Benner's Theory of *Novice to Expert:*

Explicating the Effectiveness of Virtual Clinical Reality Simulation Education in Enhancing the Competence of Undergraduate Nursing Students

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Abstract:
Introduction:
Benner's Theory of Novice to Expert has yet to be used in application to Virtual Clinical Education. Little evidence is available that discusses the benefits of Virtual Clinical Education (VCE) to undergraduate students. This presentation will describe the benefits of Virtual Clinical Education through the application of Benner's Novice to Expert theory in relating how theoretically such a learning activity may enhance the clinical performance and level of skill acquisition of undergraduate nursing students.
Objectives:
After scrupulously examining Benner's theory of Novice to Expert, research must be conducted in how virtual clinical simulation enhance the performance of undergraduate students. Therefore, the research questions based on this theory are as follows: In undergraduate nursing students enrolled in the domain of medical surgical nursing courses, how does participation in virtual clinical education affect such students' perception of their ability to recognize aspects and attributes of a clinical situation, as well as, maxims and salient parts of such situations? Does participation in virtual clinical education develop perceived of competency and experience? Does student engagement in virtual clinical educations as a learning activity allow them to perceive themselves as having reached the advanced beginner, competent, or proficient level of medical surgical nursing performance? This study will aim to describe the medical surgical student nurse's conscious experience of virtual clinical education by exploring the aforementioned research questions. The meaning, structure, and essence of the lived experience of taking on the role of a nurse avatar during a virtual clinical education will be explored. The goal of the researcher is to gain access to the student nurse's life or inner world and subjective experience.
Results:
Subjects perceived themselves to be an advanced beginner as a result of the VCE experiences. The highest levels of medical surgical nursing performance perceived were competent and proficient in two separate students. Students found the virtual environmental features of patient charts, patient avatars, medication administration records, and electronic health records to assist them in learning how to implement nursing care. It is said to supplement lectures in a dynamic case study format that is "more interesting than just reading information". Students perceived it prepared them better for clinical experiences. Students are enabled to study the patient thoroughly and in a non-intimidating environment. An unexpected finding was that students reported they felt they would be better able to navigate patient charts and electronic health records as a result of the VCE experiences.
Students explained that the virtual clinical education experience would be useful if provided to students from the beginning of the semester so that they can integrate their experiences into true clinical practice. Virtual clinical education also is perceived to cause more effective transfer of knowledge in relation to critical thinking. Students perceive the simulated virtual clinical environment to induce less anxiety so they were provided "more time to think" so as to identify salient points of patient conditions. Students find the environment to be realistic possessing "all the aspects of the clinical experience minus the live bodies and interactions with patient, families, and the clinical team".
Conclusion:
Virtual clinical reality simulation is perceived by students to be a useful tool to facilitate their transfer of theoretical knowledge to practical knowledge. Nurse educators can attempt to cultivate the awareness of nursing students by presenting them with complex ill-defined, authentic tasks during virtual simulation scenarios. As a result, there is a shift that occurs so that students are able to retrieve relevant information and clinical reasoning occurs. This enables students to "perform skills in a real world problem solving context" (Onda, 2012, p. 279). Educators must strike a balance between teaching the cognitive base and enabling students with opportunities to put such knowledge to use, as situated learning theory encourages. As a result, clinical reasoning skills will be able to evolve. When virtual clinical simulation is used within nursing clinical education, a shift of nursing education's paradigm from teaching to learning will truly occur (Onda, 2012).

Key words: Virtual clinical education, Virtual reality simulation, Benner's Novice to Expert theory, Virtual clinical educations, Virtual clinical experience

INTRODUCTION

In the year of 2008, the United States reported a shortage of 116,000 nurses. In 2025, the shortage is predicted to increase to nearly half a million. It is projected that in 2016, the United States will need to educate approximately 1 million nurses which is forty percent of today's nursing workforce (Dohm & Shniper, 2007).

New graduate nurses must be prepared to work with an increased acuity of patients while mastering psychomotor and critical thinking skills in a rapid manner. Otherwise,

inadequate preparation will continue to cause the high turnover rates in new graduates that currently exists.

Theisen & Sandau (2012) identified six areas where new graduates lacked competence including communication, leadership, organization, critical thinking, specific situations, and stress management. It is recommended that 'schools of nursing should add situation-specific skills to their current focus on critical thinking, and clinical reasoning' (p. 406). New graduates are typically classified as advanced beginners according to Patricia Benner's theory of *Novice to Expert*(1984). However, to advance to this stage of clinical performance, such students need many clinical experiences made available to them. However, Jenson & Forsyth, identify four major areas that impede optimal learning through clinical experiences of nursing students including increased patient acuity, high student-to-nurse faculty ratio, patient safety concerns from faculty, and student anxiety"(p. 314).

This essay will explore the philosophical underpinnings, theory propositions, and major concepts of Benner's theory. This theory will also be linked to the effect of virtual clinical educations as a learning activity as a way to facilitate medical surgical nursing student performance. The concepts of the theory will be incorporated into a research question to explore this phenomenon. Finally, the theory will be evaluated for completeness.

PHILOSOPHICAL UNDERPINNINGS

Benner studied clinical nursing practice in an effort to identify and more fully describe clinical knowledge and how it is embedded in practice. She posits that clinical knowledge builds over time within nursing practice and that its development occurs through dialogue in the contexts of relationships and situations. Benner was determined to demonstrate the differences between practical and theoretical knowledge. She describes that knowledge development occurs in a practice discipline when practical knowledge or 'know-how' is extended through theory based scientific investigations and the documentation of current 'know-how' in clinical nursing practice (Benner, 1984). Benner finds the lack of such "charting of our practices and clinical observations deprives nursing theory of the uniqueness and richness of the knowledge embedded in expert clinical practice"(Benner, 1983). As a result, the purpose of Benner's theory was to contribute greatly to the description of the 'know-how' of nursing clinical practice.

Kuhn (1970) and Polanyi (1958) emphasized the difference in an individual knowing how rather than knowing that. 'Knowing that' is based on theoretical explanations. This occurs when an individual gains knowledge by establishing causal relationship between events. 'Knowing how' includes practical knowledge that evades particular abstract formulations. It is skill acquisition that defies 'knowing that' in that an individual may know 'how' before arriving at a theoretical explanation. Benner cited these philosophers of science in maintaining that practical knowledge can either advance theory or be developed before scientific formulations are made. Due to the variety and complexity of clinical situations compared to theoretical accounts, clinical

practice is found to be an area of inquiry and knowledge development.

Benner based the concept of experience as the outcome of challenging preconceived notions in actual situations on the works of Heidegger (1962) and Gadamer (1970). Heidegger's influence is evident in her refuting of the Cartesian description of the mind and body being dualistic in nature. Rather, she supports Heidegger's phenomenological description of how a person is one who self- interprets themselves whom are defined by their concerns, practices, and life experiences. Humans are said to be meaningfully engaged in the context of wherever they are. Therefore, individuals come to every situation with understanding of themselves in the world around them. Heidegger (1962) termed the words *practical knowledge* to mean the type of knowing that takes place when an individual is in a situation. Embodied intelligence speaks to this term in that it means human beings come to know things by being in situations. Therefore, when an individual encounters a familiar situation, there is an embodied recognition of its meaning. Benner and Wrubel (1989) speak to this point by stating, "Skilled activity, which is made possible by our embodied intelligence, has been long regarded as 'lower' than intellectual, reflective capacities are dependent on embodied knowing" (p. 43). They also argue that such embodied knowing and the meaning of being or living are the premise of why humans have the capacity to care and therefore "cause us to be involved in and defined by our concerns" (p. 42).

THEORY PROPOSITIONS

Hubert Dreyfus was the philosopher who introduced Benner to phenomenology. Hubert Dreyfus and Stuart Dreyfus, an operations researcher, together created the Dreyfus Model of Skill Acquisition (Dreyfus & Dreyfus, 1980; Dreyfus & Dreyfus, 1986). Benner utilized the Dreyfus Model of Skill Acquisition to apply to clinical nursing practice in her work entitled *From Novice to Expert.* The Dreyfus brothers developed a theory of skill acquisition based on examining the performance of chess masters and airplane pilots in emergency situations (Dreyfus & Dreyfus, 1980). The model is situational and explains five levels of skills acquisition or development beginning with (1) novice, (2) advanced beginner (3) competent, (4) proficient, and (5) expert. The model posits that there are four features of performance that change throughout the aforementioned levels: " movement from a reliance on abstract principles and rules to use of past, concrete experience, (2) shift from reliance on analytical, rule based thinking to intuition, (3) change in the learner's perception of the situation from viewing it as a compilation equally relevant bits to viewing it as an increasingly complex whole in which certain parts stand out as more relevant, and (4) passage from a detached observer, standing outside the situation, to one of a position of involvement, fully engaged in the situation" (Brykczynski, 2006; Benner, Tanner, & Chesla, 1992).

Benner (1984) explains in her theory that one's performance level can only be determined by consensual validation of expert judges and through assessing the outcomes of a clinical situation. Skilled nursing interventions and clinical judgment skills must occur in the context of nursing practice

and does not include context-free psychomotor skills or demonstrable enabling skills. Further research allowed Benner to identify two specific interrelated parts of practice that allow one to distinguish between the advanced beginner and the expert. The first distinguishing aspect is that clinicians at varying levels practice in differing clinical worlds and recognize and respond to the situated needs which require action on their part. The second attribute is that clinicians develop what Benner terms as 'agency' or a "sense of responsibility toward the patient, and evolve into fully participating members of the health care team" (Brykczynski, 2006, p. 143).

Benner's theory was focused on more than describing a typical nurse's day but going beyond that to describe the clinical knowledge of nurses that goes beyond the inflexible application of rules and theories. Rather, she explained that clinical nursing practice is based on "reasonable behavior that responds to the demands of a given behavior" (Benner, 1984, p. xx). Acquistion of skills and perceptual awareness is what allows expert nurses to make clinical decisions from the 'gestalt of a situation' so that they follow their hunches and look for evidence to confirm what subtle changes they recognize in patients.

The Dreyfus model theorizes that during a student's learning and development of a skill that they pass through five levels of proficiency: novice, advanced beginner, competent, proficient, and expert. Benner utilized this model to see if this same transition occurred in nurses. She did so by conducting a qualitative study on 21 pairs of beginning and expert nurses. Each pair was interviewed about patient care situations they had both experienced and what stood out for them. Both the preceptor and graduate nurse were asked to describe clinical knowledge they found difficult to learn or teach.

The aim of Benner's study (1984) was to discover the differences in the novice and expert nurse's descriptions of the same clinical situation. She wished to find out how such identifiable differences in the accounts could be understood. In addition to examining preceptor-preceptee descriptions, interviews were also conducted with 11 new graduate nurses and 5 senior nursing students. The goal of such interviews were to have nurses recount clinical situations and judge each retelling independently as being reflective of a specific level of practice. The interpretive strategy used was Heidegerian phenomenology with the intent "not to come up with theoretical terms but rather to identify meanings and content" (Benner, 1984, p. 16).

Benner's study found a way to describe clinical knowledge by adopting Dreyfus & Dreyfus's model of novice to expert. Benner was able to clarify the meaning of nursing experience to mean "the refinement of pre-concieved notions and theory through encounters with many actual practical situations that add nuances or shades of differences to theory" (Benner, 1984, p. 36). She was able to explicate that clinical practice is complex and present a number of realities that cannot be captured in theory alone.

Benner explains how the Dreyfus model of professional development can be applied to nursing by utilizing the five stages of: novice, advanced beginner, competent, proficient, and expert. Each level is reflective of a change in three features of the skill performance. The first feature is the progression from reliance on abstract principles to the utilization of concrete past experiences as paradigms. The second aspect is that the learner perceives the situation as less than a combination or relevant pieces of information but rather as a whole picture with specific parts being relevant. The third and final aspect is the transition from a detached observer to an engaged or involved performer. Therefore the learner no longer remains outside the information but becomes engaged in the clinical situation (Benner, 1984). The following paragraphs will explain each stage of this process and how they have the potential to be facilitated in nursing students through Virtual clinical educations.

DEFINITIONS

In light of the philosophical underpinnings and propositions of this theory, it is pertinent that definitions be explained that are imperative for the reader to understand the 5 stages of nursing clinical performance theorized by Benner (1984). The key terms to the theory of Novice to Expert nursing clinical practice include: aspects, attributes, competency, domain, experience, maxim, salience, and hermeunetics.

Aspects of a situation are the meaningful parts of a clinical situation that are recognized and understood in the context because the nurse has had previous experience (Brykczynski, 2012).

The attributes of a situation are the measurable properties of a situation. These are explained without having previous experience in a situation (Brykczynski, 2012).

Benner (1984) describes competency as an: "interpretively defined area of skilled performance identified and described by its intent, function and meaning (p. 297). This term is not related to Dreyfus' definition of the competent stage.

A domain is the area of practice that has its own unique competencies with its own intent, functions, and meaning (Brykczynski, 2012).

Benner & Wrubel (1987) describes "experience is not a mere passage of time but an active process of refining and changing preconceived theories, notions, & ideas when confronted with actual situations, it implies there is a dialogue between what is found in practice and what is expected" (Brykczynski, 2006, p. 147).

A maxim is a 'cryptic description of one's skilled performance it requires a particular level of experience to recognize the significance of instructions' (Brykczynski, 2006).
Salience is one's perceptual stance on the embodied knowledge or the embodied knowledge that allows the performer to point out the most important features of a situation. Therefore, they also can readily recognize the aspects of a situation that are clearly less important features (Benner, 1984).

Hermeunetics is derived from biblical and judicial analysis, meaning interpretive when used in Benner's research. In

Benner's study of clinical performance, it describes the study of "meaningful human phenomena in a careful and detailed manner as free as possible from prior theoretical assumptions, based instead on practical understanding" (Packer, 985, p. 1081-1082). Therefore hermeunetics allows for the interpretation of contexts and meaningful human actions. Benner assumes that "meaning embedded in skill practices, intentions, expectation and outcomes cannot be made completely explicit; however, they can be interpreted by someone who shares similar language and cultural background and the can be concensually validated by the participants and relevant practitioners" (Heidegger, 1962; Brykczynski, 2006, p. 150). Therefore, Benner used this assumption to have expert practitioners of a particular domain evaluate what level of performance each nurse participant were at in her landmark study of paired preceptors and their preceptees. Such a method allowed her to create her theory of *Novice to Expert.*

Stage 1: Novice:

The novice nurse has no experience of the situations in which they are expected to perform. To prepare the novice for such experiences they are taught in the classroom and their studies about the clinical situation in terms of objective attributes. Such objective attributes may include terms like weight, intake and output, temperature, blood pressure, pulse, and other measurable parameters of a client's condition. These consist of characteristics of the task-oriented world which can be recognized without being in a live actual clinical situation. The novice is taught rules without context to guide their actions. Therefore, such rule governed behavior is extremely inflexible and limited in nature. When a nursing student enters their first clinical experience, they have little understanding of the contextual meaning of what they have read in their textbooks. Due to their lack of experience, these rules must be provided to guide their practice. Nevertheless, such following of such rules will not allow the novice to perform the most relevant tasks when a true clinical situation arrives. Benner's theory illustrates the situation, experienced-based premises of the Dreyfus model. The Dreyfus model clarifies the difference between levels of skilled performance which is achieved through both the principles learned in the classroom and theoretical setting as well as the context-dependent judgment and skills which is only able to be acquired through true experience of situations (Dreyfus & Dreyfus, 1980).

Application of theory to virtual clinical reality simulation education. Nursing students are often provided assignments to read books and practice skills out of context which does not encourage the professional development of the student. Therefore when the student nurse encounters their first clinical experience they are more task focused on how many tasks they can complete instead of analyzing the patients they are assigned holistically.

Melender, Jonsen, Salmu, Sandvik, & Hiilli (2012) explain the qualitative experiences of nursing student who participated in their first clinical stating: "Several students had a 'technical approach' to nursing, manifested in their writings as training of various procedures and often as a description of the number of procedures taken" (p. 46). One student reinforces the beginning clinical experiences of

nursing students being preoccupied with tasks and the rules that dictate how they are done. She states "I was happy to learn a lot, but I would have also wanted to do more myself, e.g., procedures, but in my clinical placement there were not so many procedures" (Melender, Jonsen, Salmu, Sandvik, & Hiilli, 2012, p. 46). Benner explains that such a focus "legislates against successful performance because the rules cannot tell them the most relevant tasks to perform in an actual situation" (1984, p. 21).

Stage 2: Advanced Beginner:

The advanced beginner is able to exhibit a marginally acceptable performance. These individuals have undergone enough true situations or been guided by a mentor to understand the recurrent meaning of components of situations. Dreyfus terms these components as "aspects of the situation" which greatly differ from context-free characteristics or a skills checklist of things to do that are memorized and utilized by the beginner. In contrast, the aspects of a clinical situation require the learner to have had prior experience of an actual situation to recognize 'global characteristics'. An example can be found in an advanced beginner's ability to assess a patient's readiness to learn. It truly depends on that learner's experience with previous patients with similar learning needs (Benner, 1984).

Advanced beginners are focused on rules and are task–oriented. They are challenged with grasping the current patient situation in light of the larger perspective. Clinical situations are viewed by advanced beginners as a way to test their ability and the demands which are placed on them instead of focusing on the needs of the patient and their responses. Benner classifies most new graduate nurses at this level but are student nurses able to reach this level before graduation? (Brycyznski, 2006).

Application of theory to virtual clinical reality simulation education. Secco, Bulman, & Wilson (2013) conducted a study in which senior nursing students discussed qualitative perspectives of a virtual clinical education (VCE). One student expressed, 'I really enjoyed using this tool in order to enhance learning. I do not just learn from reading out of a book, to use this VCE it gave me a practical experience, which helped me to remember things and transfer learning to my patient care' (p. 37). This comment supports Benner's theory that novice learners benefit from being provided the situational experiences that a VCE can provide.

Stage 3: Competent:

The competent nurse is characterized by the nurse who looks at how their actions will affect long-term goals and wellness of the patient. At this stage, the nurse consciously is able to look at current and anticipated future/outcomes of the patient and prioritize which part of a situation are most important and which parts can be ignored. There is deliberate planning that occurs that allows the competent nurse to have a feeling of mastery and the ability to cope and manage the unpredictability of nursing. These are organized and effective in their practice.

Application of theory to virtual clinical reality simulation education. Students have the potential to be competent through the utilization of Virtual Clinical

Experiences. In Secco et al.'s (2012) qualitative study, a student explains how it helped her to "remain calm during stressful [contingent] situations because [she] felt that [she] had been through it before' (p. 210). Another student expressed that, "I feel that this gave me confidence in my nursing knowledge. I felt I was knowledgeable about medications and ensuring that I did not make any mistakes" (p. 210). The student here is clearly looking at medications based on considerable abstract analytical contemplation (Benner, 1984, p, 6).

Another student reported improved clinical decision making stating, "I believe that it made my judgment better because it helped me think critically through each scenario and to think about possible side effects and different outcomes to the patient 'he health…It made me confident in myself as a future new graduate because it gave me some independence in decision" (Secco et al., 2012, p. 10).

This is a transition from the stage of advanced beginner and novice, who cannot cope with real situations to notice the meaningful situational components and act independently as does the competent clinician (Benner, 1984).

Stage 4: The Proficient Nurse:

The proficient nurse perceives the situation as a total picture rather than pieces. The performance of the competent nurse is guided by maxims. This level is described as a 'qualitative leap' beyond the competent nurse. This is so because the performer is able to recognize the most important aspects of a clinical situation and has intuition of what to do based on the situation and understanding its background. They have a new ability to see how the relevance of a situation changes. As the clinical situation evolves, the nurse can recognize and implement the skilled responses. No longer does the performer rely on preset goals. As a result the nurse has increased confidence in their abilities and knowledge. The nurse becomes more greatly involved with the patient and their family-performing improved patient and family-centered care. The proficient stage of performance facilitates the transition to the level of expert.

Application of theory to virtual clinical reality simulation education. A marked important feature of this level of performance is the ability to recognize the salient parts of a clinical situation and act on them. As a result, the performer develops improved confidence and ability to implement appropriate interventions due to the foresight from previous clinical experiences. One student who experienced virtual clinical reality simulation education commented on confidence stating: "I feel that this gave me confidence in my nursing interventions and skills because it made me realize that I am indeed competent with my nursing knowledge. I feel that I was knowledgeable about medications and ensuring I did not make any errors." (Secco et al., 2012, p. 3).

Stage 5: The Expert:

The expert of the Dreyfus model occurs when the performer no longer relies on rules, guidelines, or maxims to understand a situation. Rather the expert nurse clinician has an intuitive grasp of a clinical situation. They can identify the problem without losing time by going over a range of alternative diagnoses and solution. They come to 'know' the

patient by "demonstrating a clinical grasp and resource-based practice, possessing embodied know-how, seeing the big picture, and seeing the unexpected" (Bryczynski, 2006, p. 146). The expert nurse sees meeting the needs of the patient as a top priority even if they must negotiate a change in the treatment plan. Benner, Tanner, & Chesla (1992) describe it almost as a 'transparent view of the self'.

Application of theory to virtual clinical reality simulation education. Although many nursing students are unlikely to reach the expert level of nursing performance, there is a chance that students will be able to have more of an intuitive grasp on clinical situations. One student who only had the opportunity to use a virtual clinical reality simulation education experience one semester in the senior year of a traditional baccalaureate program reports "I believe that it made my judgment better because it helped me to critically think through each scenario and to think about possible side effects and different outcomes in the patient's health…It made me more confident in myself as a future new graduate because it gave me some independence in making my own nursing decisions" (Secco et al., 2012, p. 4).

Despite the student nurse not having an intuitive grasp of each clinical situation, qualitative investigation reports exhibit how close students can become to the competent or even proficient levels of nursing practice. This is proven by students' short experience with the program which facilitated their increased confidence, independence, and insight into patient outcomes.

Theory Evaluation:

The significance of the theory is clear for four reasons. The metaparadigm concepts and propositions that are spoken of in the theory are clearly understandable as aforementioned in the previous two subheadings. The philosophical claims of the study are based off ofKuhn (1970) and Polanyi's (1958) theories which clarify the difference between 'knowing how' and 'knowing what'. She also borrows from Heidegger (1962) and Gadamer's (1970) concept of experience. Dreyfus and Dreyfus model of *Novice to Expert* is clearly explicated as the source which Benner tested its application to levels of nursing clinical practice. All of Benner's knowledge from adjunctive disciplines are acknowledged and bibliographical citations are provided in Benner's explanation of her theory (Fawcett, 2005).

Internal consistency also exists within this theory in that its context and content are consistent. Also the concepts used within the theory are clear and reliable. Structural consistency is also evident in that the propositions explained remain unchanged in the theory. Dreyfus' situational model of the five stages of performance remain seamlessly in Benner's model of *Novice to Expert.* Benner presents the content of theory with plainly and concisely. The research she performed on paired prececptors and preceptees was qualitative in nature and inductive (Fawcett, 2005).

From the years 1971 to 1981, a ten year study was authored and directed by Patricia Benner as a part of a federally funded grant. The title of the study was Achieving Methods of Intra professional Concensus, Assessment, and Evaluation (AMICAE) project. Such research led to the

publication of *Novice to Expert* (1984) and a plethora of other articles. The purpose of the project was to evaluate the evaluation methods of nursing schools and hospitals in the San Francisco area, it set out to be an interpretive, descriptive approach which led Benner to utilize Dreyfus' model of the five levels of competency in the description of how skills are acquired in nursing practice. It is reported that greater than 1200 nurse student or professional participated in his study by completing surveys and interviews. In such interviews Benner (1984) describes the aim was to "discover if there were distinguishable, characteristic differences in the novice's and expert's descriptions of the same clinical incident and to describe "characteristics of nurse performance at different stages of skill acquisition" (p. 14-15). Therefore, such inquiry would reveal the meaning and knowledge that are rooted in nursing practice. This clarifies this theory's testability by exhibiting that the "data obtained from use of the research methodology represented sufficiently in-depth descriptions of one or more personal experience(s) to capture the essence of the grand theory". Also the 1200 interviews held proved empirical adequacy. This is evident by the findings from studies of descriptions of personal experiences congruent with the concepts and propositions of the grand theory" (Fawcett, 2005, p. 133).

The pragmatic adequacy of this study is proven in that it has been accepted by the nursing practice, education, and research communities. In the practice community, an example of the use of this theory can be found in that Neverveld (1990) utilized that theory to develop basic and advanced preceptorship workshops. Within education and research, Fenton (1984, 1985) has applied the domains of clinical nursing practice in the study of the skilled performance of clinical nurse specialists, which she validated the demonstrated competencies of CNSs as expert nurses and identified an extended consulting role.

RESEARCH QUESTION

After scrupulously examining Benner's theory of *Novice to Expert*, research must be conducted in how virtual clinical reality simulation education enhance the performance of undergraduate students. Therefore, the research questions based on this theory are as follows: In undergraduate nursing students enrolled in the domain of medical surgical nursing courses, how does participation in virtual clinical reality simulation education affect such students' perception of their ability to recognize aspects and attributes of a clinical situation, as well as, maxims and salient parts of such situations? Does participation in virtual clinical reality simulation educationdevelop perceived of competency and experience? Does student engagement in virtual clinical educations as a learning activity allow them to perceive themselves as having reached the advanced beginner, competent, or proficient level of medical surgical nursing performance?

Background of Virtual clinical reality simulation education:

Bell (2008) describes a virtual world as "a synchronous, persistent network of people represented by avatars, facilitated by computer (p. 2). DeGagne, Oh, Kang, Vorderstrasse & Johnson (2013) further explain that ä virtual world is a computer-based multimedia environment in which people interact with other users or objects via their personal graphic representation known as an avatar (Boulo et al., 2010; Baker, Parks-Savage, & Rehfuss, 2009).

To operationalize this concept, the students would be assigned virtual clinical educations that were designed and created by the authors of their textbook. Virtual clinical educations is an online program paired with a workbookthat guides the learner through "a virtual hospital where the patients are real and their conditions are constantly changing. By immersing students in a realistic, yet safe, nursing environment, VCE simulates the average clinical rotation by allowing users to conduct a complete assessment of a patient and set priorities for care, collect information, analyze and interpret data, prepare and administer medications, and reach conclusions about complex problems. Each lesson has a textbook reading assignment and activities based on 'visiting' the patients in the hospital — providing a perfect environment to 'practice' what the nursing student is learning" (Lewis, Dirksen, & Heightkemper, 2015).

METHODOLOGY

This study aims to describe the medical surgical student nurse's conscious experience of virtual clinical reality simulation education by exploring the aforementioned research questions. The meaning, structure, and essence of the lived experience of taking on the role of a nurse avatar during a virtual clinical education will be explored. The goal of the researcher was to gain access to the student nurse's life or inner world and subjective experience (Christensen, Johnson, & Turner, 2015).

Convenience sampling occurred by junior researchers offering students in medical surgical courses within a private nursing school to participate in the study in exchange for service hours, which are required by the university. After obtaining informed consent from 12 participants who were over the age of 18 years and who were enrolled in an undergraduate medical-surgical nursing course, the students were assigned a date and time to take part in an hour-long orientation to virtual clinical educations. Afterwards they were assigned two virtual clinical education assignments that would total 5-6 hours to take within a month. During their initial experience and orientation to clinical excursions, the research assistant student nurses took note of their behaviors and assist if any technical difficulties are met.

Immediately following the participants' experiences, they were administered an open-ended survey to elicit their experience of virtual clinical educations as an undergraduate, what they found beneficial and any disadvantages, how they think this tool could be made useful (if at all), and recommendations they may have if any. They were asked to describe what occurred in the setting of the virtual clinical education, how they interacted with the software and avatar clients, and what they did successfully, and how they perceived the virtual clinical is applicable to their live clinical rotation.

The researcher attempted to have the nursing student focus on their phenomenal space and to "describe the experience (current or from memory) on their own terms". The

participant was directed to give the experience their full attention. Open-ended questionnaires were utilized for the participants to describe their experience (Christensen, Johnson, & Turner, 2015).

Significant statements, or "words, phrases, or sentence length participant statements that the researcher thinks vividly communicate the participant's experience" were searched for in the survey responses. Once significant phrases and statements are extracted, the researcher constructed a list of meanings of the statements. The researcher went on to read, reread, and reflect on the statements of the research participants in an effort to empathetically come to a determination of the research participant's meanings of their statements. Next, the meanings were organized into clusters or themes. Then a narrative form of the phenomenological study will be written (Christensen, Johnson, & Turner, 2015, p. 369).

METHODOLOGICAL RIGOR

Creswell and Miller (2000) explain that validity is one of the main strengths of qualitative research since it is based on determining whether findings are truth from the standpoint of the participants, the researcher, or the readers of an account. The researcher employed several validity strategies to assure that the information collected is valid and reliable.

Firstly, the researcher has had over six years of experience in healthcare simulation. She also has a certification from Drexel University as a simulation education. She also worked as a clinical coordinator of basic and advanced cardiac life support where virtual reality and high fidelity simulation were utilized as an evaluation strategy. The researcher also clarified the bias she brung to the study through self-reflection which 'will create an open and honest narrative that will resonate well with readers, also known as reflexivity' (Creswell, 2000, p.202). Yin (2014) explains that the researcher should utilize their previous, expert knowledge in the case study. The researcher's knowledge of the subject matter due to one's own previous research and publications will be for the advantage and preference of the case study.

LIMITATIONS AND DELIMITATIONS

Internal Validity

Two large possible threats to internal validity are data collector characteristics and data Collector. Example of data collector characteristics include gender, age, ethnicity, language patterns or other characteristics which may influence the nature of the data that is obtained. This is especially true if the characteristics are related to variables that are the focus of the study. Therefore, the principle investigator was not in the room when the data was collected. Instead, junior researcher nursing students assisted the students in completing the survey immediately after they completed the virtual clinical education.

Data collector bias may also occur. This happens when there is unconscious distortion of data during the collection process. Examples of such instances include phrasing questions differently for different participants and asking leading questions. Therefore, when interviews are the primary data source, the researcher should standardize the procedures. To standardize an interview, an interview protocol should be created. Also ,questions should be asked of all participants in the same way; interviewees should be put at ease by asking a general, easy inquiry initially; all interviews should be conducted in a location in which the individual feels comfortable; and finally, it must be ensured that particular answers cannot be identify the interviewees. To prevent this issue of validity, the research student nursing assistants will be administering the written survey and asking for students to write further information if they find them incomplete

(http://www.ed.sc.edu/gredler/edrm700/handouts/majorqualt hreats.pdf).

Several methods for enhancing the credibility of the data were implemented. One general strategy suggested by Webb, Campbell, Schwartz, and Sechrest (1966) and elucidated by Denzin (1978) is the use of triangulation. The process consists of four strategies including: Implementation of multiple methods for obtaining data (i.e. observation and surveys; consultation of multiple data sources (surveys of teachers and students); utilization of more than one researcher to collect the data (primary researcher and 2 research assistant student nurses); as well as reliance on additional researchers for analyses.

External Validity:

External validity was safeguarded by using a nested approach by selecting case studies from within a school of nursing. There also is a clear rationale for the selection of study participants as outlined in the selection criteria which includes nursing undergraduates whomare currently enrolled in a medical surgical nursing course. These criteria reflected the purpose of the phenomenological study and its research inquiry. Details on the study's context have been included which discuss the state of national clinical nursing education(Gibbert & Ruigrok, 2010).

Construct Validity& Reliability:

Construct validity of a procedure examines how a study "investigates what it claims to investigate, that is, to the extent to which a procedure leads to an accurate observation of reality" (Denzin & Lincoln, 1994, p. 34). Therefore, construct validity of the case study was maintained through several techniques of triangulation. Participant and direct observation allowed for further triangulation of the data. This data was taken from the researchers' participation and observation of organizational meetings (Gibbert & Ruigrok, 2010).

The data was triangulated from different sources of data by examination of the evidence from the primary sources to build a coherent justification for the themes the researcher proposes. Member checking occurred to determine accuracy of the findings through taking the final report to participants for critical review. Therefore, participants were enabled to validate such finding's accuracy (Creswell, 2000). The analysis included all plausible rival interpretations by consulting fellow nursing faculty colleagues and nursing students about alternative interpretations for one or more findings (Yin, 2014).

Reliability of the findings were sought through utilizing the greatest number of participants possible. Yin (2014) explains that qualitative study results are generalizable to broader theory. The reliability will be weakened by anonymizing the academic institution so that other researchers could not contact the organization (Gibbert & Ruigrok, 2010). The reliability was also be weakened by those students who participating receiving required service learning credit, which is mandatory for their graduation.

FINDINGS

Fidelity:

Students found the environment to be realistic possessing "all the aspects of the clinical experience minus the live bodies and interactions with patient, families, and the clinical team". Students found the virtual environmental features of patient charts, patient avatars, medication administration records, and electronic health records to assist them in learning how to implement nursing care. In support of this, on student stated: "It looked like an actual hospital-patient room, medication room, RN station with charts, MAR, computer sign-ons, etc, we were able even to 'see' our patient". Another pointed out, "Yes, it was pretty realistic, especially because the patient was speaking, that videos were useful."

Interesting:

Virtual clinical reality simulation education was said to supplement lectures in a dynamic case study format that is "more interesting than just reading information". Students perceived it prepared them better for clinical experiences. Students were enabled to study the patient thoroughly and in a non-intimidating environment. One student expressed: "It was interesting and the siftware was identical to clinical experiences I have had. Maybe with more exposure to VCE, I would gain more confidence in practicing my RN skills". An unexpected finding was that students reported they felt they would be better able to navigate patient charts and electronic health records as a result of the VCE experiences.

When to Implement:

Students explained that the virtual clinical reality simulation education experience would be useful if provided to students from the beginning of the semester so that they can integrate their experiences into true clinical practice. One student expounded on this suggestion stating: "It gave me more practice that is directly related to clinical situations in the work place."

Anxiety:

Students perceived the simulated virtual clinical environment to induce less anxiety so they were provided "more time to think" to identify salient points of patient conditions. A nursing student explains further: "I liked having the time to think out why I treat the patient in the fashion I did and not having the 'put on the spot situations'in real time." Another student explains why potentially the anxiety of the student was lessened: "As a RN avatar, I have time to think about the steps I'd take to treat the patient. If I make an error, a real patient doesn't get hurt. In the live clinical environment, I find myself to be a bit nervous at times. I have to bring myself to remember to 'take your time and think things out'". Therefore, the time

and safety provided through the simulation was perceived to be beneficial to the learning environment.
However, one student pointed out that being unfamiliar with the software made it difficult for them to navigate the simulation. This finding provides support for the orientation of educators and students to virtual clinical reality simulation education software, but also the continued support of personnel.

Learner Development:

Virtual clinical reality simulation education also is perceived to cause more effective transfer of knowledge in relation to critical thinking. As a result, most students perceived themselves to be an advanced beginner as a result of the VCE experiences. The highest levels of medical surgical nursing performance perceived were competent and proficient in two separate students. This is solely the view of the students and cannot be validated. However, such findings shed light on how students perceived the virtual clinical reality simulation education scenarios contributed to their stage of learning development.

Students explained that critical thinking was used throughout the entire virtual clinical reality simulation education scenario. They pointed out they had to "really think" and 'ask themselves questions' about what they needed to do to provide the best care for their patients.

Autonomy:

Student nurses during traditional clinical rotations are supervised by a clinical faculty member in the completion of skills and to validate critical thinking and clinical decision making. Students are supervised by faculty as well as registered nurses and other staff on the unit in their care of patients. Virtual clinical reality simulation education was thought to provide nursing students with a sense of autonomy they do not experience in the live clinical setting. A student explains: "Being a nurse avatar, you really need to know all you are going to do with the patient, you are in charge as student nurse. As student nurse [in the live setting], you think all process through but also have the help of nurse instructor." Another student identified that the virtual clinical reality simulation education allowed students to go beyond their practice in the live clinical setting stating, "In clinical we see the start of care but can never follow up on the patient."

CONCLUSION

Virtual clinical reality simulation is perceived by students to be a useful tool to facilitate their transfer of theoretical knowledge to practical knowledge. Nurse educators can attempt to cultivate the awareness of nursing students by presenting them with complex ill-defined, authentic tasks during virtual simulation scenarios. As a result, there is a shift that occurs so that students are able to retrieve relevant information and clinical reasoning occurs. This enables students to "perform skills in a real-world problem solving context" (Onda, 2012, p. 279). Educators must strike a balance between teaching the cognitive base and enabling students with opportunities to put such knowledge to use, as situated learning theory encourages. As a result, clinical reasoning skills will be able to evolve. When virtual clinical reality simulation education is used within nursing clinical

education, a shift of nursing education's paradigm from teaching to learning will truly occur (Onda, 2012).

IMPLICATIONS FOR FUTURE RESEARCH

Simulation for future healthcare professional provides competency assessment. Decker, Sportsman, Puetz, & Billings (2008) observed the decreasing faculty resources and limited amount of access to real patients has made simulation a frequent method for evaluating a student's psychomotor skill competency. As of yet various simulation techniques and technologies have been in many areas of nursing including emergency, psychiatric/mental health, gerontology, oncology, and operating room settings. Galloway (2009) reports that "Simulation can pave the path between formal education and professional practice for experiences that can be difficult to find, but are essential for progressing to the level of competence and beyond" (p. 6).

There currently exists little research on the benefits of virtual reality clinical simulation. Despite there being a great amount of research yet to be completed on the relationship between patient safety, does this mean that educators should await such evidence before implementing virtual reality clinical simulation into today's nursing curriculum? Galloway (2009) makes an illustration stating: "There remains limited evidence of a firm relationship between consumer safety and simulation in the practice on flight simulators? Don't our patients deserve the same consideration? As educators and as practitioners, we have an [ethical] obligation to actively engage in learning pedagogy related to simulation enhanced learning" (p. 7).

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Virtual Clinical Excursion Qualitative Written Survey Questions

(Part A)

1. Describe the experience of your immersion in the Virtual Clinical Hospital environment as a nurse avatar.
2. How did you interact with the software and avatar clients?
3. Was the virtual environment realistic?
   a. If so or not, in what ways?
4. Would you consider yourself computer savvy? How so?
   a. Do you enjoy virtual gaming?
   b. What did you find enjoyable about the virtual feature of the clinical excursions?
5. Describe the differences in being a nurse avatar in a virtual clinical versus a student nurse in the live clinical environment.
6. How do you perceive the virtual clinical environment is applicable to their live clinical rotation?
7. Describe what occurred in the setting of the virtual clinical excursion
   a. The first session
   b. The second session
8. What did you do successfully in the virtual clinical environment?
   a. What could you have done better in the virtual clinical environment?
9. How did you perceive the direction provided by the workbook/online workbook?
10. Were you able to implement the nursing process throughout the Virtual Clinical Excursion (VCRSE)?
    a. If so how?
    b. How well did you think you did in implementing the nursing process?

Virtual Clinical Excursion Qualitative Written Survey Questions

(Part B)

11. How would you describe critical thinking?

    a. How did VCRSE's affect your critical thinking skills?

12. How and what did you learn from the VCRSE?

13. How does participation in virtual clinical reality simulation education affect your ability to recognize IMPORTANT aspects and attributes of a clinical situation?

14. Has the VCRSE impacted on your ability to transfer knowledge in relation to critical thinking in simulated lab practice?

15. Has the VCRSE impacted on your ability to transfer knowledge in relation to critical thinking in live clinical practice during clinical rotations?

16. How do you perceive your competence in the areas you experienced a VCRSE?

17. Does you perceive yourself as having reached the novice, advanced beginner, competent, proficient, or expert level of medical surgical nursing performance as a result of the VCRSE experiences?

    a. Why so?

18. What did you like most about the VCRSE?

19. What did you like least about the VCRSE?

20. How do you think this tool could be made useful (if at all) in undergraduate schools of nursing?

Figure 1. Virtual Clinical Reality Simulation Education (VCRSE) Qualitative Written Survey

VCE Outcomes — Expose to multiple patient scenarios and acllaimation to the routine and rigors of the average clinical rotation in the role of the professional nurse.

VCE Outcomes — Enhanced student ability to critically think about safe medication practices and patient care

VCE Outcomes — Guides students through patient scenarios where they collect information, make decisions, set priorities, and plan nursing care

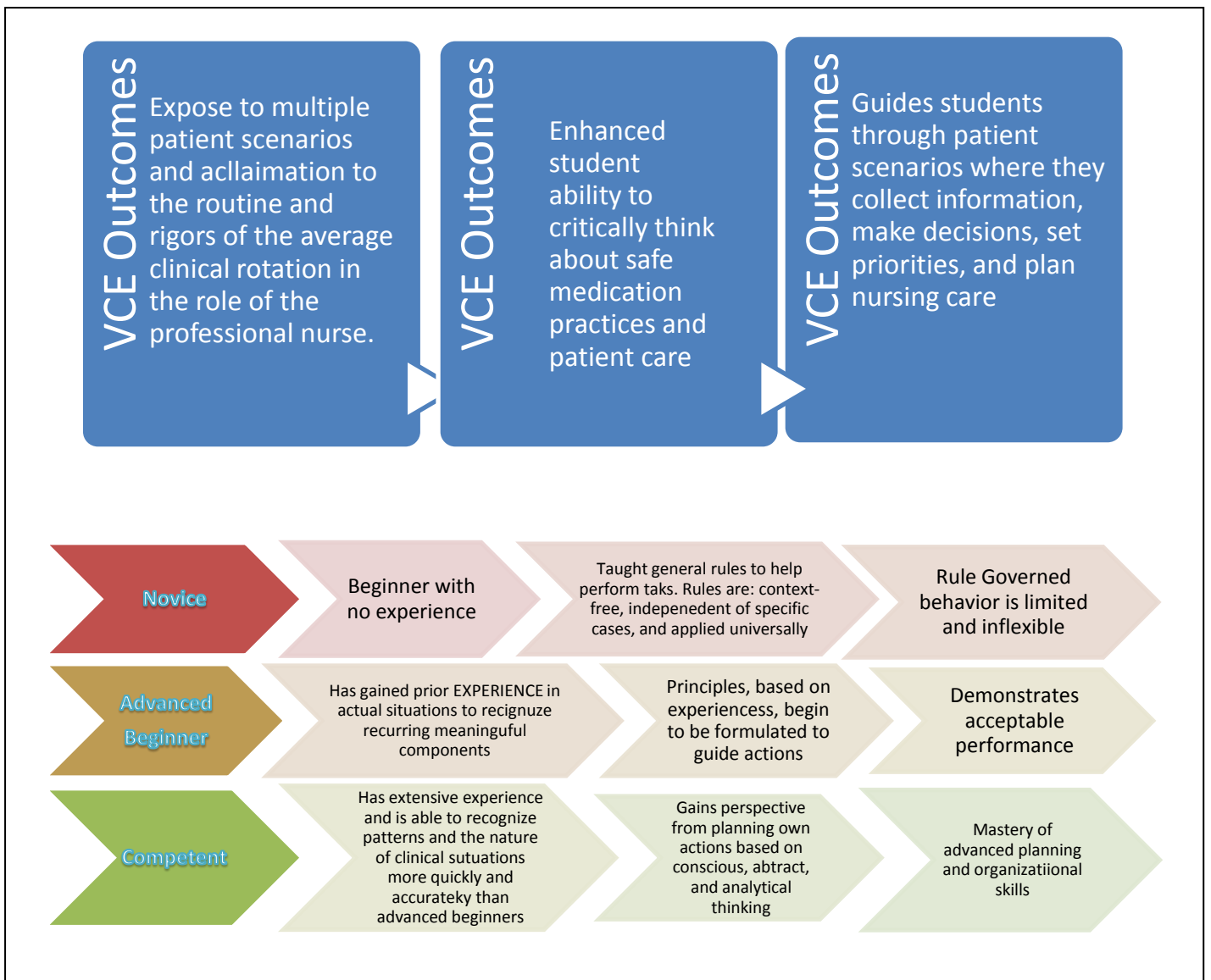| Novice	Beginner with no experience	Taught general rules to help perform taks. Rules are: context-free, indepenedent of specific cases, and applied universally	Rule Governed behavior is limited and inflexible
Advanced Beginner	Has gained prior EXPERIENCE in actual situations to recignuze recurring meaninguful components	Principles, based on experiencess, begin to be formulated to guide actions	Demonstrates acceptable performance
Competent	Has extensive experience and is able to recognize patterns and the nature of clinical sutuations more quickly and accurateky than advanced beginners	Gains perspective from planning own actions based on conscious, abtract, and analytical thinking	Mastery of advanced planning and organizatiional skills

Figure 2. Benner's Theory of Novice to Expert and its Application to Virtual clinical reality simulation education (VCRSE) Outcomes