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# Selecting a theoretical framework to guide research on the COVID-19 pandemic impacts on nursing care delivery and the critical care work system (using Reed's Intermodern approach to theory critique)

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## ABSTRACT

Understanding the impact of COVID-19 on nursing care delivery in critical care work systems is urgently needed. Theoretical frameworks guide understanding of phenomena in research. In this paper, we critique four theoretical frameworks (Donabedian's Quality Model, the Quality Health Outcomes Model, the Systems Research Organizing Model, and the Systems Engineering (SEIPS) 2.0 Model) using Reed's (2018) Intermodern philosophical perspective of nursing science. Reed's (2018) Intermodern approach to theory critique was selected for its pragmatic perspective and focus on personal and professional health and wellbeing. The SEIPS 2.0 Model was ultimately selected to guide the study of the impact of the COVID-19 Pandemic on nursing care delivery in the critical care work systems.

Nursing care delivery impacts both patient and nurse outcomes (Cheung et al., 2008). Some researchers have explored the early impact of the COVID-19 Pandemic on nursing care delivery broadly in acute care settings (Schroeder et al., 2020), yet few have concentrated on critical care settings (ICUs). ICUs are work systems designed to provide care to critically ill patients (Marshall et al., 2017). COVID-19 illness has caused unparalleled patient admissions to ICUs (Huang et al., 2020).

Theoretical frameworks are essential to understand phenomena of interest in healthcare systems (Brewer et al., 2008). Theory-based research into systems shifts attention from a superficial focus on problem-elimination and outcomes to a broader and deeper analysis of structures and processes that affect delivery of care (Verran, 1997). This paper presents the process of analyzing and evaluating four theoretical framework for selection to study the impact of the COVID-19 Pandemic on nursing care delivery in the critical care work system. The four frameworks evaluated are Donabedian's (1988) Quality Model, Mitchell et al.' (1998) Quality Health Outcomes Model, Brewer and colleagues' (2008) Systems Research Organizing Model, and Holden et al.' (2013) Systems Engineering Initiative for Patient Safety 2.0 Model. The critique was completed using Reed's (2018) Intermodern perspective of nursing science and theory development.

## 1. Frameworks and models for understanding work systems

The four theoretical frameworks, also called models, were selected for their potential to describe systems, processes, and outcomes in healthcare. Each model was analyzed and evaluated for relevance to describe the critical care work system, processes of nursing care delivery, and subsequent outcomes. Other important concepts included in the analysis/evaluation were patients' family members, healthcare professionals' well-being, and the explicit inclusion of the external environment. These concepts were added because patients' family members play a crucial role in the social support of patients, healthcare professionals' well-being has the potential to impact patient outcomes (Cheung et al., 2008), and because of the nature of how drastically the COVID-19 Pandemic altered care delivery (Schroeder et al., 2020), respectively. Reed's (2019) Intermodern perspective of nursing science was used to critique and select a theoretical framework to describe the impact of COVID-19 on nursing care delivery in critical care work systems for the following reasons: its congruence with the nursing meta-paradigm, situation and broad use in a human factors/systems research, consideration of the external environment, and explicit inclusion of the professionals' health and wellness as an outcome.

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## 2. Reed's Intermodern approach to theory critique

The Intermodern (Reed, 2018) approach to theory critique was selected for its emphasis on the role of practice in knowledge development, and its useful perspective for theory critique among researchers who consider themselves pragmatists who value scientific theories for their success in practical application. The Intermodern approach focuses on professional well-being, which is an important issue of concern during the COVID-19 Pandemic for its potential to impact patient outcomes (National Academy of Medicine, n.d.).

Like other theory critique approaches, an Intermodern approach includes analysis and evaluation. Analysis includes a look at the 1) theory components, 2) underlying assumptions, and 3) relationships among concepts. Evaluation includes assessment of multiple components of the theory for a specific research or theory purpose. These components include the following: 1) meaning and significance for ethical and effective practice, 2) underlying worldview as congruent with nursing practice needs, 3) contribution to practice knowledge that stimulates new ideas or challenges the status quo, and 4) applications in supporting professional and personal practices that promote health and well-being (Reed, 2018).

## 3. Theoretical frameworks

The theoretical frameworks described below were selected for their potential to describe the critical care work system, processes of nursing care delivery, and subsequent outcomes. The first model described in this paper is Donabedian's (1988) Quality Model, which is broadly considered the first model describing the healthcare system structures, processes, and patient outcomes. The subsequent models are predicated on the structures, processes, and outcomes as described in Donabedian's (1988) Quality Model. Mitchell et al. (1998) Quality Health Outcomes Model, Brewer and colleagues' (2008) Systems Research Organizing Model, and Holden et al. (2013) Systems Engineering Initiative for Patient Safety 2.0 Model are critiqued below using Reed's (2018) Intermodern approach in order of chronology.

### 3.1. Donabedian's quality model

Donabedian's Quality Model (1988) is a theoretical framework for evaluating the quality of healthcare. The model depicts the relationship between the structures and processes that contribute to the outcomes of care. The *structures* construct in the model represents the attributes of the setting where care occurs; for example, organizational structures refer to settings such as teaching, urban, or rural hospitals and the processes of each involved in giving and receiving care. These settings in turn impact the *processes* that occur in giving and receiving care. The *outcomes* construct denotes the impact of care processes on the health status of patients (Donabedian, 1988). The Quality Model has mechanistic philosophic roots as evidenced by the simple, unidirectional, and linear relationships (Pepper, 1942) proposed among the structures, processes, and outcomes.

The constructs within the model are sufficiently broad, allowing for consistency with the metaparadigm of nursing, and inclusion of the patient's family/caregivers, the environment beyond where care occurs, and the impact on clinicians. However, the model lacks an explicit focus on professional practices that promote health and well-being for professionals.

Donabedian's Quality Model (1988) has been used in many research studies and supported by many research studies in healthcare research (Berwick & Fox, 2016), particularly in reference to promoting understanding phenomena in healthcare research of quality patient outcomes (Ayanian & Markel, 2016). The Quality Model has stimulated new thinking and generated development of models based loosely on this model.

### 3.2. Quality health outcomes model

The Quality Health Outcomes Model (QHOM) (1998) is a theoretical framework of the relationships between multiple factors that affect care quality. Proposed in 1998, the QHOM was built on Donabedian's Quality Model (1988) by the American Academy of Nursing Expert panel on Quality to guide quality of care evaluation and research (Mitchell et al., 1998). When the QHOM was first published, it challenged the status quo through its consideration of the reciprocal relationships between system and client characteristics to produce outcomes, and its inclusion of policy implications (Mitchell et al., 1998). The QHOM has been used widely in nursing quality research and improvement efforts (Aiken et al., 2018), although the model is nearly a quarter century old.

The model is comprised of four main concepts including: *system characteristics* (structure and process elements), *interventions* (clinical processes), *client characteristics* (to whom interventions are directed), and *outcomes* (impact of clinical processes on patients) (Mitchell et al., 1998). The QHOM reflects an organismic philosophical view (Pepper, 1942) in that health outcomes are depicted within an organization of dynamic, interrelated factors, and the whole system is not necessarily predictable by the sum of its parts.

The model has several weaknesses. The interventions construct is not directly related to outcomes, but rather indirectly related through system and client characteristics (Pepper, 1942). The constructs of the QHOM are quite broad for applications in databases used for quality improvement and intervention research (Mitchell et al., 1998). While the theoretical ideas are consistent with the metaparadigm of nursing, there is an internal inconsistency in the model's theoretical separation of the system characteristics processes from clinical intervention processes; in reality, the system has considerable influence over clinical processes. Further, similar to the Quality Model (1988), the QHOM lacks consideration of environment beyond the immediate context of care. The model does not address professional practices in promoting health and wellbeing, however it has been cited over 500 times.

### 3.3. Systems research organizing model

The Systems Research Organizing Model (SROM) is a theoretical framework that explains the relationships among variables of interest in healthcare (e.g. person, environment, healthcare professionals, and health) (Brewer et al., 2008). The model contains four main constructs including the *client* that drives the model, the *environment* which is not the focus of change but can influence other constructs, an *action focus* which is the process measures, and the *outcomes* or performance measures. All of the constructs are interrelated and comprise the system as a whole (Brewer et al., 2008). The SROM has contextualistic philosophic roots as evidenced by the client depicted as interconnected with their environment and inseparable from the system (Pepper, 1942). Brewer along with faculty and doctoral students at The University of Arizona developed the SROM to evaluate nursing systems research by examining the systems' influences on outcomes of care and healthcare design (Brewer et al., 2008).

The SROM constructs are clear and broad yet sufficiently diverse. The theoretical ideas are consistent with the metaparadigm of nursing and with a systems-focus as evidenced by depiction of the constructs comprising the whole system (Von Bertalanffy, 1969). The SROM has been used to explain and predict patient mental health outcomes (Saevert, 2003) and healthcare facilities design (Brewer et al., 2008). Though it has not been used in research in the last ten years, knowledge from the SROM contributed to a systems view in nursing research by which individuals are inseparable from their environment (Brewer et al., 2008). Unlike Donabedian's (1988) Quality Model and Mitchell et al. (1998) QHOM, the SROM challenged the status quo in its flexibility and its view of interaction among all model constructs. This enables a focus on professional practices that promote health and wellbeing.

### 3.4. Systems engineering initiative for patient safety 2.0 model

The Systems Engineering Initiative for Patient Safety (SEIPS) 2.0 Model is a theoretical framework for studying and improving health and healthcare (Holden et al., 2013). The model is comprised of three main constructs including *work systems, processes, and outcomes*. The work system is further delineated into person(s) including the healthcare professionals and patients/their families, hospital organization, tasks, internal environment (e.g. sounds, temperature) and external environment (e.g. state policy, economics).

*Processes* are delineated into professional work, collaborative professional-patient work, and patient work. *Outcomes* are delineated into patient, professional, and organizational outcomes (Holden et al., 2013). The SEIPS 2.0 Model has contextualistic philosophic roots (Pepper, 1942) as evidenced by the patient depicted as inseparable from the internal environment of care and impacted by the external environment (Holden et al., 2013). The original SEIPS model was developed by Carayon et al. (2006) and was based on Donabedian's Quality Model (1988) and Balance Theory, which emphasizes the relationships between the components of the system and importance of considering the entire system as other system elements may act as barriers or facilitators. While a SEIPS 3.0 Model does exist, its focus is on patient safety during the transition out of the acute care setting; and therefore, was not included in this theory critique (Carayon et al., 2020).

The SEIPS 2.0 Model (2013) is comprised of three main constructs with sub-concepts that further define how the constructs are sufficiently broad yet diverse. There is ample contemporary research evidence supporting the use of the SEIPS 2.0 Model in practice (Center for Quality and Productivity Improvement, n.d.). The SEIPS 2.0 Model was recently used by Lumley et al. (2020) to conceptualize what nursing care delivery may look like in critical care settings during the COVID-19 Pandemic. The model has applications for evidence-based practice, quality evaluation, testing interventions, and supporting professional and personal practices promoting personal and professional health and wellbeing as evidenced by inclusion of professional outcomes in the model (Holden et al., 2013). Finally, the SEIPS 2.0 Model challenged the status quo by proposing that negative elements or barriers to work processes can be overcome by focusing on the positive elements of the system (Carayon, 2009).

### 3.5. Summary of a comparison of theoretical frameworks

The four theoretical frameworks presented above were compared overall for selecting the one most appropriate for the research on the impact of the COVID-19 Pandemic on the critical care work system from a nursing perspective. First, while Donabedian's (1988) Quality Model has been widely used in healthcare systems research to understand quality outcomes, several key details including the patients' family members, the external environment, and the consideration of the healthcare professional were not explicitly included in the model. Second, Mitchell and colleagues' (1998) QHOM also does not include consideration of the external environment. Neither model explicitly addresses promotion of professionals' health and wellness. Third, while the SRM is nested in the nursing metaparadigm, is consistent with a systems view (Brewer et al., 2008), and includes consideration of the external environment and promotion of professionals' health and wellness; however, it has not been recently used in research. Fourth, the SEIPS 2.0 Model (Holden et al., 2013) is consistent with the nursing metaparadigm, is situated in a human factors/systems view, includes consideration of the external environment, explicitly includes the professional health and wellness as an outcome, and has been used widely in recent nursing research and implemented in critical care work systems (Center for Quality and Productivity Improvement, n.d.). Therefore, the SEIPS 2.0 Model was selected to guide a research study describing the impact of the COVID-19 Pandemic on the critical care work system from a nursing perspective.

### 3.6. The SEIPS 2.0 model and the impact of COVID-19 on the critical care work system

Because the SEIPS 2.0 Model can be used to describe work systems design with a focus on patient safety (Holden et al., 2013), it is ideal for comprehensively describing nursing care delivery which aims to deliver safe nursing care to patients. More specifically, the SEIPS 2.0 Model will be used as a framework to guide development of semi-structured interviews with critical care nurse participants to elicit their descriptions of describing the impact of the COVID-19 Pandemic on nursing care delivery in the critical care work system.

The SEIPS model in Fig. 1 depicts the components of the critical care work system during COVID-19 and the process of nursing care delivery. The model's major components of the work system, work process, and outcomes outline the major interview areas designed for data collection in the research as described briefly below.

#### 3.6.1. Work system

**3.6.1.1. Person(s).** Consistent with SEIPS 2.0 (Holden et al., 2013), both the nurse and patient (and their family) will be simultaneously represented at the center of the model. Nurses will be asked to describe characteristics of their patients including their needs, preferences and goals (Holden et al., 2013). The nurses will be described through demographic characteristics including age, gender, highest level of nursing education, and years of experience.

**3.6.1.2. Nursing tasks.** The focus of the nursing tasks will be those completed by the nurse for the patient. These tasks vary in difficulty, complexity, and ambiguity as described by Holden et al. (2013). Nurses will be asked about the tasks completed for critically ill patients in the critical care work system. Other factors, such as who was responsible for completing the task and who was responsible for delegation of tasks, will be used to provide a comprehensive description of nursing care delivery models.

**3.6.1.3. Tools & technology.** Tools and technologies include information technologies, devices, and resources used to facilitate patient care (Holden et al., 2013). Nurses will be asked about the tools and technology used in caring for patients in the ICU during COVID-19. As Holden et al. (2013) describe, tools and technology factors in the SEIPS 2.0 Model include usability, accessibility, familiarity, portability, and functionality.

**3.6.1.4. Organization.** According to Holden et al. (2013), organizations are structures that organize time, space, resources, and activities that may be put in place by people but are external to people. Nurses will be asked about factors related to organizations. Organizational factors include work assignments, such as number of patients and complexity and how work was assigned to be completed for the patient, work schedules, availability of resources such as personal protective equipment and ventilators, and management and incentive systems, and training and policies and procedures specific to caring patients in the ICU during the COVID-19 Pandemic (Holden et al., 2013).

**3.6.1.5. Internal environment.** Internal environments include layout, noise, temperature, and lighting in the work setting (Holden et al., 2013). Nurse participants will be asked about what the internal environment of an ICU looked, sounded, and physically felt like during the COVID-19 Pandemic.

**3.6.1.6. External environment.** Because COVID-19 is ravaging our nation and globe, it will be important to include a macroergonomic (work system design) approach. External factors which may impact the work system include societal, economic, and policy factors (Holden

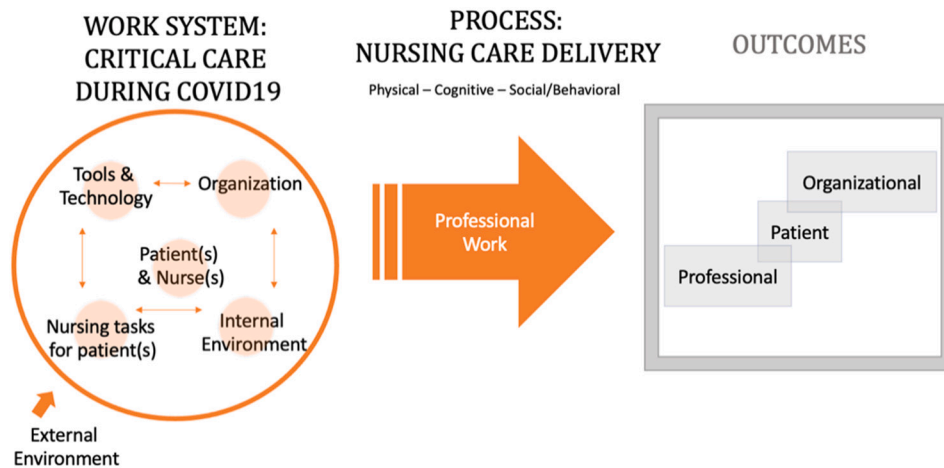


Fig. 1. SEIPS 2.0 model as adapted for this study.

et al., 2013). Nurse participants will be asked about how greater society, economics, and policy impacted their ICU and their experiences with care delivery.

### 3.6.2. Nursing care delivery as a process

Nursing care delivery is an example of professional work process completed by a nurse (Holden et al., 2013). The different components of the critical care work system will be explored for how each impacted nursing care delivery including physical, cognitive, and social/behavioral work processes. Physical work processes describe the actual process of delivering nursing care to the patient, while cognitive work processes describe the critical thinking processes and the social/behavioral work processes describe the interaction between the patient/family member and the professional and the team member interaction (Holden et al., 2013).

### 3.6.3. Outcomes

Outcomes in the SEIPS 2.0 Model include patient, professional, and organizational outcomes (Holden et al., 2013). Patient outcomes include satisfaction and quality of care, while professional outcomes include the health versus illness, job satisfaction, and burnout of the healthcare team members, and organizational outcomes include staffing difficulties, financial performance, and cultural changes (Holden et al., 2013). Nurses will be asked about nurse outcomes relating to care delivery during the COVID-19 Pandemic.

## 4. Conclusion

Theory critique including in-depth analysis and evaluation is time-consuming, yet critically important. There must be a match between the purpose of the research, the researcher's views, and the theoretical framework. One must not only consider the theories to critique, but also the approach to theory critique. Reed's (2018) Intermodern approach to critique was used for its pragmatic perspective of theory critique, which includes evaluation of a theory in terms of its practice implications and its emphasis on personal and professional health and well-being. Use of Reed's (2018) Intermodern approach facilitated selection of the SEIPS 2.0 Model was selected in part because it will provide a comprehensive framework for describing the critical care work system, processes of nursing care delivery, and subsequent outcomes with an emphasis on professional wellbeing (Carayon et al., 2006). This model offers a systems perspective to guide research on describing impact of the COVID-19 Pandemic on the critical care work systems, processes, and outcomes while emphasizing professional well-being.

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## CRedit authorship contribution statement

Claire Bethel: Conceptualization, Writing – Original Draft, Funding Acquisition, Investigation/Analysis, Project Administration, Supervision.

Pamela Reed: Methodology, Writing – Original Draft, Writing – Review & Editing, Investigation/Analysis.

Barbara Brewer: Writing – Original Draft, Writing – Review & Editing.

Jessica Rainbow: Writing – Review & Editing.

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