

## Teaching Concepts to Nursing Students Using Model Case Studies, the Venn Diagram, and Questioning Strategies

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### Abstract

Teaching nursing students to use clinical judgment is integral to successful student outcomes. Conceptual learning is at the forefront of nursing education to help students transfer didactic learning to clinical settings where clinical judgment is practiced. This article proposes the use of three interactive teaching/learning methods — model case studies, the Venn diagram, and questioning strategies — as methods to help nursing students think conceptually, that is, to think like a nurse. The concept of gas exchange is presented as an example of how these teaching/learning methods can be used; these methods are applicable to any nursing concept.

**KEY WORDS** Case Studies – Conceptual Learning – Higher Order Questions – Nursing Education – Teaching Methods – Venn Diagram

The goal of nursing education programs is to produce graduates who use clinical judgment and provide high quality outcomes-based care. This is integral in an era when nurse educators are tasked with preparing graduates to enter a health care workforce confronted with a burgeoning amount of knowledge, diverse patient populations, and an expansion of health care informatics and technologies (Institute of Medicine, 2011).

Conceptual learning helps students tackle the burden of content saturation by providing a means for content management (Giddens, 2015; Giddens & Brady 2007; Higgins & Reid, 2017) by setting up a type of filing cabinet in the brain. Traditionally, students have been taught two-dimensionally, learning facts or *knowing*, and storing those facts with the assumption that they will be able to retrieve them and perform a skill or *doing* (Erickson, Lanning, & French, 2017). With conceptual learning, three-dimensional learning occurs: *knowing* factually, *understanding* conceptually, and *doing* skillfully (Erickson et al. 2017).

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Conceptual learning is an efficient means to teach numerous nursing concepts because many disease processes (exemplars of the concept) exemplify the concept (Giddens, 2015). The goal of conceptual learning is to facilitate deep learning of these concepts (the big ideas of nursing), how they build on previously learned knowledge, and how the concepts interrelate. With integrated thinking, students make connections with similar exemplars and determine whether a specified concept does or does not apply to a given subject or situation. Through this analysis, students are challenged to use clinical judgment related to new subjects and situations when conceptual learning is employed (Giddens, 2015).

### TEACHING/LEARNING METHODS

This article provides a lesson plan that focuses on using model case studies, the Venn diagram, and questioning strategies to facilitate conceptual application for one biophysical concept, *gas exchange* (GE). GE is defined as “the process by which oxygen is transported to cells and carbon dioxide is transported from cells” (Wilson, 2017, p. 178). To demonstrate the concept, students analyze two disease processes that exemplify a life span perspective: pediatric asthma and adult chronic obstructive pulmonary disease (COPD).

The following learning outcomes were identified to facilitate guidance and evaluation of student learning:

- Define the concept of GE.
- Compare similarities and differences in the model cases that represent pediatric asthma and adult COPD.
- Identify key assessment data (critical features) of the concept and examine how they are manifested in pediatric asthma and adult COPD.
- Determine the desired patient outcome for problems with GE, regardless of etiology.

- Recognize similarities between two life span exemplars related to the concept of GE and apply the nursing interventions and collaborative care.
- Select health care settings where exemplars of the concept of GE from different life span perspectives would be observed.
- Identify various life span exemplars of the concept of GE.

Prior to class, students prepare for didactic interactive learning activities through assigned readings on the conceptual analysis of GE. Assigned readings also include in-depth didactic content on exemplars of pediatric asthma and adult COPD. Integral to class preparation is that students begin to grasp a clearer understanding of the definition of the concept.

### Model Case Studies With Examples

A case study is a teaching/learning strategy that depicts a clinical scenario based on concepts that can be translated to clinical practice (Ignatavicius, 2019). Bonney (2015) concludes that case studies are significantly more effective than other teaching strategies at promoting student application of biological concepts. Phillips (2016) states that case-based learning combines content and theory with a simulation of real-life practice. The use of case studies offers students opportunities to improve clinical judgment (Forsgren, Christensen, & Hedemalm, 2014).

Avant's (2000) classic work recommends the use of two or more cases because the comparison allows for a "back and forth" (p. 58) analysis between the cases and allows the discovery of critical features of the concept. Pediatric and adult case studies depicting exemplars of the concept of GE are presented in the following sections.

**PEDIATRIC ASTHMA, ACUTE EXACERBATION** The client is an eight-year-old girl brought to the school nurse's office complaining of difficulty in breathing; she has had asthma since age three. The child presents with perioral cyanosis, wheezing audible from across the room, and intermittent coughing, and she is unable to speak and looks frightened. Her vital signs are as follows: temperature, 98°F; heart rate, 100 beats per minute; respiratory rate, 40 breaths per minute; blood pressure, 90/54 mm Hg; and oxygen saturation, 89 percent. The child is unable to perform peak flow monitoring. Auscultation of the lungs reveals decreased air movement and inspiratory and expiratory wheezing in all lung fields. She also has intermittent intercostal retractions. She shakes her head "no" when asked whether she used her morning dose of Advair Diskus or albuterol inhaler. The school nurse administers six puffs of albuterol with an AeroChamber per the child's asthma action plan and calls 911. The child is transported to the hospital emergency department (ED).

**ADULT COPD, ACUTE EXACERBATION** The client is a 77-year-old man taken to the hospital ED by his wife because of difficulty in breathing and increased periods of shortness of breath. He has a nonproductive cough and is very anxious. He has been in the ED three times in the last year due to exacerbation of COPD. He is short of breath, has pursed lip breathing, and is sitting in the tripod position. His vital signs are as follows: temperature, 97°F; heart rate, 102 beats per minute; respiratory rate, 30 breaths per minute; blood pressure, 118/72 mm Hg; and oxygen saturation, 84 percent on room air. Auscultation of the lungs reveals decreased breath sounds to bilateral lower lobes and expiratory wheezes to the bronchiole region. He has mild retractions. Two liters of oxygen are applied via nasal cannula. The client shakes his head "no" when asked whether he had taken any medications that morning.

### Venn Diagram

In this lesson, a Venn diagram entitled Concept of Gas Exchange is applied as a teaching method. The Venn diagram is a common graphic organizer used to illustrate the symbolic logic of intersection and union (Waddell & Quinn, 2011). It has significant visual appeal in relation to learning and can be used to clarify relationships between the concept and exemplars. (A figure showing exemplars for pediatric asthma and adult COPD is available as Supplementary Digital Content 1, available at <http://links.lww.com/NEP/A143>.)

The intersection of the circles on the Venn diagram is where essential attributes of the exemplars are observed and the conceptual connection, or absoluteness, of the concept occurs. As part of the lesson, students complete a blank Venn diagram using the provided case studies and reading materials, with the nursing process as a framework.

### Questioning Strategies

A skillfully asked question can help students see relationships and fill gaps from the unknown to the known. DeTornyay and Thompson's (1982) classic work encouraged the use of higher order questions. Similarly, Erickson et al. (2017) refer to higher order questions as conceptual or debatable questions. These types of questions help students solve problems and think abstractly; they cannot be simply answered from memory or perception. (See Supplementary Digital Content 2, available at <http://links.lww.com/NEP/A144>, for a table containing higher order questions and explanations.) Higher order questions often ask "why" and are a perfect counterpart to using a Venn diagram because they help students "establish relationships, compare and contrast concepts and principles, make inferences, and see causes and effects" (DeTornyay & Thompson, 1982, p. 68).

### Interactive Class Activity

In groups, students are instructed to analyze both model cases and identify critical features (and patterns) of the concept of GE. Utilizing a Venn diagram, embedded with the nursing process, students complete the following: In the outer portion of the circle on the left of the Venn diagram (see figure in supplemental content), students will record *all* critical features of Case Study 1: Pediatric Asthma. Then, in the outer portion of the circle on the right, students will record *all* critical features of Case Study 2: Adult COPD. Lastly, the students will analyze the Venn diagram as a whole and, through comparison, discuss the key attributes of both. Students will document these features in the intersection (union) of the Venn diagram, whereby the absoluteness of the concept of GE becomes evident. A group and class discussion using the higher order questions will follow.

### EVALUATION OF STUDENT LEARNING

This lesson plan has been applied to several cohorts in a concept-based Health and Illness course. After student analysis of the model cases and completion of the Venn diagram, an instructor-led class discussion using the higher order questions served as an assessment to measure student understanding of learning outcomes. Significant to the discussion and evaluation of learning outcomes was student sharing and transfer of knowledge and experiences from the classroom to the clinical setting and vice versa. Students demonstrated enthusiasm, problem solving, and clinical judgment as they answered the complex sequence of questions. Giddens (2015) stated that the "cognitive connections to concepts" (p. 15), as made with conceptual

learning, facilitates clinical judgment when students encounter new knowledge.

### IMPLICATIONS FOR FURTHER TEACHING/LEARNING

The use of model cases along with the Venn diagram and questioning strategies could be applied to any concept in either didactic or clinical settings. Following are two examples of how the Venn diagram can be used to define other concepts:

- Addiction, with three model case studies using three overlapping circles with intersection of three exemplars (e.g., alcohol, opiates, and methamphetamines).
- Infection, using two model case studies with varied sized circles to demonstrate the incidence and prevalence of two exemplars (e.g., pneumonia and tuberculosis; pneumonia would be depicted in the larger circle and tuberculosis would be depicted in the smaller circle).

The numerous possibilities for the use of model cases, the Venn diagram, and questioning strategies in conceptual learning provide students with an opportunity to learn how to apply concepts to a range of clinical situations.

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