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Assessment of Student Learning

Allied Health and Wellness Department

Assessment Cycle 2012-2015

Final Report

Registered Nursing Clinical Program

Assessment of Simulations impact on Critical Thinking Skills

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April 2015

Background

High Fidelity patient simulators have been described as tools to enhance critical thinking. Through a state nurse support grant, the Frederick Community College Nursing Program obtained the High Fidelity patient simulator, Sim Man 3. After receiving the grant, the department incorporated simulation throughout the nursing program. With this in mind, the nursing department met with the Senior Researcher, Assessment and Institutional Effectiveness where it was determined that an Outcomes Assessment Project could be used to try to confirm the use of simulation in the nursing program and its improvement of critical thinking skills.

This was accomplished using NCLEX style questions designed to evaluate critical thinking and simulation. The RN-NCLEX (the national nursing licensure examination administered by the National Council of State Boards of Nursing) exam requires an understanding and depth of knowledge and analytical ability reflecting critical thinking in tested material. With this in mind the department used a pre and post test format to assess student learning.

Additionally during the initial discussion about the project, ineffective communication was identified as another area for assessment. Communication has been directly correlated to mistakes in the clinical setting. Utilizing a standardized communication tool reduces this risk. The Frederick Community College Nursing Program utilizes the tool SBAR (situation, background, assessment, recommendation) to teach effective communication. This tool also was used to assess nursing students' proficiency in communication.

Methodology

All registered nursing program faculty were involved in implementing the assessment plan and collecting data. All nursing clinical courses were utilized for overall improvement of student learning for Health Promotion and Maintenance concepts. The nursing courses assessed included were:

1. NU 101 – Introduction to Clinical Nursing
2. NU210 – Reproductive Health Nursing
3. NU211 – Medical Surgical Nursing I
4. NU212 – Medical Surgical Nursing II
5. NU213 – Medical Surgical Nursing III
6. NU214 – Psychiatric/Mental Health Nursing
7. NU215 – Nursing Care of Children
8. NU 216 – Preparation for Nursing Practice

The assessment plan was undertaken by both the Day and Weekend/Evening options of the RN program. During the Spring semester, the faculty developed baseline data on the initial clinical simulations. The assessment was piloted in the Summer 2013. Throughout the subsequent semesters of the assessment, NCLEX style questions were used to evaluate student's critical thinking. The evaluation utilized student scores from both multiple-choice, and select-all-that-apply NCLEX style questions related to the simulation scenario. In each course of simulation, students received the NCLEX style questions before the scenario. After the simulation experience and debriefing the students were again tested with the NCLEX style questions. The research question was; "Will critical thinking be improved after simulation evidenced by an improvement in NCLEX questions after simulation?"

Each scenario contained a necessary communication to the simulation patient provider. This communication was evaluated utilizing the standardized communication tool SBAR. A rubric developed for this purpose (see below) allowed the students to grade the proficiency of the communication. The rubric distinguished skills as developing, novice, proficient, and distinguished. Students' were measured in their communication skill throughout the assessment simulations and SBAR reports. The research question was; "Will students' communication skill improve with continued practice after each scenario?"

After review of the baseline data statistical analysis was complete, faculty reviewed the data adjusted simulation instruction or method of administering the NCLEX questions as necessary, to improve the assessment project. Reporting of data and statistical analysis for each semester continued, applying the assessment to all scenarios throughout the nursing program.

OAC Nursing SBAR Rubric					
	Developing-1	**Novice-2**	**Proficient-3**	**Distinguished-4**	**Score**
Situation (The student will identify themselves, occupation and where they are calling from, identify the patient by name, date of birth, age, sex, reason for report, describe reason for phone call or current status of the patient – if urgent say so)	The student showed poor proficiency in identifying themselves, their occupation and where they are calling from, identify the patient by name, date of birth, age, sex, reason for report, describe reason for phone call or current status of the patient – if urgent say so	The student showed average proficiency in identifying themselves, their occupation and where they are calling from, identify the patient by name, date of birth, age, sex, reason for report, describe reason for phone call or current status of the patient – if urgent say so	The student showed good proficiency in identifying themselves, their occupation and where they are calling from, identify the patient by name, date of birth, age, sex, reason for report, describe reason for phone call or current status of the patient – if urgent say so	The student showed great proficiency in identifying themselves, their occupation and where they are calling from, identify the patient by name, date of birth, age, sex, reason for report, describe reason for phone call or current status of the patient – if urgent say so	
Background (The student will give the patient's presenting complaint, give the patient's relevant past history, and give a brief summary of background)	The student showed poor proficiency at articulating the patient's presenting complaint, give the patient's relevant past history, and give a brief summary of background	The student showed average proficiency at articulating the patient's presenting complaint, give the patient's relevant past history, and give a brief summary of background	The student showed good proficiency at articulating the patient's presenting complaint, give the patient's relevant past history, and give a brief summary of background	The student showed great proficiency at articulating the patient's presenting complaint, give the patient's relevant past history, and give a brief summary of background	
Assessment (The student will report the vital signs: heart rate, respiratory rate, blood pressure, temperature, oxygen saturation, pain scale, level of consciousness, and list if any vital signs are outside of parameters; what is your clinical impression, and communicate the severity of patient, additional concern)	The student showed a poor ability to articulate and report the vital signs: heart rate, respiratory rate, blood pressure, temperature, oxygen saturation, pain scale, level of consciousness, and list if any vital signs are outside of parameters; what is your clinical impression, and communicate the severity of patient, additional concern	The student showed an average ability to articulate and report the vital signs: heart rate, respiratory rate, blood pressure, temperature, oxygen saturation, pain scale, level of consciousness, and list if any vital signs are outside of parameters; what is your clinical impression, and communicate the severity of patient, additional concern	The student showed an good ability to articulate and report the vital signs: heart rate, respiratory rate, blood pressure, temperature, oxygen saturation, pain scale, level of consciousness, and list if any vital signs are outside of parameters; what is your clinical impression, and communicate the severity of patient, additional	The student showed an great ability to articulate and report the vital signs: heart rate, respiratory rate, blood pressure, temperature, oxygen saturation, pain scale, level of consciousness, and list if any vital signs are outside of parameters; what is your clinical impression, and communicate the severity of patient, additional concern	
Recommendation (The student will provide an explanation of what they require, how urgent and when action needs to be taken, and make suggestions of what action is to be taken, and clarify what action you expect to be taken)	The student showed a poor ability to articulate and provide an explanation of what they require, how urgent and when action needs to be taken, and make suggestions of what action is to be taken, and clarify what action you expect to be taken	The student showed an average ability to articulate and provide an explanation of what they require, how urgent and when action needs to be taken, and make suggestions of what action is to be taken, and clarify what action you expect to be taken	The student showed a good ability to articulate and provide an explanation of what they require, how urgent and when action needs to be taken, and make suggestions of what action is to be taken, and clarify what action you expect to be taken	The student showed a great ability to articulate and provide an explanation of what they require, how urgent and when action needs to be taken, and make suggestions of what action is to be taken, and clarify what action you expect to be taken	

Analysis of Data

Summer 2013

Overview: The Allied Health and Wellness Department undertook an assessment project to attempt to determine how their simulation software affects students' critical thinking abilities. The data below is aggregated by students who responded pre-simulation and post simulation. For the pilot study the department simply marked the student responses as "yes" and "no". The study was further developed in future semesters. The data was entered into Microsoft Excel and analyzed. The results of the analysis are listed below.
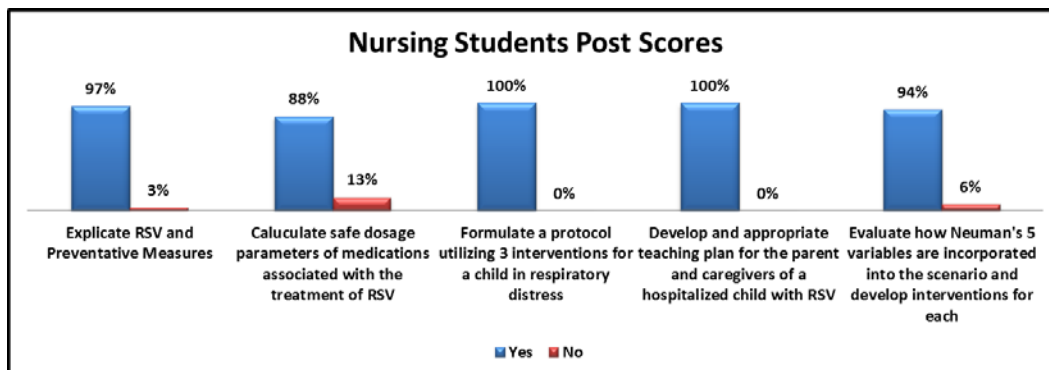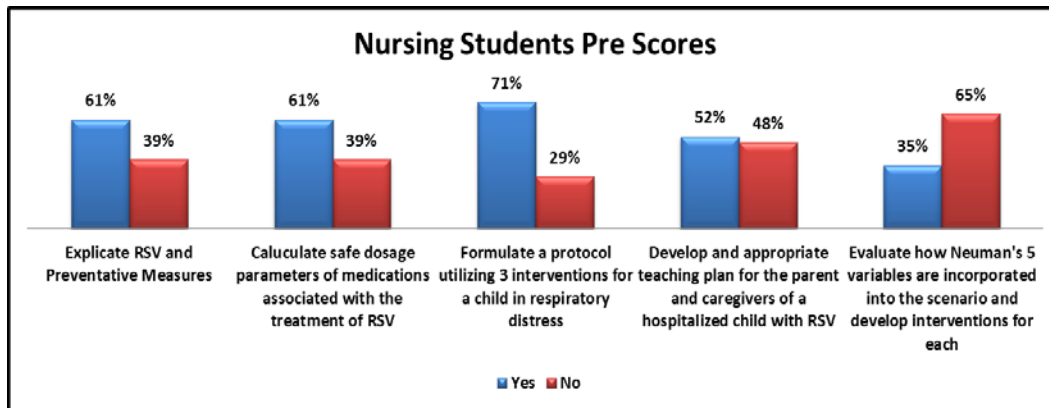
The data above shows the percentage of students who responded "yes" or "no" to each of the questions listed above. As can be seen by looking at the charts, students did much better on the "post-scores" then they did on the "pre-scores".

To further show the improvement that students had on their post scores, only 13% of students received all "yes" responses on all of the questions "pre-simulation". Seventy-eight percent of the students received all "yes" responses on all of the questions "post-simulation".

Conclusion: The department representative has already met with the college's Assessment Coordinator. They agreed that before beginning the assessment collection process in the future, the department may want to consider:

- A smoother integration of the assessment in the future using the colleges Scantron system.
- A disaggregation of courses in the nursing program so that the department can see growth as students move from one course to the next.
- Further development of the simulation activities.
- Development of a measure for testing SBAR and students communication skills.

The department will evaluate these results further and determine the best ways to improve student's critical thinking skills and measure communication skills in the future.

The summer semester, 2013 pilot

The assessment for the simulation used "yes" "no" questions to evaluate pre and post simulation understanding. This data had to be analyzed manually. SBAR was not included in this simulation. There was a concern as to how to evaluate the communication piece of SBAR.

Action: At a faculty meeting OAC was discussed. It was decided each faculty would contact the OAC representative to align NCLEX style questions with the upcoming simulation scenario. The collection of the data will be adjusted to have all students take a pre-test prior to the simulation and a post-test following to assess critical thinking competency. Scantrons will be used to for easier data collection. An SBAR rubric was developed for students to evaluate and score the communication element of the simulation scenario.
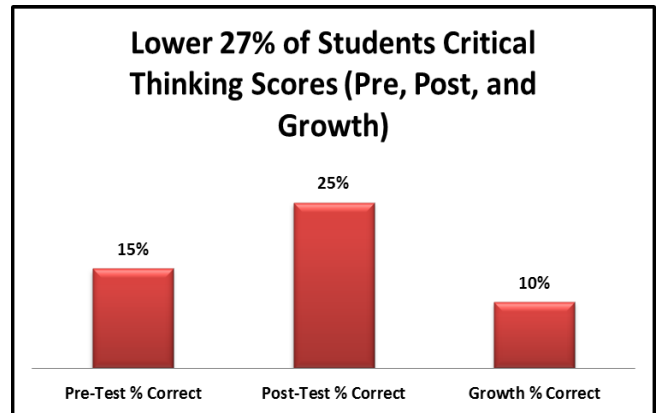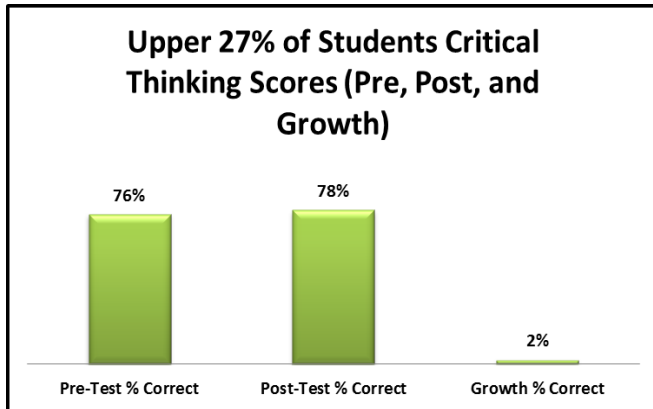
Fall 2013

Overview: The Allied Health and Wellness Department undertook an assessment project to attempt to determine how their simulation software affects students' critical thinking abilities. During the simulation process, they often evaluated students' abilities to use oral communication (SBAR). The results of these two assessments were collected by the OAC representative from the Nursing Department and processed through a Scrantron machine. The results were then shared with the Assessment Coordinator. The Assessment Coordinator compiled all the data and used statistical analysis software to analyze the results
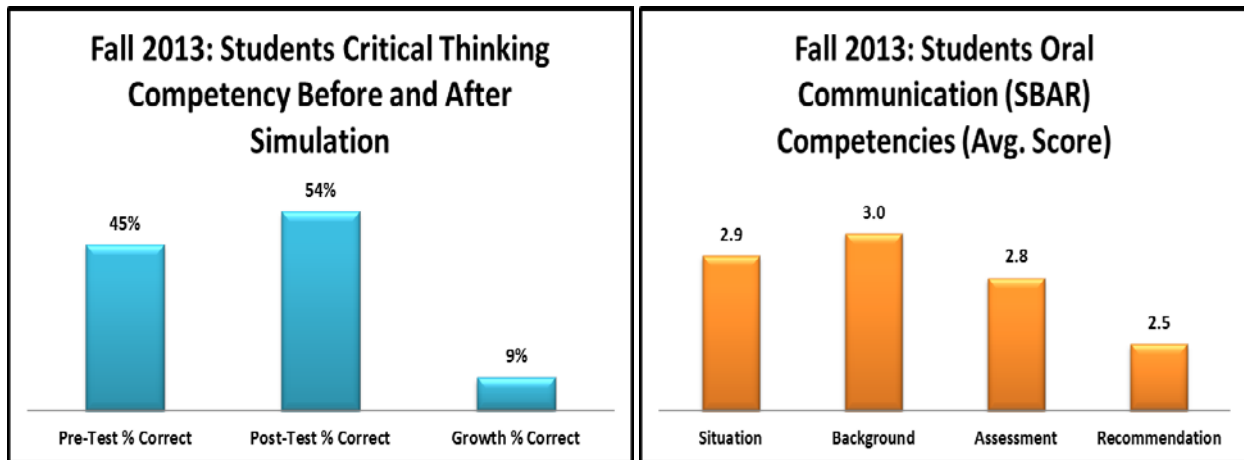
The data in the chart above on the left shows the percentage of correct answers on a critical thinking questionnaire administered to students. Students responded to a set of questions created to measure critical thinking and mirror the types of questions they will see on their NCLEX exam when they complete their program. The pre-test % correct represents student scores before simulation, the post-test % correct represents student scores after the simulation, and the growth % correct represents change in students' competency. The chart shows that students got 45% of the questions correct on the pre-test, 54% of the questions correct on the post test, showing a growth of 9% from pre to post score.
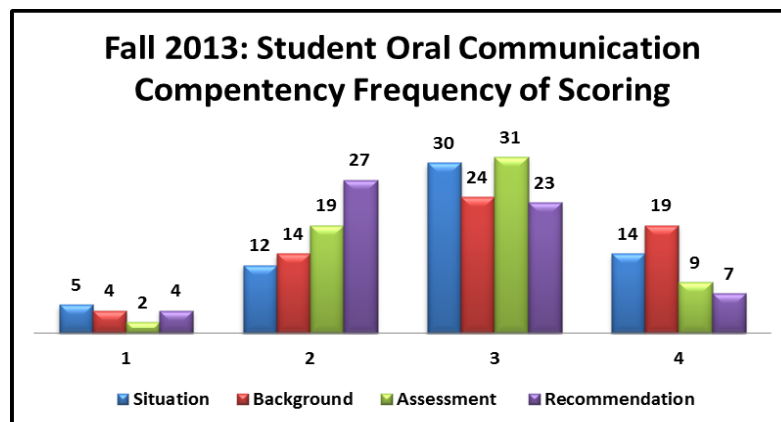
The chart above on the right represents students' ability to communicate effectively, orally. Students were graded using a rubric created by the nursing OAC member in coordination with the assessment coordinator. The rubric measures students' abilities using a standard, SBAR, which is used in the industry. SBAR stands for situation, background, assessment, and recommendation. Each of these areas represents a set of information that nurses should communicate to the doctor during diagnoses. The data shows that overall students' average scores were between a 2 and 3. This is between Novice and Proficient. Students measure at 3.0 on the background area of the rubric which is proficient. Students also scored close to a 3 (Proficient) on Situation and Background.

Upper 27% of Students Critical Thinking Scores (Pre, Post, and Growth)

76% 78% 2%

Pre-Test % Correct   Post-Test % Correct   Growth % Correct

Lower 27% of Students Critical Thinking Scores (Pre, Post, and Growth)

25% 15% 10%

Pre-Test % Correct   Post-Test % Correct   Growth % Correct

The chart on the top left shows students who rated in the top 27% of student scores. These students scored a 76% on their critical thinking questions prior to the simulation. These students scored a 78% on their critical thinking question after simulation. This represents a 2% growth in critical thinking ability.

The chart on the top right shows students who rated in the bottom 27% of student scores. These students scored a 15% on their critical thinking questions prior to the simulation. These students scored a 25% on their critical thinking question after simulation. This represents a 10% growth in critical thinking ability.

The chart on the bottom left shows students oral communication competency scores from the SBAR rubric. The chart provides a frequency of scores in each competency area. Students scored most often in the Distinguished (4) area of the rubric when describing the situation and the background. Assessment and Recommendation did not score in the Distinguished (4) area as often.

Fall 2013: Student Oral Communication Compentency Frequency of Scoring

	1	2	3	4
Situation	5	12	30	14
Background	4	14	24	19
Assessment	2	19	31	9
Recommendation	4	27	23	7

Conclusion: This report will be shared with the department's OAC representative and the department. The department identified a few areas of improvement after the pilot collection. The department improved on the majority of areas from the pilot process. The new focus on improvement will be increasing the amount of student data collected in the sample. This will comprise more faculty involvement in future collection of the simulation. The department will

evaluate these results further and determine the best ways to continue to improve student's critical thinking and oral communication skills in the future.

Fall 2013

MS III was not included in the OAC assessment for this semester. MS I and MS II each included two simulation scenarios. Data collection improved using Scantron with item analysis.
There was a 9% increase in student's critical thinking behavior. 2% of the scores from the upper 27% of the students improved their scores, 10% of the scores from the lower 27% of students improved their scores. The overall conclusion for this semester was the lower quadrant of the students increased their critical thinking skills.
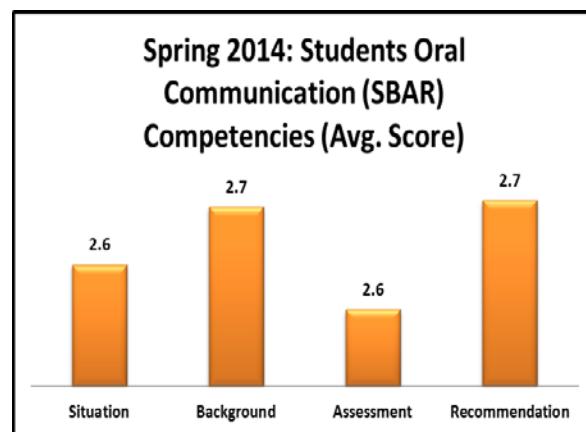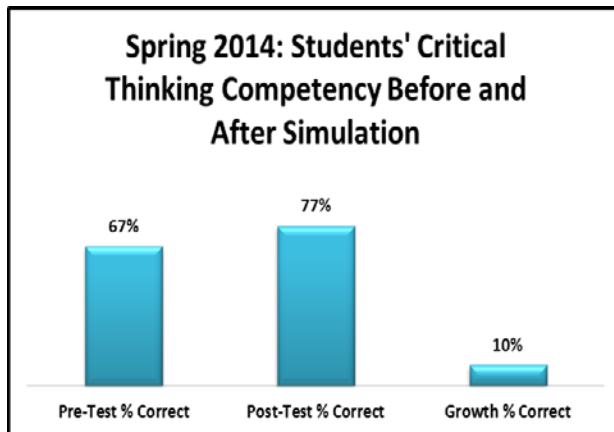The SBAR components of Situation and Background directly address the aspects of the simulation. Conversely, the SBAR components of Assessment and Recommendation require clinical impression and suggestions of action which are higher level thinking skills. Situation and Background had the highest number of scores for the distinguished area of the rubric.

Action:
Prior to the scheduled simulation, the simulation coordinator will confirm with faculty the OAC assessment would be utilized.
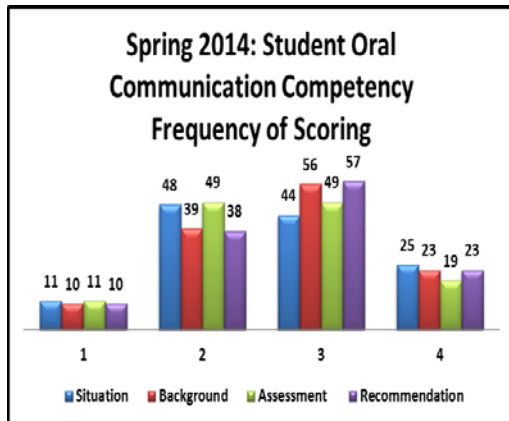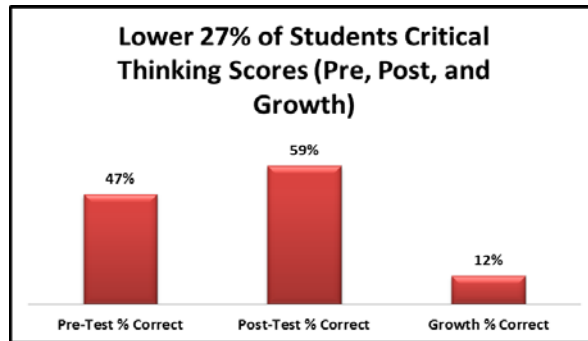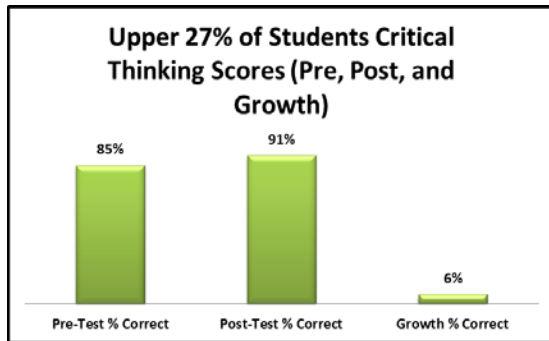
Spring 2014

Overview: The Allied Health and Wellness Department undertook an assessment project to attempt to determine how their simulation software affects students' critical thinking abilities. During the simulation process, they often evaluated students' abilities to use oral communication (SBAR). A total of 441 students participated in the Spring 2014 collection. For this semesters collection the department chose to also include summer sections in the analysis. The results of these two assessments were collected by the OAC representative from the Nursing Department and processed through a Scrantron machine. The results were then shared with the Assessment Coordinator. The Assessment Coordinator compiled all the data and used statistical analysis software to analyze the data. The results of this analysis are detailed below.

The data in the chart above on the left shows the percentage of correct answers on a critical thinking questionnaire administered to students. Students responded to a set of questions created to measure critical thinking and mirror the types of questions they will see on their NCLEX exam when they complete their program. The pre-test % correct represents student scores before simulation, the post-test % correct represents student scores after the simulation, and the growth % correct represents change in students' competency. The chart shows that students got 67% of the questions correct on the pre-test, 77% of the questions correct on the post test, showing a growth of 10% from pre to post score. The growth this semester increased 1% from Fall 2013 (9% growth).

The chart above on the right represents students' ability to communicate effectively, orally. Students were graded using a rubric created by the nursing OAC member in coordination with the assessment coordinator. The rubric measures students' abilities using a standard, SBAR, which is used in the industry. SBAR stands for situation, background, assessment, and recommendation. Each of these areas represents a set of information that nurses should communicate to the doctor during diagnoses. The data shows that overall students' average scores were between a 2 and 3. These scores are slightly lower than the data collected in Fall 2013; however, students continue to score close to a 3 (Proficient) on all areas.

Upper 27% of Students Critical Thinking Scores (Pre, Post, and Growth)

Lower 27% of Students Critical Thinking Scores (Pre, Post, and Growth)

Spring 2014: Student Oral Communication Competency Frequency of Scoring

- The chart on the top left shows students who rated in the top 27% of student scores. These students scored an 85% on their critical thinking questions prior to the simulation. These students scored a 91% on their critical thinking question after simulation. This represents a 6% growth in critical thinking ability.

- The chart on the top right shows students who rated in the bottom 27% of student scores. These students scored a 47% on their critical thinking questions prior to the simulation. These students scored a 59% on their critical thinking question after simulation. This represents a 12% growth in critical thinking ability.

- The chart on the bottom left shows students oral communication competency scores from the SBAR rubric. The chart provides a frequency of scores in each competency area. The most students scored in the Distinguished (4) of the rubric when they reported the situation. Overall, the Developing (1) area of the rubric was used on a very limited basis. A maximum of 11 students earned a Developing (1) rating on the rubric for all areas.

- **Conclusion:** This report will be shared with the department's OAC representative and the department. The department will evaluate these results further and determine the best ways to continue to improve student's critical thinking and oral communication skills in the future.

Spring 14

Simulation for the assessment included the following courses; MS I participated with a total of four simulation scenarios , MS II used one scenario, MS III used two scenarios', one scenario for both Pediatrics and Obstetrics.

Discussion with the faculty providing the simulations determined the SBAR tool was not being used consistently.
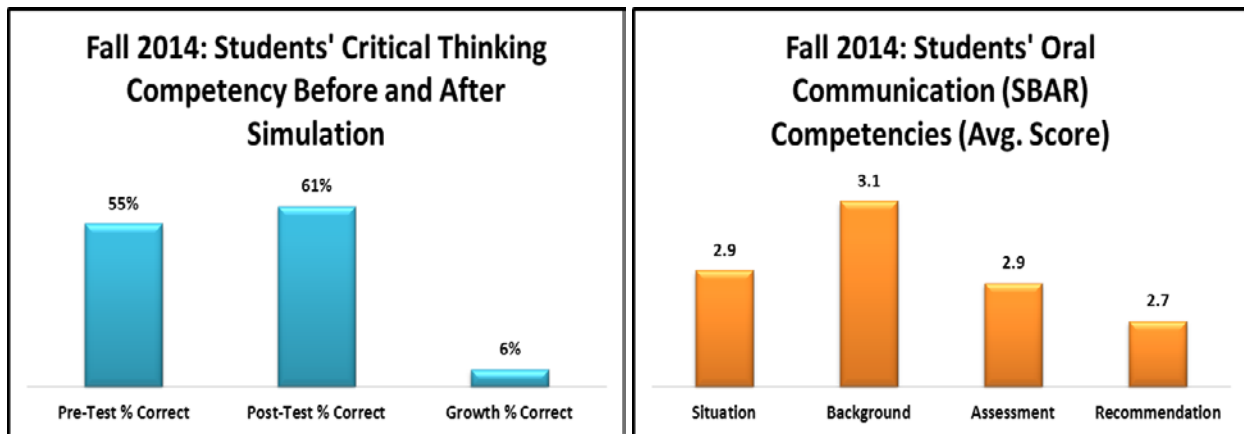
There was a 10% increase in student's critical thinking behavior. 6% of the scores from the upper 27% of the students improved their scores, 12% of the scores from the lower 27% of students improved their scores. The overall conclusion for this semester was the lower quadrant of the students increased their critical thinking skills.

The SBAR ratings are proportional to the number of students participating in simulation this semester. MS III students, who have more experience in the nursing program, were included in this assessment. It would be interesting to assess if the higher proficient levels were driven by this subset.

**Action**: continue with data collection, try to streamline the use of the SBAR tool.

Fall 2014

Overview: The Allied Health and Wellness Department undertook an assessment project to attempt to determine how their simulation software affects students' critical thinking abilities. During the simulation process, they often evaluated students' abilities to use oral communication (SBAR). A total of 213 students participated in the Fall 2014 collection. The results of these two assessments were collected by the OAC representative from the Nursing Department and processed through a Scrantron machine. The results were then shared with the Assessment Coordinator. The Assessment Coordinator compiled all the data and used statistical analysis software to analyze the data. The results of this analysis are detailed below.


The data in the chart above on the left shows the percentage of correct answers on a critical thinking questionnaire administered to students. Students responded to a set of questions created to measure critical thinking and mirror the types of questions they will see on their NCLEX exam when they complete their program. The pre-test % correct represents student scores before simulation, the post-test % correct represents student scores after the simulation, and the growth % correct represents change in students' competency. The chart shows that students got 55% of the questions correct on the pre-test, 61% of the questions correct on the post test, showing a growth of 6% from pre to post score. The growth this semester decreased 4% from Spring 2014 (10% growth).

The chart above on the right represents students' ability to communicate effectively, orally. Students were graded using a rubric created by the nursing OAC member in coordination with the assessment coordinator. The rubric measures students' abilities using a standard, SBAR, which is used in the industry. SBAR stands for situation, background, assessment, and recommendation. Each of these areas represents a set of information that nurses should communicate to the doctor during diagnoses. The data shows that overall students' average scores were between a 2 and 3. These scores are slightly higher than the data collected in Spring 2014 in all content areas except recommendation which remained the same.
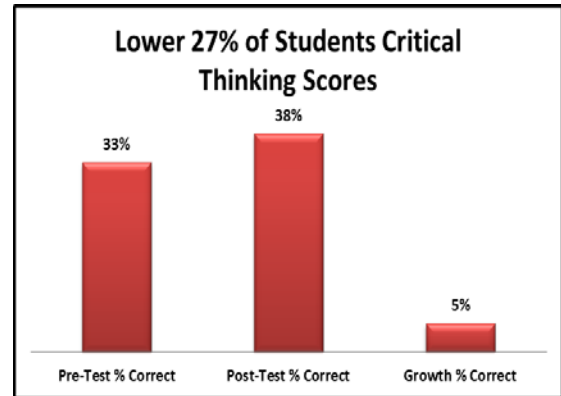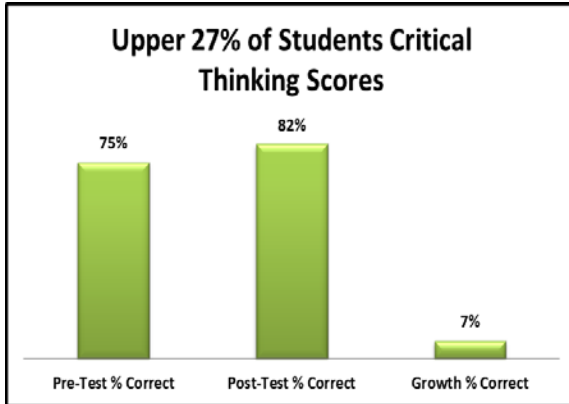
Upper 27% of Students Critical Thinking Scores

Lower 27% of Students Critical Thinking Scores

- The chart on the top left shows students who rated in the top 27% of student scores. These students scored a 75% on their critical thinking questions prior to the simulation. These students scored an 82% on their critical thinking question after simulation. This represents a 7% growth in critical thinking ability.
- The chart on the top right shows students who rated in the bottom 27% of student scores. These students scored a 33% on their critical thinking questions prior to the simulation. These students scored a 38% on their critical thinking question after simulation. This represents a 5% growth in critical thinking ability.
- The chart below shows students oral communication competency scores from the SBAR rubric. The chart provides a frequency of scores in each competency area. The most students scored in the Distinguished (4) of the rubric when they reported the background. Overall, the Developing (1) area of the rubric was used on a very limited basis. A maximum of 2 students earned a Developing (1) rating on the rubric for all areas.
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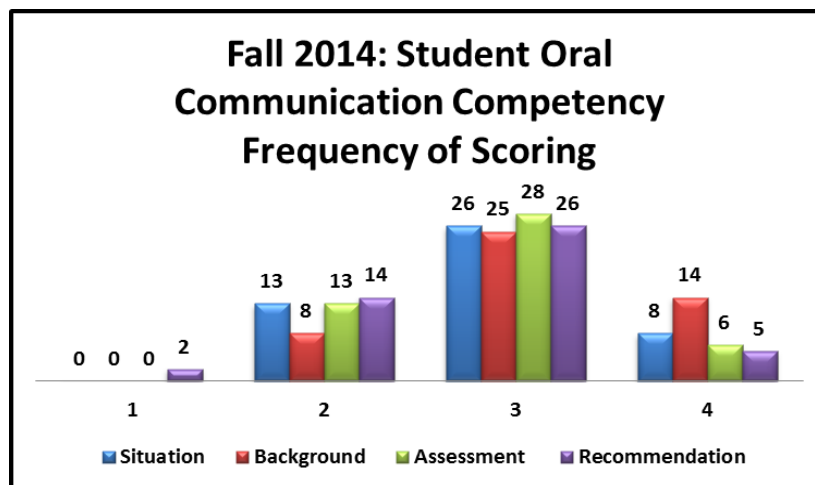
Conclusion: This report will be shared with the department's OAC representative and the department. The department will evaluate these results further and determine the best ways to continue to improve student's critical thinking and oral communication skills in the future.

Fall 14

Simulation for the assessment included the following courses; MS I used two scenarios, MS II had 2 scenarios, MS III used one scenario. The summer courses of both Pediatrics and Obstetrics simulation scenarios data were included with this collection of data.

There was a 6% increase in student's critical thinking behavior. 7% of the scores from the upper 27% of the students improved their scores, 5% of the scores from the lower 27% of students improved their scores. Unlike the previous two assessments, this did not show a significant improvement in critical thinking.

The SBAR rubric reflected the greatest number of students preformed at proficient level of competency in the communication assessment.

Further Research

Overall, the data suggest that the lower quadrant of students improved critical thinking skills with the use of simulation. Therefore, this suggests simulation is valuable.

- Frederick Community College Nursing Faculty are relatively novice in simulation skills. Future consideration may include professional development for the staff to not only improve simulation techniques but also make the simulations more in depth.

- Another recommendation would be to code the students participating in the assessment in order to create a Meta analyses to differentiate between first year and second year students.