality improvement as ongoing activities with special focus on internal and external customers' needs (32,72,73). In TQM, improvement activities are data driven and data has an essential importance (72). Although TQM is led by upper managers and leaders (32,72), it is conducted by empowered multifunctional teams (32).

Integration of central approach of TQM in healthcare systems has not been as successful as expected even though apparently it has been adopted widely (28–32,34). Most importantly, this approach has shown slight effect on medical staff (32). A big multi-central evaluation of TQM in National Health System (NHS) was carried out in 8 health authorities in 1990-1993, in which 750 people from 38 centers (hospitals and community service units) were interviewed. This evaluation showed that even though TQM had led to some cost savings, there were essential problems such as lack of an organizational approach for TQM, irregular measurements, poor involvement of physicians, poorly embedding TQM activities with activities such as audits, all of which limited

effectiveness of the approach. According to this study, emphasis on training staff (about tools and techniques of process improvement) and financial support for the start and over a 3 year implementation life span of the project were commonalities of those systems who had more advancements in TQM (32). A very important factor in the success of this model appeared to be “the extent to which TQM made sense to, and was accepted by, the front-line staff who were expected to carry out its principles in their daily activities” (32).

A.2.5.2. Business Process Reengineering (BPR)

This approach was introduced in the USA in 1990s. The focus of Business Process Reengineering (BPR) is fundamental organizational changes (32,75) . Examining and reengineering the processes is core of importance in this approach (32,75). However, it has rarely happened BPR to be fully implemented regardless of its setting (healthcare or industry). In National Health Service (NHS), two remarkable 3-year pilot studies conducted in 1990s showed slight improvements through this approach. Lately, BPR redesigning and TQM have been used jointly in reengineering projects for improving patient centered care in United Kingdom (UK) as well as at international level (32).

A.2.5.3. The Model for Improvement

Another variation of the Deming’s PDSA cycle was developed by Langley and his colleagues. This team developed a model called The Model for Improvement. The USA Institute for Healthcare Improvement (IHI) confirmed and recommended this model as IHI Model for Improvement (32,76,77).

IHI Model for Improvement (also known as Langley and his colleagues’ model for improvement) is a model for iterative short cycle and small scale changes (32,76,77) that are

expanded on the basis of reflection and learning (32,76). In this model, first three essential questions are asked that guide the entire process of improvement (76,77,179): (a) What are we trying to accomplish? (b) How will we know that a change is an improvement? (c) What changes can we make that will result in improvement? Then, the model is followed by frontline staff that put these three questions into action through a well-known cycle called Plan, Do, Study and Act (PDSA) (32,76,77).

Advantages of IHI Model for Improvement are that it allows small changes with low risk (32,76,77) that are proposed by frontline staff and can bring about staff engagement and commitment (32,76) because these ideas for change are coming from the frontline staff (32,76). This engagement (bottom up approach without imposing changes by the top management) is critical for improvement efforts as supported by Langley and his colleagues' statement that "Frontline workers are essential to the improvement efforts" (76). This is also consistent with our findings in PICU Participatory Action Research (PICU PAR) study (51).

So far there has been limited peer-reviewed evidence showing improvements in outcomes and patterns of performance resulting from the application of rapid cycle improvement approach (32). Reluctance to use among some managers, partial use and stopping in the Plan and Do part of PDSA cycle, as well as some conflicts between organizational goals and improvement teams are issues reported regarding this model. An Australian study reported that PDSA can face challenging issues when being used in more stubborn systemic problems or bureaucratic issues. Rapid cycles of PDSA may not be helpful in changing wide processes such as cross disciplinary processes and this can reduce usefulness of the model (32).

A.2.5.4. Lean thinking

Lean thinking (also known as the Toyota Production System or TPS) is another variation of Deming's model for quality improvement (78). This model was developed by Deming working at Toyota in Japan in 1950s (32,79). Lean thinking is a radical alternative to the traditional method of mass production (79) and it focuses on streamlining the processes to meet expectations of customers (both internal and external) with the least amount of waste in resources such as time and cost (32,79). Lean is an approach that focuses on integrating three aspects: (a) Quality-related beliefs and attitudes (philosophy), (b) Elimination of waste; in the context of healthcare specifically in hospitals, this means trying to remove duplication in processes and procedures that are not necessary (80) such as multiple records of patient information, patient transfer before readiness of the recipient unit, long waiting time for consultants and physicians and also discharge processes conducive to longer Length Of Stay (LOS) (79). (c) Involvement of the staff that is supported by a management system (80). Through these processes, Lean is following two primary objectives: (a) identifying and specifying value to ultimate customers. This implies that any process and its components should have added value to be considered meaningful (32,80) . (b) Analyzing and focusing on value stream in a way that keeps and continues only activities that have added value (80). This model is trying to achieve its objectives using various tools such as 5S (sort, set in order, sweep, standardize and sustain) (78,244), value stream mapping (32,80), quick changeover, theory of constraints, Kanban and Kizen (80). For re-engineering the process and also for analysis purposes, this method also uses other quality improvement tools such as PDSA rapid cycles (32). Recently there has been a growing appetite for combining Lean and Six Sigma (another model that will be described in the next section) in healthcare quality improvement projects (32,80).

Lean method has been used in healthcare systems and has achieved some success in waste reduction (32,80). It seems that this approach is more useful in facilitating processes in departments that are supporting clinical activities rather than in mainstream clinical services. Lean method suffers from partial use, and although it has been used for improving waiting times and inventory related issues, it has had limited application in healthcare systems. The best outcomes of lean can be seen mostly when it is used in systems in which we find high volume of work, tasks are repeatable (that makes a good space for standardization and integration of tasks) and when the management structure is less hierarchical and supports empowerment and engagement (32).

A.2.5.5. Six Sigma

Six Sigma is another approach for quality improvement that is based on Shewhart-Deming's PDCA cycle (81). Six Sigma has been created and used in industry by Motorola (32,38,81) since 1980s (32) while in healthcare system it is only a decade year old (32). Ideally, improvement activities in Six Sigma are based on a structured approach that is called DMAIC that is an acronym for various steps of this approach, namely Define, Measure, Analyze, Improve and Control (32,38,81). Each of these steps has its own sub-steps, typical tools and typical deliverables (80). Some of the tools used in various sub-steps of this approach include: cause-and-effect diagram, process mapping, multivariate studies, regression, simulation, optimization, Statistical Process Control (SPC) (32,80). Among these tools, SPC has special importance in Six Sigma since it allows us to do both retrospective and prospective variation analysis (32).

Six Sigma tries to identify variations in the processes through the structured approach of DMAIC and in this process it differentiates between common (chance) causes of variation and

specific (assignable) causes of variation (32,80). In this approach, main purpose is to remove special or assignable causes of variation (32,80,245).

Application of this approach in healthcare has been limited and recent, and there is room for more application in the future ³⁴. One of the important barriers that gets into the way of application of this approach is its complexity and strong focus on statistical methodologies (32,80). Nowadays, there has been an appetite for application of a hybrid model of Lean and Sigma that is called Lean Six Sigma in industry and in health care (32,80).

A.2.5.6. Lean Six Sigma

In 2002, Michael George published a book called “Lean Six Sigma: Combining Six Sigma with Lean Speed” and recommended integration of Lean and Six Sigma approaches (246). The logic behind the integration of Lean and Six Sigma is that Lean is more a holistic approach for controlling the processes without any statistical basis whereas Six Sigma is deep in statistical tools without deep focus on process improvement. In other words, Lean method is restricted in the application of statistical analytical diagnostic tools whereas Six Sigma is deep in statistical analytic tools (80,246). In Six Sigma, however, we do not see tools for speed improvement, gradual cost reduction and extended timeline that can be found in Lean method (246). Therefore integrating these two approaches can create an ideal situation (80,246).

Through combining the essential elements and related tools and technics of each of these two approaches (Lean and Six Sigma), the hybrid model of Lean Six Sigma approach gains and applies an all-inclusive methodology for quality improvement. This way, in order to find and remove non-value adding activities in the system, Lean Six Sigma uses the DMAIC (Define, Measure, Analyze, Improve and Control) pathway found in the Six Sigma in combination with

empowerment and education of everyone (that are the fundamental elements of Lean methodology) (246). Lean and six sigma each one has powerful strengths; synthetizing these strengths can be helpful in developing and implementing systematic improvement projects in healthcare (80).

In the previous few sections, I briefly described conventional quality improvement models, their principals and processes. Unlike various progresses in quality improvement in industry, movement of conventional quality improvement has not been successful enough in healthcare systems because of characteristics of this system (28–32,34).

Appendix B: Interview questions

Background information:

Person's background, experience and characteristic of workplace:

1. Tell me about yourself:
 - a. Prompts:
 - Educational background
 - Work experiences
 - What do you like about working for children?
 - What do you like about working in PICUs/ the PICU
2. How would you compare the PICU with your previous workplaces more specifically with last workplace?
 - a. Prompts:
 - Patients (in general and patients that you give care)
 - Procedures
 - Learning opportunities
 - Conducting quality improvement projects
 - Resources
 - Supporting systems etc.

Methods of formal and informal learning and training, related processes and tools used to teach new staff about the PICU:

1. How do you learn?
2. What tools do you utilize for learning?
3. What learning opportunities/ activities do you find in the unit?
4. What are the teaching activities in the unit?
5. How do you learn from these activities?
6. In which of these opportunities you find more learning?
7. How do you self-direct your learning?
8. What tools do you utilize in so doing?

Supplementary questions for preceptors/ mentors/other instructors:

1. What methods are you using for teaching/ training the newly hired nurses?
2. How do you best try to facilitate learning for your preceptees/ mentees?
3. What tools are you using for teaching the nurses?
4. Why and what are the advantages of these tools?
5. What are your expectations of new nurses with regard to learning?

Relationships between social interaction and learning during the Preceptorship in PICU:

1. Who do you learn from? How do you learn from them? What do you learn from them?
2. Who are the people that learn from you? How do they learn from you? What do they learn from you? What do you think people can learn from you?
3. What are the formal rules in the unit that affect your learning?
4. What informal norms affect your learning? How group norms affect your learning?

5. How does the internal hierarchy and your position among the others may affect your learning?
6. What is the role of interaction in the unit in your learning?
7. How does interaction with others affect your learning?
8. What do you learn through interaction with others?

Individual and shared learning during the Preceptorship in the PICU:

1. What are your learning goals in the PICU (during the Preceptorship)?
2. What do you need to/ have to learn from others to work in the PICU?
3. What do you expect to learn in the PICU? Why?
4. What does the unit expect you to learn in the PICU? Why?
5. Are other people learning from you? What? Why?
6. Are you trying to proactively teach other staff? Why yes/ not? What? How?
7. Tell me about your teaching experiences.
8. Do you learn when you teach? What do you learn when teaching? How do you learn while teaching?

Perceptions of the newly hired nurses about learning, quality improvement and quality care:

1. How do you envision learning?
2. How do you define Quality Improvement?
3. What is the relationship between learning and quality improvement and delivering quality care from your point of view?
4. Give me examples that shows this relationship.

5. How do you relate learning and teaching opportunities in the unit with quality improvement? What do you learn from quality improvement activities such as RPIWs, PSLs?
6. What is the role of ongoing learning in continuously improving quality of care?
7. What are the factors that affect your learning?
8. When do you learn? When is the best time for learning?
9. What technology are you using in your learning? What is the role of digital technology in learning? What about iPad?
10. How can technology help in ongoing learning? Ongoing quality improvement?

Supplementary questions for experienced staff only:

1. Are you still learning in the unit? What do you learn?
2. What did you learn from the newly hired nurses if any (formally or informally)?
3. Do people learn from you formally or informally? Do you teach?
4. Do you learn when you teach? What do you learn when teaching? How do you learn while teaching?
5. Do you learn anything from the newly hired nurses?

Supplementary questions for preceptors/ mentors/other instructors:

1. What is your role in helping new nurses?
2. How are the preceptors selected?
3. What do you teach to the newly hired nurses?
4. What methods do you use for teaching new nurses?
5. How do you try to facilitate their learning in the Preceptorship?

6. What tools are you using for teaching the nurses?
7. What do you expect from new nurses whom you mentor/ teach?
8. Do you learn when you teach? What do you learn when teaching? How do you learn while teaching? Why do you learn?

Appendix C: Sample PICU Orientation agenda

PICU Orientation

Session 1: Room A423

0800 - 0830	<ul style="list-style-type: none">• Welcome!• Orientation overview	Instructor
0830 - 1000	<ul style="list-style-type: none">• PICU Welcome and Overview• What/where are my resources?• People!• Red Bedside Binder• TeamSite	
1000 - 1030	<ul style="list-style-type: none">• Coffee	
1030 - 1200	<ul style="list-style-type: none">• Logistics...to the unit!• Lockers, Pyxis, glucometer codes, identification/name tags, email, sign in, PICU tour• Bedside set-up/safety checks	
1200 - 1300	<ul style="list-style-type: none">• Lunch	
1300 - 1430	<ul style="list-style-type: none">• Quality and Safety in PICU	
1430 - 1500	<ul style="list-style-type: none">• CNC role & Self scheduling	
1500 - 1600	<ul style="list-style-type: none">• Professional Development Pathway• Expectations in Preceptorship	

PICU Orientation

Session 2: Room A423

0800 - 0900	<ul style="list-style-type: none">• Respiratory Failure• Exam	Instructor
0900 -1000	<ul style="list-style-type: none">• Ventilation/role of the RT	
1000-1030	<ul style="list-style-type: none">• Coffee	
1030 - 1200	<ul style="list-style-type: none">• Ventilation/role of the RT• Artificial airways and suctioning• Mock intubation scenario• Case study (Respiratory Failure)?	
1200 - 1300	<ul style="list-style-type: none">• Lunch	
1300 - 1430	<ul style="list-style-type: none">• Chest Care	
1430 - 1600	<ul style="list-style-type: none">• Blood Gas Analysis	

PICU Orientation

Session 3: Room A423

0800 – 1000	<ul style="list-style-type: none">• CNS role• Healthy Workplace	Instructor
1000- 1030	<ul style="list-style-type: none">• Coffee - whenever instructor lets you go ☺	
1030-1200	<ul style="list-style-type: none">• Oncology in PICU	
1200 - 1300	<ul style="list-style-type: none">• Lunch	
1300 - 1600	<ul style="list-style-type: none">• TCU & Tracheostomy Care• Medication Administration• High alert meds• Electrolytes• Standard infusions• Documentation	

PICU Orientation

Session 4: Room A423

0800 - 0930	<ul style="list-style-type: none">• ECG Interpretation	Instructor
0930 - 1000	<ul style="list-style-type: none">• Coffee	
1000 - 1230	<ul style="list-style-type: none">• Principles of Cardiac Output• Hemodynamic Monitoring (IA/CVP)• Set-ups• Blood sampling	
1230 - 1345	<ul style="list-style-type: none">• Lunch	
1345 - 1430	<ul style="list-style-type: none">• Code Blue in PICU	
1430 - 1600	<ul style="list-style-type: none">• Odds & Ends• Head Injury Protocol• Peritoneal Dialysis	

PICU Orientation

Session 5: Room A423

0800 – 0830	<ul style="list-style-type: none"> • Issues? Questions? Concerns? 	Instructor
0830 - 0900	<ul style="list-style-type: none"> • Research in the PICU • PAR Study 	
0900 - 1000	<ul style="list-style-type: none"> • Human Resources 	
1000-1030	<ul style="list-style-type: none"> • Coffee 	
1030 - 1200	<ul style="list-style-type: none"> • End of Life Care 	
1200 - 1300	<ul style="list-style-type: none"> • Lunch 	
1300 - 1430	<ul style="list-style-type: none"> • Family Centered Care 	
1400 - 1600	<ul style="list-style-type: none"> • Complete Online Annual Certifications on the Learning Hub: <ul style="list-style-type: none"> ○ Code Red - Fire Safety Training Acute & Residential Facilities ○ Safe prescribing for clinicians ○ Creating a Respectful Workplace ○ Patient Safety Learning System ○ Many other modules (access e-learning via intranet link) 	