Improving clinical reasoning in nurse residents:

Evaluation of a resident facilitator model in a nurse residency program

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Abstract

Clinical reasoning, a key component of knowledge development for new nurses, is a practice-based, situated form of reasoning that requires general case knowledge, basic scientific and evidence-based knowledge of patient care. Within Benner's Novice to Expert framework, a quasi-experimental study with a matched pairs, pre-and post-test design, was conducted using a commercially available web-based instrument validated for measuring clinical reasoning in health care providers (Insight Assessment's Health Science Reasoning Test-Numeracy). The study evaluated the nurse resident's clinical reasoning skills in an established academic medical center's nurse residency program. This followed the pilot of a four-session resident facilitation model using Socratic questioning, case studies, peer-discussion and self-reflection compared with the standard lecture model. No statistical significance between the intervention and control cohort was found on the overall clinical reasoning score ($t=-.661$ df (43), $p=0.512> 0.05$). However a statistically significant difference was noted on the sublevel category of *explanation* for the control group which could not be explained by this project ($t=-2.043$, df (43), $p=0.047<0.05$). This suggests the need for further studies to better understand the expected levels of clinical reasoning and impact of education delivery models within a nurse residency program curriculum.

Keywords: nurse residency programs, clinical reasoning, Health Science Reasoning Test-Numeracy

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Improving clinical reasoning in nurse residents:

Evaluating a resident facilitator model in a nurse residency program

Nurse residency programs (NRPs) are important to the growth and clinical development of new nurses as they transition to practice, however most nurse residents fail to reach the level of clinical reasoning needed to safely care for patients (Letourneau & Fater, 2015). The Institute of Medicine (IOM) supports NRPs to assist first-year nurses to develop clinical decision-making and move to autonomy in providing patient care (Institute of Medicine, 2010). NRPs must have a curriculum that connects to a nurse's daily clinical practice and covers content applicable to nursing practice (Zinn, Guglielmi, Davis & Moses, 2012).

Introduction

The American Association of Colleges of Nursing (AACN) and the National League for Nursing Accrediting Commission (NLNAC), both accrediting agencies for nurse education programs, set the standards for nursing education programs. Both organizations treat the concept of critical thinking as a core element of nursing curricula and require measurement of this concept as an outcome in evaluating nursing education programs. Vizient formerly known as the University Hospital Consortium, is an alliance of the nation's leading nonprofit academic medical centers and their affiliated hospitals and is focused on delivering world-class patient care. In March 2000, the Consortium and accrediting bodies collaborated in developing an evidence-based curriculum for the graduate nurse, called the Nurse Residency Program™ (NRP), to improve new graduate transition to practice and patient care. The NRP curriculum requires specific competency development in critical thinking and leadership abilities. Participating hospitals use a 12-month customizable curriculum framework that emphasizes critical thinking

and clinical reasoning skill development through new graduate peer group interactions and self-reflection. The NRPs framework curriculum aids in clinical knowledge acquisition (Clark & Springer, 2012; Anderson, Hair & Todero., 2012; Goode, McElroy, Bednash & Murray, 2013). As critical thinking develops, the clinical reasoning ability of the nurse resident develops. *Clinical reasoning* is defined as a situated, practice-based form of reasoning that requires the nurse resident to have a beginner knowledge level about general nursing skills and interventions and their application to a specific patient situation (Benner, Hughes & Sutphen, 2008). *Clinical reasoning* can also be defined as the ability to sort through many details and develop a plan, change a plan or intervene appropriately within that plan (Pinnock & Welch, 2014).

Some transition to practice programs use Benner's Novice to Expert model (1984) for nursing knowledge and skill development (Figure 1). In Benner's model, the advanced beginner or new graduate nurse comes with little ability to use concepts or context to care for the patient. The model states that people gain skills by following steps, lists or rules and lack the ability to use concepts or judgement. Based on this model of knowledge and skill development, the graduate nurse needs both practice and coaching to develop clinical reasoning. The NRPs are structured to provide monthly classes for the nurse residents. These monthly classes can be facilitated by experienced nurses who have had specialized training, called 'resident facilitators' (see Appendix A for a description of NRP roles). The graduate nurses' knowledge and skill development may be improved, enhanced and supported in classes taught by experienced nurses. This raises a transition to practice question. Does the use of a resident facilitator model in NRPs improve knowledge and skill development in the area of clinical reasoning?

Pinnock and Welch (2014) state a 'talk aloud' approach is an effective method for developing clinical reasoning. Nurse residents can be taught to use their didactic knowledge and when faced with a "what if" case based scenario, talk aloud and share thought process to develop their critical thinking or clinical reasoning skills. Case based scenarios can be used to assess the nurse resident's skill performance while the Socratic teaching method of "what if" questioning can stimulate critical thinking as the nurse develops clinical reasoning skills.

Theoretical Framework

This project used Benner's (1984) framework that addresses the five stages of nursing skill and knowledge development: novice, advanced beginner, competent, proficient, expert (Figure 1).

As an 'advanced beginner' the nurse resident's entry to the nursing profession needs to be supported and prescribed to create a successful transition to practice. The 2000 Vizient/AACN NRP model (www.vizient.com) supports a learning environment for building both knowledge and skills. During their first year of knowledge and skill development, nurse residents must achieve a level of clinical reasoning and judgement to detect when the patient exhibits clinical cues and then decide on an appropriate intervention, as they transition from 'advanced beginner' to 'competent' nurse. This is typically accomplished through experiential learning and evaluated using competency and skill assessments.

The Benner model (1984) states, the nurse resident enters the nursing profession with minimal clinical experience, very basic rule (skill-based) knowledge and minimal ability to use discretionary judgement. This is called the 'advanced beginner' stage. At this level the nurse resident does not have clinical judgement or clinical reasoning and has limited understanding of

the context (environment) of actual nursing practice. During the previous 'novice' stage, the

nursing tasks are broken down into steps so the nursing skill can be performed competently

(Iglesias-Parra, et al, 2015). The nurse resident gains clinical experiences through their actual

practice and peer-sharing in the NRP. During the 12-month NRP facilitated classes, the nurse

resident gains knowledge and is afforded opportunities to self-reflect on their practice. The nurse

resident gains the ability to take prior experiences and situations and incorporate them into actual

nursing practice. The nurse resident begins to develop situational reasoning and intervention

skills. It is the nature of this transition from critical thinking into clinical reasoning that needs to

be understood better in the NRP. Evaluating clinical reasoning development in the nurse resident

as an outcome of NRP model is a valid inquiry. Understanding the impact of various teaching

methods in contributing to the development of the nurse resident's clinical reasoning establishes

best practices within specific practice environments. Hence the hypothesis for this project can be

stated as: A nurse resident participating in a NRP that uses a resident facilitator model will

demonstrate higher scores on a validated clinical reasoning assessment instrument than nurse

residents who participate in a traditional classroom style model.

Review of the Literature

A comprehensive review of the literature was conducted to identify the major issues and

strategies for promoting clinical reasoning in nurse residency programs. A search of literature

using EBSCO with full text, CINAHL with full text, OVID, Joanna Briggs and Web of Science,

used the following search terms: nurse residency programs, critical thinking and clinical

reasoning. The initial search yielded 64 articles using 'nurse residency', 'nurse residency

programs' and 'clinical reasoning'. The search was further refined by adding the search word

'nursing' and searching only articles from the year 2010 to 2015 and the reference list was

reduced to 33 articles. The inclusion criteria were the study of a nurse residency program as subject of article and /or the assessment of how nurses develop clinical reasoning. The exclusion criteria were articles before 2010, articles with no mention of clinical reasoning or critical thinking, and opinion papers about nurse residency programs. One article was from 2006 and a decision was made to include it in the literature review. This article had researched the clinical decision making process for pediatric nurses. A literature review table of the final 13 articles can be found in Tables 1, 2 and 3. Six articles focused on the nurse residents' transition to practice and clinical reasoning development (Table 1). Three articles were systematic reviews of nurse residency programs (Table 2). In four articles the focus was NRP implementation (Table 3).

Rosenfield, Glassman and Capobianco (2015) conducted a retrospective study querying nurses who had participated in a similarly structured NRP at New York University Langone Medical Center from 2007-2012. The nurses were asked if they would choose to be in a NRP if they had an option or learn at a hospital without a NRP. Three quarters (73%) of the respondents said 'take the NRP'. This study identified the interactions nurse residents had with their nurse resident cohort facilitated learning in a safe and protected environment.

In 2012 a multivariate quantitative, descriptive, correlation study was done using NRP residents from across Finland (Numminen, Leino-Kilpi, Isoaho & Meretoja, 2015). As a part of that study (n=318), competence was assessed using a Nurse Competence Scale with 73 items and a 0-100 visual analog scale (VAS) response format. Seven items in the subscale specifically assessed managing clinical situations and determining therapeutic interventions. There was a strong correlation in competence and empowerment to these subscales. Results support the important role of skill and knowledge competency as the nurse resident develops clinical reasoning and gains confidence. The subscales were: helping role, teaching/coaching, diagnostic

functions, managing situations, therapeutic interventions, ensuring quality and work role. Cronbach's alpha for the subscale data was 0.76-0.92.

In a similar study by Adams et al. (2015) focus groups were used to study 34 intensive care unit nurse residents in an academic medical center. The sessions asked open ended questions. The theme of 'developing nurse expertise' emerged in the open-dialogue focus group sessions. This theme identified by the nurse residents' was skill development and clinical knowledge as a desired outcome. It is important to note that outcome desired by the nurse residents focused on skills and knowledge and not thinking and reasoning. The stable preceptor-nurse resident relationship also emerged as a necessary component of nurse resident skill and knowledge development.

In a hospital-based descriptive study, Clark and Springer (2012) used focus groups to evaluate the 'lived experience' of resident nurses. The theme of 'not knowing' what to do in clinical settings emerged from this study. Comments that came out during the study support the need for stable preceptor relationships as the new nurse transitioned from 'not knowing' to 'knowing' what to do in clinical situations. This increases confidence in the ability to provide safe and effective care and feeling competent as the goal for NRs. A small sample size (n=37) was a limitation of this study.

Preceptor support was identified in another study as an important need for the nurse resident (Rush, Adamack, Gordon & Janke, 2014). The consistent role of the NRP educator or skill expert can substitute as a preceptor in the cohort learning environment (Zinn, et al., 2012; Maxwell, 2011; Clark & Springer, 2012; Numminen, et al., 2015; Wiles, Simko & Schoessler, 2013). In several studies, the support of the preceptors was identified in three ways: giving them (nurse residents) little support, to great support and to the continued relationship as a mentor.

For many nurse residents the charge nurse is also seen as a preceptor (Wiles, et al., 2013). This study demonstrates the NRs beginning to see value in the mentorship relationship for future learning. One limitation of these studies was small sample size and inability to control variables across various hospital settings.

Separate studies of the long term outcomes of NRPs identified the curricula structure of NRPs as an important feature of success (Fiedler, Read, Lane, Hicks & Jegier, 2014; Rosenfeld, et al., 2015; Goode, et al., 2013). The necessary components of the curricula structure include: 12 months in length, cohort grouping, skill development and an evidenced based research project at the end of the NRP. These core components all support clinical reasoning development and clinical autonomy while strengthening the nurse resident's commitment to nursing. The underlying principle here is the fact that as the nurse resident feels successful in functioning by skill mastery and clinical reasoning, this helps them become competent and therefore a safe practitioner. Thus, their commitment to nursing increases, because the NR begins to see themselves as a competent nurse. This role identity is important. Many of these studies had limitations of a small sample size or single health system setting.

The original purpose of NRPs was to support the novice or advanced beginner nurse with their transition to practice in the first 12 months (Rosenfield, et al., 2015). Attempting to understand the quality of NRPs was the subject of one systematic review. This systematic review had 20 studies reporting data for programs for new registered nurses (nurse residents). In this systematic review, it was noted that most NRPs use a 12-month cohort model and use pre- and post-test design for program evaluation. Their design allows for data analysis within a cohort and the ability to compare cohorts across different periods of time. This data was shared with

submission to Vizient for the purpose of sharing lessons learned; both about implementation and evaluation of NRPs.

In a similar study, Goode, et al. (2013), found that the nurse resident's ability to perform his or her work and competencies improved over a 12-month time frame. This was assessed through nurse resident's personal perception of his or her abilities to perform and prioritize the care needed for the patient. There was a statistically significant increase in the nurse residents' perception of their ability to provide clinical leadership during the 12-month NRP. Means (with standard errors in parentheses) for organizing and prioritizing care section of the pre- and post-test at the start, midpoint and completion of the NRP were 2.68 (0.03), 2.97 (0.03), and 3.10 (0.02) with $p<.001$.

Letourneau and Fater (2015) conducted an integrative literature review by searching 10 empirical and 15 NRP development articles. Overall the authors determined NRPs support the nurse resident with their transition to practice, thus providing supporting evidence for nurse leaders and educators to implement and evaluate NRPs.

The remaining studies were focused on clinical reasoning. Wiles, et al., 2013 studied a small group of nurses (n=5) using a qualitative one-to one interview process and a working definition of clinical reasoning as a 'deliberative problem solving activity or process". Interviews were transcribed, coded and analyzed. The three themes emerged: confidence development in practice, asking for assistance, and decision making (clinical reasoning). The nurse residents who were interviewed used self-reflection during the decision making process. The limitation of this study was a small sample size (n=5).

 Twycross and Powls (2006) assessed the clinical reasoning of pediatric nurses in a hospital setting. The study design used a "think aloud" technique and the nurse residents talked

out loud as they were thinking about an intervention for a patient. This technique is supported in

an expert opinion paper by Pinnock and Welch (2014) that directly addresses the use of the

'think aloud' style for knowledge development. Clinical scenarios were applied and the narrative

responses of the nurses were analyzed to describe how nurses make clinical decisions. It was

noted that nurses used a hypothetico-deductive model to make clinical decisions. This means

nurse residents used an analytical model to hypothesize an outcome for a nursing intervention.

The nurse resident would then deduce and predict the outcome with the final step being the

observation of the outcome. The next step tests predictions and the nurse resident begins to use

inductive reasoning. Nurse residents in this research study also used backwards reasoning in their

decision making. The goal for the patient situation was discussed and the nurse residents'

worked the patient situation backwards to create an outcome.

In a case study review by Maxwell (2011), a facilitated nurse residency program model

was assessed. The 410 bed Magnet hospital had a high turnover rate for the nurse residents at the

one year mark. The decision was made to bring in a clinical nurse specialist (CNS) to facilitate

the education of the nurse residents. The CNS revamped the program's schedule and course

content. The CNS acted as mentor and teacher for the monthly classes. The CNS was the resident

facilitator for the NRP. The hospital administrators observed a decrease in new nurse turnover

(leaving at the one year mark) dropped from 40% to 14%.

Pertinent Findings

The purpose of this literature review was to determine the current available evidence

related to NRPs. There were articles that discussed new resident nurse and knowledge

development. Many studies addressed the use of the Dreyfus (1981) model of skill acquisition

and the Benner (1984) novice to expert model of nursing knowledge development. In combining

skill acquisition theory and knowledge theory with the design of the NRPs, similar themes emerged in the literature review. Two basic components of the NRPs include: a set curricula design and a supportive preceptor. There are benefits for the nurse resident as they gain clinical reasoning skills with the resident facilitator model of NRP's. The evidence establishes that part of the acquisition of new knowledge should be the use of a resident facilitator during case based scenarios and subsequent self-reflection by the nurse resident (Anderson, et al., 2012, Clark & Springer, 2011, Wiles, et al., 2013). The NRP supports the nurse resident as they transition to practice.

Using a cohort model for participation creates an environment of learning and reflective sharing (Anderson, et al., 2012). The scheduled seminar sessions promote clinical reasoning as the nurse residents learn from trained preceptors or teachers (resident facilitators) and share their clinical experiences (Goode, et al., 2013; Wiles, et al., 2013). These sessions create opportunities to explore how clinical decisions were made and allow for self-reflection on future actions the next time a similar clinical situation occurs.

The literature review supports the need for NRPs. The nurse resident gains knowledge and skill in the first 12 months of entering their work environment. This foundational knowledge and skill acquisition is supported by the stable relationship with their preceptor, the charge nurse and the unit or hospital leadership (Adams, et al., 2015; Anderson, et al., 2012; Fiedler, et al., 2014; Goode, et al., 2013; Wiles, et al., 2013). Nurse residents reported feeling supported by resident facilitators or clinical experts in the NRP as they gained patient care knowledge and experience.

Methods

Purpose of the project

This pilot project evaluated the outcome of the resident facilitator model's ability to create change in the nurse resident's critical thinking skills and emerging clinical reasoning skills. The resident facilitator model integrates certain educational strategies such as Socratic questioning, case-based scenarios, talk aloud sessions and self-reflection. These sessions are held in specialty-specific groupings. This raises a transition to practice question; does the use of a resident facilitator model in NRPs improve knowledge and skill development in the area of clinical reasoning?

Definition of Terms

For the purpose of this project, the following terms are defined. *Nurse resident program* (NRP) is a program that focuses on new graduate nurses knowledge development as they transition to practice (Vizient, 2016a). It is an evidenced-based curriculum and has three key areas of focus: leadership, patient safety outcomes and professional development. It is structured as a once a month classroom education using a cohort model for nurse residents. The classes are 4 hours in length with didactic learning and integrated reflection time in each class. *Nurse residents* are newly hired nurses who are licensed as a registered nurse and entering the NRP (Vizient, 2016b) as *advanced beginners* on the Benner scale (1984). These nurse residents have 6-months or less of fulltime nursing experience. The *resident facilitator* is a professional nursing educator who is an experienced, clinically competent nurse with a master's degree who commits to investing in the professional development of one or more new graduates participating in the NRP (Vizient, 2016). See Appendix A for additional NRP related role definitions.

Research Design

A quasi-experimental, pre- and post-test assessment with a comparison group design was used for this project. The subjects for the pilot project were a convenience sample of new graduate nurses called nurse residents, hired to work in an academic medical center (AMC) in central Virginia. The inclusion criterion included participants who met all hiring standards set by the AMC. These newly hired nurses with an employment start date of July 18 were assigned to Cohort D, the intervention cohort. Cohort E, the control group, had an employment start date of August 1. The exclusion criteria included nurse residents not hired on July 18 or August 1.

Variables

The independent variable was the teaching and learning method used: resident facilitator model (Cohort D) or traditional classroom model (Cohort E). The dependent variable will be the difference between the overall pre-test and post-test score measures.

Setting

The pilot project was conducted in designated nurse education classrooms in the nurse education building that is geographically separate from the main AMC building. The educational space was set up in a traditional classroom style. The Director of Nurse Professional Development Services approved the pilot project (Appendix B: Letter of project support).

Procedures

Four sessions of the NRP used the resident facilitator model with the intervention group, Cohort D. These sessions occurred October 2016 through April 2017. The NRP controlled the schedule and agenda for the NRP sessions. The four class sessions for the intervention group Cohort D used a resident facilitator who is a Nursing Professional Development Specialist (NPDS) within the AMC's Department of Nurse Professional Development Services. The

resident facilitators (RF) attended a two 2-hour training sessions in August 2016. (See Appendix

C for the training agenda) A suggested curriculum for the resident facilitator training sessions

was supplied by Vizient. The training session curriculum included education in the Socratic

teaching method (Daroszewski, Kinser, & Lloyd, 2004), the use of 'what if' questions, the 'talk

aloud' method (Pinnock & Welch, 2013) and nurse resident self- reflection. The RF and nurse

resident dialogue is an example of the Socratic method of teaching where the nurse resident will

be challenged by the RF to analyze the case being discussed to develop critical thinking skills

and clinical reasoning.

The intervention group of Cohort D was prompted with Socratic questioning style of

teaching using 'what if' questions, the 'talk aloud' method or self- reflection during skill

development or knowledge development case-based scenarios. The control group Cohort E had

no changes to the usual style of large classroom education and used a lecture style model. The

class instructor(s) for the control group did not use Socratic questioning and some instructors did

not have resident facilitator training.

Measures

The AMC and NRP collaborated with California Academic Press, LLC, in Millbrae,

California, founded in 1986 and doing business as Insight Assessment in selecting an appropriate

measurement instrument for the NRP. The measurement instruments Health Sciences Reasoning

Test (HSRT) and the HSRT-Numeracy (HSRT-N) were evaluated for use in this study. Both the

HSRT and the HSRT-N are validated assessment instruments. The HSRT-N was selected for

assessing the clinical reasoning skills of the nurse resident.

The HSRT-N instrument provided a discipline neutral measure of reasoning skills and is

widely used to assess clinical reasoning in the health care field. The HSRT-N can predict the

strength of critical thinking and reasoning in problem solving scenarios. The HSRT-N can be

administered in many modes: application based, through a web browser, learning management

system (LMS) online testing and traditional paper and pencil. The principle domain for the

HSRT-N are critical thinking and reasoning (Insight Assessment, HSRT-N, 2016)). This

measurement instrument does not test content knowledge. The online assessment instrument

consisted of 38 scenario-based multiple choice questions. The anticipated time to take the pretest

and posttest is 55 minutes for each, totaling 110 minutes for both tests. The AMC and the NRP

purchased seats (individual computer access sessions) for the online clinical reasoning

assessment instrument used. The expectation for the NRP is that the nurse residents attend their

assigned cohort class. The pre- and post-tests were administered in specific cohort sessions.

There were no make-up dates for the pre-tests or post-tests.

Data Analysis Plan

Insight Assessment presented initial analysis of average overall scores and individual

scale scores for the HSRT-N in excel spreadsheet, group histograms and descriptive statistics for

both cohorts tested. The descriptive statistics include: size of the group, mean, median, standard

deviation, standard error of the mean, lowest score, highest score, first quartile score and third

quartile score. The analytics provided performance scores in these sub-categories of clinical

reasoning: analysis, interpretation, evaluation, explanation, inference, deduction, and induction

and overall reasoning skills. Insight Assessment's definitions of the performance sub-categories

are:

- **Analysis**- reasoning skills enable people to identify assumptions, reasons and claims
  and to examine how they interact in the formation of arguments.

- **Interpretation**- skills are used to determine the precise meaning and significance of a message, icon, chart, spoken word or gesture.

- **Evaluation**- evaluative reasoning skills enable people to assess the credibility of sources of information and the claims they make such as in the use of evidence based practice.

- **Explanation**- explanatory reasoning skills when used prior to making a final decision enable people to discover, test and to articulate the reasons for actions, beliefs or decisions.

- **Inference**- skills to assist people in drawing conclusions from reasons and evidence. Conclusions, hypotheses or decisions may be based on faulty analysis but had excellent inference skills used in the process for decision making.

- **Deduction**- this reasoning moves with precision from an assumed truth of beliefs to a conclusion which cannot be false if beliefs are true. This type of reasoning leaves no room for uncertainly.

- **Induction**- is decision making in the context of uncertainty. Things are probably true based on analogies, case studies, prior experience, statistics, hypotheticals and patterns the decision maker recognizes. May provide a confident basis for conclusions and decision making.

- **Reasoning Skills (Overall) -** describes overall strength in using reasoning to form reflective judgments about what to believe or do. It predicts the capacity for success in workplace settings which demand reasoned decision making and thoughtful problem solving.

- **Numeracy**- used when there is an application of numbers, arithmetic, measures and
    math techniques needed to make decisions. It also includes the understanding of
    charts, graphs, tables and diagrams.

Further statistical analysis of the data was conducted using the statistical software package of SPSS® 24. Project investigators received group measurement data labeled intervention group (Cohort D) and control group (Cohort E). Descriptive statistics were performed on the demographic data and assessment category responses. Frequencies and valid percentages were computed for all nominal and ordinal data. The means, medians and standard deviations were computed for normally distributed continuous data.

A paired t-test was used to detect significant differences in normally distributed continuous data between pre-and post-test assessment overall scores and the eight sub-categories. Comparative statistics were done to identify if significant differences between demographic groups and category mean scores were found. Statistical significance (α) was determined at 0.05 or less.

Protection of Human Subjects

Following project proposal approval, an ethical research review was conducted by Institutional Review Board for Social and Behavioral Sciences (IRB-SBS). The project and instrument was approved, IRB-SBS: #2016-0299-00. The approved participant consent form for the NRs is included as Appendix D.

Strengths and Limitations of the Project

The literature reveals that NRPs may improve first year retention; positively impact new graduate confidence and improve nurse resident competence. One strength of the project is using a reliable and validated instrument for assessing clinical reasoning (HSRT-N). The project also

contributes to the body of nursing knowledge on new nurse transition to practice, and NRPs curriculum planning.

Project limitations included the lack of randomization of subjects and small sample size of the matched pairs (n=25, n=20). Other limitations of the project were variability in RF experience and comfort using the Socratic teaching method with small group facilitation and the inability to control how the RF utilized the 'what if', 'talk aloud' and case-based scenarios. The study attempted to control for this by requiring all RFs to go through the RF training that included Socratic questioning techniques and topics on critical thinking.

RESULTS

The HSRT-N online assessment data was collected by the Insight Assessment Company and retrieved for this project by web access. Data was analyzed using matched pairs for the intervention and control cohorts. The sample size of the cohorts was appropriate to analyze (n=25 and n=20). The matched pairs for the intervention cohort was female n= 22, 88%. The control cohort was female n=18, 90%. Eighty eight percent of the project participants self-identified as White, Caucasian, Anglo-American with n=40. The remaining 11.9% (n=5) project participants self-identified as Black, African-American, Hispanic, Latino or Mexican American. The combined cohorts represented academic levels Associate (ADN), Bachelor (BSN) and Masters (MSN). The majority of the NRs were BSNs at n=28, 62.2%, ADNs at n=10, 22.2% and MSNs at n=7, 15.6%.The participants worked in various patient care settings. The main areas self-identified were adult acute care n=15, 33.3%; adult critical care n=5, 11.1%; adult intermediate care n=4, 8.9% and the OR n=4, 8.9%. See Table 4 for expanded data on represented specialty areas and group demographics.

Post-test participant ages ranged from 22 to 48 years old with 47.7% of the post-test

combined cohorts in the 22-24 years range. The ages 25-30 years old were 27.2% of the

combined cohorts. The ages of 31-39 years old represented 12.6% of the combined cohorts. Two

outliers aged 45 and 48 year old were represented in the combined cohorts. The mean age was

27.4 years old (SD=7.153 years) in the intervention cohort. The mean age was 25.1 years old

(SD= 4.340 years) in the control cohort.

In consultation with the Insight Assessment Company, the overall score of the HSRT-N

was used to evaluate the clinical reasoning improvement across the cohorts. The data was

checked for skewness. A paired t-test was used to assess post-minus pre-test differences. The

intervention cohort had a post-test minus pre-test mean score of -.8 (SD=4.795) and the control

cohort had a post-test minus pre-test mean score of .2000 (SD=5.337). The results indicate that

the intervention in a NRP was not statistically significant in improving *overall* clinical reasoning

scores for the NR; $t = -.661$, df (43), $p=.512 > 0.05$. Within the HSRT-N clinical reasoning

sublevels, explanation showed the greatest difference in mean post-test minus pre-test scores

between the intervention cohort (-2.48, SD= 7.24) and the control cohort (2.1500, SD= 7.93)

with the control cohort showing improvement. The explanation sublevel score was statistically

significant; $t= -2.043$, df (43), $p=.047 < 0.05$. See Table 5 with table group means and SDs for all

results of the post-test minus pre-test scores. See Table 6 for statistical analysis of sublevels of

clinical reasoning.

The NRs had the opportunity to attend other cohort sessions due to work schedules or

illness. There was intervention cohort and control cohort attendance crossover of the 4 class

sessions. A variance noted was attendance at the NRP sessions. The control group had a matched

pairs n=20 compared to the matched pairs for the intervention cohort n=25. See Table 7. Data

was compared on the demographics on who attended the 4th session and who missed the 4th

session and it was not significant. See Table 8.

DISCUSSION

Clinical reasoning is an expected outcome as NRs build their knowledge and skill to

safely care for patients. The NRs in this project are all in Benner's Stage 2: Advanced Beginner

phase of knowledge and skill acquisition; with less than 12 months on the job. The curricula of

NRPs aid in clinical knowledge acquisition (Clark & Springer, 2012; Anderson, et al., 2012;

Goode, et al., 2013). Development of critical thinking improves the clinical reasoning ability of

the NR and the ability to apply their knowledge and skill to an individual patient (Benner, et al.,

2008).

Socratic questioning provided an opportunity for NRs in the intervention cohort to break

into small discussion groups for sharing clinical experiences and learning. These small groups

were divided by specialty practice settings to provide an opportunity for the NRs to hear and

learn from similar patient and clinical experiences. These small break out groups allowed

opportunities for NR sharing in an intimate setting different from the large classroom style

environment of the control cohort. The RFs for the intervention sessions were trained in the use

of Socratic questioning. The project was not able to control for the individual RF nuances in

leading Socratic questioning sessions. It is unknown if this factor had an influence on the

intervention cohort data.

Explanation can be defined as the NR being able to discuss in a clear, logical and

pertinent way the results of their clinical reasoning about a specific patient or in the case of this

project, the online case study. The NR has not yet developed big picture thinking. The Insight

Assessment Corporation describes explanation as the ability to use explanatory reasoning skills when making a final decision. Being able to explain lets NRs discover, test and articulate the reasons for clinical decision making. This project is unable to explain why the intervention group had a lower score in the explanation subtype of learning and the control cohort had an improved score in the explanation subtype. Figures 2 through 9 show the data in histogram format for the intervention cohort and the control cohort, displaying nurse resident scores without identifiers.

NRs noted preference for small group RF led Socratic questioning sessions through unsolicited comments from control cohort NRs who attended an intervention makeup NRP session. NRs who had experienced an intervention session expressed that every NRP class "should be done that way" and "I like spending time with other nurses in my area". Many requested that the rest of their NRP be done in the breakout session model.

Implications for Nursing

Research supports the use of NRPs for the NRs (Anderson, et al., 2012). NRs benefit from good relationships with preceptors or instructors (Goode, et al., 2013; Wiles, et al., 2013). This project did not support the use of Socratic questioning in a NRP for improving the overall HSRT-N clinical reasoning score. There was statistical significance in the explanation sublevel of knowledge development, demonstrating that this area of critical thinking may need attention as NRP curriculums are refined in the future. There is also an opportunity to educate the preceptors in the area of 'explanation' for the NRs. The use of Socratic questioning with a focus on building explanation skills can benefit NRs as they participate in classes and clinical experiences in their practice settings. A longitudinal study could improve the NRP's understanding of a timeline needed for development of clinical reasoning over time. This type of

study may also help understand any relationship between clinical reasoning and academic

preparation. The AMC may benefit from studying future cohorts over time to assess if retention

rates or specific patient outcomes improve.

Conclusion

This scholarly project used two methodologies to evaluate improvement in clinical

reasoning for the nurse resident. The RF model supports the nurse resident in the NRP as a

mentor and teacher, both shown to be important in the literature. The RF model has potential to

establish new or different curricula designs for nurse resident education. The NRP classroom

sessions were done in two distinct models: one, use of a large classroom for the control group

and two, small breakout sessions for the intervention group.

The RFs were taught to use Socratic questioning in the small breakout sessions for the

intervention group. This new pedagogic training for the RFs may benefit future nurse residents in

the NRP. The RFs can assist the nurse residents to explore, define, explain and follow logical

conclusions as they discuss clinical situations.

This project did not show that clinical reasoning was improved using the HSRT-N as our

measure. The results of this study will be used by the project's AMC setting to support design

and resource allocation decision-making for their existing NRP including development of

resident facilitator training program; a preceptor training in the use of Socratic questioning and

possible creation of new computer-based learning modules.

Products of the Project

The results of the piloted RF model can be shared with other nurse resident programs and

presented at professional conferences. The scholarly project will be documented and presented in

a public defense. The Journal for Nurses in Professional Development manuscript submission

guidelines are presented in in Appendix E. A manuscript will be submitted to the Journal for

Nurses in Professional Development. See Appendix F.

References

Adams, J. M., Alexander, G. A., Chiari, R. G., Banister, G., McCauley, M. E., Whitney, K. B.,
      & Erickson, J.I., (2015). Strengthening new resident nurse residency programs in critical
      care: Recommendations from nurse residents and organizational stakeholders. *Journal of*
      Continuing Education in Nursing, 46(1), 41-48. https://doi.org/10.3928/00220124-
      20151217-01

Anderson, G., Hair, C., & Todero, C. (2012). Nurse residency programs: An evidence-based
      review of theory, process, and outcomes. *Journal of Professional Nursing, 28*(4), 203-
      212. https://doi.org/10.1016/j.profnurs.2011.11.020

Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice.*
      Menlo Park: Addison-Wesley.

Benner P, Hughes R. & Sutphen M. (2008). Chapter 6: Clinical Reasoning, Decision making,
      and Action: Thinking Critically and Clinically. *Patient Safety and Quality: An Evidence-*
      Based Handbook for Nurses. In R. Hughes (Editor). Rockville, Maryland (US): Agency
      for Healthcare Research and Quality.

Clark, C. M., & Springer, P. J. (2012). Nurse residents' first-hand accounts on transition to
      practice. *Nursing Outlook, 60*(4), e2-8. http://dx.doi.org/10.1016/j.outlook.2011.08.003

Daroszewski, E., Kinser, A., & Lloyd, S. (2004). Socratic method and the Internet: using tiered
      discussion to facilitate understanding in a graduate nursing theory course. *Nurse*
      Educator, 29(5), 189-191.

Dreyfus, S. (1981) *Formal models vs. Human Situational Understanding.* University of
      California, Berkley.

Fiedler, R., Read, E. S., Lane, K. A., Hicks, F. D., & Jegier, B. J. (2014). Long-term outcomes of

a post baccalaureate nurse residency program. *Journal of Nursing Administration, 44*(7),

417-422. doi:10.1097/NNA.0000000000000092

Goode, C., Lynn, M., McElroy, D., Bednash, G., & Murray, B. (2013). Lessons Learned from 10

years of research on a Post-Baccalaureate Nurse Residency program, *Journal of Nursing

Administration. 43*(2), pp 73-79. http://dx.doi.org/10.1097/NNA.0b013e31827f205c

Iglesias-Parra, M., García-Guerrero, A., García-Mayor, S., Kaknani-Uttumchandani, S., León-

Campos, Á., & Morales-Asencio, J. (2015). Design of a competency evaluation model for

clinical nursing practicum, based on standardized language systems: Psychometric

validation study. *Journal of Nursing Scholarship, 47*(4), 371-376. doi:10.1111/jnu.12140

Insight Assessment. (2016, June25). California Critical Thinking Skills Test. (2016, June 25).

Product summaries: California Critical Thinking Skills Test (HSRT-N). Retrieved from

https://www.insightassessment.com/Products/Products-Summary/Critical-Thinking-

Skills-Tests/Health-Sciences-Reasoning-Test-Numeracy-HSRT-N

Institute of Medicine of the National Academies (Report brief October 2010). Future of Nursing

Focus on Education. (2010, October). Retrieved from National Academies website:

http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2010/The-Future-

of-Nursing/Nursing%20Education%202010%20Brief

Letourneau, R. M., & Fater, K. H. (2015). Nurse residency programs: An integrative review of

the literature. *Nursing Education Perspectives, 36*(2), 96-101. doi:10.5480/13-1229

Maxwell, K. L. (2011). The implementation of the UHC/AACN new resident nurse residency

program in a community hospital. *Nursing Clinics of North America, 46*(1), 27-33. doi:

http://dx.doi.org/10.1016/j.cnur.2010.10.013

Numminen, O., Leino-Kilpi, H., Isoaho, H., & Meretoja, R. (2015). Newly graduated nurses'

    competence and individual and organizational factors: A multivariate analysis. *Journal of*

    Nursing Scholarship, 47(5), 446-457. doi: http://dx.doi.org/10.3928/00220124-

    20170110-08

Pinnock, R., & Welch, P. (2014). Learning clinical reasoning. *Journal of Paediatrics & Child*

    Health, 50(4), 253-257. doi: http://dx.doi.org/10.1111/jpc.12455

Rosenfeld, P., Glassman, K., & Capobianco, E. (2015). Evaluating the short- and long-term

    outcomes of a post-BSN residency program. *Journal of Nursing Administration, 45*(6),

    331-338. doi: http://dx.doi.org/10.1097/NNA.0000000000000211

Rush, K. L., Adamack, M., Gordon, J., & Janke, R. (2014). New resident nurse transition

    programs: Relationships with bullying and access to support. *Contemporary Nurse: A*

    Journal for the Australian Nursing Profession, 48(2), 219-228.

    doi: http://dx.doi.org/10.5172/conu.2014.48.2.219

Twycross, A., & Powls, L. (2006). How do children's nurses make clinical decisions? Two

    preliminary studies. *Journal of Clinical Nursing, 15*(10), 1324-1335. doi:

    http://dx.doi.org/10.1111/j.1365-2702.2006.01453.x

Vizient/AACN Nurse Residency Program Guide. (2015). Retrieved October 2017 from

    http://www.aacnnursing.org/Portals/42/AcademicNursing/NRP/Nurse-Residency-

    Program.pdf

Vizient Incorporated. (2016a) Homepage President and CEO purpose statement. Retrieved from

    https://www.vizientinc.com/what-we-do

Vizient Incorporated. (2016b) https://www.vizientinc.com/Our-solutions/Clinical-

    Solutions/Vizient-AACN-Nurse-Residency-Program

Wiles, L., Simko, L. & Schoessler, M. (2013). What Do I Do Now? Clinical Decision Making by

New Residents. *Journal for Nurses in Professional Development, 29*(4). pp 167-172. doi:

http://dx.doi.org/10.1097/NND.0b013e31829aeab3

Zinn, J. L., Guglielmi, C. L., Davis, P. P., & Moses, C. (2012). Addressing the nursing shortage:

the need for nurse residency programs. *American Operating Room Nurses Journal. 96*

(6). Pp 652-657. doi: https://doi.org/10.1016/j.aorn.2012.09.01

Table 1.

Summary of studies of new nurse residents' transition to practice and clinical reasoning development.

Study	Design and Purpose	Setting	Size Sample Description	Findings
Adams et al., 2015	Qualitative analysis of 12 focus groups to study the needs of a critical care nurse residency program as they prepared to open a new intensive care unit.	Large urban academic medical center in the Northeast	Focus group of 34 new resident nurses, 18 preceptors, 5 clinical nurse specialists, 5 nursing directors,	Focus groups of nurse residency program revealed five themes: • Program design • Developing nurse expertise • Impact on unit(s) • Future needs of new unit • Communication Are needed to open a new hospital intensive care unit
Clark & Springer 2012	Descriptive qualitative study to examine the 'lived experience' of new nurses in their first year of practice	Large public hospital with 600 beds in the northwestern United States	Focus group of 37 new nurse residents	New residents felt they benefited from nurse residency program. Need for 'guided' learning modules or scenarios Experienced stress in situations of 'not knowing'
Fiedler, R., et al. 2014	Descriptive study to assess the influence of nurse residency programs on new nurse residents	Large urban academic medical center in the Midwest	N=51 Nurses hired between 2008 and 2010 who completed the nurse residency program	Mean nurse residence survey scores increased over time after graduation from the nurse residency program but not statistically significant at *p=.709* The only NRP score that was statistically significant was the ability to act as a charge nurse, *p=.016*

Study	Design and Purpose	Setting	Size Sample Description	Findings
Numminen, O., et al. 2015	Demographic survey used along with the McClosky/ Mueller Satisfaction Scale (MMSS). Correlational study of the relationships between new nurse residents and their perceptions of their professional competence.	National convenience sample in Finland	N=318 new residents representing all main healthcare settings in Finland	Found strong relationship with competence and empowerment Nurse Competence Scale- measures generic competence: Subscales (number of items)- 1. Helping role (7) 2. Teaching and coaching (16) 3. Diagnostic functions (7) 4. Managing situations (8) 5. Therapeutic interventions (9) 6. Ensuring quality (6) 7. Work role (19) Visual analog design (0-100) Cronbach's alpha for subscales: 0.76-0.92
Rosenfeld, P. et al. 2015	Descriptive and retrospective study of short and long term	Academic medical center in	N= 425 (65.8% response rate) of RNs who were in the nurse residency program	22-57% of the respondents scored decision making as a valuable component of the nurse resident program

Study	Design and Purpose	Setting	Size Sample Description	Findings
	outcomes of a nurse residency program	urban location	and still employed at medical center 1-8 years after completing the program	
Rush, K. et al. 2014	Electronic descriptive survey to examine the access to peer support and the new nurses' transition to practice	British Columbia, Canada	N=245 New nurse residents from seven health authorities with under 1 year of employment in an acute care setting	81.3% of the respondents who attended a formal transition NRP reported most (52.1%) or all (29.2%) of the time that they felt they did have access to peer support when needed compared to 54.5% of nurses who did not attend such a program (most=41.6% and all=12.9%) 60% of all respondents reported the need for peer support in the first 1-3 months of employment

Table 2.

Systematic reviews of Nurse Residency Programs

Study	Design	Setting	Size Sample Description	Findings
Anderson, G., et al., 2012	Systematic review- Nurse Residency Programs to review theory basis, process and outcomes	Database reviews of nurse residency programs, internship or transition programs for new nurses	20 studies reviewed	Identified a lack of theoretical framework in NRPs and need for facilitators or trained preceptors to aid in clinical reasoning development
Goode, C. et al. 2013	Systematic review- Nurse Residency Programs for lessons learned	Data collected from nurse residency programs from 2002-2012	Outcomes reviewed from 10 years of NRP surveys 2002-2012	New nurse residents learned: organization, prioritization, leadership, communication, interdisciplinary team work, quality, safety and EBP. Research supports the use of nurse residency programs for new nurses.
Letourneau, R., et al. 2015	Integrative Literature Review to explore nurse residency programs and evaluate supporting evidence	Published articles from 2006 to July 2013	25 articles: 10 empirical and 15 on program development for nurse residency programs	Empirical data: Used Casey-Fink Resident Nurse Experience Survey- showed nurse residents had higher job satisfaction, quality of their nursing performance and improved clinical decision making. Program development data: NRPs facilitate transition from student to nurse by assisting with a successful transition to practice

Table 3.

Implementation review of nurse residency programs

Study	Design and Purpose	Setting	Size Sample Description	Findings
Maxwell, K. 2011	Case study to assess the transition to practice of new nurses in a nurse residency program	410 bed tertiary acute care Magnet hospital	29 nurse residency participants had clinical nurse specialist as facilitator	Reviewed data and reported that NRP benefits the hospital: Turnover rates reduced from 40% in previous model (no CNS or facilitator) in NRP to 14% in the clinical nurse specialist as facilitator NRP model.
Twycross, A. et al. 2006	Individual case control study to gain understanding of how pediatric nurses make clinical decisions	Pediatric medical ward and pediatric surgical ward in Scottish hospital	n=27 pediatric nurses	New nurses used 'think aloud' techniques to assist in knowledge acquisition. New nurses used backwards reasoning which is a characteristic of non-expert (novice) decision making.
Wiles, L et al. 2013	Case studies to interpret the experience of new nurse residents as they made critical thinking and decision making	New nursing residents who worked on adult medical–surgical units in acute care	n=5	Qualitative theme of decision making was identified as important. Knowledge can be described as both horizontal, bits of knowledge about a broad range of topics, and vertical, in-depth knowledge about topics. Both types of knowledge are necessary for effective clinical practice; however, it takes more than knowledge to make good decisions.

Study	Design and Purpose	Setting	Size Sample Description	Findings
		institutions in West Michigan		Use of reflection on practice allows the nurse resident to think about the situation and work through how they would handle it the next time it occurs.

Table 4.

Table 4: Post-Test Cohort Demographics

	Cohort D-Post-test Intervention Cohort n=25 (%)	Cohort E- Post- test Control Cohort n=20 (%)
Gender		
Female	22 (88%)	18 (90%)
Male	3 (12%)	2 (10%)
Age (years)		
Mean age	27.4	25.1
Std. Deviation	7.153	4.340
Minimum	22.0	22.0
Maximum	48.0	38.0
Nursing Degree		
Associate Degree	6 (24%)	4 (20%)
Bachelor's Degree	14 (56%)	14 (70%)
Master's Degree	5 (20%)	2 (10%)
Ethnicity		
Black, African American	4 (16%)	0 (0%)
Hispanic, Latino, Mexican American	1 (4%)	0 (0%)
White, Caucasian, Anglo-American	20 (80%)	20 (100%)

Work Specialty Areas	**n=25**	**n=20**
Acute Care-Adult	6 (24%)	9 (45%)
Critical Care-Adult	4 (16%)	1 (5%)
ED	3 (12%)	0 (0%)
Intermediate Care-Adult	1 (4%)	3 (15%)
Pediatrics-Acute	0 (0%)	3 (15%)
Procedural	0 (0%)	1 (5%)
OR	4 (16%)	0 (0%)
PACU	2 (8%)	1 (5%)
Neonatal	0 (0%)	2 (10%)
L and D/Women's	3 (12%)	0 (0%)
Ambulatory	2 (8%)	0 (0%)

ED is Emergency Department, OR is Operating Room, PACU is Post Anesthesia Care Unit, L and D is Labor and Delivery

Table 5.

Table 5: Post-test minus pretest scores of the matched pairs

	Intervention Cohort D Mean score	Intervention Cohort D Standard Deviation		Control Cohort E Mean Score	Control Cohort E Standard Deviation
OVERALL	-.800	4.79583		0.200	5.33706
Analysis	-2.6000	7.10634		0.7500	7.69056
Interpretation	1.8	8.14964		3.5	8.19804
Inference	.3600	6.92748		1.0500	7.38045
Evaluation	-1.600	8.41467		-.0500	5.75349
Explanation	-2.4800	7.24063		2.1	7.93576
Induction	-1.4000	6.05530		-.7000	6.61020
Deduction	-.0400	7.73240		1.2500	8.23264
Numeracy	.1200	8.46227		2.6	7.34327

95% CI

Table 6.

Table 6: Paired sample *t* test results of the cohorts

		F	Sig.	*t*	df	Sig. 2 tailed	t- test Mean Differences
Analysis	Equal variance assumed	.199	.658	-1.515	43.000	.137	-3.350
	Equal variances not assumed			-1.502	39.304	.141	-3.350
Interpretation	Equal variance assumed	.018	.894	-.714	43.000	.479	-1.750
	Equal variances not assumed			-.713	40.753	.480	-1.750
Inference	Equal variance assumed	.021	.885	-.323	43.000	.749	-.690
	Equal variances not assumed			-.320	39.634	.750	-.690
Evaluation	Equal variance assumed	1.578	.216	-.050	43.000	.960	-.110
	Equal variances not assumed			-.052	42.090	.959	-.110
Explanation	Equal variance assumed	.000	.985	-2.043	43.000	**.047**	-4.630
	Equal variances not assumed			-2.021	39.030	.050	-4.630
Induction	Equal variance assumed	.150	.701	-.370	43.000	.713	-.700
	Equal variances not assumed			-.366	39.117	.716	-.700
Deduction	Equal variance assumed	.459	.502	-.540	43.000	.592	-1.290
	Equal variances not assumed			-.537	39.648	.595	-1.290
Numeracy	Equal variance assumed	.032	.859	-1.056	43.000	.297	-2.530
	Equal variances not assumed			-1.073	42.680	.289	-2.530
Overall	Equal variance assumed	.009	.924	-.661	43	**.512**	-1.000
	Equal variances not assumed			-.653	38.693	.518	-1.000

CI 95%, p≤0.05: Independent t test computed. The overall score was not found to be statistically significant. The explanation score for the control group had a greater improvement than the intervention group and was found to be statistically significant.

Table 7.

Table 7: Attendance at NRP Sessions

	Class 4 (pre-test)	Class 5	Class 8	Class 9 (post-test)	Matched Pairs
Cohort D-Intervention	31	27	29	28	25
Cohort E-Control	27	33	29	32	20

Class attendance varied with some NRs missing due to work schedules or illness. NRs had the opportunity to attend other make-up classes and this also altered the attendance numbers.

Table 8.

Table 8: Missed 4th session combined cohort cross tabulations

	Value	df	Asymptotic Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.683[a]	1	.003	.006	.003
Continuity Correction[b]	6.824	1	.009		
Likelihood Ratio	9.870	1	.002	.006	.003
Fisher's Exact Test				.006	.003
N of Valid Cases	59				

    a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.41.
    b. Computed only for a 2x2 table.

| Level of knowledge and skill development	Descriptions and characteristics
Novice	• No or minimal experiences on how to perform in situations • Little understanding of conceptual meaning of textbook concepts (uses context free rules) • May be limited or inflexible with clinical decision making • Needs support of competent or higher level of preceptor for clinical practice • *Most new graduates are at this level*
Advanced Beginner	• Limited experiences with how to perform in situations • Beginning to recognizes global aspects of a clinical situation • Needs support competent or higher level peer
Competent	• In job with similar experiences for 2-3 years • Recognizes conceptual concepts in clinical situations • Has developed feelings of mastery and ability to manage their situations • May still perform best with deliberate planning for situations
A significant level of expertise occurs as the nurse moves into the Proficient and Expert Level. At these levels the following of rules or models is not needed for a response to a clinical situation.	
Proficient	• In job with similar experiences for 3-5 years • Recognizes the conceptual whole of a clinical situation • Knows what to expect based on previous experiences • Able to hone in to the actual problem and considers fewer options • Able to perform with great flexibility
Expert	• In job with similar experiences for 5-10+ years • Able to see the entire clinical situation as a contextual whole; no need for rules or guidance • Very intuitive in situations • Very flexible performance

Benner, P (1984). *From novice to expert: Excellence and power in clinical nursing practice.* Menlo Park, CA: Addison Wesley.

Figure 1. Adapted from Patricia Benner's novice to expert framework from content in the text; adapted to meet the needs of this paper.

Cohort D- Intervention group- pre-test: OVERALL score

Descriptive Information: OVERALL

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
26	82.6	83.0	6.8	1.3	67	92	77.0	89.0
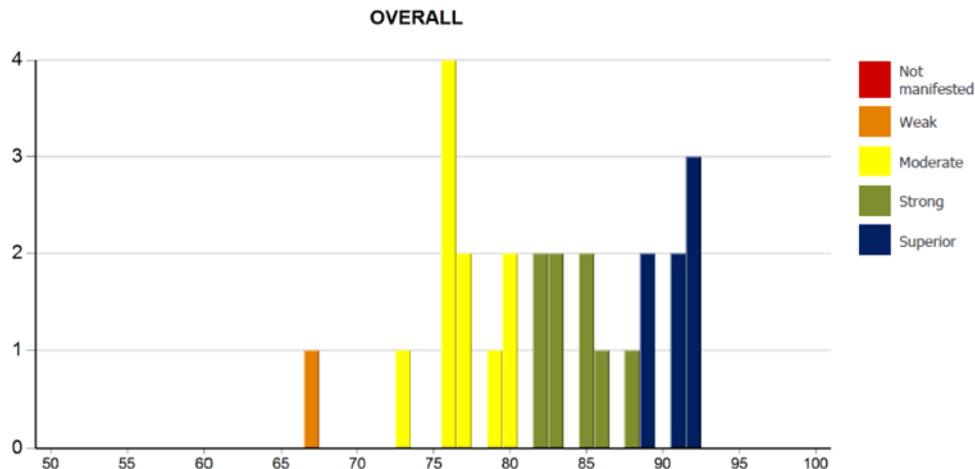
This figure shows the Intervention group's OVERALL score on the pre-test. The colors represent score levels set by Insight Assessment. Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There were participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.

Figure 2. Cohort D- Intervention group- pre-test: OVERALL score.

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose, CA., USA. No permission needed for use of the histograms.

Cohort D- Intervention group- post-test: OVERALL score

Descriptive Information: OVERALL

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
27	82.7	83.0	8.2	1.6	67	98	77.0	89.0

This figure shows the Intervention group's OVERALL score on the post-test. The colors represent score levels set by Insight Assessment. Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. In the post-test there were more participants that scored in the weak category. There were also participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.
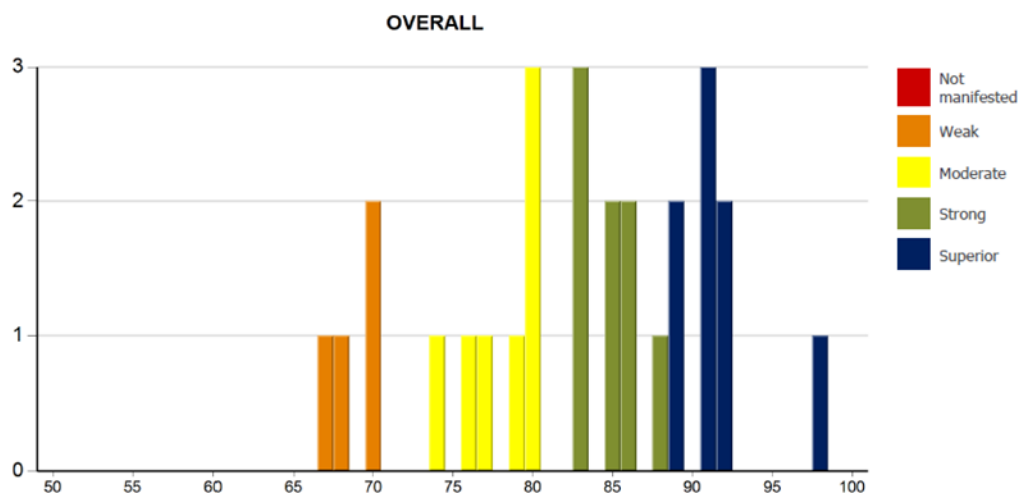
Figure 3. Cohort D- Intervention group- post-test: OVERALL score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort D- Intervention group- pre-test: EXPLANATION score

Descriptive Information: Explanation

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
26	85.0	86.0	6.8	1.3	68	95	82.0	91.0

This figure shows the Intervention group's EXPLANATION score on the pre-test. The colors represent score levels set by Insight Assessment.   Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There was a participant that scored in the weak category. There were also participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.
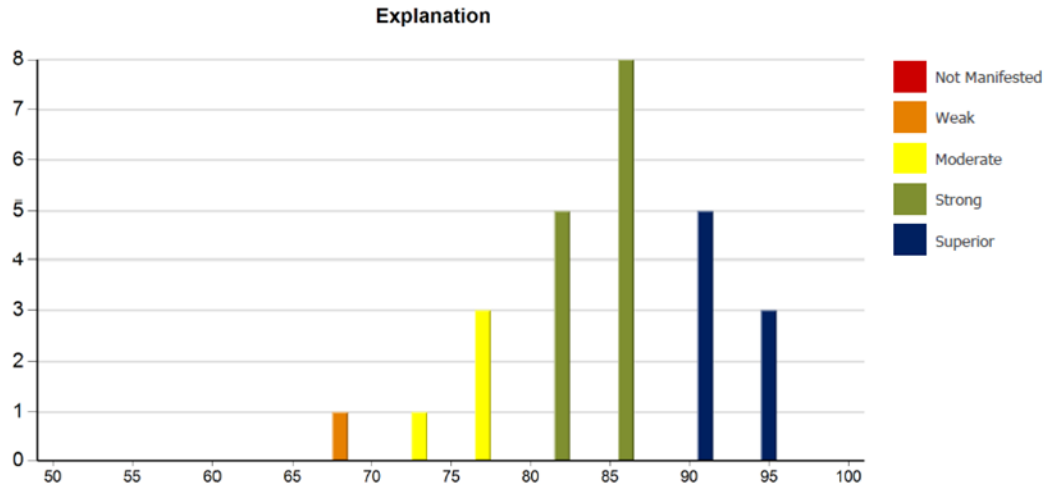
Figure 4. Cohort D- Intervention group- pre-test: EXPLANATION score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort D- Intervention group- post-test: EXPLANATION score

Descriptive Information: Explanation

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
27	82.9	86.0	8.9	1.7	64	95	77.0	91.0

This figure shows the Intervention group's EXPLANATION score on the post-test. The colors represent score levels set by Insight Assessment. Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There was a participant that scored in the weak category. There were also participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.
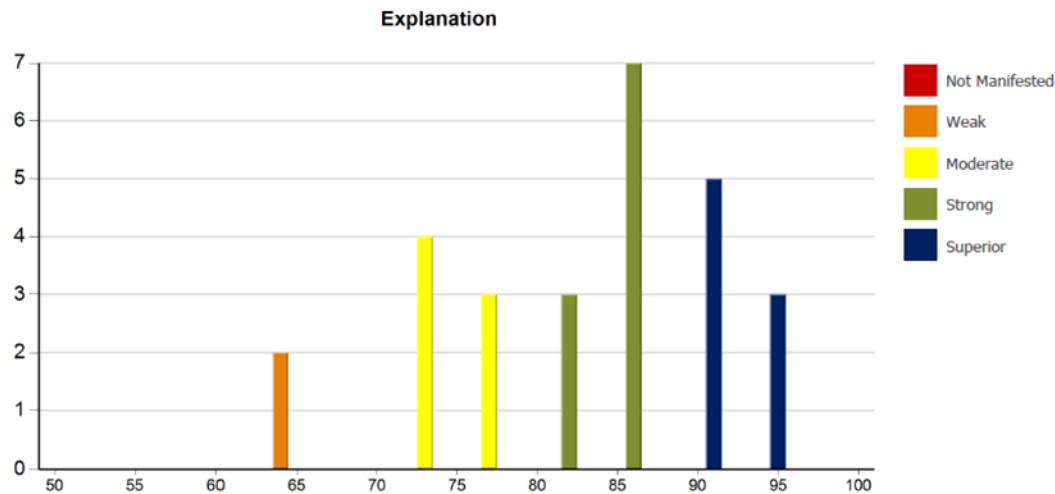
Figure 5. Cohort D- Intervention group- post-test: EXPLANATION score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort E- Control group- pre-test: OVERALL score

Descriptive Information: OVERALL

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
30	82.1	82.0	5.8	1.1	67	91	79.0	86.0

This figure shows the Control group OVERALL score on the pre-test. The colors represent score levels set by Insight Assessment.   Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There were two participants that scored in the weak category. There were also participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.
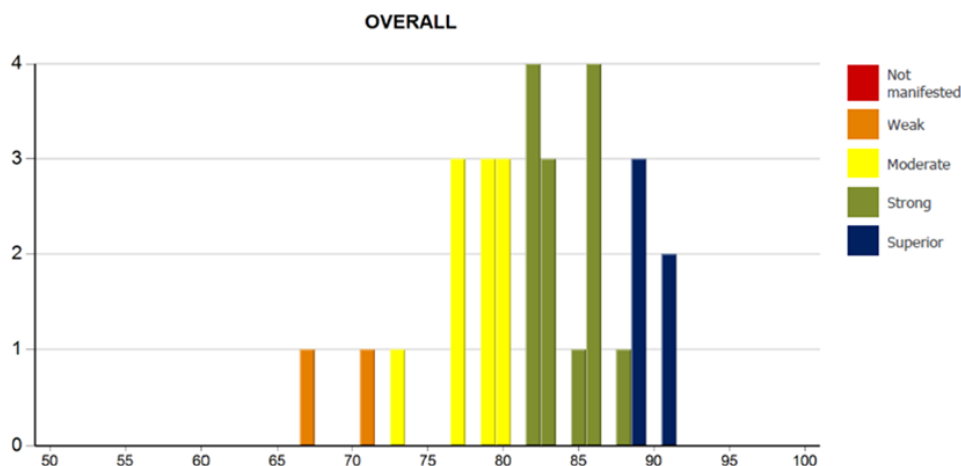
Figure 6. Cohort E- Control group- pre-test: OVERALL score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort E- Control group- post-test: OVERALL score

Descriptive Information: OVERALL

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
20	82.1	83.0	7.4	1.7	62	92	79.0	88.0
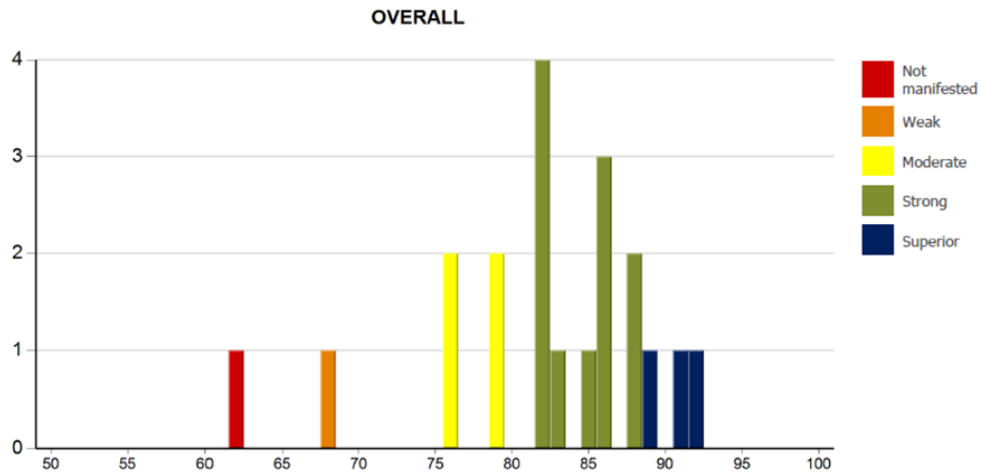
This figure shows the Control group OVERALL score on the post-test. The colors represent score levels set by Insight Assessment.   Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There was a participant that scored in the weak category. There were also participants in the superior score levels. One participant was in the not manifested category. This participant's test could not be scored as it was not completed in the allotted time. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.

Figure 7. Cohort E- Control group- post-test: OVERALL score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort E- Control group- pre-test: EXPLANATION score

Descriptive Information: Explanation

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
30	84.6	86.0	7.9	1.4	55	95	82.0	91.0
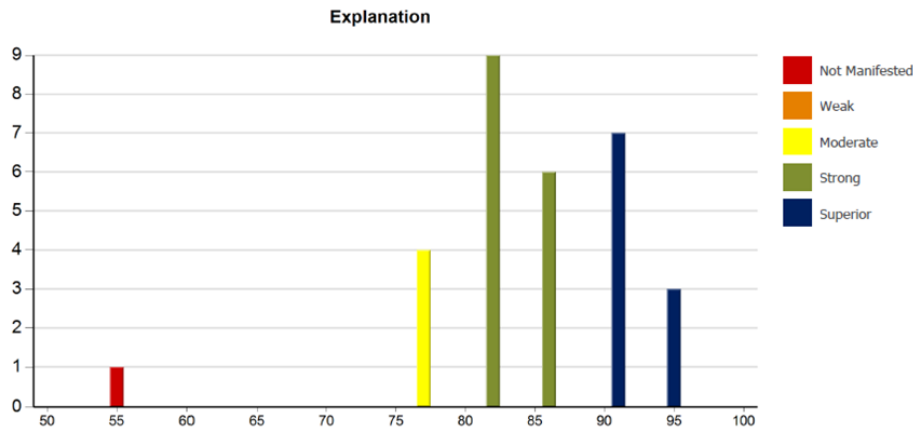
This figure shows the Control group EXPLANATION score on the pre-test. The colors represent score levels set by Insight Assessment. Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There were also participants in the superior score levels. One participant was in the not manifested category. This participant's test could not be scored as it was not completed in the allotted time frame. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.
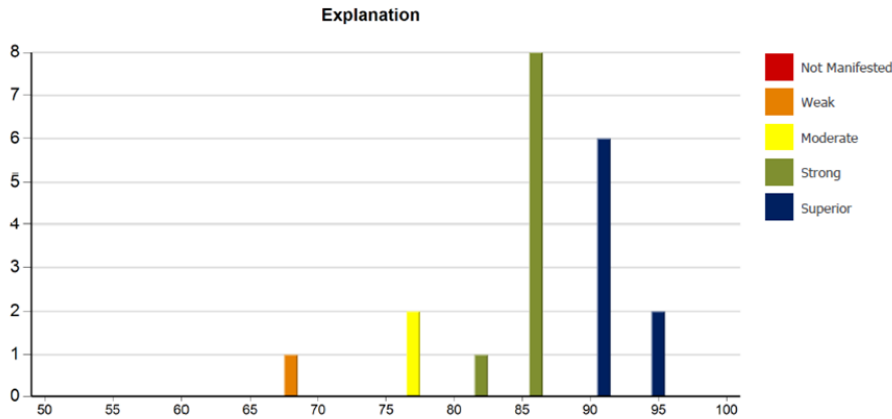
Figure 8. Cohort E- Control group- pre-test: EXPLANATION score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Cohort E- Control group- post-test: EXPLANATION score

Descriptive Information: Explanation

N	Mean	Median	Standard Deviation	SE Mean	Minimum	Maximum	Quartile 1	Quartile 3
20	86.4	86.0	6.5	1.5	68	95	86.0	91.0

This figure shows the Control group EXPLANATION score on the pre-test. The colors represent score levels set by Insight Assessment. Yellow and green are labeled moderate and strong categories. You can see that most participants in the Intervention cohort scored in the moderate and strong levels. There were also participants in the superior score levels. X axis displays score ranges in numeric and color legend on right side of histogram. Y axis displays number of NR respondents.

Figure 9. Cohort E- Control group- post-test: EXPLANATION score

Results from: Insight Assessment; a division of The California Academic Press LLC, San Jose,

CA., USA. No permission needed for use of the histograms.

Appendix A

Nurse Residency Program Roles

Nurse residency program coordinator- responsible for the overall coordination of the program as well as day-to-day functioning; orients all new faculty and beginning nurse residents to the program; maintains program evaluation; assures compliance with standards; functions as a liaison for the national components of the program.

Nurse resident- completes the mandatory Nurse Residency Program by attending all scheduled events, active participation in workshops and seminars, evidence-based practice project, including the end-of –program presentation and completes evaluation surveys.

Resident facilitator- plans and facilitates Nurse Residency Program seminars; clinical resource, assists with evidence-based practice project, communicates regularly with the program coordinator, nurse residents, other resident facilitators, preceptors and nurse managers.

Content experts- present specific content related to their area of expertise at designated seminars; incorporate the Nurse Residency Program curriculum objectives into all presentations; serve as resources to the nurse residents.

Preceptor- functions as a teacher, advocate and role model in guiding, directing and overseeing the clinical practice of the nurse residents; encourages participation by the nurse residents; maintains open communication with resident facilitator concerning the nurse residents' progress and evidence-based project.

Unit manager- encourages and facilitates the nurse residents' full participation in the Nurse

Residency Program; assists with scheduling issues, supports the evidence-based project,

maintains open communication and attends the end-of-program celebration.

Adapted from 2015 UHC/AACN Nurse Residency Program Guide

https://www.vizientinc.com/Our-solutions/Clinical-Solutions/Vizient-AACN-Nurse-Residency-Program

Accessed October 1, 2017

Appendix B

Project formal agreement

6/29/2016

Susan Galloway, PhD, RN
Director, Nursing Professional Development Services
University of Virginia Medical Center
999 Grove St., Charlottesville, VA 22908

To Whom It May Concern,

I am pleased to submit this letter as the formal agreement for Sharon Bragg, MSN, RN, CCRN, to carry out her Doctor of Nursing Practice Project with the department of Nursing Professional Development Services, University of Virginia Medical Center. Her project to evaluate the use of a resident facilitator model to improve clinical reasoning for nurse resident education is of great interest to my team of professional nurse educators. Ms. Bragg will be working with the Nursing Professional Development Services office starting in August of 2016 and we anticipate she will finish her project in the summer of 2017.

I look forward to contributing to Ms. Bragg's education and assisting her as she develops nursing research skills.

Very Respectfully,

Susan Galloway, PhD, RN
Director, Nursing Professional Development Services

Appendix C

2016 NRP Resident Facilitator (RF) Training Agenda

Aug 8, 1300-1500:

1300-1345   Introductions, Overview, RF Role and Responsibilities

1345-1400   Curriculum Overview   .

1400-1500   Critical Thinking (CT) and Critical Reasoning (CR) in Nursing Practice

Aug 11, 1200-1400:

1200-1245   Socratic Questioning to Promote Clinical Reasoning

1245-1400   Designing the Socratic Seminar

2016 NRP RF Training: Total of 4 hours

Goal: Identify & implement effective ways to help Nurse Residents think about their thinking.

  Objectives:

1.   Describe NRP curriculum including the role of RF

2.   Define Critical Thinking (CT) in Nursing Practice

3.   Discuss Elements of Thought in CT concepts

4.   List 3 elements of CT to implement in the RF role

5.   Describe the relationship between Socratic questioning, CT & Clinical Reasoning (CR)

6.   Incorporate Socratic questioning methods to a scenario-based nursing care situation delivered in a seminar setting

Specialty areas represented at the training:

- ICU/IMU
- Adult acute care
- Women's Health
- Pediatrics
- Neonatal ICU
- ED
- OR
- Long term care
- Staffing Resource Office
- Ambulatory

Resources used for the training agenda:

Peter Facione: The Definition & Purpose of Critical Thinking   (video)

> https://www.youtube.com/watch?v=J0yEAE5owWw

Paul, R., & Elder, L. (2016). Thinkers Guide to Socratic Questioning, Tomales, CA: Foundation

> for Critical Thinking.

Elder, L. and Paul, R. (2004). The Thinker's Guide to the Art of Strategic Thinking: 25 Weeks

> to Better Thinking and Better Living. Retrieved from

> http://wwww.ciriticalthinking.org/pages/becoming-a-critic-of-your-thinking/478

Dickerson,Pamela S. (2005). Nurturing Critical Thinkers. The Journal of Continuing Education

> in Nursing, 36, 68-72.

Vizient NPR guide: link found in www.virginia.edu/collab

> Vizientinc.com   NRP Guide

Appendix D

Project Title: Improving clinical reasoning in new nurse residents:
A proposal to evaluate a resident facilitator model in a nurse residency program

Informed Consent Agreement

Please read this consent agreement carefully before you decide to participate in the study.

Purpose of the research study: The purpose of this pilot study is to investigate the clinical reasoning skills of new nurse residents in a nurse residency program using a resident facilitator model in an established nurse residency program.

What you will do in the study: Phase I of the study: In September 2016 and October 2016 two cohorts of nurse residents enrolled in the NRP will be given an online link to the **pre-test** to assess critical thinking and clinical reasoning at the beginning of their NRP. The online assessment test takes approximately 45 minutes to complete.

Phase II of the study: In March 2017 and April 2017, a **post-test** to assess critical thinking and clinical reasoning will be administered online to the two cohorts. The online assessment test takes approximately 45 minutes to complete.

Time required: The study will require about 2 hours of your time. (Two online assessment sessions lasting approximately 45 minutes each: the pre-test and the post-test.)

Risks: There are no anticipated risks in this study.

Benefits: There are no direct benefits to you for participating in this research study. The study may help add knowledge to already known information about nurse resident education and transition to practice for the advanced beginner nurse. For the study participants, the pre-test and post-test survey scores they will receive related to the assessment of their critical thinking and clinical reasoning may assist the individual nurse on ways to enhance and develop plans for personal growth and professional development.

Confidentiality: The information that you give in the study will be handled confidentially. Because of the nature of the data, it may be possible to deduce your identity once final assessment scores are received; however, there will be no attempt to do so and data will be reported in a way that will not identify an individual. Privacy of the study participants is protected by utilizing individual online access for the study participant's surveys. Individual participant identifiers will be linked to the data so the participants can see their own assessment scores related to critical thinking and clinical reasoning. No recording devices will be used. Consents will be stored in a secured file located in a locked office. There are no other materials to store.

Confidentiality: All attempts to protect confidentiality will be in place for the study. Data will only be accessible to the study participant, the study investigator(s) and the nurse resident program Director.

Revision date: 11/01/11
Page 1

IRB-SBS Office Use Only		
Protocol #	2016-0299-00	
Approved	from: 9/29/16	to: 9/28/17
SBS Staff		

Project Title: Improving clinical reasoning in new nurse residents:
A proposal to evaluate a resident facilitator model in a nurse residency program

Voluntary participation: Your participation in the study is voluntary.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.

How to withdraw from the study: Please notify Sharon Bragg (slb4w@virginia.edu), Sue Galloway (sjg8d@virginia.edu) or Linda Peffley-Firer (lmp@virginia.edu) if you wish to withdraw from the study.

Payment: You will receive no payment for participating in the study.

If you have questions about the study, contact:

Sharon Bragg, MSN, RN, CCRN
Medical ICU, Box 801456
University of Virginia Health System, Charlottesville, VA 22903
Telephone: (434) 982-1049 (office)
slb4w@virginia.edu

Or

Susan Galloway, PhD, RN
Director, Nursing Professional Development Services
University of Virginia Medical Center
999 Grove St., Charlottesville, VA 22908
434-465-8918 (cell)
sjg8d@virginia.edu

Faculty Advisor:
Elizabeth Friberg, DNP, RN
University of Virginia School of Nursing
202 Jeanette Lancaster Way
Charlottesville, VA 22903
Telephone: (434) 924-0114
eef3c@virginia.edu

If you have questions about your rights in the study, contact:
Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: (434) 924-5999

Revision date: 11/01/11
Page 2

IRB-SBS Office Use Only		
Protocol #	2016-0299-00	
Approved	from: 9/29/16	to: 9/28/17
SBS Staff	SMR	

Project Title: Improving clinical reasoning in new nurse residents:
A proposal to evaluate a resident facilitator model in a nurse residency program

Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Agreement:
I agree to participate in the research study described above.

Signature: _____ Date: _____

You will receive a copy of this form for your records.

IRB-SBS Office Use Only		
Protocol #	2016-0299-00	
Approved	from: 9/29/16	to: 9/28/17
SBS Staff	smH	

Appendix E

Journal for Nurses in Professional Development

Online Submission and Review System

Author Resources
Author Guidelines (this page)
Copyright Transfer (PDF)
Reprint Ordering
Permissions Requests
Permission Form

Editorial Objectives

The *Journal for Nurses in Professional Development* is the official publication of the Association for Nursing Professional Development (ANPD) and is designed for professional development educators as a source of information on (1) planning, implementing, and evaluating professional development and inservice educational activities; (2) administration of professional development or inservice education departments; (3) research; (4) technological and other innovations; (5) issues in professional development and/or inservice education; and (6) patient education.

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Online manuscript submission: All manuscripts must be submitted online through the new Web site at http://www.edmgr.com/jnpd/. **First-time users:** Please click the Register button from the menu above and enter the requested information. On successful registration, you will be sent an e-mail indicating your user name and password. *Note:* If you have received an e-mail from us with an assigned user ID and password, or if you are a repeat user, do not register again. Just log in. Once you have an assigned ID and password, you do not have to re-register, even if your status changes (that is, author, reviewer, or editor). **Authors:** Please click the log-in button from the menu at the top of the page and log in to the system as an Author. Submit your manuscript according to the author instructions. You will be able to track the progress of your manuscript through the system. If you experience any problems, please contact us through the "Contact Us" tab along the top of every page of the submission site.

Manuscript Preparation

Leave one-inch margins and use double spacing throughout (including tables, figures, and references). Do not justify text.

Number the pages at the upper right from the first page of the text to the end of the references. The preferred length of a manuscript is 12-16 pages including figures, tables, and references.

Also include the following:

An *abstract* of the article (approximately 50-75 words) that gives an overview of the article and *clearly states the specific benefits* of the article for staff development educators. Do not cite references in the abstract. Spell out abbreviations and acronyms.

Author Biography. Include full name followed by suitable abbreviations for both professional licenses and the highest degree earned; honorary degrees in order of bestowal; professional or occupational title; and current position.

EXAMPLE: Marci J. Smith, MSN, RN, is Director of Staff Development at Memorial Hospital, Anytown, USA.

Title Page. Submit this page as a separate file when you are instructed to attach files to your

ttp://edmgr.ovid.com/jnsd/accounts/ifauth.htm

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submission. Include the title of the article and the author's name, preferred address, telephone number, fax number, and e-mail address. Author identification should appear *only* on the title page of the manuscript.

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The author must request permission for the use of material owned by others such as any copyrighted material: tables, charts, forms, and figures. All letters of permission should be submitted with the manuscript.

References, Tables, and Figures

Use the *Publication Manual of the American Psychological Association, Sixth Edition, 2010*, for style and format guidelines.

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1. Learn about the publication requirements for Digital Artwork: http://links.lww.com/ES/A42
2. Create, Scan and Save your artwork and compare your final figure to the Digital Artwork Guideline Checklist (below).
3. Upload each figure to Editorial Manager in conjunction with your manuscript text and tables.

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Here are the basics to have in place before submitting your digital artwork:

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- Crop out any white or black space surrounding the image.
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Appendix F

DRAFT MANUSCRIPT

Title Page

Assessing clinical reasoning in nurse residents:

Evaluating a resident facilitator model in a nurse residency program

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Abstract

Project evaluated clinical reasoning skills of nurse residents in a nurse residency program using a resident facilitator model embedded with Socratic questioning and peer reflection group techniques. Intervention and control cohorts were assessed using a web-based instrument with pre-test and post-test assessments. Comparative analysis demonstrated no statistically significant difference between the intervention cohort (M= -.800, SD=4.79) and the control cohort (M=0.20, SD=5.33) in the improvement of clinical reasoning; t (43) = -.661, p=.512 > 0.05).

Nurse residency programs (NRP's) are important to the growth and clinical development of new nurses as they transition to practice, however most nurse residents lack the level of clinical reasoning needed to safely care for patients (Letourneau & Fater, 2015). The Institute of Medicine describes NRP's as "planned, comprehensive periods of time during which nurse residents can acquire the knowledge and skills to deliver safe, quality care that meets defined (organizations or professional society) standards of practice" (2011, p 120-121). NRPs require a curriculum that connects to a nurse's daily clinical practice and covers content applicable to nursing practice (Zinn, Guglielmi, Davis & Moses, 2012).

Introduction

The American Association of Colleges of Nursing (AACN) and the National League for Nursing Accrediting Commission (NLNAC), both accrediting agencies for nurse education programs, set the standards for nursing education programs. Both organizations treat the concept of critical thinking as a core element of nursing curricula and require measurement of this concept as an outcome in evaluating nursing education programs. Vizient formerly known as the University Hospital Consortium, is an alliance of the nation's leading nonprofit academic medical centers and their affiliated hospitals and is focused on delivering world-class patient care. In March 2000, the Consortium and accrediting bodies collaborated in developing an evidence-based curriculum for the graduate nurse, called the Nurse Residency Program™ (NRP), to improve new graduate transition to practice and patient care (Vizient, 2016a). The NRP curriculum requires specific competency development in critical thinking and leadership abilities (Vizient, 2016b). Participating hospitals use a 12-month customizable curriculum framework that

emphasizes critical thinking and clinical reasoning skill development through new graduate peer group interactions and self-reflection. The NRPs framework curriculum aids in clinical knowledge acquisition (Clark & Springer, 2012; Anderson, Hair & Todero, 2012; Goode, McElroy, Bednash & Murray, 2013). As critical thinking develops, the clinical reasoning ability of the nurse resident develops. Clinical reasoning is defined as a situated, practice-based form of reasoning that requires the nurse resident to have a beginner knowledge level about general nursing skills and interventions and their application to a specific patient situation (Benner, Hughes & Sutphen, 2008). Clinical reasoning can also be defined as the ability to sort through many details and develop a plan, change a plan or intervene appropriately within that plan (Pinnock & Welch, 2014).

Many transition to practice programs (TPP) and NRPs are based on the components of the Benner's novice to expert framework (1984), merging knowledge development and clinical skill acquisition. The newly graduated nurse will need both practice and coaching to develop these skills, and thereby develop clinical reasoning. The NRPs provide monthly classes for the nurse residents. These classes are facilitated by experienced nurses who have had specialized training called resident facilitators. Newly graduated nurses taught by more experienced nurses in facilitated sessions, have an opportunity to improve their knowledge and have enhancement in their skill development. This author evaluated the use of a resident facilitator model for a NRP class to improve the clinical reasoning ability of the nurse resident.

Literature Review

An integrative review of the literature was conducted to identify the major issues and strategies for promoting clinical reasoning in nurse residency programs. A search of literature was conducted using EBSCO with full text, CINAHL with full text, OVID, Joanna Briggs and

Web of Science using the following search terms: nurse residency programs, critical thinking and clinical reasoning. The initial search yielded 64 documents using the terms 'nurse residency' and 'clinical reasoning'. The search was further refined by adding the search word "nursing" and searching only articles from the year 2010 to 2015. The reference list reduced to a count of 33. The inclusion criteria were: the study of a nurse residency program as subject of article; or the assessment of how nurses develop clinical reasoning. The exclusion criteria were: articles before 2010; articles with no mention of clinical reasoning or critical thinking, and opinion papers about nurse residency programs. One article was from 2006, and a decision was made to include it in the literature review because the article addressed how pediatric nurses make clinical decisions. With a final sample of 13 articles, six of the articles focused on the nurse residents' transition to practice and clinical reasoning development. Three of the articles were systematic reviews of nurse residency programs. Four articles focused on the implementation of NRPs.

Pertinent Findings of Literature Review

The purpose of the literature review was to review NRPs and clinical reasoning. There were studies and articles that evaluated new resident nurse related to their knowledge development. Many studies addressed the Benner novice to expert framework (1984) and how it describes the knowledge and skill development of nurses. In combining skill acquisition theory and knowledge theory with the design of the NRPs, similar themes emerged in the literature review. Two basic components of the NRPs include: a set curricula design and a supportive preceptor. The evidence establishes that part of the acquisition of new knowledge should be the use of a resident facilitator during case based scenarios, and subsequent self-reflection by the nurse resident (Anderson, et al., 2012, Clark & Springer, 2011, Wiles, Simko, Schoessler, 2013). NRPs demonstrated their assistance to the nurse resident as they transitioned to practice.

(Adams, et al., 2015; Anderson, et al., 2012; Fiedler, Read, Lane, Hicks & Jegier, 2014; Goode, et al., 2013; Wiles, et al., 2013).

Using a cohort model for participation creates an environment of learning and reflective sharing (Anderson, et al., 2012). The scheduled seminar sessions promote clinical reasoning as the nurse residents learn from trained preceptors or teachers (resident facilitators), and share their clinical experiences (Goode, et al., 2013; Wiles, et al., 2013). These sessions provide opportunities to explore how clinical decisions are made and allow for self-reflection on future actions the next time a similar clinical situation occurs.

The literature review supports the need for NRPs. The new nurse resident gains knowledge and skill in the first 12 months of entering their work environment. The nurse resident's foundational knowledge and skill acquisition is supported by the stable relationship with their preceptor, the charge nurse and the unit or hospital leadership (Adams, et al., 2015; Anderson, et al., 2012; Fiedler, et al., 2014; Goode, et al., 2013; Wiles, et al., 2013). Nurse residents reported feeling supported as they gained knowledge to care for patients and gained experience in the NRP settings led by resident facilitators or clinical experts.

Methodology

The use of a resident facilitator model can support the successful transition for the new nurse resident. The use of case studies for nursing education is an established method utilized for skill and knowledge development. Clinical reasoning is a deliberate process where conclusions are identified using actual experiences or suggested interventions in case based scenarios. The aim of the pilot project was to evaluate the use of a resident facilitator model after nurse residents had sessions using Socratic questioning and case based 'what if' scenarios using an

assessment instrument for clinical reasoning improvement at the end of the NRP. The nurse residents were prompted with questions during these case based scenarios. The Socratic seminar was led by a resident facilitator who had been trained to use Socratic questioning. As the nurse residents participated in the discussion and also listened to the comments of others, they can begin to think critically for themselves. Socratic questioning, or thinking about how to think, and the 'talk aloud' method (Pinnock & Welch, 2013) can enhance critical thinking and clinical reasoning.

This pilot project was a quasi-experimental, pre-test and post-test design with a comparison group analysis. The subjects for the pilot project were a convenience sample of new graduate nurses (nurse residents) hired to work in an academic medical center (AMC) in central Virginia. The inclusion criterion included participants who met all hiring standards set by the AMC and nurse residents assigned to specific cohorts by the date of hire.

Research Design

The AMC supported the purchase of electronic seats for the nurse residents to access an online assessment instrument. The HSRT-N is a content-validated, online, clinical reasoning assessment instrument (Insight Assessment, June 2016; Facione, 1990).

Prior to this project, the NRP used a classroom style for all twelve of the NRP sessions. This project planned four NRP classroom sessions, utilizing Socratic questioning in conjunction with small breakout groups based on specialty areas worked. The pre-test assessment tool and the post-test assessment tool were administered to the intervention cohort and the control cohort in specific scheduled sessions. The data were collected online by the Insight Assessment and retrieved by web access by the project investigator.

The HSRT-N measurement instrument provided a discipline neutral measure of reasoning skills and is widely used to assess clinical reasoning in the health care field. The HSRT-N assessed critical thinking and reasoning in case based scenarios. The measurement did not test knowledge. The online assessment consisted of 38 scenario based multiple choice questions.

The pre-test HSRT-N was administered using internet access and laptop computers furnished by the NRP to the intervention group, Cohort D, and control group, Cohort E, during their respected class sessions. After Institutional Review Board (IRB) approval, the online assessments were administered October 2016 and November 2016, respectfully (IRB #2016-0299-00). The post-test was administered to the intervention group, Cohort D (n=25), in April 2017 and the control group, Cohort E (n=20), in May 2017. This project was not able to alter the established dates of the NRP cohorts related to scheduling pre-tests and post-tests.

Results

Statistical analysis was conducted using SPSS 24 Software (SPSS, Inc., Chicago, Illinois). Data were analyzed using matched pairs for the intervention and control cohorts using a 0.05 level of significance with data points. The sample size of the cohorts was appropriate to analyze.

The matched pairs for the intervention cohort was predominantly female n= 22 at 88%. The control cohort was predominantly female n= 18 at 90%. The project participants self-identified as White, Caucasian, Anglo-American with n=40, 88.9%. Other project participants self-identified as Black, African-American, Hispanic, Latino or Mexican American at n=5, 11.9%. The combined cohorts were all prepared as Associate Degree (ADN), Bachelor Degree (BSN) and Master Degree (MSN) nurses. There were no diploma graduates in the combined

cohorts. The majority of the NRs were BSNs at n=28, 62.2%; ADNs numbered at n=10, 22.2%

and MSNs at n=7, 15.6%. The participants worked in a variety of patient care areas. The main

areas that were self-identified, included: adult acute care n=15, 33.3%; adult critical care n=5,

11.1%; adult intermediate care n=4, 8.9% and the OR n=4, 8.9%. See Table 1 for details on

nursing degrees and areas worked.

Table 1

Post-Test Cohort Demographics

	Cohort D-Post-test Intervention Cohort n=25 (%)	Cohort E- Post-test Control Cohort n=20 (%)
Gender		
Female	22 (88%)	18 (90%)
Male	3 (12%)	2 (10%)
Age (years)		
Mean age	27.4	25.1
Std. Deviation	7.153	4.340
Minimum	22.0	22.0
Maximum	48.0	38.0
Nursing Degree		
Associate Degree	6 (24%)	4 (20%)
Bachelor's Degree	14 (56%)	14 (70%)
Master's Degree	5 (20%)	2 (10%)
Ethnicity		
Black, African American	4 (16%)	0 (0%)

Hispanic, Latino, Mexican American	1 (4%)	0 (0%)
White, Caucasian, Anglo-American	20 (80%)	20 (100%)

Area Worked in Hospital	n=25	n=20
Acute Care-Adult	6 (24%)	9 (45%)
Critical Care-Adult	4 (16%)	1 (5%)
ED	3 (12%)	0 (0%)
Intermediate Care-Adult	1 (4%)	3 (15%)
Pediatrics-Acute	0 (0%)	3 (15%)
Procedural	0 (0%)	1 (5%)
OR	4 (16%)	0 (0%)
PACU	2 (8%)	1 (5%)
Neonatal	0 (0%)	2 (10%)
L and D/Women's	3 (12%)	0 (0%)
Ambulatory	2 (8%)	0 (0%)

The post-test participant ages ranged from 22 to 48 years old. The ages of 22-24 years old represented 47.7% of the post-test combined cohorts. The ages 25-30 years old were 27.2% of the combined cohorts. The ages of 31-39 years old represented 12.6% of the combined cohorts. The outliers were 45 and 48 year olds representing 4.2% of the combined cohorts. The mean age was 27.4 years old (SD=7.153 years) in the intervention cohort. The mean age was 25.1 years old (SD= 4.340 years) in the control cohort.

In consultation with the Insight Assessment, the post-test minus the pre-test overall score of the HSRT-N was used to evaluate the project. A paired t-test was done to assess post-test minus pre-test differences. The intervention cohort had a mean post-test minus pre-test score of -.8000 (SD=4.79583) and the control cohort had a mean post-test minus pre-test score of .2000 (SD=5.33706). These results indicate that the intervention of the use of a resident facilitator model in a NRP did not indicate statistical significance in improving overall clinical reasoning scores for the NR; t (43) = -.661, p=.512 > 0.05. Within the HSRT-N subtypes of clinical reasoning scores analyzed, 'explanation' had the greatest difference in mean post-test minus pre-test scores between the intervention cohort (-2.48, SD= 7.24063) and the control cohort (2.1500, SD= 7.93576). The explanation subtype scores were statistically significant for clinical reasoning using the HSRT-N; t (43) = -2.043, p=.047 < 0.05. (See Table 2 and Table 3 for details.)

A variance identified was NRP session attendance. The NRs had the opportunity to attend other cohort sessions if needed due to work schedules or illness, so there was intervention cohort and control cohort attendance crossover at some of the 4 sessions. Computer logins for each cohort helped assure that pre-tests and post-tests were done correctly. The demographic characteristics data were compared on who attended the 4th session and who missed the 4th session. Cross tabulation tests were also performed on the demographics of gender, ethnicity, RN degree level and areas worked. This was not significant.

Table 2: Post-test minus pretest scores of the matched pairs

	Intervention Cohort D Mean score	Intervention Cohort D Standard Deviation		Control Cohort E Mean Score	Control Cohort E Standard Deviation
OVERALL	-.800	4.79583		0.200	5.33706
Analysis	-2.6000	7.10634		0.7500	7.69056
Interpretation	1.8	8.14964		3.5	8.19804
Inference	.3600	6.92748		1.0500	7.38045
Evaluation	-1.600	8.41467		-.0500	5.75349
Explanation	-2.4800	7.24063		2.1	7.93576
Induction	-1.4000	6.05530		-.7000	6.61020
Deduction	-.0400	7.73240		1.2500	8.23264
Numeracy	.1200	8.46227		2.6	7.34327

95% CI

Table 3: Overall score and Explanation score with paired t-test results

	Intervention Cohort PRE-test M (SD)	Intervention Cohort POST-test M (SD)	Control Cohort PRE-test M (SD)	Control Cohort POST-test M (SD)	Mean difference p value
HSRT-N **Overall** Score	-0.800	4.79583	0.200	5.33706	.512 $p > .05$
HSRT-N **Explanation** Score	-2.4800	7.24063	2.1	7.93576	.047 $p < .05$

DISCUSSION

Clinical reasoning is an expected outcome as NRs build their skill and knowledge to safely care for patients. The NRs in this project are all in Benner's Stage 2: Advanced Beginner phase of knowledge and skill acquisition; with less than 12 months on the job. The curricula of NRPs aid in clinical knowledge acquisition (Clark & Springer, 2012; Anderson, et al., 2012; Goode, et al., 2013). Critical thinking development improves the clinical reasoning ability of the NR and the ability to apply the knowledge and skill to an individual patient (Benner, et al., 2008).

The resident facilitator model provided an opportunity for NRs in the intervention cohort to break into small discussion groups for the purpose of sharing clinical experiences and learning. These small groups were divided by areas worked so the NRs could hear and learn from their similar patient experiences. These small break-out groups allowed opportunities for sharing in an intimate setting for the NR. The RFs for the intervention sessions were trained in the use of Socratic questioning with a 4-hour training session. The project was not able to control

for the individual nuances of leading the sessions by the RF who was instructed in the use of

Socratic questioning. It is unknown if this factor had an influence on the intervention cohort or

control cohort data.

The project does not demonstrate why the explanation subtype of learning category score

for the intervention cohort was lower. You may conjecture that the NR not being able to discuss

in a clear, logical and pertinent way what their clinical reasoning was in situations. Most NRs

have not yet developed visionary thinking. The project does not demonstrate why the control

cohort had an improved score in the explanation subtype of learning category. Being able to

explain allows NRs to discover, test and articulate the reasons for their clinical decision making.

Unsolicited feedback from control group participants who attended an intervention

session indicated that the small group RF Socratic questioning sessions were preferred. NRs who

had experienced an intervention session expressed that every NRP class "should be done that

way" and "I like spending time with other nurses in my area". Many requested that the rest of

their NRP be done in the resident facilitator breakout session model using Socratic questioning.

Implications for Nursing

Research supports the use of NRPs for the NRs (Anderson, et al., 2012). NRs benefit

from mentoring and teaching relationships with preceptors or instructors (Goode, et al., 2013;

Wiles, et al., 2013). This project provided evidence that the nurse facilitator model with

embedded Socratic questioning in a NRP did not improve the overall score when using the

HSRT-N instrument. There was statistical significance in the explanation subtype of knowledge

development, demonstrating that this area of critical thinking may need attention as NRP

curriculums are developed in the future. There is also an opportunity to educate the

preceptors/nurse facilitators in the area of 'explanation' for the NR. The use of Socratic

questioning and the focus on building explanation skills can support NRs as they attend NRP

classes and have clinical experiences in their work areas. A future longitudinal study would

strengthen understanding of how the use of a nurse facilitated with embedded Socratic

questioning may improve clinical reasoning. Future studies should assess if employment

retention rates or specific patient outcomes improve for NRs transitioned to practice using a

nurse facilitation model with embedded Socratic questioning and small peer group reflection

techniques.

References

Adams, J. M., Alexander, G. A., Chiari, R. G., Banister, G., McCauley, M. E., Whitney, K. B., & Erickson, J.I., (2015). Strengthening new resident nurse residency programs in critical care: Recommendations from nurse residents and organizational stakeholders. Journal of Continuing Education in Nursing, 46(1), 41-48. https://doi.org/10.3928/00220124-20151217-01

Anderson, G., Hair, C., & Todero, C. (2012). Nurse residency programs: An evidence-based review of theory, process, and outcomes. Journal of Professional Nursing, 28(4), 203-212. doi:10.1016/j.profnurs.2011.11.020

Benner, P. (1984). From novice to expert: Excellence and power in clinical nursing practice. Menlo Park: Addison-Wesley.

Benner P, Hughes R. & Sutphen M. (2008). Chapter 6: Clinical Reasoning, Decision making, and Action: Thinking Critically and Clinically. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. In R. Hughes (Editor). Rockville, Maryland (US): Agency for Healthcare Research and Quality.

Clark, C. M., & Springer, P. J. (2012). Nurse residents' first-hand accounts on transition to practice. Nursing Outlook, 60(4), e2-8. http://dx.doi.org/10.1016/j.outlook.2011.08.003

Facione, P. (1990) *Critical-thinking: A Statement of Expert Consensus for Purpose of Educational Assessment and Instruction*. Millbrae, CA: California Academic Press,

Fiedler, R., Read, E. S., Lane, K. A., Hicks, F. D., & Jegier, B. J. (2014). Long-term outcomes of a post baccalaureate nurse residency program. Journal of Nursing Administration, 44(7), 417-422. doi:10.1097/NNA.0000000000000092

Goode, C., Lynn, M., McElroy, D., Bednash, G., & Murray, B. (2013). Lessons Learned from 10 years of research on a Post-Baccalaureate Nurse Residency program, Journal of Nursing Administration. 43(2), pp 73-79. http://dx.doi.org/10.1097/NNA.0b013e31827f205c

Insight Assessment. (2016, June25). California Critical Thinking Skills Test. Product summaries: California Critical Thinking Skills Test (HSRT-N). Retrieved from https://www.insightassessment.com/Products/Products-Summary/Critical-Thinking-Skills-Tests/Health-Sciences-Reasoning-Test-Numeracy-HSRT-N

Institute of Medicine of the National Academies (Report brief October 2010). Future of Nursing Focus on Education. (2010, October). Retrieved from National Academies website: http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2010/The-Future-of-Nursing/Nursing%20Education%202010%20Brief

Letourneau, R. M., & Fater, K. H. (2015). Nurse residency programs: An integrative review of the literature. Nursing Education Perspectives, 36(2), 96-101. doi:10.5480/13-1229

Pinnock, R., & Welch, P. (2014). Learning clinical reasoning. Journal of Paediatrics & Child Health, 50(4), 253-257. doi: http://dx.doi.org/10.1111/jpc.12455

Vizient/AACN Nurse Residency Program Guide (2015). Retrieved October 2017 from http://www.aacnnursing.org/Portals/42/AcademicNursing/NRP/Nurse-Residency-Program

Vizient Incorporated. (2016a) Homepage President and CEO purpose statement. Retrieved from

    https://www.vizientinc.com/what-we-do

Vizient Incorporated. (2016b) https://www.vizientinc.com/Our-solutions/Clinical-

    Solutions/Vizient-AACN-Nurse-Residency-Program

Wiles, L., Simko, L. & Schoessler, M. (2013). What Do I Do Now? Clinical Decision Making by

    New Residents. Journal for Nurses in Professional Development, 29(4). pp 167-172. doi:

    http://dx.doi.org/10.1097/NND.0b013e31829aeab3

Zinn, J. L., Guglielmi, C. L., Davis, P. P., & Moses, C. (2012). Addressing the nursing shortage:

    the need for nurse residency programs. American Operating Room Nurses Journal. 96

    (6). Pp 652-657. doi: https://doi.org/10.1016/j.aorn.2012.09.01