

## C O N T I N U I N G

## E D U C A T I O N

# Combining Simulation, Instructor-Produced Videos, and Online Discussions to Stimulate Critical Thinking in Nursing Students

JACQUELINE GUHDE, MSN, RN, CNS

Combining the use of several different types of technology enables an instructor to develop creative learning activities that can foster clinical decision making and critical thinking. Using a combination of technologies can tap into the different learning styles of students. For example, in an online discussion of a case study, the instructor can have written information and questions. If a video utilizing the patient simulator is added, the learning activity now utilizes the four different learning styles that are visual, hearing, reading/writing, and kinesthetic. Another benefit is that the instructor can develop a learning activity that deals with a specific learning problem that cannot be addressed in more traditional ways. This article discusses an 8-week program that was developed that utilized SimMan (Laerdal Medical, Wappingers Falls, NY), instructor-produced videos, and online discussion to stimulate critical thinking in beginning-level nursing students.

## LITERATURE REVIEW

Although there are many positive aspects to using the different types of technology, they each have benefits and limitations. For example, online discussions give all students an equal opportunity to participate,<sup>1</sup> and they can work at their own convenience.<sup>2</sup> A barrier is that many students may lack computer skills.<sup>3</sup> They also

Combining the use of several different types of technology enables an instructor to develop teaching methods to address a specific problem area that students encounter and can greatly affect student learning. This article discusses a program that was developed that utilized SimMan, instructor-produced videos, and online discussion to stimulate critical thinking in beginning-level nursing students. The goal was to make the student aware of the importance of an initial thorough assessment of a client. This is especially difficult since new students are focused on learning the skills and have not had enough clinical experience to appreciate the importance of assessment. The first two videos show a nurse who makes a very incomplete assessment of the client and misses important observations. This leads to the patient (SimMan) going into respiratory distress. The third video demonstrates a complete assessment. The students viewed and discussed the first two videos online. After the third video, students posted their own reflections of this activity including what they learned and how this would change their behavior. The outcome showed an increased awareness of the importance of assessment. Instructors observed a change in behavior, which included early assessment of the client.

### KEY WORDS

Critical thinking • Nursing students • Online learning • Simulation • Videotaping

may miss the verbal communication and the sense of belonging to a group.<sup>2</sup> Videotapes of patient scenarios can be effective in presenting case studies since the student can actually watch a patient interaction, but many times, it is difficult to find one that addresses a specific learning need or patient problem. Several authors report the positive effect of using patient simulators in

Author Affiliation: College of Nursing, University of Akron, OH.

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Corresponding author: Jacqueline Guhde, MSN, RN, CNS, 32788 Charmwood Oval, Solon, OH 44139 (guhde@uakron.edu; jfguhde@sbcglobal.net).

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undergraduate nursing education. These include the ability to practice critical but low-volume cases,<sup>4</sup> learn technical skills,<sup>5</sup> increase self-confidence,<sup>6</sup> and practice clinical decision making in a controlled safe environment.<sup>7</sup> Some of the major disadvantages, however, are the need for small groups when using simulators,<sup>8</sup> students having trouble relating to the simulator as a person,<sup>9</sup> and student anxiety when performing skills in front of their peers.<sup>10</sup> More importantly, there is very little research on the advantages of this type of learning activity in comparison to more traditional methods.<sup>11</sup> But if an instructor can utilize the strengths in the different modalities and combine these to achieve a specific outcome, some powerful learning activities can be developed.

## RELATED THEORY

One of the largest challenges faced by nursing educators is helping students develop critical-thinking skills so that they can make good clinical decisions. For nurses to make good clinical decisions, they must investigate and reflect on all aspects of a clinical observation or problem and then apply nursing knowledge to decide on the appropriate course of action.<sup>12</sup> This series of actions is labeled “the nursing process” and requires “critical-thinking skills.” But what are critical-thinking skills and how are they applied to teaching in the classroom and clinical setting?

Learning to think critically is not an intuitive process, but develops over time, as a person systematically assesses his/her own thinking process.<sup>13</sup> Nurses who make good clinical decisions start with basic knowledge of a disease condition and the expected outcomes and compare this to the assessment they are seeing. Over time, they are able to develop a framework for evaluating patients, which they consistently apply to problems they encounter. Student nurses many times are at an early stage in being able to analyze their thinking. They may realize the importance of critical thinking, but their thinking skills are more random and may lead them to false conclusions. This initial “awareness” that their thinking process led to a wrong conclusion acts as a catalyst for change and is the first step in improving critical thinking.<sup>13</sup> Elder and Paul<sup>13</sup> recommend that classroom activities include those that help the students examine their sound thinking, as well as their faulty thinking.

## METHODS

### Problem

Developing assignments that help to develop critical-thinking skills is a challenge. This is especially difficult in the first year of a nursing program when students are excited and focused on learning nursing skills. Even

though educators discuss assessment and try to instill the importance of assessment as the first step in clinical decision making, the students have not had enough clinical experience to appreciate the importance of this. Applying Elder and Paul's<sup>13</sup> theory, they must become aware of their own ignorance so that they begin to realize that their thinking may be faulty. The program that will be discussed is based on trying to make the students challenge and change their basic beliefs about what is important in caring for a client. The two goals are:

1. to increase the student's awareness of the importance of an initial assessment of a client
2. to change the practice of a student's initial contact with a client to focus on assessment

This program was exempted from institutional review board approval since it was an internal evaluation of a teaching/learning activity intended for quality control and improvement of an ongoing assignment.

### Level of Student

This assignment was presented to 136 students who are in the sophomore year of a 4-year baccalaureate program. They have had a foundations course in their first semester, in which all of the basic skills are taught. They are concurrently taking their anatomy and physiology (A & P) course. In the second semester, they have a health assessment course, where they study and practice the actual physical assessment of a client in a laboratory setting (Table 1). SimMan and other teaching equipment for heart and lung sounds are utilized. Their clinical experience is on a medical-surgical unit in an acute-care hospital, where they practice the actual health assessment skills. Each week, they are to begin the care of the client with vital signs and a physical assessment that incorporates those systems of the body that have been covered in the health assessment laboratory. By the 10th week of the 15-week semester, they will have covered all systems and should be able to perform a head-to-toe assessment. To help students develop good work habits, the importance of doing early assessments of clients so that a nurse can prioritize care was stressed.

Although all of these tools and strategies were being used, the students did not seem to understand the real importance of nursing assessment and the impact this could have on their clinical outcomes. More important, they did not change their behavior. Even when reminded in morning report that their first activity is to complete an initial assessment of their client and equipment in the room, students would frequently complete the bed and bath prior to the actual assessment. Students were not aware that their thought process was wrong and therefore had no incentive to change their behavior.

**Table 1****Sequencing of Courses**

<b>Course</b>	<b>Previous Content</b>	<b>Wk 3</b>	<b>Wk 4</b>	<b>Wk 5</b>	<b>Wk 6</b>	<b>Wk 7</b>	<b>Wk 8</b>	<b>Wk 9</b>	<b>Wk 10</b>
Online assignment	Introduction to online learning	CHF	Medications for CHF	Teaching/learning care plan	Wound care	Blood work, complete blood count	Blood work, white blood cells	Videos 1 and 2	Video 3
Health assessment	Skin	Eyes, ears	Head, neck	Respiratory	Skills test	Cardiac	Breast	Gastrointestinal	Muscular/skeletal
A & P	Skin, skeletal, muscles, nervous	Endocrine	Cardiac	Cardiac	Cardiac	Test review	Test	Respiratory	Respiratory

**Program**

An 8-week series of modules was developed as online assignments. Students work online, in groups of five, to answer and discuss the scenarios. The first 6 weeks have the students explore congestive heart failure (CHF), including the pathophysiology, medications, blood work, a teaching care plan on medications, and wound care of a leg ulcer. In each assignment, the patient is an 81-year-old woman called “Aunt Lucy.” The purpose for using the same client is to help the students build a relationship with this patient that would carry over to the simulated activity presented in weeks 7 and 8. In the seventh week, Aunt Lucy is hospitalized. At this point in their semester, the students have completed most of the major systems of the body including the cardiac and respiratory systems in both A & P and health assessment (Table 1). They are now ready to perform a partial head-to-toe assessment along with assessments of basic equipment such as intravenous (IV) lines, Foley catheters, and oxygen. Working with the Learning Resource staff, the instructor made a series of three video tapes utilizing SimMan. These videos were streamed, so that the students could view them online. In the scenario, Aunt Lucy is hospitalized with an exacerbation of her CHF. The first video shows a nurse doing a very incomplete assessment of this client. This includes many of the problems in assessment that the instructor has seen clinically with her students. For example, the nurse looks at the IV site and not at the rate that the IV pump is set at. The doctor’s orders are for 50 mL/h, and the pump is set at 150 mL/h, which will lead to pulmonary edema in this client. The second video starts out with the nurse entering the room 3 hours later and finding Aunt Lucy in severe respiratory distress and ends with Aunt Lucy coding. In this week 7 assignment, students are asked to view the first two videos. The group then discusses online the assessment they saw. Students are required to post a minimum of two times. Since online discussions are a new teaching method for this group, some specific questions are given. Students are not limited to these questions, however. The questions are both specific to diagnosis and more general, about process. For example, specific questions are as follows: “Why did the vital signs change?” “Why did your client go into pulmonary edema?” The process questions are as follows: “What did the nurse do correctly in her initial assessment?” “What did the nurse miss in her initial assessment?” “Would the outcome have been different if the nurse’s assessment had been more complete?” In week 8, the students watch the third video. This video shows a complete assessment and describes those areas that are missed on the first video, and also how different symptoms such as the vital signs changing, the urinary output dropping, and so on, all have an impact

on the final outcome for the patient. The students are then asked to post on the following two questions: "What did you learn from watching these three videos?" and "How will this affect your care of patients?" In this reflective activity, students post one time and identify what they had thought through correctly and what they had missed. After the postings are completed, the groups then discuss this assignment in their clinical conferences with their instructor to reinforce and clarify what they had seen. This final week of online assignments is timed to coincide with the completion of all the systems of the body in health assessment. At this point, the students will begin to practice the total assessment of a client in the hospital, and it was felt that this timing was essential in "getting the student's attention" about assessment. It also allowed for 5 more clinical weeks to reinforce this concept and practice a complete assessment.

## RESULTS

This program was initially completed by 136 students. Since the use of online learning was a new technique, it was important to obtain a good evaluation of the program. The final online assignment required the students to complete a course evaluation. Students received full credit for this assignment if they completed the evaluation. Since this was part of the course evaluation system used by the university, the instructor knew if a student had completed the evaluation, but could not link any response to a particular student. Because students knew that all responses would be anonymous, any bias for giving positive responses was removed. The course evaluation was completed by 134 of the 136 students, for a 98.5% return rate. The evaluation consisted of 15 items that covered the many different components of the course. Ten items were scored on a 5-point Likert scale (5 = strongly agree to 1 = strongly disagree). Five items asked for qualitative information. Of these 15 items, one item related to the series of assignments described in this article, and three related to the overall experience of online learning.

### **Eight-Week Online Assignment**

#### **Goal 1**

The first goal of this assignment was to increase the student's awareness of the importance of early assessment. The students were asked to evaluate the following statement: "The videos increased my awareness of the importance of a complete assessment of a client." The mean score on the above statement was 4.43 of 5. This strong positive response was supported in a qualitative review of the postings completed after the students watched the third video. The students responded

to the following questions: "What did you learn from watching these three videos?" and "How will this affect your care of patients?" In reviewing the responses, three themes were identified:

1. awareness of the importance of early assessment
2. awareness that the outcome of a client is linked to nursing assessment
3. statements of how this will change the student's approach to patients

Variations of the following comments were seen in many of the postings: "I never thought I could hurt someone"; "I just assumed everything would be correct in the patient's room"; "I never realized how important the assessment is." Interestingly, even though the questions did not ask about assessment, the responses focused on this.

#### **Goal 2**

The second goal of this assignment was to change the practice of a student's initial contact with a client to focus on assessment. Since this had not been previously measured, only anecdotal evidence from the four instructors who taught at the next level could be obtained. They all taught the clinical portion of the course in an acute medical-surgical setting. All agreed that the students were doing early and more complete assessments of their clients. Comments included: "The students are much more prepared to advance to their junior-level courses than previous students. They verbalize that they are more comfortable performing assessments. They are able to identify abnormal findings and the nursing implications much earlier than in the past"; "The students are better able to demonstrate a head-to-toe assessment on their clients than in previous years. They usually complete this first thing in the morning without me having to remind them."

### **Online Learning**

Three of the course evaluation items were specifically about online learning. The first item was: "Reading other students' responses was beneficial." The mean score on the Likert scale on the above statement was 3.6 of 5. Several students wrote that many of the responses were repetitious and added little to their learning. Students also commented that they did not know what to write when a second posting was required. They wanted either to drop the second posting or to be given specific questions to answer as they are given for the first posting.

The second evaluation item asked about the time it took to complete assignments. Some students complained



that these assignments required a lot of time to complete. The instructor intended that the assignment take about 2 hours. The actual reported time was a mean of 95 minutes, with 45% of the students spending less than 1 hour, and 16.7% spending more than 2 hours.

The final survey question asked students to describe any problems they encountered with the online assignments. The majority of the negative responses centered on computer problems. These included not having access to a personal computer at home, inability to open other students' attachments when they used different operating systems, and posting problems.

## DISCUSSION

Overall, there was a positive response to this series of online exercises. The students especially commented favorably about the three videos using a real-life clinical situation. The ability to videotape the scenario allowed all 136 students to experience the simulation within the same time frame. More important, they were able to view the correct assessment multiple times since they had ongoing access to it during the latter part of the course. This was important since they had learned a head-to-toe assessment in the laboratory setting and would be demonstrating it in the clinical area. The timing of this to other course work was critical (Table 1). If presented too early (ie, before the students could actually complete a total assessment), they were not able to view themselves in this role. If done at the end of the semester, the students would not have had time to immediately practice this skill. Since the online portion of this class is monitored and graded by the clinical instructors, this also allows the instructors to clarify any misconceptions they find in the online postings. It also gives the instructors some insight into their students' thought processes, which helps direct clinical activities.

One of the most important goals for completing this learning activity is to help students "critically think," that is, to begin to "think about their thinking." One of the first steps is for students to acknowledge that their current way of thinking about a problem is incorrect. The online postings clearly show that the students did become aware of this. Many comments start with the words, "I never thought..." This awareness of a problem must happen first, and it becomes the stimulus for a change in thinking and behavior.

Lastly, instructors observed an actual change in students' behavior where the students focused first on assessment of their patients prior to actual physical care. Since the students were learning about assessment in foundations, health assessment, and A & P and were practicing in a clinical setting, the change in behavior cannot be accounted for solely by this assignment. Elder and Paul

recognize that students will spend time thinking about what they value and how this fits into their personal goals.<sup>14</sup> Most nursing students have the goal of becoming good nurses. By allowing the students to identify their own misconceptions about what makes a nurse good, this assignment acted as a catalyst for changing their thinking and behavior.

## RECOMMENDATIONS

Several lessons were learned as this assignment was developed. Students are not as computer literate as the faculty initially thought. Many can e-mail and text message but are unable to navigate an online educational Web site. It is useful to develop a first assignment that helps the instructor to evaluate the computer skills of the students. For example, in the first week, have the students post something about themselves in their discussion groups. Any students who have trouble can then receive individual instruction on navigating the Web site. Another appropriate early assignment is having the students identify professional Web sites to use as references. This forces the students to navigate both the course Web site and the World Wide Web for information.

To address the students' concerns about not knowing what to post in the second posting, it is helpful if the faculty gives specific suggestions. For example, the students are told to write as if they are talking to the person face-to-face. They are also told to read the first postings and then decide whether they agree or disagree. They should defend their position and provide literature support for why they agree or disagree. They are also told to add new thoughts that have not been discussed yet. To prevent the problem of students posting at the last minute, students are given specific dates for when each posting is due. This allows other students ample time to read and respond.

Another area to consider is the problems with videotaping. It took much longer to make the videos than anticipated. The three videos totaled less than 10 minutes in time, but took 4 hours to produce. It is recommended that a written script be used to decrease this time. Another problem arose when streaming the videos. Numbers on the monitors and IV pumps could not be clearly seen. It is recommended that numbers on the monitors be read out loud and that large lettering be used when labeling IV pumps or other equipment. If your facility has a department that will videotape the scenarios, the quality would be improved. The school must also have access to equipment for streaming the videos to place these on the Web site.

A final recommendation addresses the problem of working with a large faculty group, many of whom are part-time. In this course, there were two full-time

and 10 part-time faculty. The lead instructor developed a faculty manual that contained all the assignments, answers, and specific instructions to be followed. She also met with all instructors in the course to explain the assignments and to help them to learn to navigate the Web site. To keep the grading as equal as possible, grading rubrics were developed for all assignments. The lead instructor also had access to all of the discussion groups and could view all postings. When an instructor had a question, the lead instructor could look at a specific problem with the faculty member. This could be done either in person, via e-mail, or over the phone. This made it easy to keep in contact with part-time faculty and help them learn to teach online.

## CONCLUSION

The possibilities for mixing and matching different technologies to create stimulating learning activities are endless. The use of instructor-generated videos allows the instructor to address the learning needs of a specific group of students and could be used at any level of a nursing program. With the patient simulator, scenarios can be developed that help students view actual clinical problems. With the ability to view these online, students are able to watch and process by themselves what they are seeing. It allows for both personal reflections on their decisions (ie, thinking) and group discussions in which the students can validate what they believe or identify where they made errors. Encouraging students to critically analyze how their decisions were either right or wrong helps them to begin to develop the framework to assess patients that is necessary for a practicing nurse. Faculty who create assignments that help beginning nursing students reflect on their own

thinking and clinical decisions will help lead them to develop safe practices in the clinical area.

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