RESEARCH ARTICLE

Application of Roy's Adaptation Model in Understanding Content Saturation in Nursing Education

James Montegrico, PhD, RN, CMSRN[1]

Abstract

Background: Significant changes in healthcare and society prompted constant revisions in the nursing curriculum that resulted in content saturation in nursing education and challenged the delivery of effective instruction. Various factors contributed to content saturation in nursing education, which has produced adverse individual and institutional outcomes. A lack of literature on a theoretical framework limited understanding of this phenomenon. This article addressed this gap in the literature.

Purpose: This article aims to describe the applicability of the Roy Adaptation Model (RAM) as a theoretical framework for understanding content saturation in nursing education.

Methods: A literature review of published articles from the 1980s to 2020s on using RAM in nursing education was conducted. Walker and Avant's (2011) concept theory and derivation techniques were used to propose a new conceptual model based on RAM.

Results: RAM is widely used in nursing research, practice, and education. However, it has not been used to describe content saturation in nursing education. The Content Saturation in Nursing Education Model (CSNEM) is proposed to explain this phenomenon.

Conclusion: RAM provides a theoretical lens for understanding content saturation in nursing education. The CSNEM can be a new framework to describe this phenomenon, contributing to knowledge development in nursing education.

Keywords: *Roy Adaptation Model, content saturation, nursing education, nursing curriculum*

Introduction

The problem of content saturation in nursing education has been prevalent for a long time (Duncan & Schulz, 2015; Giddens & Brady, 2007; Giddens & Morton, 2010; Miller, 2014). Literature review, personal observations among students, interaction with colleagues in the academe, professional reflection, and experience validate the existence of this phenomenon. Content saturation in the nursing curriculum is influenced mainly by various factors and significantly impacts the individual, institution, and society.

The Roy Adaptation Model (RAM) is a theoretical framework widely used in nursing practice, research, and education. Nursing schools commonly use RAM as a theoretical framework to guide curriculum and instruction (Davis, 2010; Fawcett, 2003). However, its use in the context of content saturation in nursing education is lacking. This article explains this phenomenon using an adaptation of RAM, the Content Saturation in Nursing Education Model (CSNEM), as a conceptual framework to better understand student's adaptation to deal with an information overload in the nursing curriculum effectively, the implications of content saturation on the teaching-learning process, and its impact on individual and institutional outcomes.

Background

A meta-synthesis of global studies of the nursing curriculum described the nursing curriculum as overloaded, fragmented,

[1] Assistant Professor, School of Nursing, University of North Carolina at Charlotte, 9201 University City Blvd. Charlotte, North Carolina, USA, 28223, Phone: 1 (704) 687 7970
Email: jmontegr@charlotte.edu

and filled with multiple demands (Murararaneza et al., 2017). In the United States, the Institute of Medicine (IOM) claimed that the health professions education was in a state of crisis related to the rapid accumulation of new knowledge (Hall & Walton, 2004; Murararaneza et al., 2017), resulting in an overly crowded and content-laden curriculum with competing demands (Giddens & Eddy, 2009; Kaylor, 2013). Comparatively, the Philippines' Bachelor of Science in Nursing (BSN) curriculum was reportedly more comprehensive and content-heavy, with significantly more didactic and clinical hours than the U.S. BSN curriculum (Montegrico, 2021). To address content saturation in U.S. nursing education, the National League of Nursing (NLN) developed the Excellence in Nursing Model to restructure the nursing curriculum to address the challenges of an ever-changing world of health care (Brandon & All, 2010). An example of a statewide response to streamline the nursing curriculum, the North Carolina (NC) Associate Degree Nursing (ADN) Council and the NC IOM's Task Force on the NC Nursing Workforce developed a statewide concept-based curriculum as an answer to this significant issue affecting nursing education (CIP, 2006).

Developmental, systems, and interactionist models are commonly used to guide nursing education, practice, and research (Aggleton & Chalmers, 1987). Developmental theories (e.g., Erikson's psychosocial theory) explain an individual's growth and development, while interactionist frameworks (e.g., Peplau's interpersonal theory) focus on relationships between individuals. Systems theories, such as RAM, describe the structures and processes of individuals as they respond to ever-changing internal and external environments. RAM is primarily used to guide nursing practice as it describes an individual's ability to adapt to human systems and the environment in producing positive health outcomes; it has broad applicability in nursing education. It provides a more comprehensive understanding of students' constant adaptation to the demands of the teaching-learning process in nursing education.

Using concept analysis and concept and theory derivation (Walker & Avant, 2011), the RAM was chosen to explain the problem of content saturation in nursing education from the context of a nursing student. The multiplicity of factors affecting outcomes in nursing education makes RAM an appropriate theoretical perspective as a nursing model with a systems approach (Aggleton & Chamlers, 1987). The model has a broad conceptual base that makes it applicable to various settings (Artinian, 1990; Dobratz, 2008; Fawcett, 2003, 2009), including nursing education (Morales-Mann & Logan, 1990). The model recognizes the individual as a biopsychosocial being who needs to respond to various internal and external stimuli, which are categorized as focal, contextual, and residual, and the ability to adapt depends on the individual's coping processes, known as the regulator and the cognator (Whittemore & Roy, 2002). The adaptation process can be manifested in the student's distinct but interrelated physiologic, psychologic, self-concept, or interdependence modes (Chiou, 2000). The process can determine how the student responds consistently with his personal, academic, or professional goals.

As the focal point in the teaching-learning process, the student's ability to adapt to the problem of content saturation can affect their academic performance. As Dickelmann (2002) claims, students' experience with content saturation ranges from overwhelming frustration to increased memorization and content processing (as cited in Giddens & Brady, 2007), while Magnussen & Amundson (2003) reported that students feel overwhelmed and have to meet conflicting demands. The use of the nursing process was reported to be dissatisfying among students (Heidari & Hamooleh, 2016). Suppose the problem of content saturation persists in the nursing curriculum. In that case, it can eventually affect the student's safe and effective nursing care delivery as they transition into professional practice (Getha-Eby et al., 2015).

Methods

A literature review to identify theoretical and conceptual models relevant to content saturation in nursing education was done using several databases, such as Cumulative Index for Nursing and Allied Health Literature (CINAHL), ProQuest Nursing and Allied Health Database, Dissertations and Theses Global, Google Scholar, and the University of North Carolina at Greensboro Libraries using the keywords *content saturation, information overload, curriculum, nursing education, Roy Adaptation Model (RAM)*, and *Adaptation Theory*. The search was initially limited to peer-reviewed articles and unpublished theses written in English and published or written from 1998 to 2021. A preliminary search using the databases, keywords, and criteria resulted in 3,783 articles. The query limiter of "applied to nursing education" was added to explore the application of the theory to nursing education. The search narrowed to 331 articles. To examine the relevance of the articles to nursing education, 331 articles were reviewed, but only 36 articles were finally selected to develop the CSNEM, an adaptation of the RAM.

Most of this literature dealt with the application of RAM in nursing practice and research. However, using the RAM in nursing education is limited to selecting, implementing, and evaluating nursing curricula using the model. Early foundational literature about the origin and evolution of the theoretical framework and its use in nursing education was included to find a better fit for the RAM to explain content saturation in nursing education. This was necessary due to this article's conceptual nature and potential for knowledge development. The CSNEM is the output of the literature review that covers the period from 1980 to 2021.

Results and Discussion

Content Saturation in Nursing Education

Content saturation, also referred to as information overload in this context, is defined as a situation in which the ability of a person to use information is hampered by the amount of available helpful information (Gruszka & Necka, 2017). It is a mismatch between the rate of knowledge expansion versus the ability of the human brain to handle information. It occurs because of increasing new information and technology, the changing nature of work, and the demand for information from end users (Hall & Walton, 2004). The crisis has been recognized by various levels of professional organizations, such as the International Council for Nurses, the Institute of Medicine, and the NC ADN Council (CIP, 2006; IOM, 2010, & Murararaneza et al., 2017). The problem of content saturation is characterized by an overly crowded nursing curriculum with competing demands (Giddens & Eddy, 2009), fragmented content (McGrath, 2015; Murararaneza et al., 2017), repetition (McGrath, 2015), students' overwhelming frustration to increased memorization and content processing (Dickelmann, 2002), feeling overworked and unprepared, and meeting conflicting demands (Magnussen & Amundson, 2003).

The saturation of the nursing curriculum is largely influenced by societal factors. Globalization, economic decline, shortage in the healthcare profession (Murararaneza et al., 2017), information knowledge explosion in healthcare (Hall & Walton, 2004), expanded role of nurses (IOM, 2010), growing complexity of the healthcare environment, shift from acute to chronic disease management, changes in patient population's demographics and acuity, technology, regulatory policies and recommendations are major societal factors that affect the nature and magnitude of nursing content in the curriculum (Davis, 2010; Duncan & Schulz, 2015; McGrath, 2015). Regulatory agencies' recommendations include the American Association of Colleges of Nursing (AACN)'s New Essentials of the BSN Program, the National Council on Licensure Examination for Registered Nurses (NCLEX-RN) categories of client needs, the Quality and Safety Education for Nurses (QSEN) competencies, Future of Nursing (2020-2030) recommendations all added to the saturation of content in the nursing curriculum (American Association of Colleges of Nursing [AACN], 2021; Giddens & Brady, 2007; Magnussen et al., 2013; National Academy of Medicine [NAM], 2020; Patterson et al., 2016).

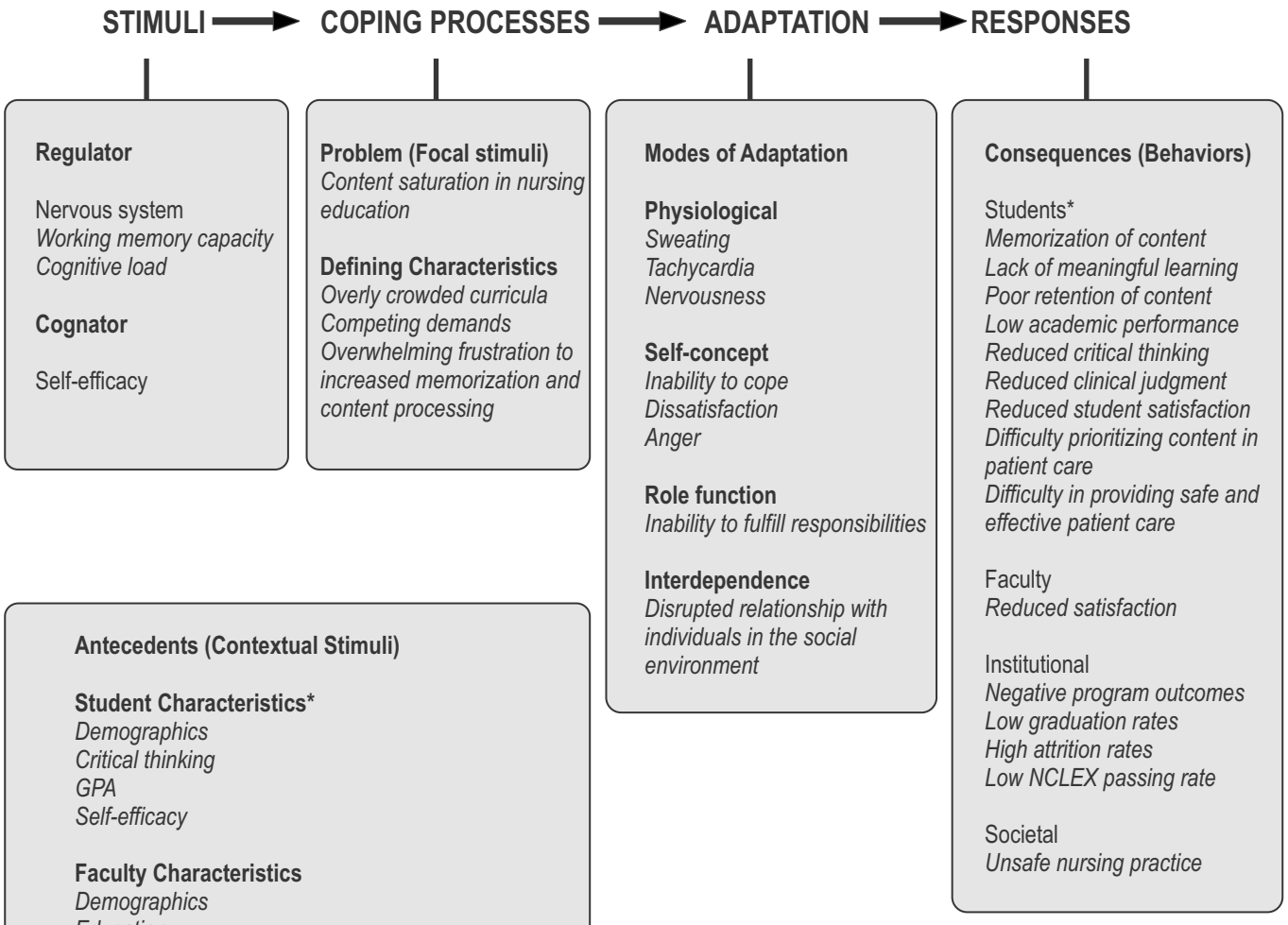
Specific student characteristics affect information processing and academic performance. Demographics, personality characteristics, critical thinking ability, previous academic performance, self-efficacy, cognitive load, and working memory capacity (Gruszka & Nesca, 2017; Kaylor, 2014) can affect the processing of content, behavioral outcomes, and overall academic performance (Davis, 2010; Hall & Walton, 2004; Harvey & McMurray, 1994; Lauder et. al., 2008; McLaughlin et al., 2007; Robb, 2012). The educational preparation of the current generation of nursing students produced less adaptive students to cope with the demands of a content-laden nursing curriculum (McGrath, 2015).

Self-efficacy is a student characteristic linked to positive student outcomes. Self-efficacy, defined by Bandura (1994) as the "individual's perception of his/her capabilities to produce a designated level of performance" (Robb, 2012, p. 167), is associated with academic performance (McLaughlin et al., 2007), career interest and progression (Harvey & McMurray, 1994), knowledge and skill acquisition and academic success (Robb, 2012), effective learning (Lauder, 2008), self-evaluation (Steyn & Mynhardt, n.d.), and competence in nursing education (Lauder et al., 2008).

The faculty member's characteristics related to demographics, educational preparation, clinical experience, and teaching styles (Magnussen & Amundsen, 2002; McGrath, 2015) can either help or hinder a student's progress in a nursing program. Certain institutional factors, such as a teacher-centered pedagogy, content repetition (Giddens & Brady, 2007), fragmented curriculum (Murararaneza et al., 2017), traditional medical model curriculum (Miller, 2014), and over-teaching (Giddens & Eddy, 2009) were also cited as contributory factors to an overloaded nursing curriculum.

Since learning is affected by the program curriculum (Davis, 2010), the problem of content saturation in nursing education significantly affects student and institutional outcomes. Information overload can lead to stress and tension, fatigue and sickness, decreased social life, and deterioration of personal relationships (Hall & Walton, 2004). The problem can also be manifested in student and faculty dissatisfaction with the curriculum. Effects on the student's critical and clinical thought processes, academic performance, licensure examination results (Davis, 2010), and motivation (Magnussen & Amundsen, 2003) are short-term consequences of information overload. Teaching methods that use memorization of nursing content contribute to information overload and lack of meaningful learning (Getha-Eby et al., 2015; Magnussen et al., 2013; McGrath, 2015). This can hinder the long-term retention of content and the development of critical thinking and clinical judgment that impacts academic performance, licensure exam results, and safe, effective patient care (Getha-Eby et al., 2015). Program outcomes such as promotion, attrition, and graduation rates, as well as licensure examination results, may be affected (Davis, 2010;

Figure 1. *Content Saturation in Nursing Education Model*



Duncan & Schulz, 2015), and nursing schools may produce nurses who cannot overcome the challenges of a complex health care environment, compromising the delivery of safe and effective nursing care (Davis, 2010; Murararaneza, et al., 2017).

The Content Saturation in Nursing Education Model (CSNEM): An Adaptation of Roy Adaptation Model (RAM)

Three nursing models are commonly used to guide nursing practice, research, and education: developmental, systems, and interactionist models of care (Aggleton & Chalmers, 1987). The systems model explains the conceptual nature of the problem as it focuses on the existence of biopsychosocial and environmental systems that influence a person's response. RAM is one of the most common nursing models based on the systems approach. Figure 1 illustrates the CSNEM, an adaptation of RAM.

RAM uses the assumptions of systems theory and adaptation theory (Mastal & Hammond, 1980). The individual is an adaptive holistic system composed of independent and interrelated parts

that act in response to various types of stimuli (Whittemore & Roy, 2002; Chiou, 2000). A *focal* stimulus confronts the individual directly and immediately attempts to adapt. In this context, the focal stimulus refers to the problem of content saturation in the nursing curriculum. A *contextual* stimulus is something in the individual's internal or external environment that impacts the magnitude of the focal stimulus, while *residual* stimuli produce effects on the focal stimulus that are unclear or unvalidated (Chiou, 2002; Jirovec et al., 1999; Levesque et al., 1998; Whittemore & Roy, 2002). In the CSNEM, the contextual and residual stimuli are the antecedents contributing to content saturation. These stimuli that impact students' adaptation and learning are influenced by student and faculty member characteristics, which are shaped by the institution (Davis, 2010), health care system, and society (McGrath, 2015; Murareneza et al., 2017).

According to the RAM, when an individual responds to these stimuli, innate and acquired coping mechanisms known as regulators and cognators are activated to adapt. *Regulators* are physiologic processes that maintain physiologic needs, while *cognators* are cognitive, behavioral, and emotional processes that aim to help the individual effectively adapt to the stimuli (Chiou, 2002; Jirovec et al., 1999; Whittemore & Roy, 2002). Applied to the CSNEM, the student's personality characteristics (McLaughlin et al., 2007) and coping mechanisms such as self-efficacy outcomes (Harvey & McMurray, 1994; Lauder et al., 2008; Robb, 2012) also influence their adaptation and response, which can be an *integrated, compensatory*, or *compromised* adaptation (Whittemore & Roy, 2002). An individual's response to these stimuli can be manifested through four adaptive modes: *physiologic*, which emphasizes physiologic integrity; *self-concept* focuses on psychological integrity; *role function*, which includes performance and mastery of roles in the society; and *interdependence* mode, which encompasses social integrity (Chiou, 2002; Whittemore & Roy, 2002). These modes correlate to Hall & Walton's (2004) claim that information overload can lead to stress, tension, fatigue, sickness, and social and personal relationship deterioration.

While the need for information attempts to reduce uncertainty, additional information may result in uncertainty since more information presents additional alternatives for the individual (Savolainen, 2007). Successful information processing leads to changes in an individual's knowledge or behavior (Savolainen, 2007), such as positive academic outcomes, an indication of integrated or compensatory adaptation, or a positive consequence. Applied to CSNEM, ineffective adaptation to a saturated nursing curriculum may produce short-term and long-term negative consequences at the individual, institutional, or societal levels.

The Cognitive Load Theory and Working Memory Capacity

The Cognitive Load Theory (CLT) was also adapted to explain the structure and processing of memory and cognitive load and better understand the student's ability to process information overload. This comprehensively conceptualizes the role of human cognition in information processing. According to the CLT, "learning interference is related to the amount of effort associated with thinking and reasoning and that some learning environments demand greater cognitive effort than others, thus requiring the learner's working memory to use higher loads of information-processing resources" (Kaylor, 2013, p. 108). Cognitive load is the cognitive ability or effort required to process information (Kaylor, 2013), while working memory capacity refers to the inherent limitations of the human brain in processing information (Gruszka & Necka, 2017). Applying the theory to education, effective adaptation to information overload depends on three types of cognitive load: the *intrinsic cognitive load*, which refers to the nature of the topic; the *extrinsic cognitive load*, or how the teacher presents information, and the *germane cognitive load*, which are the student's cognitive resources that organize information for long-term memory, that enhance learning (Gruszka & Necka, 2017). Cognitive load and working memory capacity complement the regulator and cognator of the RAM in explaining coping with information overload. Incorporated into the CSNEM, understanding cognitive load and working memory capacity will enable nurse educators to consider individual limitations when designing effective instructional strategies for their students.

Conclusion, Implications, and Recommendations

Conclusion

Information overload in the nursing curriculum, which includes the factors or antecedents that contributed to the problem, and the consequences of this educational issue on the individual student, the institution, and the society, is well documented. The literature search revealed overlaps in student and faculty member demographic characteristics and institutional, socioeconomic, political, and global factors that contributed to content saturation in the nursing curriculum, such as information explosion, changes in the health care system, changing population health care needs, globalization, regulatory compliance requirements, and need for educational reforms in nursing. Content saturation in nursing education may adversely affect students' academic performance, self-competence, self-efficacy, critical thinking, progression in nursing, licensure examination results, and ability to transition to provide safe, effective nursing care. To develop a better-organized