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Active Learning: Strategies in Nursing Education

Loretta Vobr

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ACTIVE LEARNING: STRATEGIES IN NURSING EDUCATION

By

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ABSTRACT

As the generations change so do the methods and needs of teaching and learning. Today's teaching methods as well as those in the future are moving toward learning methods in which students play an active role in their learning experiences. The National League for Nurses (NLN) is promoting and encouraging schools of nursing to move into the "hands-on" learning experience. Active learning teaching strategies allow nursing students to experience real-life situations before going into practice, therefore providing safety for the clients that they care for. It also allows students to experience the results of their decisions and offers them feedback and an opportunity for remediation as needed.

This project provides a literature review of five active learning methods: a) guided design, b) gaming, c) case studies/unfolding case studies, d) concept mapping and e) simulation. A selected example of an unfolding case study and the evaluation is also provided.

Active learning strategies not only benefit nursing students but also nurses and other medical personnel. New technologies and equipment can be simulated which allow for hands-on experiences before using them in a real-life situation; allowing for increased client safety.

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CHAPTER I

INTRODUCTION

The classroom was about full to capacity. There were all ages including several that appeared to be right out of high school. They were in their late teens and early 20's, and about ten students were in their 30's. Most of the students were female; and four or five students were in their 40's and maybe early 50's, and one gentleman looked to be in his late 50's or even 60. His silver hair was very attractive and sparkled when the light reflected from it.

This scenario demonstrates what many classrooms look like today. It is not unusual to have four generations represented at a time. It is a challenge for any instructor to meet the learning styles and needs that are represented. Traditionally the teacher plays the dominate figure and the students listen and take notes, write papers and complete other tasks and assignments. In the traditional classroom setting, "teachers focus more on the process of teaching (e.g., methods and testing) than the process of learning" (Schaefer and Zygmunt, 2003, p. 241); however this is quickly changing.

Each generation brings their own set of values in regard to education and each generational group has its own expectations. According to Taylor (2005), the veterans (people born 1922-1943), also known as traditionals, were born before World War II. In this generation experience is valued and learning about what has worked well and what hasn't worked well is very important to them. Duty, discipline, thriftiness and self sacrifice are valued attributes. Conformity and strict lines of authority are respected (Taylor, 2005). Many members of this generation are senior faculty and administrative

staff today. There are many veteran nurses still working today; but probably more in administrative positions. They value the hierarchy and the clear division of labor. A lifetime position is important and is respected (Swearingen and Liberman, 2004).

The Baby Boomers (people born 1945-1964) represent the majority of the work force today, including the nursing profession; however, over the next ten years this generation will be retiring. They grew up in an era where social values included "human development and progress through science and reason" (Taylor, 2005). Boomers are dedicated to their job and find identity in performance of their work (Swearingen and Libermann, 2004). Many nurses of this era chose nursing as a profession and many considered it a calling to serve mankind and to make their communities a better place to live.

Next in line, according to Taylor (2005), are the Generation X individuals (people born 1965 to 1979). There were major societal changes taking place during this time which included mothers going to work and the creation of the latchkey child. It was also a time when great advances were made in technology; allowing them to learn the concept of instant gratification. These people grew up to be more independent, better problem solvers, more adaptable, and more technologically savvy. On the other hand they are also more skeptical and less relationship oriented than Baby Boomers. They appreciate feedback and evaluation but do not like close supervision. The Generation X folks were also entering the work force when companies were going through reorganization and downsizing which demonstrated to them that success and security could not be placed in businesses and companies they worked for (Karp, Fuller, and Srias, 2002).

Generation Y, also known as the Millennials, bring many traits and expectations as the other generations do, however this group's expectations regarding education is a "consumer orientation." Education is a commodity that is acquired by paying tuition -- receiving credit or an excellent grade because they have paid for the class. In the academic arena this generation does well with a variety of learning options where learning is directly applied to real-life experiences -- improving critical, creative and practical thinking (Taylor, 2005).

Caputi (2005) describes some of the characteristics of the adult learner: a) they need to see a direct relationship between what is being learned and how it applies to real life; b) they need to be actively involved and participate in the learning process; c) adult learners bring a host of life experiences to a learning situation; d) they are independent learners; e) adults prefer individual instruction and to be able to learn at their own pace.

Johnson and Roamnello (2005) offer these characteristics from the individual generational groups. The veterans and sometimes called the silent generation "have more difficulty adjusting to technological advances in nursing and education" (p. 212). Boomers "come prepared for class, arrive on time ... some may struggle with technological advancements; however they are conscientious and willing to accept help ... most would probably prefer to learn content through lecture and note taking"(p. 214). The Generation Xers value time to themselves which is oftentimes more important to them than school work. "Gen Xers view education as something that has to be endured; it is merely a means to an end" (p. 214). The Millennials are well adapted to the computer and the World Wide Web and are more likely to receive information in this fashion

versus using a library. "... they demand immediate feedback on their work, as they are accustomed to information access 24/7" (p. 214).

Each generational group possesses its own style and preference for learning. One can only visualize the challenges and the creativity that is needed in today's classrooms to meet these varied generational differences.

Problem and Purpose

The purpose of this project is twofold. First, to explore the literature, discuss selected active learning methods and their application and evaluation in nursing education. Secondly, an example of an unfolding case study and an evaluation rubric is provided.

The National League for Nursing (NLN) is calling for nursing education to reform. It is encouraging transformation from traditional models and past practices to move forward with innovative curriculum that is evidenced-based and to move away from "focus on content" coverage. The NLN is encouraging nursing education programs to involve students in their educational process. Instructors need to be mindful of the individual student learning needs, be accessible as well as be responsive to the diverse student's needs (NLN, 2005).

Among the obstacles in initiating a more 'active participant' curriculum is having the time to develop it. Also, when an effective learning activity is designed it needs to be stored so it can be used again and again and revised as needed to meet the learning needs of the students. Another challenge is the need to share so other faculty members can benefit from it, rather than expecting them to create and design what already is available.

Active learning, which involves many methods, is a way to help meet the diverse learning needs within the classroom as well as the expectations for reform in nursing education. It is one way to involve the students in their learning, giving them the opportunity for hands on experience and helping them to develop the critical thinking skills, vital in nursing education and nursing practice.

Conceptual and Theoretical Framework

There are many theories regarding the learning process, however the Human Constructivism Theory probably best describes how active learning is developed and processed. It was developed from the work of developmental psychologists, particularly David Ausubel, in the early 1950's. Ausubel theorized that the most important factor influencing learning is what the learner already knows (Breslow, 2001). Constructivist Theorist, J. Bruner (n.d.), also identifies learning as an active process in which learners develop or construct new ideas based upon their current and past knowledge.

Constructivism impacts learning in the following ways: a) curriculum is customized to the student's prior knowledge and it emphasizes hands-on problem solving; b) instruction is tailored by the educator to encourage students to analyze, interpret and predict information; c) assessment becomes part of the learning process so that students play a larger role in judging their own progress. Constructivism calls for the elimination of grades and standardize testing (Funderstanding, 2001). Figure one demonstrates a conceptual map of constructivism developed by Breslow, 2001.

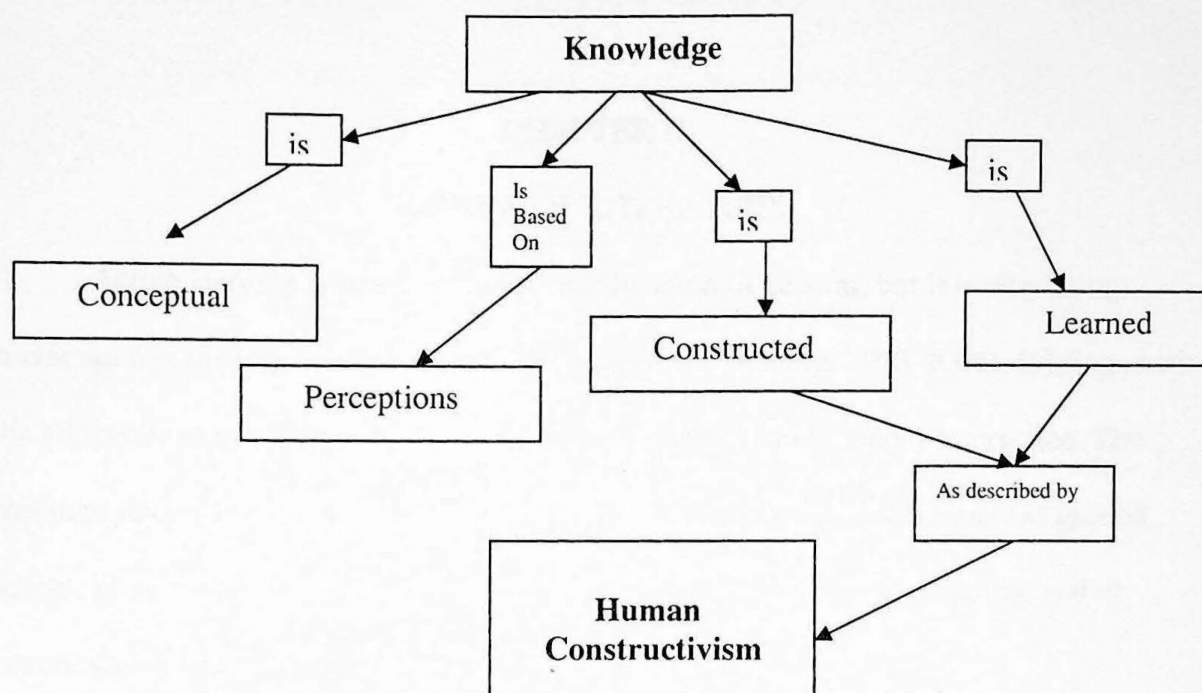


Figure 1. Vobr Conceptual Map of Human Constructivism.

An active learning environment is an environment in which students can use previous knowledge to build and create new concepts. They can manipulate different ideas, make decisions and arrive at a decision using real-life situations. Billings and Halstead (2005) state: “It is important for students to have the opportunity to construct knowledge for themselves, group discussions of topics that involve a number of different variables enhances knowledge construction” (p. 243).

The instructor becomes more of a facilitator and a resource entity. Students become more responsible for their learning and spoon feeding is not an issue. It leaves the student feeling invigorated, “more adult and more valued” (Mckeachie and Svinicki, 2006, p. 286). Active learning brings satisfaction to the learning experience and in turn spurs retention of what is learned.

CHAPTER II

REVIEW OF LITERATURE

Active learning is being promoted in education in general, but it is also being encouraged in nursing education (National League for Nursing, 2003-2006). It brings real life situations to the classroom where students are able to apply theory to practice. The literature review will provide an overview of five active learning techniques: a) guided design, b) gaming, c) case studies/unfolding case studies, d) concept mapping, and e) simulation.

Guided Design

Guided design was developed at West Virginia University in the late 1960's to instruct engineering students, however it can be used by almost any field where problem-based learning is applied or needed. It is an active learning method where students work in a group which provides them with the opportunity to critically think by recalling information learned from theory and then how to apply it to a given situation. Wales (1978) describes the steps in using guided design:

- a) identify the problem ... look beyond the symptoms of the problem to find out what is wrong;
- b) state the basic objective or goal;
- c) state the constraints (factors which limit the outcome) assumptions (are applied to factors which can be changed to simplify the problem and make it solvable) and facts (statements of things that are known);
- d) generate possible solutions (get all the different thoughts you can);
- e) evaluate and make a decision (determine which possible solution is most likely to solve

the problem); f) analysis (separate the chosen possible solution into meaningful elements); g) synthesis (combine the elements to create a detailed solution); h) evaluate the solution (does it satisfy the basic objective?); i) report the results and make recommendations (describe what you have done and decided; j) implement the decision; and k) check the results (solution work, or further design effort required?) (p. 34).

Later, in 1986, White and Coscarelli combined the steps into stages as follows: a) “stage1, identify the problem, state the goal and gather information; b) stage 2, component analysis and generate possible solutions; c)stage 3, list constraints and assumptions, then choose; d) stage 4, analysis, synthesis and evaluation; and e) recommendations and report” (p. 65).

Guided design works well with either a large project where the group is designated certain roles such as leaders, planners, or researchers and the end product may be a paper that is presented or the product may be a class presentation. It also works well with in-class activities. The students divide into groups of 5 to 7 people. Each group is given a scenario where they need to decide what to do and why they are doing it. This encourages the students to critically think and to apply theory based information. After students have had time to prepare their responses, each group presents their findings or results to the class so the entire class gets the benefit from each scenario. The instructor’s role is to listen and interject comments or ask a leading question if he/she feels the information should be expanded or more thoroughly covered.

Fuszard (1995), describes Guided Design by stating “It is step-by-step practice in guided decision making, with the teacher modeling professional reasoning for real-world

problems” (p. 181). Guided Design is an active learning strategy where immediate feedback is given. It allows students to remediate their thinking about the situation and to develop a new frame of reference if necessary. White and Coscarelli (1986) state: “With Guided Design the faculty is available to work with groups as consultants, advisors, and guides ... students not only learn course content material, but also learn how to apply the material. The instructor can spend class time in the more important role of mentor” (p. 125).

An experimental study was conducted by Newsome and Tillman (1990) to compare “the effects of guided design and lecture teaching strategies on knowledge recall and the ability of student nurses to solve problems (appropriately utilize the nursing process) in the clinical setting” (p. 90). Their sample consisted of 50 students in a two year associate degree nursing program. The instruments used were a multiple-choice test to assess the student’s knowledge of the nursing process and a “care plan evaluation tool to score accuracy in the use of the nursing process in patient care and the use of the nursing process during a controlled patient simulation” (p. 91).

The guided design groups all scored higher in the five areas of the care plan variable: diagnosis, goal, intervention, rationale and evaluation. This study demonstrated that guided design, if used effectively, can accomplish the same goals as the lecture, and can increase student’s ability to apply problem solving methods to patient situations. Guided design can also help students to generate appropriate care plans from the diagnoses.

Gaming

Gaming is another active learning tool. The purpose is not to introduce new material but this method of active learning works nicely to reinforce existing knowledge. It provides motivation among the students and works well for an ice breaker -- getting students acquainted with each other (Fuszard, 1995).

Ridley (2004) discusses the use of games that she developed and used for a maternal-child nursing class: "millionaire mania," designed after Who Wants to be a Millionaire? "OB Pyramid" based on the \$10,000 Pyramid; "Name that STD" created after Name That Tune, but she used pictures of the manifested STD as well as gave clues (p. 48). Other games Ridley developed were based on Jeopardy and Pictionary. Ridley states: "No matter what the game, the best strategy is making sure the students know the rules before hand ... the goals of fun and learning are stressed" (p. 49).

Fuszard states: "Games have a special role in building students' self confidence and an understanding of the real world. They can reduce the gap between quicker and slower learners; encourage creative behavior and divergent thought" (p. 112).

Oermann and Gaberson (2006) talk about individual games such as cross word puzzles. These work well for reviewing previous knowledge and as an aid in learning specific terminology such as defense mechanisms in the psychosocial integrity class. Oermann and Gaberson (2006) state: "Games, however, are not intended for grading; they should be used only for instructional purposes and formative evaluation" (p. 226). Gaming does work nicely for formative evaluation because all the students are involved and assessments can be made by observing their ability to answer questions.

Fuszard (1995) includes the following steps in developing a game: a) "define learning objective; b) develop participants' role, materials, and sequence of actions; c) develop instructor's manual; d) try out the game; e) obtain feedback; f) revise game bases on feedback; g) repeat steps 4,5, and 6 as needed" (p.116).

Case Studies/Unfolding Case Studies

The use of case studies in nursing education is a mainstay in teaching strategies. So many things can be accomplished with a case study. They can be used as in class activities or as individual assignments. Fuszard (1999) points out that case studies work especially well in nursing education because real-life situations can be brought to life without posing any danger to a patient.

Practicing situations through the use of case studies allows students to think through a real-life situation and determine what actions or interventions are necessary. As nursing practice becomes more complex with advanced methods and technology, the assessment skills and the ability to critically think become more crucial. At times a clinical situation can be likened to putting a puzzle together. The pieces that a nurse must put together and to know when to take action, can mean saving a life or saving a patient from harmful circumstances.

Dowd and Davedhizar (1999) make these observations:

Case study teaching provides models of how to think professionally about problems. Students learn how to use theoretical concepts to illuminate a practical problem (also called critical thinking). They learn how to spot the larger issues implicit in what seem to be a minor decision. Teaching by the case study method helps students learn how to think productively about

concrete experiences. It can allow the student to think through an experience before being confronted with it. It thus enhances their ability to learn from their own experiences, either real or simulated (p. 42).

Billings and Halstead (2005) list specific advantages to using case studies:

a) stimulates critical thinking, retention and recall; b) associating the practical with the theoretical helps many students to recall important information; c) typical lecture material can be presented in more practical context; d) problem solving can be practiced in a safe environment without the threat of endangering a patient; e) especially good for adult learners who desire peer interaction, support for prior experience, and validation of thinking; and f) an experienced nurse can readily devise a case study example from actual patient encounters (p. 297).

An unfolding case study can be used as a classroom activity using PowerPoint and having the class participate in answering or solving the situation. Unfolding case studies can also be used in class with group work where each group would be given a case study to complete. Case studies or unfolding case studies can also be used as take home assignments or as essay questions.

Glendon and Ulrich (2001) have written unfolding case studies with the following characteristics: a) learning objectives that alert the student as to what is expected to be learned from a particular unfolding case study; b) the particulars to the scenario; c) focus questions are asked as the case study unfolds; and d) reflective writing which includes thought provoking questions as far as what would the student do if they were in that situation. For example:

Today at the clinic you are caring for another mother who has had an amniocentesis and it is determined that her baby has Down Syndrome. At 18 weeks she decides to abort the baby. You have been assigned to be her nurse for the abortive procedure, but your beliefs are that the baby has a right to live. Will you care for her? What are the pros and cons of your action? (p. 7).

Case studies and unfolding case studies offer the teacher the ability to cover many situations and can be written or designed to suit whatever topic that needs to be learned. They are effective, active learning tools that help to enhance critical thinking skills.

Concept Mapping

Concept mapping is another active learning strategy that is quickly becoming more popular in nursing education. This strategy allows the student to organize a concept and put the information into a visual format. "Concept mapping increases learning efficiency, decreases anxiety, and actually assists students in learning how to learn" (Beitz, 1998, p. 35).

In developing a concept map for the assessment and care of an individual, King and Shell (2002) made these observations:

The primary purpose of the concept map is to synthesize relevant data such as diagnoses, signs and symptoms, health needs, learning needs, nursing interventions, and assessments. Analysis of the data begins with the recognition of the interrelatedness of the concepts and visualization of the whole picture of a unique individual's health status as well as those concepts that affect the individual such as culture, ethnicity, and

psychosocial state. Once the map has some structure, the instructor or student may ask: a) What additional information do I need? b) How does one concept relate to another or what is the direction of the relationship? Is one problem or symptom the direct cause of another? c) Are there possible relationships with signs and symptoms and current medication? d) Where are the knowledge deficits and/or learning needs of this patient/family? (p. 215 & 216).

Hsu and Hsieh (2005) conducted a study to determine how well concept mapping would work as an “instructional” strategy. There were 43 students involved, and they were divided into seven groups. Six scenarios were given to each group. Five scenarios dealt with physical disorders and one dealt with role functions. The students were given two weeks to complete their maps. “Participants were told in advance that a concept map should display each nursing problem and, more importantly, its relationship to nursing problems” (p.143-144).

The results demonstrated that the first maps were not done very well. Their thinking demonstrated more linear thought, but after the third and following maps the students exhibited a higher level of thinking and their maps were branching out and not as linear. Hsu and Hsieh (2005) state: “The concept maps provided a context for these students to interpret problems systematically, define problems, connect theory with scenarios, and find proper interventions” (p. 147).

Concept mapping has been used in the clinical setting and particularly with developing patient care plans (Castellino and Schuster, 2002). The traditional four column care plan that consists of: a) column one, goals for the patient; b) column two,

nursing interventions; c) column three, rationales and; d) column four, evaluation, is very linear and many students have difficulty with this documentation of their thinking. With the use of concept mapping, students are able to visualize the patient's needs and the concept map aids in the process of creating a care plan that is applicable to the patient. Caputi and Englemann (2005) state: "Mapping the plan of care for an assigned client in the clinical setting is an exciting and meaningful way for students to organize information and see the bigger picture" (p. 643). Shuster (2000) states: "Concept mapping of clinical problems allows students and faculty to see interrelationships in clinical data and grasp the total patient clinical picture" (p. 81). Concept mapping enhances the nursing process and develops critical thinking.

Simulation

Four nursing students are hovering over a hospital bed. A voice coming from the bed says: "I can't breathe." The nursing students look at each other and then up at a camera that is recording their actions. Again the voice from the bed says: "I can't breathe." The students quickly look at their printed case scenario and decide among themselves what their next step or nursing intervention should be. While this situation plays out, there is a lab assistant sitting behind a wall running the Human Patient Simulator (HPS) via computer. This is one example of simulation, and how it can be used in a nursing education laboratory.

The English Dictionary (2005) identifies simulation as: a) "the act of giving false appearance; b) the act of imitating the behavior of some situation or some process by means of something suitably analogous (especially for the purpose of steady or personnel training; c) representation of something; d) the technique of representing the real."

Simulation has been widely used in industry and the military for several years. The Navy discovered that much of their training could be done without men and women ever leaving port. Rand National Defense Research Institute (2005), reports that there is still debate as to what types of things should be taught through simulation and what should not be taught, but one thing, for sure, is that simulation has greatly reduced training and instructional costs.

Dental Education has also found the advantage of using simulation. Littlefield, Demps, Keiser, Lipika, Cheny, Yuan and Hargreaves (2003), report that with the development of SimEndo I, dentistry students have been given the opportunity to practice dentistry without involving a real patient. This allows the dentistry student to practice earlier in their education process. SimEndo I has also been helpful to dental students as they learn to correctly diagnose endodontic conditions.

Computer simulation has been used in training Interventionalist in cardiovascular care. Faires, Lin, Bernheim, Hohenbeck, DeRubertis, Trocciola, Rhee, McKinsey, Morrissey and Kent (2004) record that after receiving didactic instruction the participants performed carotid angioplasty and stenting using simulation. Novices, in particular, gained the most from the experience and desired more training time.

Endoscopy is another computer-based simulation that can be used. A laboratory, such as the one at Metropolitan State College in St. Paul, Minnesota, can be set up to perform colonoscopy, bronchoscopy and gastroscopy. The equipment, including the scopes, is the real thing. When they are placed into the manikin real-life images are seen on the computer screen. The student can practice performing the procedure as if it were a real patient (Save the Date, 2005).

Over the past three to four decades, the field of medicine has made great advances in saving people's lives from serious medical conditions and other crises. The result has been great advances in sophisticated technology. While this is amazing and wonderful it has also created a much higher degree of acuity in the patient population and a special challenge for medical personnel to provide safe and appropriate care. It also challenges colleges and educators to provide adequate education to meet these high level needs. Aronson and Squires (2004), also bring to attention the challenge of having a shortage of clinical sites and instructors.

As nurse educators become more familiar with the use and advantages of simulation it is becoming a more popular method of training. Johnson, Zerwic and Theis (1999), point out that simulation can be used in all specialty areas including: critical care, medical-surgical, psychiatric, obstetrics and pediatric settings.

The National League for Nursing (NLN) supports and promotes the development of simulation in nursing education. The Laerdal Company, maker of SimMann, HPS (Human Patient Simulator), has partnered with the NLN in developing a project called: "Designing and Implementing Models for the Innovative Use of Simulation to teach Nursing Care of Ill Adults and Children: A national Multi-Site, Multi-Method Study" (NLN Progress Report, 2003-2005, p. 1). Figure two demonstrates a simulation research model.

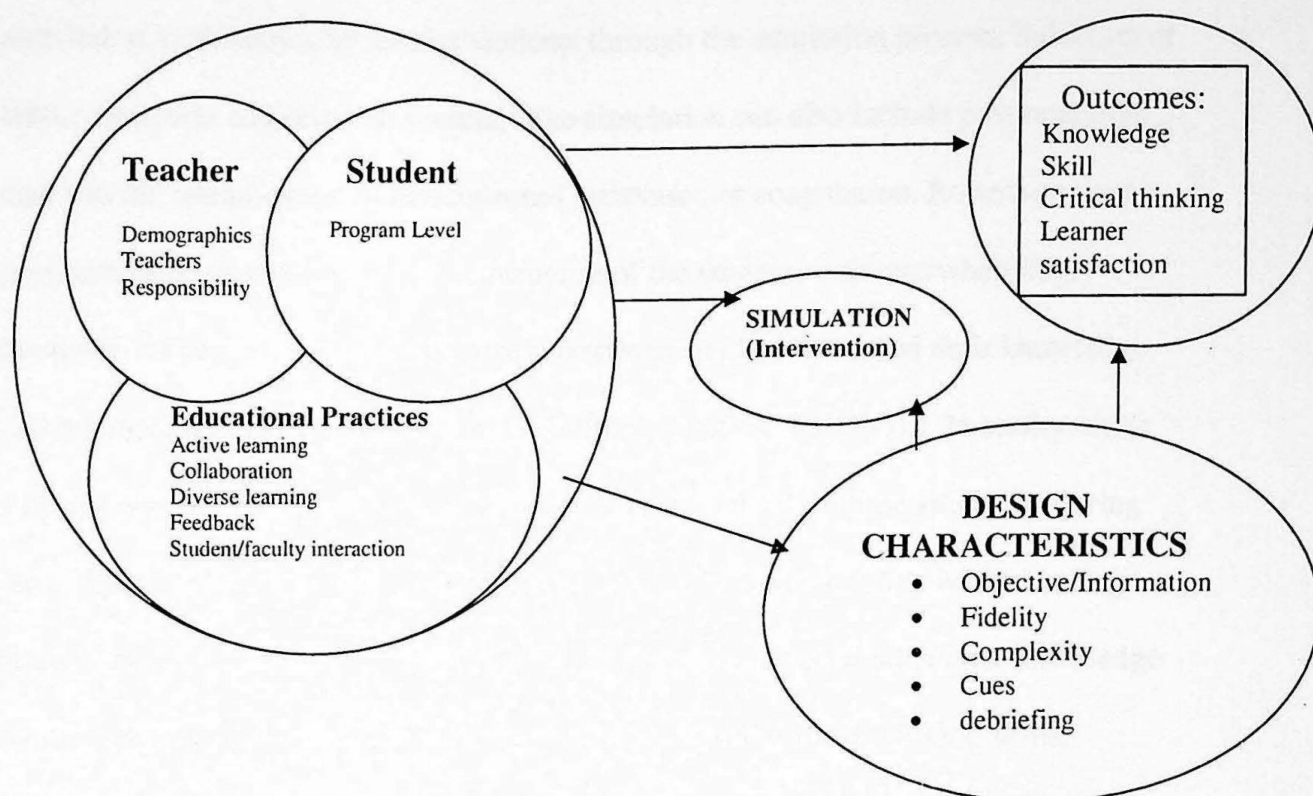


Figure 2. Vobr Simulation Research Model, adapted from the National League for Nursing.

The purpose of this model is:

- a) to develop and test models that nursing faculty can implement when using simulation to promote student learning;
- b) to develop a cadre of nursing faculty who use simulation in innovative ways to enhance student learning;
- c) to contribute to refinement of the body of knowledge related to use of simulation in nursing education; and
- d) to demonstrate the benefit of collaboration between the corporate and not-for-profit-worlds (NLN Progress Report, 2003-2005, p. 11).

The HPS is currently being used in many nursing programs. Nehring and Lashley (2004) note that these manikins can be programmed to teach pathophysiology and pharmacology as well as a host of health incidents. Robertson (2006) discusses the use of

simulation in obstetrics by leading students through the admission process, induction of labor; abruption and cesarean section. The simulation can also include post operative care and the complication of disseminated intravascular coagulation. Robertson used a pregnant HPS manikin, Noelle. The response of the students was overwhelmingly favorable. "They felt it evoked a realistic response and had increased their knowledge, making them feel more prepared for their clinical rotation" (p. 77-78). In reality, these students may not have had the opportunity to experience all of these situations during their obstetric clinical rotation, but through the use of simulation they were able to go through these real-life situations. This allowed the students to broaden their knowledge base which in turn helps to cultivate their assessment and critical thinking skills.

Robertson (2006), also states: "The strategy required the student to apply past concepts, critically evaluate a client care situation, work with classmates on a team, and provide interventions" (p. 78).

There are many advantages to using simulation. Rauen (2001) discusses several:

- a) it involves no risk to the patient;
- b) it allows the instructor to manipulate the situation;
- c) learning can take place at a planned time, in a controlled environment where mistakes are permitted and their consequences are witnessed;
- d) a valuable bridge between theory and practice can be demonstrated, and cause and effect connections can be assessed;
- e) simulators don't get embarrassed or mind that inexperienced providers are working with them;
- f) learning is reinforced ...because students are active participants in their education;
- g) more than one student at a time can interact with the manikin, and they can learn from each other's successes

and mistakes; and h) simulation offers the learner immediate feedback (p. 98).

Johnson, Zerwic, and Theis (1999) state:

The simulation experience allows students to validate their knowledge and decision-making skills as a nurse through an interactive role-playing experience. Simulated activities permit students to react to a variety of situations typically encountered in clinical practice without the fear of making a mistake ... Simulations also increase students' confidence in critical thinking and problem-solving ... Another dimension of this experience is that students can review and critique their own and other students' actions and behaviors in an atmosphere conducive to learning; this is a learning experience that students rarely have the opportunity to do in the clinical setting. Without the pressure of a grade and the risk of endangering patients, students are more open to discuss the merits of their actions. Use of the same simulation scenarios allows students to see other approaches to the clinical problems that are correct by different (p. 41).

Patient and client safety is always number one on the priority list. The number of deaths that occur in the United States from medical error, range in the tens of thousands (Hughes, 2004). One way to try and reduce this rate is through safety simulation. Paparella, Mariani, Layton and Carpenter (2004) discuss the use of an exercise called "What's Wrong with This Patient" (WWP) (p. 249). The lab or learning area was set up to look like a hospital room, and the students had to find the errors that included the areas of: a) "medication safety; b) equipment safety; c) physical safety; and

d) documentation safety” (p. 250). The students were able to see that there is a need for observational skills and were able to observe the important role that the nurse plays in protecting their patients from harmful situations. This simulation exercise would be effective in helping students to develop their assessment skills and to be mindful of the whole picture. It can be challenging for both student and instructor to go to the next level of critical thinking in assessing the whole situation and planning for the “what ifs”. A simulation of a particular situation gives the students a life-size visual that they can manipulate as well as experience the results. Mistakes or poor judgments can be reviewed by faculty and student, giving the student the opportunity to decide what should have been done instead. Simulation provides the potential for immediate feedback and opportunities for remediation.

Simulation is a wonderful teaching tool for a wide variety of learning situations. Examples range from a simple scenario of assessing edema or lung sounds to a more complex scenario such as the patient experiencing an acute myocardial infarction or cardiac arrest. It can take place in the classroom, lab or at the actual clinical site. It is regarded as an enhancement to what students learn in theory. Rauen (2001) states: “It (simulation) is an additional form of education, not a replacement...learners must have command of the content and theory before they can move to the application phase” (p. 98).

Billings and Halstead (2005) offer the following teachings tips in regards to simulation:

- a) a sound lesson plan must be developed so that the content is addressed adequately;
- b) learning through simulation is best when combined with

other strategies appropriate to the content; c) relevance of the simulation to real-life situations enhances retention; d) teacher preparation for simulations involves several steps; e) in simulation, previously learned content is applied so appropriate presimulation activities, assignments etc. are required; f) student expectations should be stated at the beginning and end of the simulation; g) discussion about what happened during the simulation (debriefing) and a summary of the major points are critical components of learning through simulation; h) emphasizing the process rather than the details in the simulation will enhance student learning; and i) simulations can also be used as an evaluation tool, especially in evaluation of psychomotor skills and decision making (p. 308).

There are many challenges to implementing simulation into a nursing curriculum. Based on the needs of a particular nursing program, a simulation lab could be very elaborate, costing several million dollars to a more simplified lab which would cost much less. Whichever the case, developing a simulation lab is not an overnight project. Planning and designing the lab, along with securing the financing is time consuming. Other aspects of simulation lab development include securing the necessary space, and assuring the appropriate technical support to operate the lab. An essential part of the process is the need for continuity and team work by the faculty as they develop scenarios. This continuity and sharing will ensure that the simulations will be accessible so that the wheel is not reinvented each time a course is taught.

At the community and technical college where the author teaches, the faculty are in the very early stages of developing and cataloging active learning projects and making

them available for use by all nursing faculty. Rauen (2001) states: "... if more than one instructor is used, developing a consistency plan" (p. 98) is necessary. There could be literally hundreds and even thousands of scenarios created involving several different knowledge levels, depending on the needs of the program. To create and catalog these scenarios would be a major task and faculty would collect overtime not to mention the time involved in revising them and keeping them current and evidenced based.

The development of simulation in nursing education is not a small endeavor, but an endeavor that is necessary to help meet the needs of nursing programs throughout the country. This is an effort that will better prepare nursing students to meet the challenges and expectations of their future profession. The technology is available to make simulation successful, but the challenge is to bring all the necessary components together. With the NLN and the Laerdal Company working together there is the potential to promote research, development and implementation of simulation as an integral part of nursing education. The development of simulation into nursing curriculums adds another valuable active learning strategy to the repertoire of teaching and learning strategies in nursing education.

Evaluation

Learning is not complete without an evaluation process to determine whether the objectives and goals are met. Formative evaluation and summative evaluation are two evaluation methods used with active learning strategies.

Formative Evaluation

Formative evaluation is an evaluative process that occurs throughout the teaching-learning process. The goals and objectives that have been established at the beginning of

the course are evaluated continuously and feedback provided to the students on an ongoing basis. Faculty can determine where changes need to be made so that students can better understand the material that is being presented. Billings and Halstead (2006) state:

Faculty use formative evaluation a) to appraise learning activities while they are developing and using them, b) to assess student learning and ability to apply the content, and c) to identify any difficulties that come up during the implementation. Students use formative evaluation to appraise a) the effectiveness of their learning strategies; b) the extent to which they are grasping the knowledge, skills, and attitudes presented in the course; c) the need for additional clarification of the material; and d) the need for further study (p. 209).

There are different ways to collect data for formative evaluation. The most frequent means used is continual observation of student's performance by the faculty member. Observation occurs both in class activities as well as performance on written assignments. There are several class assessment techniques (CATs) that can be used to collect student feedback. Some of these techniques include the minute paper, chain notes, memory matrix, and directed paraphrasing, one-sentence summary, exam evaluations, application cards and student-generated test questions (Indiana University, 2004 and Angelo and Cross 1993).

The primary purposes for using CATs are to monitor the students' understanding of the content and to determine ways to improve teaching methods so students can better grasp the information. The process for using CAT provided in the literature on use of CAT includes a) determine what type of information the instructor wants to obtain; b)

choose a CAT that provides relevant feedback and that can be implemented easily; c) provide instructions and the purpose of CAT to students ; d) review the CAT results and make necessary revisions to the teaching plan; e) inform the students of CAT results and explain how this information will be utilized (Indiana University, 2004 and Angelo and Cross, 1993).

Summative Evaluation

Summative evaluation is an evaluative process that is conducted after a completion of a course or course unit. Examples of summative evaluation are: a unit test, a mid term test, a final test or any other project that would represent an overall evaluation. Students receive a grade as a result of summative evaluation. This type of evaluation takes in a broader range of material than formative evaluation. Summative evaluation determines the students' overall knowledge of what has been taught.

Oermann and Gaberson (2006) describe summative evaluation as: "... end-of-instruction evaluation designed to determine what the student has learned in the classroom or clinical setting. Summative evaluation provides information on the extent to which objectives were achieved, not on the progress of the learner in meeting them" (p. 5).

Billings and Halstead (2005) offer these observations: "Faculty use summative evaluation to a) appraise the students' learning outcomes, b) determine the effectiveness of all the instructional strategies and learning activities used during the course, and c) plan appropriate revisions to the planned learning activities of the course" (p. 210).

CHAPTER III

SELECTED EXAMPLE OF ACTIVE LEARNING AND EVALUATION

The final chapter of this project includes an example of an unfolding case study and a rubric for summative evaluation. Both formative and summative evaluation can be applied to most active learning teaching strategies; however games should not be graded or used for summative evaluation (Oermann and Gaberson, 2006). Chapter 3 also includes implications for nursing.

Unfolding Case Study

Mr. G., a 55 year old man, wakes his wife at 2 A.M. He tells her "I feel like I have an elephant sitting on my chest." His wife tells him to go to the bathroom and to take a drink of water to see if that helps. Mr. G. returns to bed and his wife notices that her husband feels very cold and his skin is dripping with perspiration. She asks him how he feels and he states: "I'm really feeling sick to my stomach and my arms ache, and I guess my chest is starting to hurt too.

His wife insists that she call 911, but Mr. G. absolutely refuses. "It's nothing," he states, "It's probably just a flu bug -- I'll be O.K." Mrs. G. is very anxious and keeps insisting that he does something, so finally Mr. G. consents to have his wife drive him to the hospital: a) What do you suspect is happening with Mr. G.? b) What are some "red flag" symptoms? c) Why do you think Mr. G. would not allow his wife to call 911 or receive care?

They arrive at the emergency room and Mrs. G. states: "I have my husband out in the car and I think he's having a heart attack." You, as the receiving nurse, get a gurney and someone to help you to bring Mr. G. to a trauma room: a) What should you do first? b) What should you do secondly? c) What other interventions would you do? (There are standing orders) c) What things might you see on standing orders for an MI?

The doctor reviews Mr. G.'s labs and EKG and he informs Mr. and Mrs. G. that Mr. G. has indeed had an MI. His troponin is 47 and his CKMB is 120. His EKG is showing ST elevation as well. He explains to Mr. G. that there is a cardiologist on call and that the cardiologist said that he would come in to do an angiogram with possible angioplasty. The doctor gives them a brief overview of the procedure. The doctor also explains the risks involved as far as a slight chance that open heart surgery may have to be performed if a vessel ruptured or is torn during the procedure. He tells Mr. and Mrs. G. that a consent form would need to be signed.

When the doctor leaves the room Mr. and Mrs. G. start asking you to explain the procedure again, it was all so overwhelming to them. How are you going to explain the angiogram and possible angioplasty to Mr. and Mrs. G.?

At 4 A.M. Mr. G. is taken to cath lab and he has 90% blockage in the circumflex artery as well as 80% blockage in the left main artery. The cardiologist is able to place stents and successfully opens the blocked areas. Mr. G. goes to the cardiac ICU. An angiocele was used to close the puncture site: a) what are some of the complications Mr. G. could experience from this procedure? b) What are some important nursing interventions that will be initiated?

Mr. G. recovers from his surgery and he is ready to go home. You, as the same nurse that took care of him in ER, were floated to ICU for the day. He and his wife are very happy to see you and are appreciative of the care you gave them. Mr. G. states: "The heart attack was very painful, but I feel so much better now. I was wondering if you could explain to me what causes the pain in a heart attack: a) how would you answer Mr. G.'s question? b) What are you going to include in the discharge patient education?"

Depending upon how this unfolding case study is used, both formative and summative evaluation could apply. If this was done as an in class activity, with the whole class participating, the instructor could observe student participation and evaluate understanding by the answers that are given to the questions. However, in a large class this would not be very accurate because not everyone is going to offer an answer. A more effective formative evaluation could be used. As an example the instructor could use "chain notes" where a question is written on an envelope pertaining to the unfolding case study. Each student anonymously writes their answer on a piece of paper and puts it in the envelope. For example one might ask: "Did you find the unfolding case study helpful?" or "Did you understand this unfolding case study and if not what didn't you understand?" After class the instructor can review these "chain notes" and make changes accordingly. The results can and should be shared with the class and at that time further discussion can take place, especially if there were areas that some students needed further explanation.

There are several choices with how an unfolding case study can be used for summative evaluation: a) as an individual assignment, b) as an essay question on a test,

or c) as a group project. Figure three demonstrates how one might use summative evaluation for an unfolding case study.

Category	Excellent 19-20	Satisfactory 16-18	Needs Improvement 13-15	Unsatisfactory 0-12	Score
Identifies Problem	Clearly identifies red flag symptoms of a heart attack; offers description and rationales	States symptoms of a heart attack and identifies red flag symptoms	identifies a few red flag symptoms	Does not identify any red flag symptoms	
Identifies and prioritizes nursing interventions	Clearly identifies & prioritizes pertinent nursing interventions and offers rationales	Identifies pertinent nursing interventions; prioritized correctly	Identifies 2-3 pertinent nursing interventions; does not prioritize	Does not identify pertinent nursing interventions	
Identifies potential complications	Clearly identifies potential complications & offers rationales	Identifies potential complications	Does not identify pertinent complications	Does not identify complications	
Provides pertinent patient education	Clearly & thoroughly covers pertinent pt. education; states pt. response	Covers pertinent pt. education; states pt. response	Gives pt. education, but missing important points	Does not give sufficient pt. education	
Group participation (if applicable)	Clearly involved, offers answers ideas, and rationales referring to references	Offers answers & ideas; uses references	Offers minimal dialogue and involvement	Not involved	
Total					

Figure 3. Vobr scoring rubric for unfolding case study.

Implications for Nursing

As medical and technical advances continue to develop so do the challenges in producing nurses that are able to quickly and accurately assess a situation that signals danger for a client. Facilities, which employ nurses, have expectations that the people they hire are equipped to provide safe and adequate care to their clients. With the use of active learning strategies student nurses are given the opportunity to have experienced numerous real-life situations. They are permitted to critically think through a scenario and receive feedback in situations that may take months or years to experience on the job.

Active learning strategies do not just apply to the classroom or clinical setting for nursing students, but apply to nurses and other health care personnel. New procedures and new equipment can be taught through the use of simulation. Many communities throughout the country have purchased HPSs to train their medical personnel. Local hospitals, para medics and fire departments share in the costs of the HPS and the setting up of the lab where each entity has access to it. The end result is more thoroughly trained medical professionals, but more importantly the ability to provide the safest care possible for all clients.

Conclusion

Meeting the educational needs of a diverse generational population is a challenge. Each generation brings unique and interesting qualities to the classroom. Faculty are being called to meet these diverse learning needs. The NLN is encouraging nursing education to take an active role in developing curriculum to help meet the educational needs of today's nursing student.

One way is for students to take a more active role in their learning. Active learning methods provide an avenue for the student to be involved. It is especially vital in nursing education because nursing is not only a science with a huge theoretical base but it is also a "hands-on" profession. Active learning strategies such as guided design, gaming, cases studies/unfolding case studies, concept mapping and simulation provide students with the opportunity to develop their assessment skills and critical thinking skills. These strategies also provide the opportunity for the student to see and experience the results of their decisions and actions without jeopardizing a client's safety. Just as important is that students have the chance for feedback and remediation allowing for the learning experience to come full circle.

There are many active learning strategies available, and the student's progress can easily be evaluated. Both formative and summative evaluation can be implemented with the active learning methods.

One of the biggest challenges for active learning strategies is developing the material. It is not that it is difficult, but the time commitment is great. It is also labor intensive. Other challenges include funding, technical assistance and support of the faculty as a whole.

At this time there is not a lot of research to demonstrate the effectiveness of the active learning strategies. Preliminary reviews demonstrate that students appreciate the opportunity to play an active role in the learning process. Further research is needed on each individual strategy to determine the degree of influence in the learning process.

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