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Understanding Nursing through a Theoretical Model: Complexity, Synergy, and General Systems

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Abstract

As the largest sector of the health professions in the United States with three million registered nurses, nursing needs to hear student voices to formulate a new mission and vision in education and practice. Nursing students are the future architects of nursing, and have the potential power to change the direction of nursing practice. The theory and practice of nursing is ever changing, warranting the way nursing is taught to change along with it. However, students in Bachelor of Science in Nursing (BSN) programs fail to see a connection or rationale in some of the courses they are required to take. Students are often left out of the decision making process in planning their curriculum. To enhance their interest in classes and reduce their feelings of disconnect, and not belonging, the researchers examined some of the courses that they are taking and integrated rhyme, reason, and proximate relationship to nursing by defining three theories and integrating them into one Complex Synergistic System (CSS) theoretical framework. The purpose of this paper is to discuss the integration of three theories toward understanding nursing as a complex synergistic system. The theories are the complexity theory, synergy theory, and general systems theory. Integrating these theories to form the Complex Synergistic System (CSS) helps student nurses understand the multifaceted nature of nursing (complexity theory), its collaborative relationship with various disciplines (synergy theory) by shedding light into the importance of taking other humanities and science courses that seem unrelated to nursing, and the permeability of nursing's boundaries (general systems theory). CSS was developed by Constantino and Crane (2013) to be used by forensic nurses as a way to fully assess emergency room patients who are survivors of sexual assault. CSS as a theoretical framework grounds nursing students to withstand and transform challenges into opportunities for growth and positive outcomes. A theoretical framework such as CSS is a tool that could shape, engage, and guide thinking, feeling, and behaving in nurses in their education and practice. Using CSS in education and practice empowers students to assert their voices to be heard by bringing new depth and breadth to classroom and clinical experiences.

Keywords: Nursing, Theory, Education

1. Introduction

The practice of nursing is ever changing, warranting the way nursing is taught to change along with it. However, the present students of Bachelor of Science in Nursing (BSN) programs fail to see a point in the courses they are learning, as evidenced by opinions shared by CUR nursing students during the mentoring relationship. These discussions sparked the birth of this research study. The students look at some of the courses as disconnected and unrelated to nursing. They also see the courses as difficult to understand as well as disjointed in the way they are taught, as if each course stands alone and has no bearing on the past and future courses. Thus, a new integrated theoretical framework of nursing is needed. The purpose of this paper is to define three theories toward

understanding the complexity, synergy, and system of nursing and form one theoretical framework to guide evidence-based nursing practice. The three transdisciplinary theories are the complexity theory, synergy theory, and general systems theory. Integrating these theories to form one conceptual framework called Complex Synergistic System (CSS) helps student to understand the multifaceted nature of nursing (complexity theory), its interrelatedness to various disciplines (synergy theory), and the permeability of its boundaries so that the nursing is greater than the sum of each course, clinical experience, and curriculum (systems theory)[9]. Through these theories, the student nurse will feel more confident that the subject matter taught in BSN programs is applicable in the real life and practice of nursing. The IOM (2011) suggests the future of nursing is bright if it would transform itself by reconceptualizing its role, redesigning nursing education, examining innovative strategies, and attracting, retaining, and graduating well-prepared students to lead the nursing profession deep into the 21st century[14].

2. Unifying Theories

A nurse is held to standards from a variety of sources, including the nurse practice act and the laws and regulations of the jurisdiction in which the nurse practices, the *Code of Ethics for Nurses*, the *Scope and Standards of Nursing Practice*, accrediting organization standards, and institutional policies[1, 2]. It is expected that the best practice standards derived from research or evidence-based literature guide nursing actions. In order to better understand these nursing actions and the practice standards, it is important to look at various theories of nursing. CSS was developed by Constantino and Crane (2013) to be used by forensic nurses as a way to provide comprehensive nursing care to emergency room patients who are survivors of sexual assault[9]. CSS was formed after a decade of discussion, thoughtful dialogue, deliberate questioning, and a search for answers to nagging questions that baffled students and educators alike[4].

2.1. Complexity Theory:

Complexity theory is a collection of scientific theories that attempt to explain complex behavior occurring in dynamic, non-linear systems. Complexity theory has influenced many areas of study and practice[3]. It has great potential for use in nursing. It explores patterns of relationships, how they are sustained, how they are organized, and how outcomes emerge. It reinforces that, although interactions occur at a local level, they have an impact on the entire system, by virtue of their influence on future interactions[4]. Complexity theory shows student nurses that nursing practice involves many different complex scopes of knowledge that interrelate not only with each other, but also with other disciplines of work[5]. By looking at this complexity theory, the student nurse is reminded that one action or inaction can have drastic effects on another aspect of a patient's overall health. Complexity theory as applied to practice produces dynamic interactions of diverse individuals who self-organize and produce outcomes that can neither be predicted nor controlled[13]. Paley characterizes complexity theory very pointedly: simple practitioners who follow simple rules could generate complex structures[19]. Complexity theory is a collection of overlapping and complementary theories from various sciences, including chaos theory, organization theory, and general systems theory. The Plexus Institute considers complexity theory to be the intellectual successor of general systems theory; it combines the case study method and complexity science to create new ways for practitioners to understand the complex synergistic systems that are part of interpersonal relationships and interactions among practitioners[20].

2.2. Synergy Theory:

Synergy theory is the study of organizations that form partnerships and collaborate with other organizations to fulfill a unified mission and vision. Synergy theory may be applicable in unifying complex alliances, coalitions, and partnerships with nursing[12].

The nurse is suited to act as a leader in interdisciplinary relationships based on an understanding that today's practice environment requires partnership and collaboration between service providers and other professions to achieve desirable outcomes. In a collaborative environment, there is great potential for the nurse to act as a catalyst to bring synergy to healthcare and the nursing practice. A synergistic system creates partnership capacity to address its mission, vision, roles, and goals. Synergy as a framework acts as a road map that lays out the pathways by which

participatory collaborative processes create more effective community problem-solving and improvements in outcomes[15].

Synergy specifies processes that are integral to collaboration that can be generalized across heterogeneous practice settings. Synergy is conducive to the cultivation of consequential leadership and management. It is a prerequisite in building a sense of empowerment among individual members and fostering stronger sociocultural ties among stakeholders and participants. Synergistic partnerships in nursing are most likely to occur when leadership (administration), management (faculty) and membership (students) embody the following characteristics: (1) Being inclusive by involving a broad array of people and organizations central to the cause; (2) Focusing on the processes of partnership engagement, such as who has influence and control; and (3) Expanding to multiple issues as different areas begin to relate to each other[16]. Where synergy is, systems have the ability to produce the creative leaps in thinking, feeling, and behaving[17]. Synergy is the creative blending of ideas; such ideas have a greater effect than do individual ideas that stand alone.

Student nurses must recognize the importance of synergy early in their nursing education. It is vital to providing the best patient care. This is clear even on the first day of a clinical rotation. There are numerous different professionals walking through the hallways and in and out of patients' rooms and the nurse and also the student nurse must interact with all of them. They must be able to work collaboratively with each member of the healthcare team. Through this synergy, ideas can be bounced back and forth between healthcare workers so that only the evidence-based idea is executed and no crucial detail is overlooked. In addition, the Institute of Medicine stresses the importance of nurses becoming leaders and working together with physicians, businessmen, and politicians to create a better future for healthcare. The Institute discusses how important it is for nurses to actively critique the healthcare system around them and strive for policy changes[14].

2.3. General Systems Theory:

General systems theory (GST) considers interacting entities that form a unified functioning whole having permeable boundaries conducive to input, feedback, output, reverberation, equifinality, and negentropy[7]. General systems theory was proposed in the 1940s by biologist Ludwig von Bertalanffy as a reaction to reductionism and as an attempt to revive the unity of science[6]. Input is information entering the system from the environment. Output is anything leaving the system, crossing the boundary, and entering the environment. Reverberation is a property of systems whereby a change in one part affects other parts of the system, like a ripple caused by a tiny pebble thrown into a pond. The ripple reverberates, expanding until it joins its boundaries. If its boundaries are porous or permeable, it mixes, blends, and transforms its properties into a complex synergy that continues to provide input and feedback to the pond, albeit in its transformed complex components. Feedback occurs when output returns to the system (input), and it is used to regulate the system. Any change in the system or the environment can reverberate out from and into both the system and the environment. Equifinality is a principle that describes an open system as having the capacity to achieve outcomes through various mechanisms and processes. Similar results can be obtained by many different paths. Negentropy is the opposite of entropy. Entropy is a measure of disorder, whereas negentropy, or negative entropy, maintains order and constant growth in open systems. Equifinality allows nursing to achieve its goals through diverse and multidimensional activities and strategies. Nursing lives, grows, adapts to challenges, and seizes opportunities to transform entropy into negative entropy. Negentropy sustains nursing so that it survives and flourishes by transforming challenges into opportunities[8].

GST is the transdisciplinary study of the abstract organization of phenomena, independent of their substance, type, and spatial or temporal existence. It explores the principles common to all complex entities and the models used to describe them. Systems theory is a theory of wholeness in which there is a general tendency toward integration and unification that can lead to transformation of scientific education and practice. Systems biology is an interdisciplinary science that studies complex systems using a holistic approach and that uses experimental and computational investigative methods. Systems biology can be integrated into nursing because it can transcend how nursing affects and is affected by its own interventions[9]. Systems are either closed or open. Closed systems are considered detached and isolated from their environment, whereas open systems, which are connected and integrated with their environment, have permeable boundaries and maintain themselves by a continuous input and output of data and energy to and from their environment. Feedback is the constant give and take and breaking down and building up of data and energy. Feedback enhances systems' steady state or dynamic equilibrium[11].

It is important for the student nurse to understand that complex synergistic systems, such as nursing, are constantly buffeted by intentionally and unintentionally created challenges and opportunities that are created by intersections of theory and practice. Theoretical frameworks ground the professions so that they may withstand the challenge. A

theoretical framework is a powerful tool that organizes, shapes, and guides thinking, feeling, and behavior in professional practice. It provides a lens through which ideas, vision, and mission come into focus. By learning about general systems theory and integrating it into their practice, the student nurse will better understand the practice of nursing. The student nurse will appreciate that nursing is an open system that interacts with many different systems, ever growing and adapting to new discoveries and revolutionary changes in healthcare.

3. Nursing as a Complex Synergistic System

Nurses work with numerous different professions (physicians, lawyers, sociologists, pharmacists, business workers, social workers, psychologists, rehabilitation science, and lay people). It is the intersection with these professions that brings new depth and breadth to the practice of nursing. All these fields form a transdisciplinary complex synergistic system that fortifies the practice of nursing as a profession all of its own yet in synergy with others[19].

The scientific approach is by far the most advanced way to develop theoretical/conceptual frameworks. The scientific method is more reliable than tradition, authority, or experience. Scientists use this method to develop theories. The scientific method allows a more systematic explanation of how phenomena are related or interrelated. Concepts or conceptual models provide insight and understanding regarding relationships among phenomena. Frameworks are the skeleton upon which the theory or concept hangs. The frameworks are the foundation that explains how a phenomenon interacts and reacts within the environment. The importance of these frameworks to nursing is that they advance both the practice as a profession and the understanding of the practice and what it can be. Combining three theories—complexity, synergy, and (general) systems—to form one single theoretical framework for nursing is essential. It joins each aspect of nursing together to explain the full range of nursing.

The first concept that appeared was complexity. Nursing is complex because it does not draw from one source of science but rather from several, including nursing, biology, psychology, sociology, medicine, and anthropology. Second, synergy, or collaboration, needs to occur to integrate these sciences. Third, this needs to be articulated and combined into one system or entity—nursing.

4. Implications in Education and Practice

Changes in healthcare methods and practices have added complexity and synergy to nursing theory and practice. As mentioned previously, nursing intersects with many different disciplines and may adapt taxonomies and styles for its own use. Most important, characteristics of those disciplines are incorporated within the practice of nursing itself. Integrating theories to form one theoretical framework will explain the complex nature of nursing (complexity theory), its interrelatedness to various disciplines (synergy theory), and the permeability of its boundaries (systems theory). Nursing is a CSS of intersecting sciences, including anatomy, biology, psychology, sociology, medicine, and anthropology. The integration of complexity, synergy, and systems theories into one overarching theoretical framework for nursing cultivates education, practice, research, and leadership in nursing.

Nursing as a CSS is an open system and maintains itself through continuous input and output of data and information to and from its environment. This constant give and take or breaking down and building up of data and energy gives feedback, which enhances systems' steady state or dynamic equilibrium.

Nursing has permeable boundaries and is open to new ideas, theories, and principles. It accepts multiple intersections with and feedback from other disciplines and is transformed through the permeability of its boundaries. Equifinality is another property of nursing which suggests that outcomes are achieved or reached using different paths. Equifinality allows nursing to achieve its goal through diverse and multidimensional activities and strategies. Because of its equifinality, nursing lives, grows, and adapts to challenges through negative entropy. Negative entropy, or negentropy, sustains nursing so that it will thrive and flourish, not wither away[7].

The value of using the CSS framework in nursing education is threefold: (1) It allows for the public debate of philosophical assumptions about the specialty, providing the opportunity for self-evaluation and accountability to the public and to the profession; (2) It provides a structure of theoretical statements that suggest appropriate and effective nursing interventions; and (3) It allows hypotheses for systematic scrutiny and analysis of emerging care protocols[9, 21]. By using these values, student nurses can effectively critique their own science and practice, look for innovations to improve care, and better prepare themselves to withstand changing technologies and practice

methods. Furthermore the use of the CSS framework better engages the student nurses into their own education, providing for them a firm foundation from which their studies are based.

As nurses function in a complex synergistic practice, they also provide care to a complex ecological domain represented by the client. The nurse does not work with a patient alone because the patient belongs to a complex ecological system. Nursing interventions impact on the patient's entire ecological domain—individual, intrapersonal, interpersonal, family, and community—no matter the outcome (positive or negative)[22]. Therefore, it behooves every nurse who comes in contact with a patient or client to consider the impact he or she will have on the patient's/client's complex ecological system. Each patient brings a unique collection of personal characteristics to a healthcare situation, including stability, complexity, predictability, and vulnerability[10]. Teaching the science of nursing through the CSS framework will teach the student nurses to treat each patient's entire complex domain, to embrace the reactive interdependence, intersubjectivity, and shared harmony within the nurse-patient relationship, and to be receptive to new changes and contributions from other sciences.

5. Conclusions

Nursing is a growing practice, yet it struggles to define and clarify its role. With the recent passing of the Affordable Care Act Healthcare Reform Legislation, nurses are called to act with more responsibility and independence[18]. Thus, student nurses must be educated in the complexity of the science of healthcare, the necessity of synergy between patients, families, and other health professions, and the connectedness of all aspects of wellbeing. Research on a national and global level is needed to support evidence-based practice and clarify the many facets of the profession. A theoretical framework upon which to base education, practice, and research will assist the profession to achieve its goals. The CSS framework serves as a useful foundation for beginning this process. What the future holds for nursing is yet unknown, but this is certain: as healthcare enters the second decade of the 21st century, nursing occupies the healthcare stage front and center. The researchers suggest the complexity, synergy, and systems thinking should be the new basics in nursing education. It is up to current nursing students and educators to be visionaries and innovators.

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