Innovative Lesson Plans for Active Learning: Teaching Nursing Research and Evidence-Based Practice

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An Overview of Active Learning Strategies

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Active learning (AL) strategies have been utilized in different areas of study and across different countries with reported positive outcomes, in domains such as critical thinking, information processing and retaining knowledge. AL is a student centered approach in which the responsibility for learning is placed upon the student, often working in collaboration with classmates (Bonwell & Eison, 1991). A shift in education is underway, moving from traditional lecture style to the use of more AL; which requires students to be actively engaged in the classroom. With this teaching method, instructors are facilitators rather than one way providers of information. Strategies, such as faculty role modeling, student interactive group learning, and group testing within a didactic learning environment are employed in AL (Toole, Stichler, Ecoff, & Kath, 2013).

It is increasingly necessary for nursing schools to implement AL to engage and educate their students. AL is rooted in teaching critical thinking skills, which is necessary and valuable for reinforcing classroom-acquired knowledge (Hoke & Robbins, 2005), and uses creative teaching strategies to improve critical thinking. AL also facilitates stimulation of higher order cognitive functions associated with critical thinking and analysis (Bevis, 1989). These are all skills and habits required of professional nurses (Kearney-Nunnery, 2016).

AL encourages expressing ideas through writing, exploring personal attitudes and values, giving and receiving feedback, and reflecting on the learning process. Students can complete these instructional strategies either in-class or out-of-class, working either as individuals or in a group. AL has multiple modes and activities of

teaching, making it more versatile and adaptable to the learning needs of many students, with no one specific mode more effective than another but with all forms of AL seen as more beneficial than lecture alone.

Three specific studies assessed the impact of active learning on knowledge retention. Hoke, & Robbins (2005) found the combination of active learning and didactic learning had a 2.84% improvement in the average clinical grade (87.03%) in comparison to the average clinical grade for students taught using only a lecture approach (84.19%). Middleton (2013) described the effectiveness of AL in an undergraduate curriculum for developing health professionals capable of integrating knowledge, theory, and leadership in a classroom setting. According to Wonder & Otte (2015) benefits of using AL include that it

- Creates greater student interest and motivation than traditional lecture.
- Involves students in learning-process activities rather than passive listening.
- Provides more frequent and immediate feedback to students.
- Promotes development of student skills in critical thinking.
- Improves writing and speaking skills.
- Increases individual accountability.
- Promotes greater academic achievement (breadth and depth); students learn to think deeply about a subject/topic.
- Provides students with an opportunity to think about, talk about, and process course material.
- Improves recall of information.
- Contributes to more favorable attitudes toward learning.

- Places more emphasis on the teacher becoming a designer and facilitator of learning experiences rather than an imparter of knowledge.

Nursing education continues to strive to include AL in the courses, as these teaching strategies are linked to easier transition and application of information into clinical settings (Benner, Sutphen, Leonard, & Day, 2010). Students who experienced active learning as a mode of education strategy report positive perception of active learning strategies, and negative perception for traditional learning strategies (lecture). Evidence demonstrates a need for increased use of AL in all aspects of nursing education.

References

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Toole, B. M., Stichler, J. F., Ecoff, L., & Kath, L. (2013). Promoting nurses' knowledge in evidence-based practice: Do educational methods matter? *Journal for Nurses in Professional Development, 29*, 173–181.

Wonder, A. H., & Otte, J. L. (2015). Active learning strategies to teach undergraduate nursing statistics: Connecting class and clinical to prepare students for Evidence-Based practice. *Worldviews on Evidence Based Nursing, 12*, 126-127. doi:10.1111/wvn.12075

Puppet Introduction to Research

Prerequisite Knowledge	● none
Learner Setting	Classroom
Strategy Type	Small group
Time	Faculty prep: 30 minutes Delivery with students: 45 minutes Evaluation: 30 minutes
Learning Objectives	● To demonstrate the basic elements of a research study ● To identify researchable problems in nursing
Materials/ Resources	Photos of students (can be done without photos by having students draw their own face or a face of any character), cardstock, scissors, glue, tape, straws/wood skewers, crayons.
Strategy Overview	This lesson introduces students to the process of generating a research study. Students can think about nursing problems creatively when they engage many areas of the brain. This assignment allows students to consider nursing problems while utilizing their creativity to create a puppet. The puppet will be used as a participant in a play describing a study that addresses a specific problem.

Steps	1. Pre class; Print out pictures of each class member from class roster (optional). Students can draw their own heads. 2. Class discussion of overview of research and nursing inquiry 3. Instruct students to form groups of three to four students. 4. Pass out student pictures, cardstock paper, scissors, crayons, tape/glue and straws or skewers. 5. Explain that each student is to create a puppet of themselves while discussing nursing problems. They are to come to a consensus of the problem most urgent in nursing from the problems generated. 6. They will then develop a study to address their problem. 7. Using their puppets, they will perform the study in front of the class. 8. The instructor will collect the puppets and a written version of the study. On the last day of the course students will receive back their early version of a study to redesign using the knowledge gained over the semester.
Evaluation	Final puppet performance at end of semester

Rotating Stations: Problem and Purpose and Question, Oh My!

Prerequisite Knowledge	● The purpose of research and evidence-based practice in nursing ● The types of research that generate evidence for nursing practice ● The steps of research in nonexperimental and experimental designs
Learner Setting	Classroom
Strategy Type	Small group
Time	Faculty prep: <5 minutes Delivery with students: 45 minutes Evaluation: 15 minutes
Learning Objectives	● To critically appraise the problems, objectives, hypotheses, and variables in studies.
Materials/ Resources	Markers and whiteboard (or large sheets of paper attached to walls or easels) Instructor-generated example (see below) Sample classroom diagram (see below) Critique questions (see below) Photos of student examples (see below)
Strategy Overview	The purpose of this strategy is to provide students with an opportunity to practice their understanding of the connections between various elements found in a research report (research problem, study purpose, objectives/aims, research question, and hypothesis). Through a collaborative small group activity, students rotate through various “stations” in the classroom and create their own research problems,

	purposes, etc. and then critique the student-generated examples. The instructor circulates among the groups during the course of this activity, providing clarification and feedback but not always correction, leaving the groups something to critique and discuss. Groups then answer a set of critique questions using the example at their final station. Groups share their critiques and impressions of the learning experience with the whole class.
Steps	1. Demonstrate an example that begins with a broad topic and progresses through research problem, purpose, objectives/aims, question, and hypothesis 2. Take class suggestions or simply provide students with a broad research topic (i.e. nursing education) 3. Divide students into small groups and assign each group a beginning station at the whiteboard. 4. Each group generates a research problem based on the overall topic. 5. The instructor circulates to provide clarification and feedback and then directs each group to move to the next whiteboard station. 6. Each group generates a study purpose based on the research problem that is already written at this station. 7. The instructor circulates to provide clarification and feedback and then directs each group to move to the next whiteboard station. 8. Each group generates a study objective or aim based on the problem and purpose that are already written at this station. 9. The instructor circulates to provide clarification and feedback and then directs each group to move to the next whiteboard station.

	10. Each group generates a research question based on all the information already written at this station. 11. The instructor circulates to provide clarification and feedback and then directs each group to move to the next whiteboard station. 12. Each group generates a hypothesis based on all the information already written at this station. 13. The instructor circulates to provide clarification and feedback and then directs each group to move to the next whiteboard station. 14. Now, at the final station, groups complete the critique questions in their small groups. 15. The instructor facilitates a class discussion of the critique questions and lessons learned from this assignment that can be applied to critiquing research articles.
Evaluation	Low stakes - Instructor feedback during class activity and/or credit for active participation

Rotating Stations: Instructor-generated Example

Topic: A broad area that includes many potential research problems

Example: Side effects of chemotherapy

Problem: An area of concern within the broad topic of interest

Example: Nausea and vomiting are common side effects among patients on chemotherapy, and interventions to date have been only moderately successful in reducing these effects. New interventions that can reduce or prevent these side effects need to be identified.

Purpose: A summary of the overall goal of the study

Example: The purpose of this study is to test an intervention to reduce chemotherapy-induced side effects

Objectives/aims: The specific accomplishments the researchers hope to achieve through this study

Example: The objective of this study is to develop and implement two alternative procedures for administering antiemetic therapy for patients receiving moderately emetogenic chemotherapy (patient-controlled versus nurse-controlled).

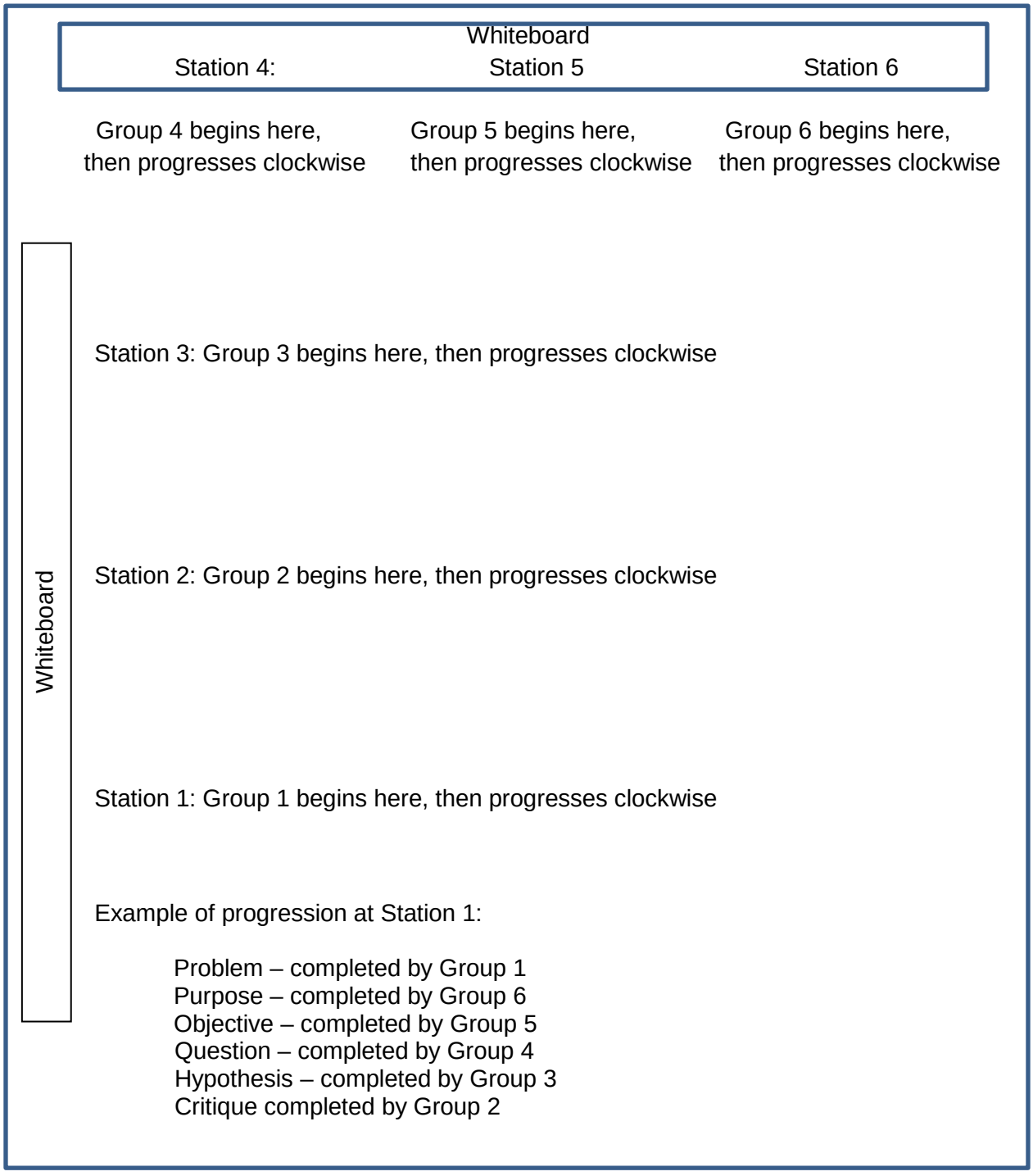
Question: The specific question the researchers hope to answer in addressing the research problem

Example: What is the relative effectiveness of patient-controlled antiemetic therapy versus nurse-controlled antiemetic therapy with regard to (a) medication consumption and (b) control of nausea/vomiting in patients on chemotherapy?

Hypothesis: A statement of predicted relationships between variables

Example: Subjects receiving antiemetic therapy by a patient-controlled pump will (1) be less nauseated, (2) vomit less, and (3) consume less overall medication than subjects receiving the therapy by nurse administration.

Rotating Stations: Sample classroom diagram



Rotating Stations: Critique questions

Now that you've completed your rotation through the room, consider the following questions for your current station. I'll ask each of the groups to share an answer with the class.

1. Is the problem clear and concise?

2. Does the purpose express the goal/focus of the study?

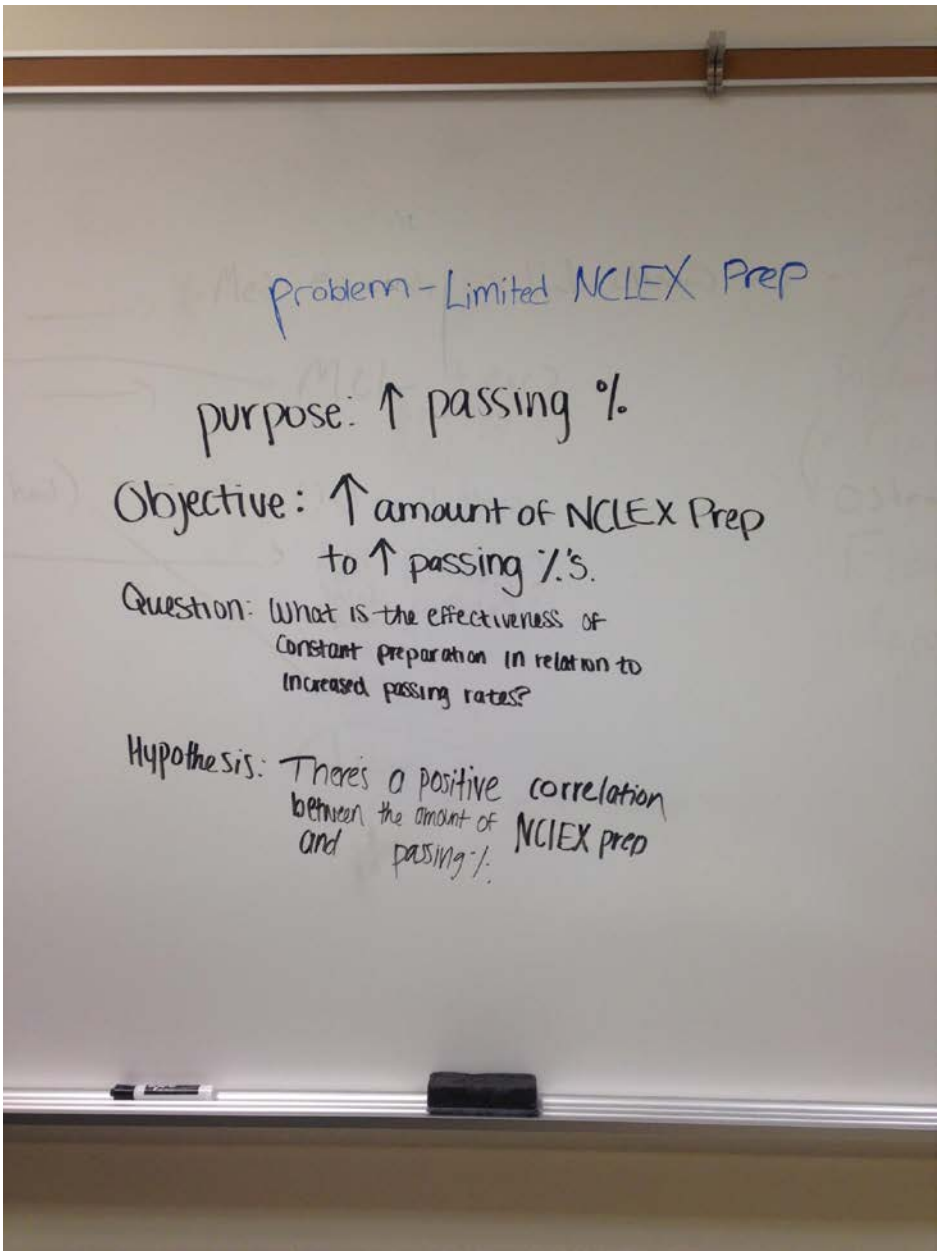
3. Is the objective/aim based on the study purpose?

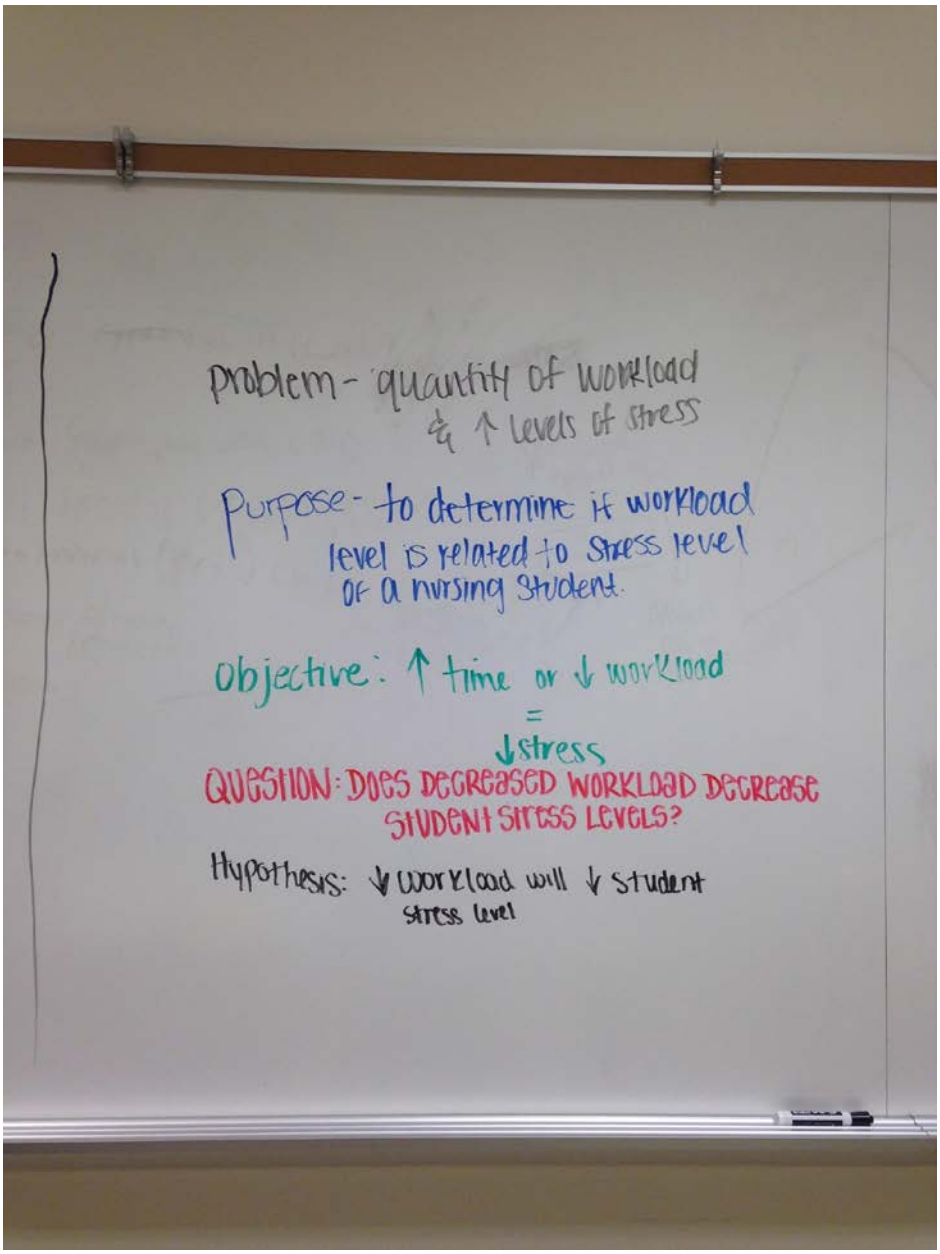
4. Does the question direct the type of data that will be collected?

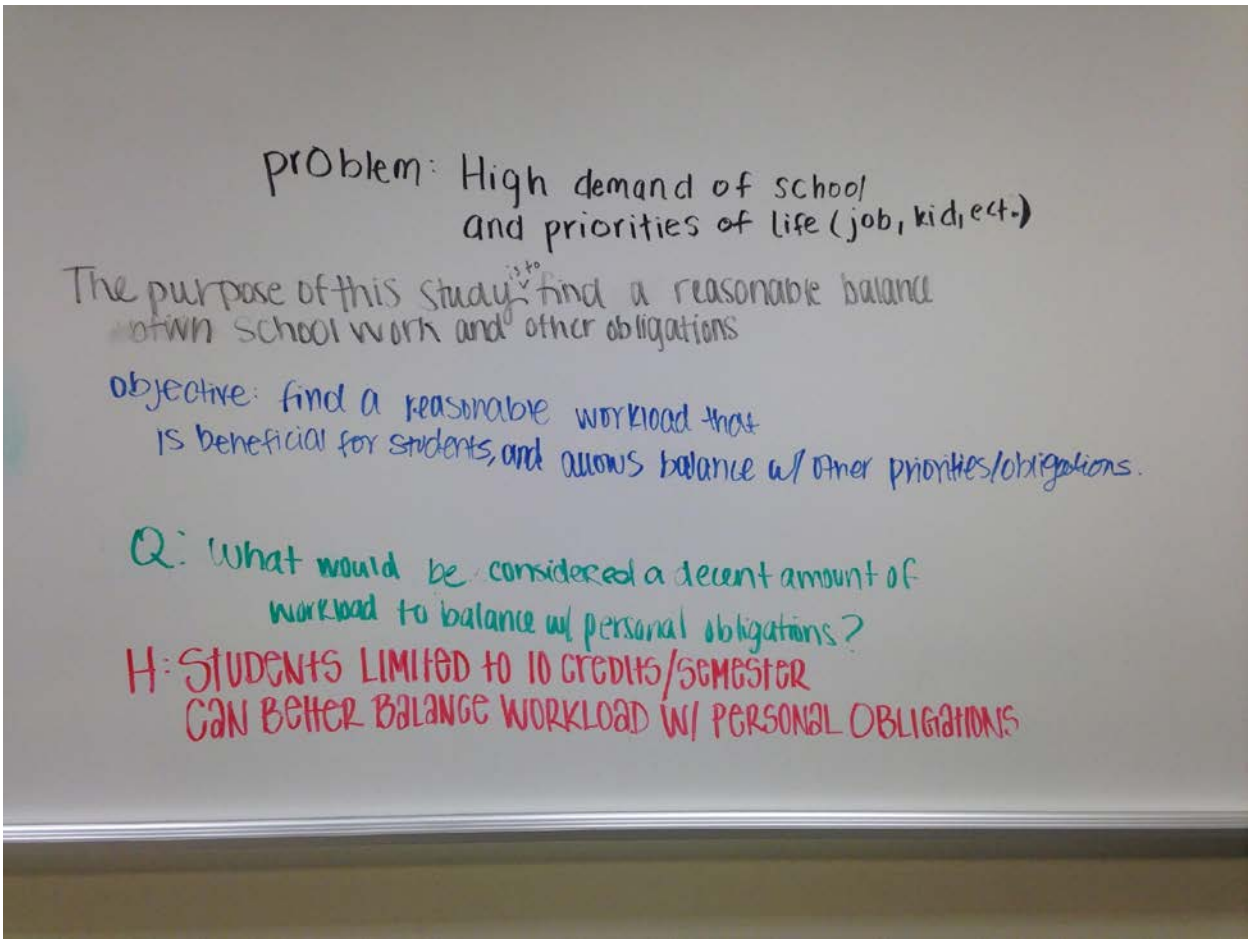
5. What type(s) of hypothesis is it?

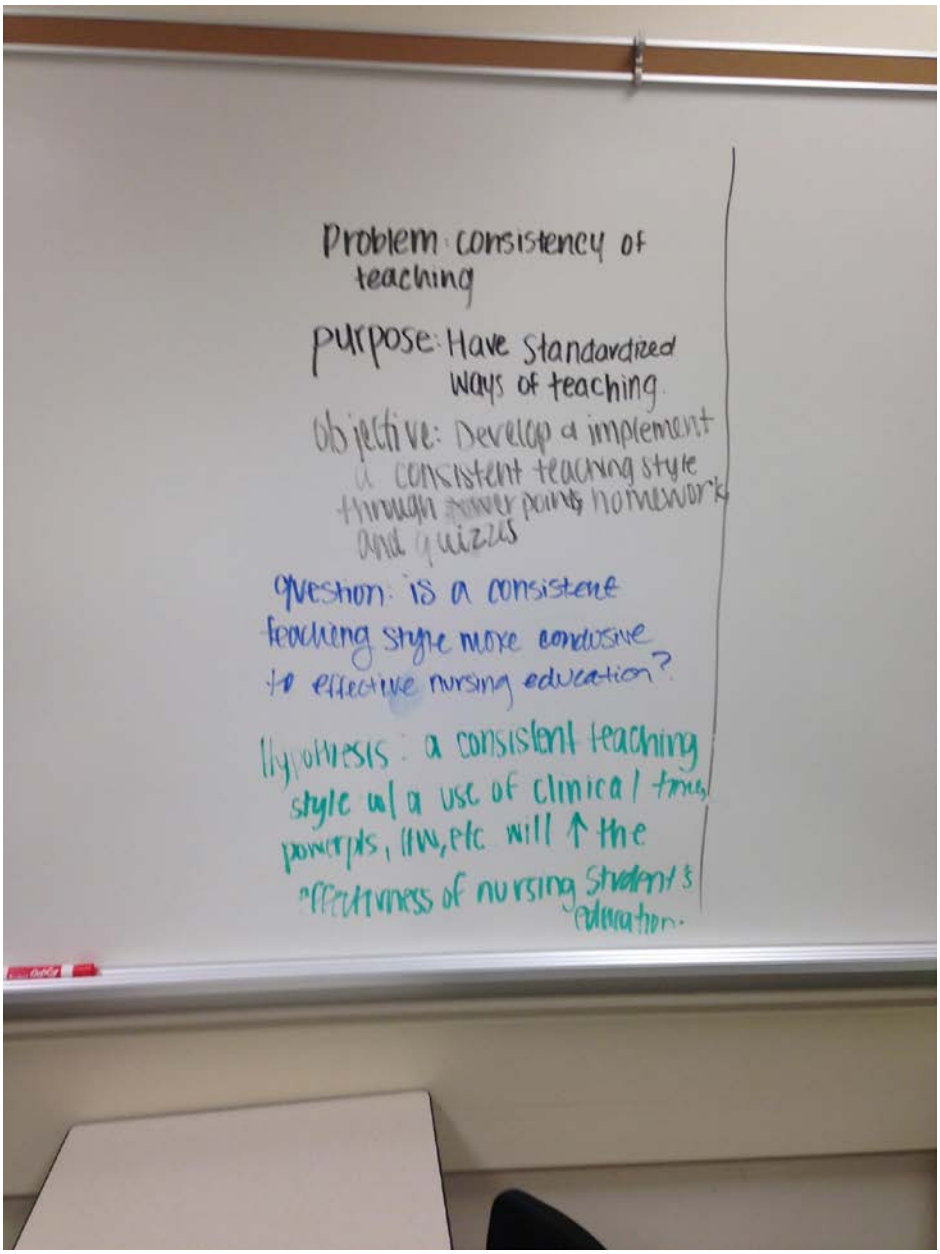
6. Does the hypothesis identify the relationships among the variables in the study?

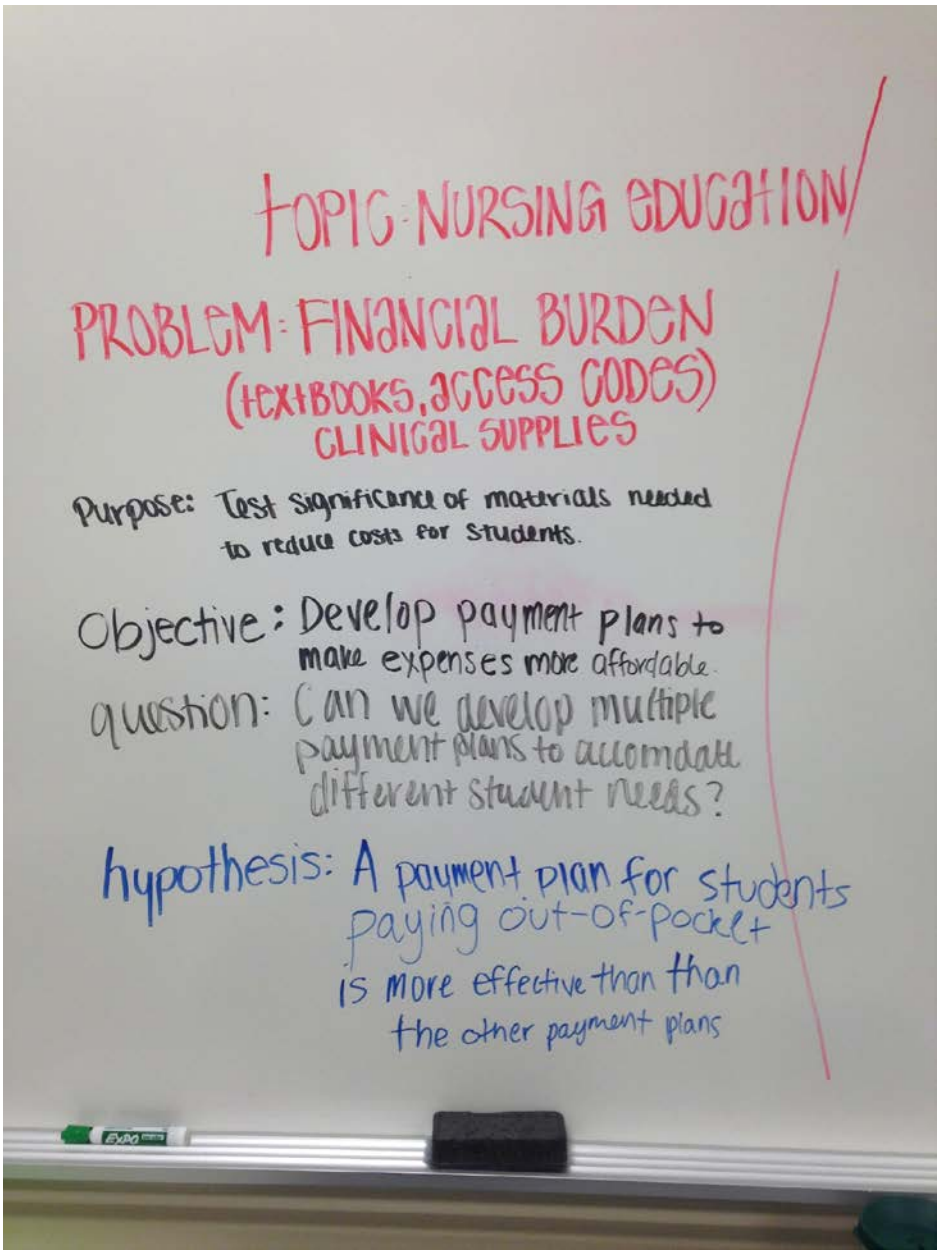
Rotating Stations: Photos of student examples

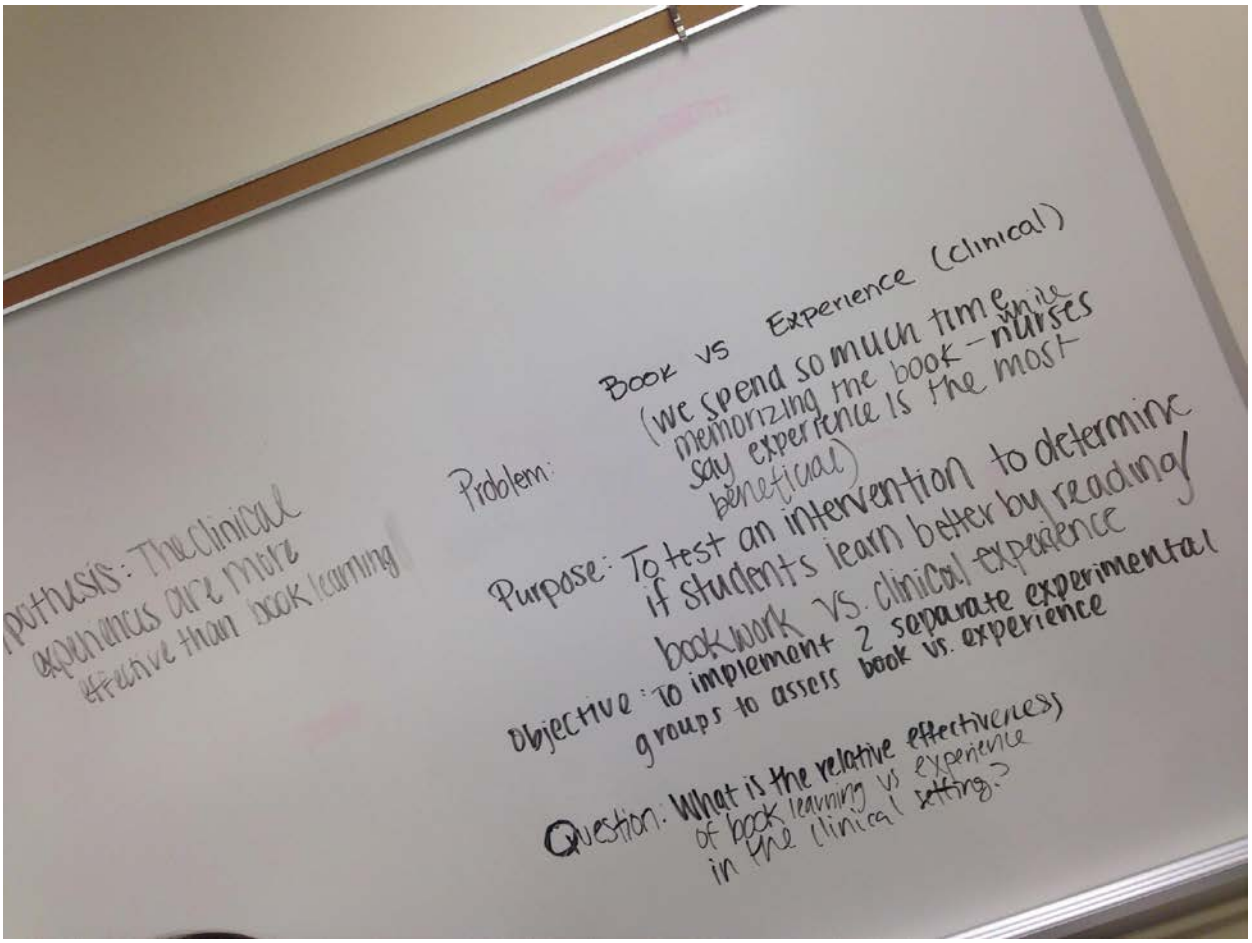



Problem - quantity of workload
& ↑ levels of stress
Purpose - to determine if workload
level is related to stress level
of a nursing student.
Objective: ↑ time or ↓ workload
=
↓stress
QUESTION: DOES DECREASED WORKLOAD DECREASE
STUDENT STRESS LEVELS?
Hypothesis: ↓ workload will ↓ student
stress level


problem: High demand of school and priorities of life (job, kid, ect.)
The purpose of this study is to find a reasonable balance btwn school work and other obligations
objective: find a reasonable workload that is beneficial for students, and allows balance w/ other priorities/obligations.
Q: What would be considered a decent amount of workload to balance w/ personal obligations?
H: STUDENTS LIMITED TO 10 CREDITS/SEMESTER CAN BETTER BALANCE WORKLOAD W/ PERSONAL OBLIGATIONS


Problem: consistency of teaching
purpose: Have standardized ways of teaching
objective: Develop a implement a consistent teaching style through power points homework and quizzes
question: is a consistent teaching style more conducive to effective nursing education?
Hypothesis: a consistent teaching style w/ a use of clinical / times, powerpts, HW, etc will ↑ the effectiveness of nursing student's education.


TOPIC: NURSING EDUCATION
PROBLEM: FINANCIAL BURDEN
(TEXTBOOKS, ACCESS CODES)
CLINICAL SUPPLIES
Purpose: Test significance of materials needed to reduce costs for students.
Objective: Develop payment plans to make expenses more affordable.
question: Can we develop multiple payment plans to accomdate different student needs?
hypothesis: A payment plan for students paying out-of-pocket is more effective than than the other payment plans


Book vs Experience (clinical)
Problem: (we spend so much time memorizing the book - while say experience is the most beneficial)
Purpose: To test an intervention to determine if students learn better by reading/ bookwork vs. clinical experience
Objective: to implement 2 separate experimental groups to assess book vs. experience
Question: What is the relative effectiveness of book learning vs experience in the clinical setting?
pothesis: The clinical experiences are more effective than book learning

Ethics in Nursing Research: The Tuskegee Study

(see this link for an overview of this lesson plan)

https://youtu.be/mQlMzF5HqAA

Prerequisite Knowledge	● Basic ethical principles from ANA Code of Ethics, and Belmont Report (available from https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html)
Learner Setting	Online
Strategy Type	Other (video with student participation)
Time	Faculty prep: Approximately 1 hour Delivery with students: Approximately 2.5 hours to view videos and respond to questions (additional time needed if paper required as part of assignment) Evaluation: half hour, depending on number of students
Learning Objectives	● Discuss the ethical principles violated in the Tuskegee study ● Apply ethical principles to research practices
Materials	Playposit https://www.playposit.com/ See below for YouTube links See below for questions, and instruction sheets for students
Strategy Overview	Students view YouTube video segments of the movie “Miss Evers’ Boys” regarding the role of Nurse Evers in the Tuskegee Research Study. While watching the videos in PlayPosit, students answer reflective questions to demonstrate their knowledge of research ethics and that they have completed the assignment. This can also be used as a pre-writing assignment—see paper instructions below.
Steps	1. Create a Playposit account (free) at https://www.playposit.com/ click on join to create account.

	2. Click on Create, then class. 3. Name your class, then click create. 4. Click on “new”, then “bulb” (bulb is the term Playposit uses for the video with embedded questions). 5. Enter URL for first video, then click “add”. 6. Follow the instructions to add the questions listed below for each video by clicking on the menu square, then add question by selecting type of question, then adding text for that question. Make sure you click on save to save each question. 7. When done, click on “settings” (gear) then click save/done. The bulb will then appear in your list. 8. To move bulb to your class, click on the link for the bulb in Playposit, then monitor, then assign to a class. Select the due date for the bulb, then save, then the second save. 9. Import bulb into your learning management system (LMS), by clicking on the “share” icon to the right of the bulb. Make sure that you do NOT select “do not require viewers to authenticate” and “share ungraded”. Leaving both of these unchecked will require students to enter their names at the start of the video, and allows their answers to be saved and graded. 10. Consult with your instructional designer for their preference to share the bulbs in your LMS. Sharing the URL tends to be more universal, but depending on the LMS, it may play better with the embed code. 11. You may want to create a practice Playposit to demonstrate to the students how this works. For example, I found a YouTube video of my school’s marching band playing at a football game. Within the first minute of the video, I inserted the question “what instrument would you like to play if you were in a marching band?” I leave it as a free response. Once this Playposit bulb is created, I load it into the course so students can see how it

	appears in the LMS, how to access it, how to enter their name, answer a question, and then proceed with watching the video.
Evaluation	Other: low to medium stakes depending on if used as a stand alone assignment or a pre-writing activity. Review student responses by clicking on your class, then the bulb, then “monitor”, then selecting bulb. Scroll down to see the students’ responses. If you chose to have the students write a paper, the instructions and grading rubric follow the list of questions below.

Ethics in Nursing Research: YouTube links to videos for use in Playposit

Video 1	https://www.youtube.com/watch?v=9ymd0P1sCBQ&index=1&list=PL310B8233BA1947FA
Video 2	https://www.youtube.com/watch?v=foP7wTJZb0I&index=2&list=PL310B8233BA1947FA
Video 3	https://www.youtube.com/watch?v=6ogSvwNf5LY&index=3&list=PL310B8233BA1947FA
Video 4	https://www.youtube.com/watch?v=W7NuAXsOTkQ&list=PL310B8233BA1947FA&index=4
Video 5	https://www.youtube.com/watch?v=KaokmKeGKJE&list=PL310B8233BA1947FA&index=5
Video 6	https://www.youtube.com/watch?v=7KjbxgJtZI4&index=6&list=PL310B8233BA1947FA
Video 7	https://www.youtube.com/watch?v=kCXZFYkSWeI&list=PL310B8233BA1947FA&index=7
Video 8	https://www.youtube.com/watch?v=NVgaaiMwCbc&list=PL310B8233BA1947FA&index=8
Video 9	https://www.youtube.com/watch?v=Lx5-UztAIJs&list=PL310B8233BA1947FA&index=9

Ethics in Nursing Research: Questions to load into YouTube videos

(approximate time location in video given after each question. All questions are free response unless otherwise noted)

Video 1	What was the attitude towards trying something new to solve a medical problem? (7:48)
Video 2	What elements of the Belmont report are missing at this point of the video? (9:58)
Video 3	How does this meet the criteria for informed consent? (1:17) What ethical principle did Miss Evers just violate? (8:22)
Video 4	What ethical principle is in play here? (6:55) Do you think a study comparing two different groups is ethical? Why or why not? (12:56) Do the means (method) in the proposed study justify the end results or potential knowledge gained? (14:14)
Video 5	No question. Students needed to report opinion of video as a rank out of 5.
Video 6	What do you think about what the doctor and Miss Evers told Willie about the procedure? (5:58) What ethical principle is involved with Miss Ever's not telling the subjects in the study what was really happening? (12:13)

Video 7	What do you think about the statement 'Science is a hard taskmaster'? Was it ethical to withhold treatment that posed a risk? (4:56) Is the risk benefit ratio appropriate to continue with the study? Why or why not? (8:49)
Video 8	Research subjects can get compensated for participating in a study--was the $10 appropriate? Why or why not? (1:39) Why did Nurse Evers warn of the possible side effects of penicillin? What ethical principle did she follow? (7:03)
Video 9	What do you think of Miss Ever's response: Doctors know best? (4:38) Do you think Miss Ever's was doing what a nurse should do in a research study? Is giving it your all enough or the right thing to do? (9:10)

Ethics in Nursing Research: Instructions for viewing videos using Playposit

1. Firefox seems to work better than Chrome as the platform to view videos in Playposit.

2. Click on the link available in (location of Playposit in LMS)

3. Watch the video (click on the play icon). Make sure you enter your real name so you get credit for watching the videos. Enter text responses when prompted. Responses don't need to be lengthy, just a sentence or two will do. But they do need to be appropriate to the topic and video.

4. Once you have entered your text, click on "submit", then "continue"

5. Watch the remainder of the video, answering questions when prompted (videos have 1-3 questions per video). You must watch all of the video for your answers to show up and receive credit.

6. Click on "finish" when you are done with the video.

7. To review and save your answers, go to the "review" area on the upper left of the screen.

Ethics in Nursing Research: Short Paper Instructions

1. Read Belmont Report (tell students where this link is located in your course) and assigned chapter in your text.
2. Watch Ms. Ever's Boys (where found in LMS) —all 9 links). As you are watching the videos, provide short answers to the prompts. These short answers will help you write your paper (pre-writing). See instructions for using Playposit in (location in LMS)
3. Write the short paper analyzing the ethical element of the Belmont Report you thought was the most violated (select only one element to focus on, you do not have to do all of the elements violated). The paper should include the following sections: Introduction, Ethical Analysis and Conclusion
    a. Make sure you include a purpose statement in the introduction, stating the focus of your analysis (specifically state: The purpose of this paper is……)
    b. Support your ethical analysis with appropriate citations and/or quotations. You can use your text or the Belmont Report.
    c. The conclusion should include steps *you as a nurse can take to prevent this particular ethical breach in future studies with justification.*
    d. Follow APA formatting rules when writing the paper, which includes proper formatting of the title page, body of the paper, headings, and reference page.
    e. The paper should be written at a college level, including proper sentence and paragraph structure, spelling, grammar and clarity in expression of thought. You may use first person in the concluding paragraph only.
    f. Submit the paper to Safe Assign to check for plagiarism. Submit a copy of the Safe Assign report to the drop box in Bb at least 24 hours before the paper is due. Failure to submit the Safe Assign report will result in a penalty grade of 73%.

   g. The body of the paper should be no more than 3 pages in length. I will stop reading and grading after three pages. The three page limit does not include the title or reference page.

4. Submit your paper by the due date and time electronically (tell students where to submit the paper in your LMS) Submit the rubric *with your name on it* as a separate attachment via Bb to the same drop box. (minus 2 points if no rubric attached)
5. Consult the rubric posted for further grading criteria.
6. If you anticipate difficulties with the mechanics of writing or APA, start early and utilize the Writing Center or Knowledge Market. I will not read proofs of papers. You may utilize peer review, but each student is responsible for their own work.

Ethics in Nursing Research: Rubric for Short Paper

Points earned	Excellent	Above Average	Average	Below Average
	Introduction: Content introduced with enough background to inform the reader of what is to follow in paper. Purpose statement is clearly written at end of introduction (10 points)	**Introduction:** Content introduced with most of necessary background to inform the reader of what is to follow in paper. Purpose statement is clearly written at end of introduction (9 points)	**Introduction:** Content introduced with some background but reader is left with questions regarding topic of paper. Purpose statement is included but not clearly stated. (8 points)	**Introduction:** Content vaguely introduced with little or no background. Purpose statement is included but not clear, or not included (7 points)
	Ethical Analysis Ethical principle appropriately used and discussed in relationship to assigned video. Includes appropriate principles from text and from Belmont Report relating to purpose statement (18- 20 points)	**Ethical Analysis** Ethical principle appropriately used and discussed in relationship to assigned video. Includes some principles from text and from Belmont Report but not comprehensive (16-17 points)	**Ethical Analysis** Ethical principle used and discussed in relationship to assigned video but not always appropriate. Includes some principles from text and from Belmont Report relating to purpose statement but not comprehensive	**Ethical Analysis** Ethical principle identified but little correlation to assigned video. Lacking major principles relating to purpose statement (11-13 points)

			(14-15 points)	
	Conclusion Conclusion includes steps nurses can take to prevent ethical breach in future studies, with justification (10 points)	**Conclusion** Conclusion includes some steps to prevent ethical breach in future studies, with justification (not focused on nursing steps) (9 points)	**Conclusion** Conclusion includes some steps to prevent ethical breach in future studies, justification not always appropriate (8 points)	**Conclusion** Conclusion includes some steps to prevent ethical breach in future studies, justification not always appropriate (7 points)
	Writing and APA Appropriate use of headings, title and reference page formatted per APA as is entire paper. Writing is clear, concise, college level using correct grammar, spelling and structure. (5 points)	**Writing and APA** Minor APA error in headings, title and reference page or overall APA format. Writing is clear, concise, college level with minor (1-2) grammar, spelling or structure errors. (4 points)	**Writing and APA** Major APA error in headings, title and reference page or minor error in all APA formatting. Writing is somewhat clear, concise, with some (3-4) grammar, spelling or structure errors. (3 points)	**Writing and APA** Major APA error s in format of multiple aspects of paper. Writing is unclear, not concise or not at college level and/or has multiple errors (5+) in grammar, spelling and or structure. (0 points)

Total Score **-2 points if rubric not stapled at back of paper - 12 points if Safe Assign not used**

Comments

Culture Shots

Prerequisite Knowledge	● Understand the role of theory in research, ethics, and qualitative research
Learner Setting	Classroom, community
Strategy Type	Active lecture and small group
Time	Faculty prep: 20 minutes Delivery with students: 30 minutes Evaluation: 45 minutes
Learning Objectives	● To demonstrate the development of a theory ● To evaluate the ethical principles related to a research study ● To demonstrate qualitative methodology in the community
Materials/ Resources	Cell Phones
Strategy Overview	Culture Shots is an activity that addresses important aspects of theory, ethics and qualitative design. This activity requires students to photograph and observe a specific culture. Going out into the community to create this assignment helps students to understand that research is pertinent to their lives. They can begin to see that research problems ask questions important to their practice. This activity requires students to actively experience and understand components of qualitative research

Steps	1. Class discussion of theory in terms of concept and relationships. 2. Introduce concept of culture. 3. Discuss qualitative research. 4. Students form groups of three to four and identify a culture to which they have access. Examples include; football fans, coffee shop patrons, music students. 5. Explain the assignment; Students will use their cellphones to photograph their cultures and observe and record interactions and behaviors. Students need to be sensitive to participants' feelings about being photographed. Discuss ethical considerations. Students will then prepare a possible theory of their culture from their observations and photos. 6. Discuss ethical considerations in research. Discuss the principles of the Belmont report; Respect for persons, Justice and Beneficence. 7. Provide an example of theory development using photos on a culture familiar to you. 8. At next class time students will develop and discuss their theory incorporating class input.
Evaluation	Class presentation

Theory Mapping: Conceptual and Operational Definitions

Prerequisite Knowledge	● Problems, objectives, hypotheses, and variables in studies ● Introduction to study frameworks
Learner Setting	Classroom
Strategy Type	Small group
Time	Faculty prep: 45 minutes Delivery with students: 30 minutes Evaluation: 15 minutes
Learning Objectives	● To distinguish and critique conceptual and operational definitions ● To identify connections between nursing theory and research
Materials/ Resources	Map templates (see below) Mapping pieces (see below) Envelopes Glue sticks Completed student example (see below)
Strategy Overview	After a brief instructor-generated example regarding the differences and connection between conceptual and operational definitions, students work in small groups to sort and place conceptual and operational definitions onto a map of a theory of pain. The instructor circulates the room to provide guidance and facilitates a discussion of the groups' answers when the task is complete.
Steps	1. Demonstrate difference and relationship between conceptual and operational definitions using a simple example, or one from a published study. 2. Distribute one map template, one envelope of color-coded mapping pieces, and one glue stick to each group 3. Instruct students that their task is to sort the mapping pieces and glue the conceptual and operational definitions for each box in its

	appropriate place. Each color corresponds to one row (or column); the students must determine where the correct colors go. 4. Circulate through room to assist student groups as needed. 5. Facilitate group discussion of answers. 6. Note: Students like to take photos of the completed map so all can have a copy of the work.
Evaluation	Low stakes – Instructor feedback during class activity and/or credit for active participation

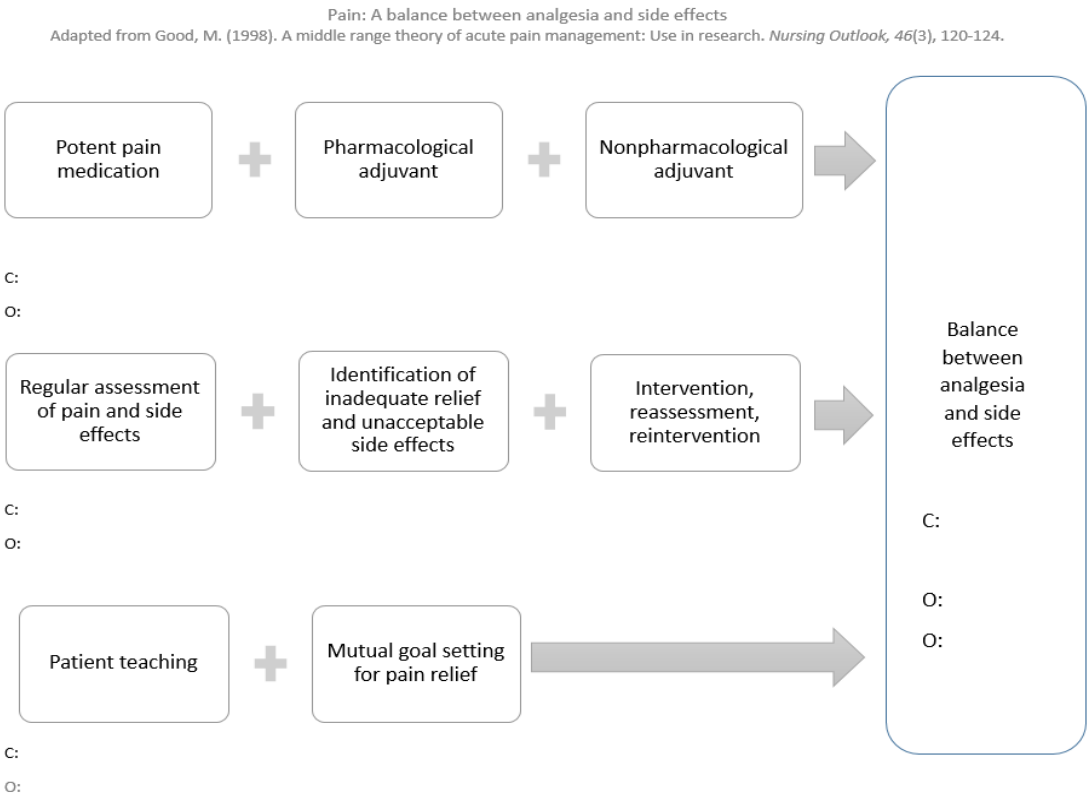
Theory Mapping: Instructor generated example

Conceptual Definition	Operational Definition
The abstract or theoretical meaning of the concept being studies	The operations that researchers must perform to collect and measure the required information

	Conceptual Definition	Operational Definition
Weight	The gravitational pull on an object's mass	An object's weight in pounds, to the nearest whole pound
Anxiety	A feeling of unease	Hamilton Anxiety Rating Scale Palmar Sweat Index

Theory Mapping: Map template

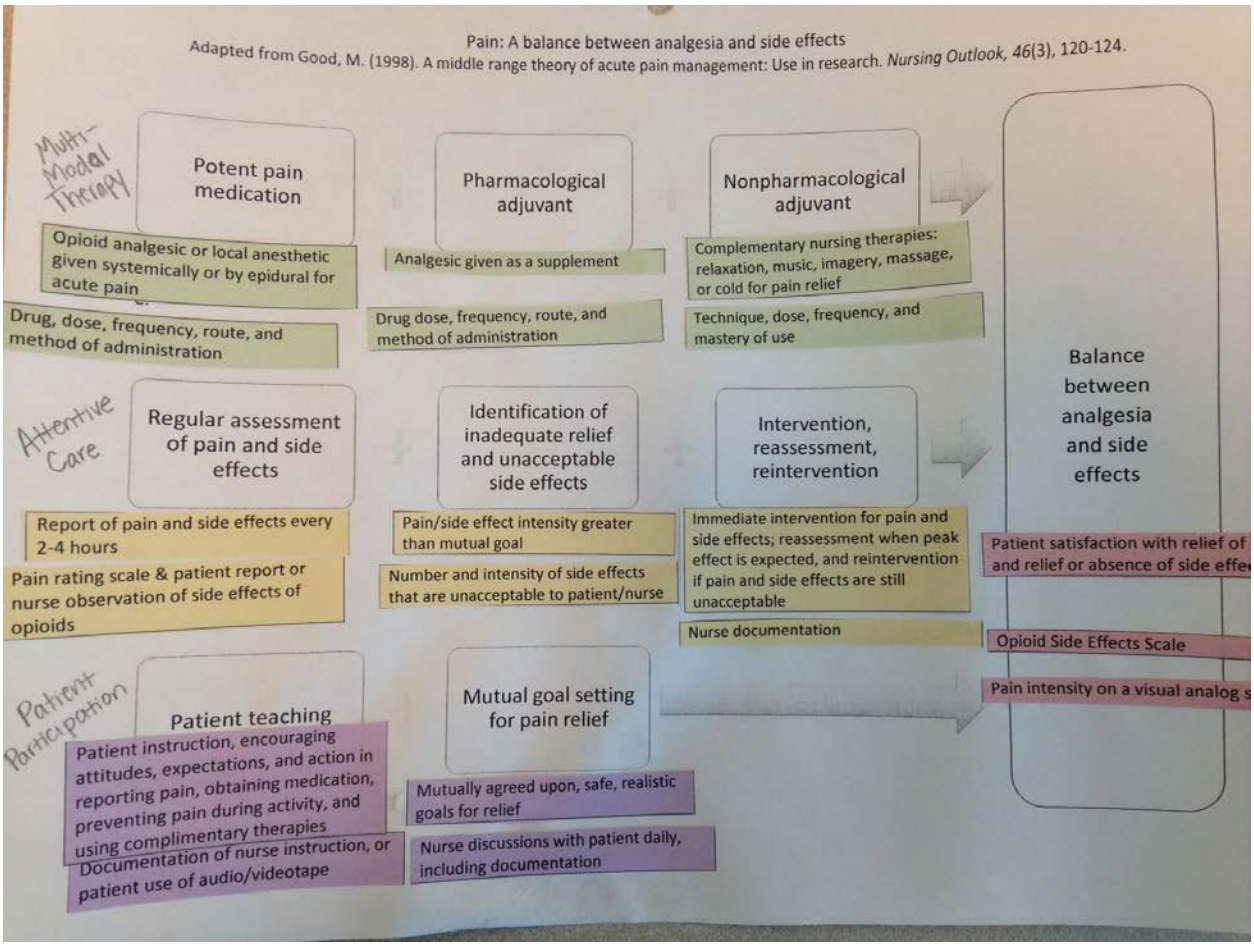
Students glue conceptual definitions for each box beside (C) and operational definitions beside (O).



Theory Mapping: Mapping pieces

Opioid analgesic or local anesthetic given systemically or by epidural for acute pain	Drug, dose, frequency, route, and method of administration
Analgesic given as a supplement	Drug dose, frequency, route, and method of administration
Complementary nursing therapies: relaxation, music, imagery, massage, or cold for pain relief	Technique, dose, frequency, and mastery of use
Report of pain and side effects every 2-4 hours	Pain rating scale & patient report or nurse observation of side effects of opioids
Pain/side effect intensity greater than mutual goal	Number and intensity of side effects that are unacceptable to patient/nurse
Immediate intervention for pain and side effects; reassessment when peak effect is expected, and reintervention if pain and side effects are still unacceptable	Nurse documentation
Patient instruction, encouraging attitudes, expectations, and action in reporting pain, obtaining medication, preventing pain during activity, and using complimentary therapies	Documentation of nurse instruction, or patient use of audio/videotape
Mutually agreed upon, safe, realistic goals for relief	Nurse discussions with patient daily, including documentation
Patient satisfaction with relief of pain and relief or absence of side effects	Pain intensity on a visual analog scale
	Opioid Side Effects Scale

Theory Mapping: Completed student example



Game of Assumptions

Prerequisite Knowledge	• Understanding of the role of theory in research
Learner Setting	Classroom
Strategy Type	Large group game
Time	Faculty prep: 20 minutes Delivery with students: 30 minutes Evaluation: 10 minutes
Learning Objectives	• To identify assumptions commonly held by individuals • To verbalize assumptions inherent in theories used by researchers • To describe how theory influences variables and methodology
Materials/ Resources	Cards from the game MindBender® or similar story cards, such as found on https://gpuzzles.com/brain-questions/logic-puzzles-and-riddles/ . Card should be logic cards that when answered should make the student realize that they could not answer it correctly because of an assumption that they had made about the situation.
Strategy Overview	Students will learn how to identify assumptions made by authors as expressed in the chosen theory. By recognizing their assumptions

	student realize how limited their thinking about a phenomenon may be. Being able to apply this thinking to theory choice and assumptions of authors is important.
Steps	1. Have students divide into two or three teams and give themselves a team name. 2. Using cards from the game MindBender® or similar story cards, give the first group one minute to answer the first question. If they answer correctly they get a point. If they answer incorrectly then the question is open for the whole class. 3. Continue for a few rounds. 4. Return to the whole group and discuss how our assumptions prevent us from seeing many obvious things. Discuss how this is true in research as well. Discuss the role of theory in reinforcing assumptions. Discuss how theory directs the choice of variables and methods.
Evaluation	Low stakes, informal discussion

Bias Parody

Prerequisite Knowledge	● Understanding of qualitative and quantitative research design and methods
Learner setting	Classroom
Strategy Type	Performance
Time	Faculty prep: 20 minutes Delivery with students: 45 minutes Evaluation: 30 minutes
Learning Objectives	● To demonstrate understanding of the role of biases in study designs. ● To apply biases to different non-research situations ● To engage the creative mind in learning the effects of biases on study results.
Materials	Handout Small slips of paper upon which each has a specific bias written
Strategy Overview	Students will identify threats to validity. Using three identified threats they will create a parody of any song. The song must contain examples of how the threat affects validity. This assignment is a fun way for students to understand various threats. By putting validity threats to music, both logical and creative areas of the brain are stimulated, increasing learning.

Steps	1. Before class create handout of biases (see below). Create slips of paper with a type of bias printed on each one. 2. Have a class discussion of threats to validity. 3. Distribute list of potential biases. 4. Form groups of three to four students. 5. Allow students to discuss understanding of biases in small group. 6. Give each student a slip of paper. 7. Instruct students to create a parody, poem or fairytale using the biases distributed on the slips of paper. 8. The performance should use the biases in a context outside of research. The audience should be able to identify the bias with making reference to its name. 9. Groups will perform their story for the class. The class will identify the biases and discuss how they could impact a study.
Evaluation	Class presentation

Bias Parody: Threats to Validity Handout

experimenter effect (internal validity threat)
researcher could treat participants differently if they knew what group the participants were in therefor affecting the participants behavior

observer bias (internal validity threat)
when the researcher knows the hypothesis and variables of the study and has a biased view because they know what they are looking for

researcher attribute (internal validity threat)
how the characteristics of the researcher can affect the participants (example how they look, gender)

hawthorne effect (internal validity threat)
participants responses change because they know they are being observed, similar to the social desirability effect

testing effect (internal validity threat)
taking a pretest before the experiment can influence the participants views which confounds the experimental results

internal validity
that the conclusions drawn from experimental results accurately reflect the experiment

maturation (internal validity threat)
people and their surroundings are continually changing, and such changes can effect the experiment

experimental mortality (internal validity threat)

people drop out of experiment before it is complete (like if there was a smoking psa experiment, the kids who already smoke might just leave)

selection bias (internal validity threat)

comparisons between two groups of participants means nothing unless these groups are essentially the same at the beginning of the study (random sampling helps us ensure they will be)

intersubject bias (internal validity threat)

when participants from the control group and the experimental group have accesses to one another and can share information

compensatory rivalry

those in the control group may try to compensate for lack of stimulus and work harder that normal

demoralization

feelings of being denied in the control group may result in them just giving up

history

results of an experiment could really be the result of current events that take placed while the experiment is being conducted (a study could be taking another class that helped them too)

instrumentation

using different measurements for the same dependent variable, no consistent between pre test and post test

treatment confound

the dependent variable is influenced by another variable not part of the experiment which ends up influencing the treatment (having to pay 25 dollars to do something, only people who can pay are now part of experiment)

statistical regression

people that score either really high or really low on the pretest end up having scores close to the mean on the post test

compensation

participants in control group are deprived of something valuable, and so then maybe they would get something extra and nice

Bingo Sampling

Prerequisite Knowledge	• Overview of elements of research study
Learner Setting	Classroom
Strategy Type	Game
Time	Faculty prep: 20 minutes Delivery with students: 30 minutes Evaluation: 10 minutes
Learning Objectives	• To demonstrate probability and nonprobability sampling methods • To elucidate the role of sample size in a study
Materials/ Resources	Commercially available Bingo game and cards
Strategy Overview	Students will understand the effects of sampling methods on validity of study results. Playing Bingo while discussing different sampling frames keeps students engaged and active in classroom.

Steps	1. Class discussion of sampling in research 2. Pass out Bingo cards to students. 3. Explain that the Bingo balls and cage represent a population. 4. Explain that we have knowledge that no researcher has. We know exactly what the population looks like. Take out one ball. This ball is one participant in the study. Tell the students that you are going to do an in-depth interview of the ball. Then you are going to ask the ball to refer you to another ball that is like the first ball in one specific way. The ball refers you to another ball in the Bingo basket. Take out that ball now. Tell the students that the researcher will continue this procedure until all the information is retrieved from the balls, in other words data saturation has occurred. 5. Ask the students what is the name of this sampling method. 6. Discuss the effects of this sampling on validity. Discuss which kinds of studies would most likely use this methodology. 7. Repeat the sampling demonstrations and discussions until you have covered the major sampling methods. 8. When demonstrating random sampling, stop after sampling ten participants and discuss what the sample looks like to the researcher. Compare that to what we know about the population. Continue sampling for another ten balls. Discuss how the sample appears to the researcher in comparison to what we know. 9. Discuss how sample size affects validity. 10. Continue sampling until someone shouts Bingo.
Evaluation	Low stakes, informal discussion

Critiquing Sampling: A Guided Analysis

Prerequisite Knowledge	● Problems, objectives, hypotheses, and variables in studies ● The steps of research in nonexperimental and experimental designs ● Strengths and threats to validity in various study designs ● Study frameworks
Learner Setting	Online
Strategy Type	Other: Instructional media with corrective feedback
Time	Faculty prep: 30 minutes Delivery with students: 60 minutes Evaluation: 45 minutes
Learning Objectives	● To critically appraise the sampling criteria in studies ● To determine the adequacy of sample size in published studies
Materials/ Resources	Article: Padula, C. A. Yeaw, E., & Mistry, S. (2009). A home-based nurse-coached inspiratory muscle training intervention in heart failure. *Applied Nursing Research, 22*, 18-25. doi: 10.1016/j.apnr.2007.02.002 Worksheet (see below) Video (see below) Transcript (see below)
Strategy Overview	In this activity, students read an assigned article and submit worksheet related to sampling. They then receive access to a screencast video where the instructor reviews the rationale for the answers. Students then submit a second draft of the worksheet. The order in which these items are required helps students appreciate what they do not understand and experience valuable learning and guidance.
Steps	1. Each student reads assigned article and submits answers to

	worksheet via learning management system (LMS) 2. Their submission prompts the LMS to allow student access to a ten-minute guided analysis video which walks student through the rationale for each answer and where to find the answers in the article 3. Student submits a second draft of answers to worksheet 4. Instructor grades answers on second draft and provides feedback
Evaluation	Low stakes – Small credit given for effort on first draft, second draft answers are graded

Critiquing Sampling: Guided Analysis Worksheet

Answer the following questions:

1. What were the inclusion criteria?

2. What were the exclusion criteria?

3. Of the screened subjects, what percent were eligible to participate?

4. What was the refusal rate?

5. What is the independent variable?

6. What are the dependent variables?

7. Did Padula and colleagues indicate that they conducted a power analysis to determine the sample size?

8. Did they report an effect size?

9. In the limitation section, what standard did the researchers use to argue that their sample size was adequate?

Critiquing Sampling: Guided Analysis Video

https://gvsu.ensemblevideo.com/Watch/Qb8g5AMd

Critiquing Sampling: Guided analysis transcript

So, you've read – or at least skimmed – this article, and come up with some answers to the questions I've posted in Blackboard. Grab your article, any notes you took, and maybe your textbook for good measure, and let's walk through the answers.

The first two questions ask about the inclusion and exclusion criteria. Of the main, basic sections in a research article (introduction, methods, results, and discussion), this is something you should expect to find in the methods section. In this article, you'll find it on page 21. Under *Recruitment*, you'll see five inclusion criteria listed. But it's a trap! Technically, only the first three of these are inclusion criteria. They are criteria that the participants must have. The last two are the exclusion criteria because they are criteria that the participants must not have – coexisiting pulmonary disease and cognitive impairment. The authors say these criteria maintain the quality of the data, so we might assume that they perceive these to be confounding or extraneous variables and would like to control for that. That's great, but on the other hand, if a large proportion of heart failure patients have coexisting pulmonary disease or cognitive impairment, are the authors failing to get a sample that represents the population of heart failure patients? They even mention that nearly half of those screened were ineligible due to COPD! Deciding how broad or narrow to make the inclusion and exclusion criteria is a compromise between excellent control and excellent representativeness. Generally, both will be flawed to at least some extent.

The answers to questions three and four also fall on this page, in Figure 1. Of the screened subjects, what percent were eligible to participate? The answer is 12.5% -- the number eligible (36) divided by the number screened (288). Did you notice, higher on the page, the authors stated that 13.8% were eligible? Where does this number come from? It doesn't match the basic math in Figure 1. Also, the number ineligible and the number eligible don't equal the total number screened; there are four people unaccounted for. Let me know if you can figure this out! What a great example of how just because something is published, it doesn't mean that there's nothing to scrutinize. As for the next question about the refusal rate, that's 11.1% -- the number refused (4) out of the number eligible (36). At least this math seems to add up correctly. These

first four questions should get you thinking about representativeness. I've already hinted at that for the first three questions. Think on your own about how the 11% refusal rate reflects the degree of representativeness that this sample might have to the greater population. Why might they have refused?

The remaining questions get at evaluating the sample size. Let's start with variables (questions five and six). These also fall in the methods section. The independent variable is very clearly specified on page 20. The four dependent variables are in section 4.6.1 but also right up front in the abstract, listed as outcome measures. Is that discrepancy in terminology confusing? Dependent variables and outcome measures are the same thing because they're the variables that depend on the effect of the independent variable and are measured as the outcome of the implementation of that independent variable. So if these questions are supposedly about sample size, what do variables have to do with sample size? There's a section in your textbook starting on page 266 that covers five factors that influence the adequacy of sample size in quantitative studies; these factors are all important in determining adequate sample size because they impact the statistical ability to accurately detect relationships among variables or differences in outcomes among experimental and control groups. One of these factors is the number of variables. Statistically speaking, the greater the number of dependent variables being tested, the greater the sample size needs to be. This study has four dependent variables; let's keep that in mind as we move on.

Was there a power analysis reported? Did the researchers make this calculation ahead of time to figure out what their sample size should be? I have nothing to show you; no, they did not. Why is this important? Well, among all the study results, there *were* some results that were not significant, such as the scores on HRQOL. The non-significant results raise a red flag. Is there really no difference, or was the sample size just too small to detect a difference? Did the authors at least perform a power analysis after their results were obtained and include it in the discussion to evaluate this concern? No. Shame, shame.

Let's briefly examine the next question and look for the effect size. It's at the top of page 23, and it's a medium effect size of 0.48. Hold that thought as well.

In the final question, I asked you how the authors argued that their sample size was adequate. This is on page 24. They do acknowledge that it was somewhat small (at 31 participants), but they compare it to similar studies published over the prior 12 years and point out that it was one of the largest samples. Is this good justification? Are you satisfied with the answer? If we compare what we've found in this article to the five factors I mentioned in your book, 1) the four dependent variables indicate that the size should be larger. Larger than what remains to be seen, but bear with me. 2) The medium effect size calls for a medium sized sample…okay… 3) The authors claim at different times that this is a quasi-experimental study and a RCT, either way, the sample can be smaller than a descriptive or correlational study. I wonder what the previous studies they cited were. 4) With regard to measurement sensitivity (this is on page 268 in your text book), we haven't covered this yet, but the authors cite some great information on the sensitivity of some of their measures; on others they're more vague. So that's kind of a mixed bag when it comes to drawing a conclusion about the adequacy of their sample size. 5) For data analysis, they used ANOVA. We haven't covered this either, but your book chapter does briefly mention that this test requires larger sample sizes when the groups are uneven. The groups were a little uneven, 15 and 17. Is this even enough? How do you decide? You know what I think? It sure would have been nice if they had just done a power analysis and put the whole issue to rest. Their sample size could be just fine, but their argument that it's bigger than other studies…not really good enough for me.

Now, while I've got you here, let's take a minute to flashback and integrate a couple of the other topics we've discussed this semester. It's bonus learning!

The first thing I'll point out is the interwoven cluster of problem, purpose, aims, objective, and hypothesis. The first paragraph is full of this stuff! The authors set the stage for the problem (HF affects a lot of people and the symptoms are disabling, and they hint that there may be a yet unknown answer in inspiratory muscle training); they give a condensed purpose about determining the effect of this muscle training; and state their hypothesis (which you may note is complex, causal, and directional). You

may notice that some of this information is also present right in the abstract. On the next page, concluding their review of the literature (which is quite substantial), they contribute more to the problem and the purpose (muscle training *is* effective but we don't know the right doses or how it actually impacts dyspnea and quality of life, previous studies have not been based on theory, and this study serves to fill a research gap). On page 20, you find their overall goal, (which you can consider their purpose), their aims, and their research question nicely laid out.

Let's touch on theory too. This study is amazingly integrated with Self-Efficacy Theory. This is clearly not something that the authors tried to make fit their research after the fact so it would look good for publication. The constructs spelled out in the theory were incorporated in the interventions, one of the aims and one of the dependent variables deal directly with self efficacy, their data collection points were informed by the theory, and they relate their discussion of clinical application of these findings back to the theory as well. This is an excellent example of integration of theory and research.

I hope this guided critique helped you in critically appraising the sampling criteria in studies. Let me know if you have any questions!

Snack Mix Sampling (Qualitative and Quantitative studies)

Prerequisite Knowledge	● Basic knowledge of various types of sampling (from assigned readings)
Learner Setting	classroom
Strategy Type	Active discussion--individual or group
Time	Faculty Prep time: 20 minutes Delivery with students: 45 minutes to an hour for example, an additional 15-30 minutes for critiquing sampling method of articles. Evaluation: 15-30 minutes, depending on group or individual format, and number of students
Learning Objectives	● Apply principles of sampling to quantitative and qualitative studies
Materials/ Resources	Napkins 1 cup measuring cup 2 cup or half cup measuring cup Snack mix o Pretzels o Chex cereal (rice or corn, do not mix types) o Chocolate candies (M & M © type) One qualitative and one quantitative study with simple sampling methods
Strategy Overview	This activity helps students identify usefulness and appropriateness of various types of sampling methods for both qualitative and quantitative studies, using visual clues from a snack mix
Steps	1. Create a snack mix so you have a minimum of 3 different ingredients (suggested ingredients above) 2. Prepare snack mix in large mixing bowl—make enough for the entire class to have about 1 cup of snack mix per person

	3. Have students see large bowl of snack mix before they take out their cup 4. Let students know they can each scoop out 1 cup of snack mix, but they cannot eat the snack mix until we have finished the discussion. Take the snack mix back to their seat 5. Discussion: a. Large bowl is the population (the entire group that you can sample from) b. Each cup you took is a sample i. What kind of sampling did you do? ii. How many peanuts/chex cereal/candies did you get from your sample? Is this representative of the population? How will you know if it is representative (if you counted the number of each ingredient before taking the samples) iii. Why is there variance in the number of each ingredient that you received? (Suggest tallying counts on the board—this also allows you to see mean, median and mode (descriptive statistics) of the sample. Example: first few people give their counts, then make a mark next to that number for each person who has the same amount). Is the variance significant? iv. How can we make it a different type of sampling (cross sectional, random, etc.) Which type of sampling would give us the best results? What do we have to do to change the sampling method of the snack mix for a different study? v. How could you use this population for purposive sampling in qualitative studies (only pick out the chocolate candies if studying “chocolateness”)

	c. Ask students to change their thinking to variables, with each element of the snack mix representing a variable. Ask: if we did an intervention (selecting a cup of snack mix), what could the independent variable be? If we change the size of the cup (from 1 cup to 2 cups) as the intervention, what does that do to the dependent variable? (How does the ratio of variable A impact the relationship with variable B or C? How does that change your sampling?) d. Allow students to eat snack mix, while they read and critique the sampling methods for two chosen research articles—one qualitative, one quantitative. 6. To evaluate: Ask students to provide a summative statement regarding sampling methods and how it can impact outcomes of a study. They can do this as a group, or submit the summary as individuals in class. If submitted as individuals, you can also ask for what questions they still have about sampling and critiquing sampling in a research article, for further discussion and clarification after class.
Evaluation Description	Informal evaluation based on discussion or written assessment.

TRIZ: Maximizing Measurement Error

Prerequisite Knowledge	● Problems, objectives, hypotheses, and variables in studies ● Strengths and threats to validity in various study designs ● Study frameworks ● Introduction to measurement in research
Learner Setting	Classroom
Strategy Type	Small group
Time	Faculty prep: <5 minutes Delivery with students: 30 minutes Evaluation: 15 minutes
Learning Objectives	● Identify possible sources of measurement error in studies
Materials/ Resources	Markers and whiteboard
Strategy Overview	TRIZ is an acronym for a Russian inventive problem-solving strategy often used in engineering. A goal of TRIZ is to generate examples that maximize error in order to expose ways in which error may inadvertently be occurring and propose ways in which it can be corrected. In this activity, students borrow this method for nursing research. After a brief instructor-generated example of the TRIZ process, students brainstorm their own ideas related to research. They then share their ideas in small groups and generate further ideas. All examples are then written on the board and students discuss solutions.

Steps	1. Share example of applying TRIZ to a clinical problem: How do you make your patient fall? 2. Encourage creative responses from class. Answers might include: trip him, tell her to always get up on her own, neglect hourly rounding duties. 3. Explain how these examples may actually occur: Although I don't purposely trip my patient, what obstacles might I accidentally leave in his way? Although I don't tell my patient to always get up on her own, if I don't always tell her otherwise, this may still be the impression she gets. 4. Introduce a research study/measurement topic to the class (i.e. a study about a community-based exercise program that is measuring blood pressure as an outcome) 5. Have students take 2-3 minutes to individually write down as many ideas as they can about increasing measurement error in this proposed study 6. In small groups, students take the next several minutes to share their ideas with each other and write down any more ideas that come to mind 7. Group representatives write ideas on the whiteboard. The instructor may streamline/eliminate duplicate ideas. 8. In their small groups, student discuss solutions for correcting the measurement error ideas displayed on the whiteboard. 9. The instructor facilitates a class discussion of solutions. 10. The instructor encourages students to use this critical mindset when analyzing measurement in studies, possibly tying this exercise to a research article recently discussed in class. What kinds of unseen measurement errors may have occurred?
Evaluation	Low stakes – Instructor feedback during class activity and/or credit for active participation

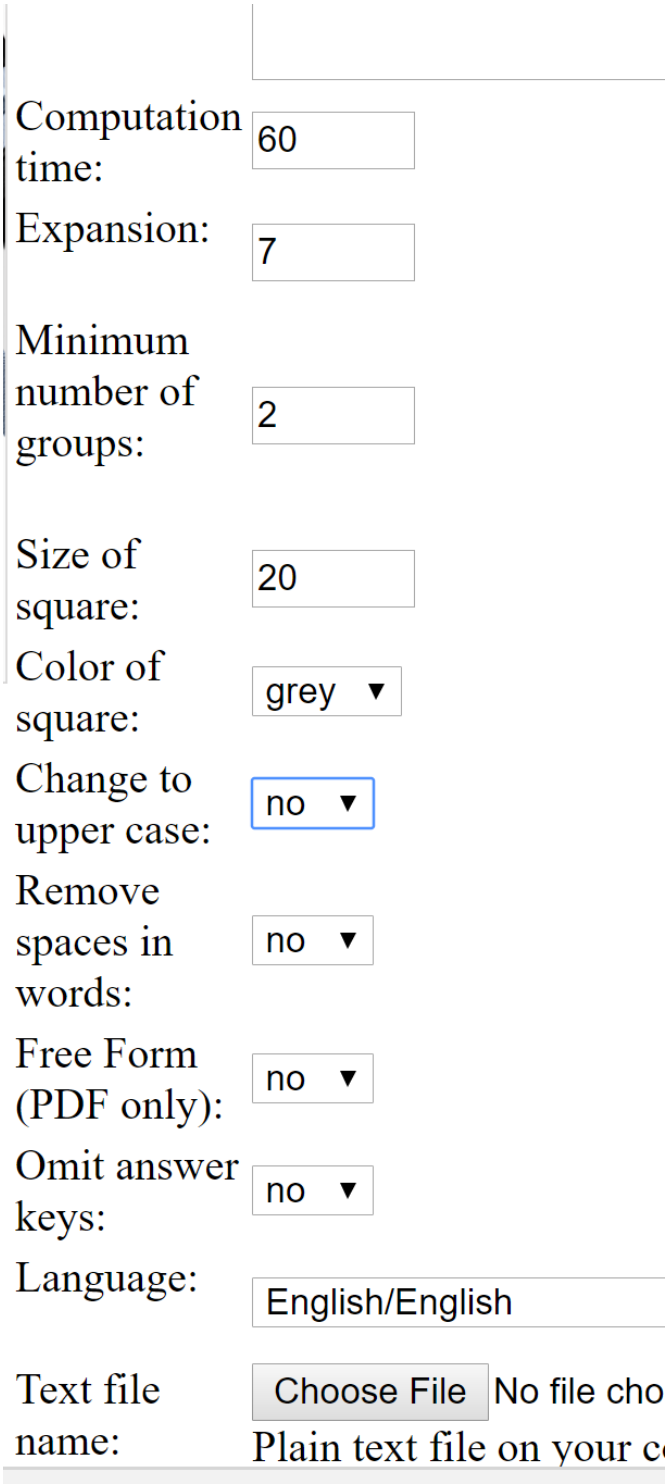
Crossword Puzzle Creation

Prerequisite Knowledge	● Critiquing quantitative and qualitative studies, ● Introducing meta-analysis and meta-synthesis studies
Learner Setting	Classroom or online
Strategy Type	Game
Time	Faculty Prep: 30-60 minutes Delivery with students: 2 -3 hours depending on how many sections of article critiqued Evaluation: 30 minutes
Learning Objectives	● Define and comprehend terms within research articles
Materials/ Resources	http://www.armoredpenguin.com/crossword/ Research articles of your choosing—see steps for suggestions
Strategy Overview	Each student creates a crossword puzzle using key terms they identify in a research article. The crossword puzzles they create may be used by other students in subsequent weeks. This assignment helps students comprehend various sections of a research article as they need to select keywords in each section.
Steps	1. Select and assign various nursing research articles (possibly one qualitative and one quantitative, or a meta analysis and meta synthesis) to each student 2. Assign students to various sections of each article (suggestion: background and methods, findings and discussion), or the entire article 3. Each student selects approximately 15 words and definitions based on the article, or found in other resources (statistical terms, etc.). Provide the students with the following information to set up the puzzle

	4. Go to http://www.armoredpenguin.com/crossword/ 5. In the title line, enter the first author of the study, and if only doing certain sections, the section used to create crossword puzzle (example: King, background and methods 6. Author's name is the name of the student creating the puzzle. 7. Description of puzzle can be name of course and course code, or name of assignment, etc. at the faculty's discretion *For the following steps, refer to the notes on the webpage for more descriptions of options and see screen shots following instructions.* 8. Set minimum number of groups to 2. 9. Start with 20 for size of square 10. Instruct students to select gray or black for preferred color. Note that if you will print these out for students to use, gray squares require less ink, black is more traditional 11. Let students know if you want all words in all capital letters, or leave as they are entered. Suggestion: leave words as entered, as spell check will notice errors more easily if you don't have words in all caps. 12. Instruct students regarding "omit words" (see cue) and determine how you want the puzzle to format (suggested to leave at "no") 13. Select "no" for free form and omit answer key 14. You have the option of using an uploaded file to create the puzzle, but students must follow formatting instructions. For the size of puzzle students create, entering the text is fine and not cumbersome. 15. Inform students of your preferred PDF font and page size 16. A 15 word puzzle can fit both cues and puzzle on one page. If you want students to create a larger puzzle, have cues and puzzle on 2 pages. 17. Instruct students on your preferences for information gap (used

	when working in pairs) and if you want a word bank created 18. Start entering their words and cues 19. Once all words and cues are entered, select “make puzzle” (this may take a few minutes) 20. Once puzzle is created, students can preview, then select should select “answer key PDF”, and then “printable PDF”. Save both the answer key (suggest naming file “Last Name Author of Study Section Answer Key Student Surname” for ease in retrieving) and actual puzzle, and submit. 21. One option for hybrid courses is to have students pair up and complete each other’s puzzle, especially if they only did selected sections. For increased learning, students can complete puzzle on sections they did not use. NOTE that the PDF of the puzzle created is not fillable, just printable. Students could complete the printed puzzle, then scan and upload as an assignment, if they do not have problems scanning. 22. For online courses, an additional learning option is for students to use a discussion forum after submitting their puzzle with their “takeaway” message from creating the puzzle, or any remaining questions they have about the article after creating the puzzle. 23. For traditional (face to face) classes, students could project the puzzles they created and the class could solve the puzzles as a class, discussing the answers while solving the puzzle 24. Note that students (and faculty) will have access to created puzzles on the Amored Penguin website for only 2 months, so saving the PDF is critical if you want to use the puzzle again, or if students want to have access to the puzzle after the 2 month time frame.
Evaluation	Low stakes, informal

Crossword Puzzle Creation: Screenshot of settings for creating your crossword puzzle



Article Critique using Kahoot ©

(see this link for an overview of this lesson plan)

https://www.youtube.com/watch?v=YAEGBTfeixg&feature=youtu.be

Prerequisite Knowledge	• Knowledge of critiquing various sections of quantitative and qualitative studies (method, sampling, findings, discussion, conclusion)
Learner setting	Classroom
Strategy type	Game
Time	Faculty Prep: 1 hour Delivery with students: 2 hours--can increase or decrease amount of time based on number of questions posted. Evaluation: based on number of questions posted
Learning objectives	● Select appropriate critique methods for the method, findings, discussion and conclusions aspects of a qualitative studies ● Compare and contrast critiquing qualitative studies with quantitative studies
Materials/ Resources	● One smart phone/lap top/mobile device per team to provide responses ● Optional prize for winning team (candy bar, apple, EC point, etc.) ● See steps for link to Kahoot
Overview	Working in teams, students select appropriate answers to questions related to qualitative study articles, and discuss why that answer was appropriate while also competing with other teams. Students also discuss how that aspect of the critique compares with critique strategies for those sections of a quantitative study
Steps	1. Select 2 qualitative research articles (for example, one grounded theory and then either phenomenology or ethnography). See

	suggested articles in additional materials at end of lesson plan. Have students read article before coming to class. 2. Design 3 to 5 multiple choice or true/false questions per section for each article. Include terminology and areas to critique such as purposive sampling, saturation, semi-structured interviews, focus groups, naturalistic observation, rigor, transferability, themes, data analysis, use of demographics or tables in the study to display findings, outliers, limitations, etc. and any other terms specific to qualitative research. 3. Create free Kahoot account at https://kahoot.com/ a. Click on sign up b. Click on "As a teacher" c. Follow prompts (school, user name, email address, password) to create account. d. Click on three lines in purple box to create a new Kahoot, then click on New K! e. Upload questions into Kahoot (after creating an account). Label each question by author: question. (see attachment for sample questions). Set time for each question to 120 seconds. 4. Show class how to do Kahoot with a practice quiz. Use non class related content for quiz (such as local college mascots, names of songs and artists, etc.) Remind students that points are not just based on being correct, but on speed in which they answer questions. 5. Once class is comfortable with using Kahoot, start on quiz on articles. 6. After each question is answered, discuss why Multiple Choice options were either correct, or incorrect. 7. After discussing answers to each question, ask how the critique would be different for a quantitative study. For example: after

	discussing Kahoot question about purposive sampling, ask about different types of sampling for quantitative studies (convenience, random, random stratified, etc.) 8. Allow approximately 5-7 minutes per question for discussion, and 2 minutes for students to answer each question.
Materials	Each team needs one person with a smart phone or lap top to provide response to question using Kahoot website (https://kahoot.com). Suggest also having a small prize for the winning team (candy bar, apple, EC point, etc.)
Evaluation	Low stakes, informal using scores on Kahoot

Article Critique Using Kahoot: Sample questions and articles (correct answer bolded)

Article 1 (phenomenology)

Hallrup, L., Albertsson, D., Tops, A., Dahlberg, K., & Grahn, B. (2009). Elderly women's experience of living with fall risk in a fragile body: A reflective lifeworld approach. *Health and Social Care in the Community, 17*(4), 379-387.

Question 1: Sampling Question: What type of sampling is used in this article?

1. Purposive
2. Theoretical
3. Random
4. **1 & 2**

Discussion: Does the fact that these women were already in a fall and fracture prevention program skew the data?

The informants were 13 women aged 76–86, living in their own homes in rural areas. The women had a high risk of fall and fracture, due to their gender, high age and a history of fragility fractures (Cummings et al. 1995, Albertsson et al. 2007). All the women had participated in a voluntary hip fracture prevention programme since 2002.

The women underwent a heel bone mineral density scanning, and were given the scanning results in a letter together with written fall and fracture preventive advice, such as daily outdoor walks, physical training at home or in group…. The informants were selected by purpose sampling to create variation in both number of clinical hip fracture risk factors (Albertsson et al. 2007), walking capacity, mobility change and degree of participation in the fracture prevention programme. Women in wheelchairs, those who only walked indoors or had obvious memory impairment were excluded. Fifteen women were contacted by telephone in 2004 (by D.A.), and 13 of them agreed to participate.

Ask if there are any other questions related to the question and options in the Kahoot question.

Question 2: True or False: A reflective lifeworld approach is appropriate for this study.

TRUE

Discussion: Reflective lifeworld research illustrates the world as experienced prior to any theories devised to explain it (Dahlberg et al. 2001). The lifeworld is to be investigated in its own terms, without reference to any external criteria of 'how it is' (Ashworth 1996).

Question 3: How is sampling in a qualitative different from a quantitative study?

1. Random & large sample size
2. **Known to researcher, small sample size**
3. Multiple sites and random
4. Single site and not known to researcher

Discussion: Difference from quantitative includes small size, from one site, no randomization. Ask why additional information about sample provided? (Transferability)

Also discuss why sampling is different in qualitative and quantitative studies, and how that impacts critiquing the studies.

Article 2 (grounded theory)

McMillan, L., Booth, J., Currie, K., & Howe, T. (2014). "Balancing risk" after fall-induced hip fracture: The older person's need for information*. International Journal of Older People Nursing, 9*(4), 249-257.

Question 4: True or False: The tables and graphs in this study make this a mixed method study. **FALSE**

Discussion: what are the characteristics of a mixed method study? What are the advantages and disadvantages of a mixed method study?

Question 5: Knowing more about the details about participants (age, gender, etc.) allows for

1. Generalizability
2. Rigor
3. Randomization
4. **Transferability**

Discussion: Why is transferability important in qualitative studies? How is it different from generalizability in quantitative studies? How else can you ensure rigor in a qualitative study? In a quantitative study?

Question 6: Steps for data quality in this study included (select all that apply)

1. **Recording interviews and questions from a previous study**
2. The researchers dressed well
3. **Participants that could speak to the topic**
4. The participants were smart

Discussion: why is data quality important in qualitative studies? Why is it important in quantitative studies? How can you critique for it in either type of study?

Walking Rounds: Putting Together a Research Study Critique

Prerequisite Knowledge	● How to critique both qualitative and quantitative research studies
Learner Setting	Classroom
Strategy Type	Small group, suggested small group size of 3-5 students
Time	Faculty prep: 15 minutes Delivery with students: Approximately 2-2.5 hours Evaluation: Approximately half hour
Learning Objectives	● Demonstrate how various aspects of a research article relates to other sections ● Demonstrate ability to identify key aspects of a research study article
Materials/ Resources	One worksheet per group (see below) Space to move about classroom or hallway
Strategy Overview	This lesson helps students understand how the different sections of a research study relate to other sections, and identify key elements of each section of a research study.
Steps	1. Develop an equal number of clinical questions that can be stated as a PICOT statement. For each statement, list 6 or 7 sections of a research study (PICOT, research question, type of study, population, sampling methods, variables (if applicable), data analysis/statistical analysis, etc. See two worksheets below as a template to use to develop additional worksheets if desired 2. Post an equal number of worksheets as groups (example: 5 groups, 5 worksheets) at various stations around the room as you have teams. Each team starts in a different location and at a different section of the worksheet (see attached)

	3. Each team has 5 minutes to answer their section of the worksheet. They then rotate to the next worksheet, and have to answer any section of the worksheet they have not completed on a previous worksheet. Students rotate in a pattern around the room (for example, always moving to the right) 4. By the end, each group of students should have completed each different section of the worksheet, and each worksheet should be complete 5. Upon completion of all worksheets, ask students what was easy and difficult completing this assignment (hard to state variables if PICOT not yet completed, hard to determine data analysis of method not completed, need population before you can determine sample, etc.). Easy to work in order. Relate this to how they read studies—cannot read discussion or findings section before reading lit review, methods, etc. 6. Discuss as a group each completed “study” to make sure the different aspects of the study correspond to the others
Evaluation	Informal, discussion as above

Walking Rounds: Worksheet 1

A recent research study found that 20 minutes of exercise a day improves learning. The types of exercise included in the study were running, yoga, and swimming. You aren't crazy about any of those types of exercise, but finals are coming up, and you're looking for any help you can get and want to know which of these three worked the best.

Complete the table below regarding this problem

Starting Team	Question	Answer
7	What is the PICOT question? (Include the P, I, C, O, and T, and the complete sentence)	
1	What are the variables you search for in the research? Which ones are the IV and the DV?	
2	What types of validity and reliability will you look for in this study?	
3	What type of data (nominal, ordinal,	

	interval, ratio) would you look for and why?	
4	What type of statistics do you need to answer the research question?	
5	How would you interpret the statistics? (what would they mean?)	
6	As a BSN prepared nurse, what would you look for in the study before applying it to your population?	

Walking Rounds: Worksheet 2

You are interested in working at a hospital where you did a clinical rotation, and really enjoyed working with the staff on a particular unit. However, that unit uses a variety of shifts to accommodate staffing needs, including 8, 10, and 12 hour shifts. You want to know what shift would provide the best working conditions for you.

Starting Team	Question	Answer
7	What is the PICOT question? (Include the P, I, C, O, and T, and the complete sentence)	
1	What are the variables you search for in the research? Which ones are the IV and the DV?	
2	What types of validity and reliability will you look for in this study?	
3	What type of data (nominal, ordinal, interval, ratio) would you look for and why?	
4	What type of statistics do you	

	need to answer the research question?	
5	How would you interpret the statistics? (what would they mean?)	
6	As a BSN prepared nurse, what would you look for in the study before applying it to your population?	

March Madness: Putting it all Together

Prerequisite Knowledge	● The purpose of research and evidence-based practice in nursing ● The types of research that generate evidence for nursing practice ● The steps of research in nonexperimental and experimental designs ● The problems, objectives, hypotheses, and variables in studies ● Strengths and threats to validity in various study designs ● Study frameworks in nursing research ● The sampling criteria in nursing research ● The measurement approaches in nursing research ● The principles of statistics in appraising nursing research
Learner Setting	Classroom; online
Strategy Type	Small group; discussion; debate; journaling
Time	Varied; this assignment spans three weeks and integrates both online and in-seat class sessions
Learning Objectives	● Implement key principles in critically appraising studies ● Evaluate the strengths and weaknesses of different forms of evidence
Materials	Articles (see below) Assignment prompts (see below) Secret bias cards (see below) Sample bracket (see below) Sample assignments (see below)
Strategy Overview	In this innovative learning activity that mirrors an athletic tournament, students are engaged and motivated to apply the knowledge they have gained during the course in a collaborative and competitive way.

	Using eight pre-selected research articles on an appealing topic immediately of use to the students – reducing test anxiety in nursing students – a competition "bracket" is created in which students are assigned to play offense, defense, or referee on the articles. The first week of the assignment is an online week in which the students present and judge critiques in small-group discussion boards. The second week is in-seat, and the students each have new roles, including secretly biased referees. There is a structured debate in class, critiquing the four "winning" articles from the previous week. The third and final week is online and involves individual reflective journals in which students share their own assessment of which of the final two articles should be declared the "winner" as well as their reflection on how they have met the learning outcome tied to this assignment. As it is written, this assignment is designed for 24 students. It can be adapted to smaller or larger groups by adding or subtracting articles or adjusting the number of students per role.
Steps	1. Establish bracket, assigning articles to each slot and assigning students to the roles corresponding to each slot. 2. Week 1 (online): Students follow prompts for their assigned role and complete the discussion board activity. The instructor serves as a tie-breaker, if needed, to determine which four of the eight articles will move on to the next week. 3. Week 2 (in-class): With their new roles and articles, students use class time to work in offense/defense pairs to create their arguments for the in-class debate. In the meantime, the referees are pulled aside and given their secret biases. The referees also work together to decide on factors to use in ranking the articles. This takes about 30-40 minutes. The instructor circulates to provide assistance as needed. Then one representative from

	each pair sits in the front of the room and arguments are presented for each article (another 30-40 minutes total). The referees judge using their secret biases, and the instructor serves as a tie-breaker, if needed. 4. Week 3 (online): Students follow the prompts to complete private individual reflective journal entries in which they share their own assessment of which of the final two articles should be declared the "winner" as well as their reflection on how they have met the learning outcome tied to this assignment
Evaluation	Moderate stakes - both graded and ungraded feedback over the three week period

March Madness: Articles

Berube, C.A. & Gouveia, J. M. (2015). An academic support strategy: The "magic pencil." Nurse Educator, 40, 276-277. http://doi.org/10.1097/NNE.0000000000000197

Johnson, C.E. (2014). Effect of aromatherapy on cognitive test anxiety among nursing students. Alternative and Complementary Therapies, 20, 84-87. http://doi.org/10.1089/act.2014.20207

Lai, H.-L. (2006). A preliminary study of music effects on nursing students' test anxiety. International Journal of Human Caring, 10, 85.

Patterson, S.L. (2016). The effect of emotional freedom technique on stress and anxiety in nursing students: A pilot study. Nurse Education Today, 40, 104-110.

Prato, C.A. & Yucha, C.B. (2013). Biofeedback-assisted relaxation training to decrease test anxiety in nursing students. Nursing Education Perspectives, 34, 76-81.

Sharif, F., Dehbozorgi, R., Mani, A., Vossoughi, M., & Tavakoli, P. (2013). The effect of guided reflection on test anxiety in nursing students. Nursing and Midwifery Studies, 2, 16-20. http://doi.org/10.5812/nms.11119

Young, J.S. (2012). Pet therapy: Dogs de-stress students. Journal of Christian Nursing, 29, 217-221. http://doi.org/10.1097/CNJ.0b013e31826701a7

Zargarzadeh, M. & Shirazi, M. (2014). The effect of progressive muscle relaxation method on test anxiety in nursing students. Iranian Journal of Nursing and Midwifery Research, 19, 607-612.

March Madness: Week 1 (online) instructions

Defense assignment

You're assigned as the defense for an article this week. The offense is going to attack your article, but your job is to protect it!

Read your assigned article thoroughly. Using what you've learned this semester, identify the following research steps in your assigned article and find all the strengths that you can in these ten areas:

- Problem and Purpose
- Literature Review
- Framework
- Variables
- Design
- Sample and setting
- Measurement
- Statistical Analysis
- Interpretation of Findings
- Implications for education, practice, or research

Post a summary on Blackboard that includes all of the strengths you've found in these areas so that the referees can make their decision. Do not only cite opinion. You must make specific reference to the material in the textbook/Key Points/Powerpoint.

(Week 1, cont.)

Offense assignment

You're assigned as the offense for an article this week. The defense is going to protect your article, but your job is to attack it!

Read your assigned article thoroughly. Using what you've learned this semester, identify the following research steps in your assigned article and find all the weaknesses that you can in these ten areas:

- Problem and Purpose
- Literature Review
- Framework
- Variables
- Design
- Sample and setting
- Measurement
- Statistical Analysis
- Interpretation of Findings
- Implications for education, practice, or research

Post a summary on Blackboard that includes all of the weaknesses you've found in these areas so that the referees can make their decision. Do not only cite opinion. You must make specific reference to the material in the textbook/Key Points/Powerpoint.

(Week 1, cont.)

Referee assignment

1) You're assigned as the referee in the competition between two articles this week. Check Blackboard for your assigned articles, then read both articles and answer the following questions:

Study #1 Title:	Yes	No
Was the study title clear?		
Was the abstract clearly presented?		
Was the writing style of the report clear and concise?		
Were relevant terms defined?		
Were the Introduction, Methods, Results, and Discussion sections clearly identified?		

Study #2 Title:	Yes	No
Was the study title clear?		
Was the abstract clearly presented?		
Was the writing style of the report clear and concise?		
Were relevant terms defined?		
Were the Introduction, Methods, Results, and Discussion sections clearly identified?		

2) After reading the two articles and completing the brief overviews above, read your peers' offense and defense responses to the articles above on the Blackboard discussion board. Then write one paragraph justifying which article you think should win the competition. In other words, which article is overall stronger and provides better evidence (and why)?

March Madness: Week 2 (in-seat) instructions

Offense:

You'll be assigned an article to critique for credibility and meaning (the final step of critical appraisal). You'll work in pairs to answer the questions below, then the team captains (the ones who were referees last week) for offense and defense on each article will present your findings to your team of referees. Find as many weaknesses as you can!

Defense:

You'll be assigned an article to critique for credibility and meaning (the final step of critical appraisal). You'll work in pairs to answer the questions below, then the team captains (the ones who were referees last week) for offense and defense on each article will present your findings to your team of referees. Find as many strengths as you can!

The questions for offense and defense

1. What rival hypotheses can be suggested for the findings?
2. Do the findings from this study build on the findings of previous studies?
3. When the findings are examined in light of previous studies, is the research gap improved?
4. How confident are you in the validity of the study findings?
5. Could the limitations of the study have been corrected?
6. To what populations can the findings be generalized?
7. What questions emerge from the findings, and does the researcher identify them?
8. What implications do the findings have for nursing practice?

(Week 2, cont.)

Referees:

You get to play the role of selection committee! In college basketball, the selection committee uses factors like record, strength of schedule, and rating percentage index (RPI) to determine the ranks or "seeds" of the teams. Although it's after-the-fact, I would like to know how these articles stack up against each other. Which one is the "number one seed"? In this assignment, I would like you to work together to "seed" these articles (one through eight) based on criteria of your own choosing. For example, maybe you'll decide that the strength of the method/design, the quality of the measurements of the variables, and the sample size are most important. Choose at least four criteria, scan the articles and make notes, then submit your final rankings by the end of week 3.

Final Rank	Article	Notes
	Berube & Gouveia (pencils)	
	Johnson (aromatherapy)	
	Lai (music)	
	Patterson (emotional freedom)	
	Prato & Yucha (biofeedback)	
	Sharif et al. (guided reflection)	
	Young (dogs)	
	Zargarzadeh & Shirazi (muscle relaxation)	

What criteria did you use to rank the articles?

-
-
-
-

(Week 2, cont.)

Referees, you also have secret instructions for today's class debate/discussion of our Final Four articles!

Like in sports where referees aim to be fair but naturally all have their own biases, there are biases in research. We've talked about bias with regard to research design, sampling, measurement methods, etc. This week, you're also being introduced to forms of publication bias such as language bias, time lag bias, etc.

During today's discussion you'll each be assigned a secret bias – a filter through which to listen to your peers who play the roles of offense and defense. For instance, you might be biased toward creativity and that would influence you to vote for the article that presents the most creative intervention, data analysis, or implications. Or, you might be biased toward caution. In that case, you'll be most swayed by the presentations of the offense and cast your vote toward the article with the least amount of negative points (no matter how many positive points are given)! I'll be passing out cards with your secret biases on them, and you'll be able to ask questions about them before the debate/discussion begins.

Secret biases to be written on notecards and one distributed to each referee:

- Data/facts
- Feelings/emotions
- Positive view, benefits
- Caution/judgment
- Creativity/new ideas
- Summaries/decisions

March Madness: Week 3 (online) instructions

All students:

Answer the following questions. Please write at least two sentences in response to each prompt:

- Which article should win March Madness and why?
- Which roles did you play during March Madness (offense, defense, referee, selection committee)? What did you like/dislike about these roles?
- What's the most important thing you learned while completing March Madness and why?
- How did March Madness help you evaluate the strengths and weaknesses of different evidence?
- What question(s) has March Madness raised for you? What are you still wondering about?

March Madness: Sample bracket

Week 1	Week 2	Week 3	Week 2	Week 1
Article 1				Article 5
vs.	Article 1		Article 6	vs.
Article 2				Article 6
		Article 1 vs		
	vs.	Article 7	vs.	
Article 3				Article 7
vs.	Article 4		Article 7	vs.
Article 4				Article 8

March Madness: Fictional student assignments

Week 1	Week 2	Week 3	Week 2	Week 1
Offense: Akira				Offense: Mack
Defense: Bailey				Defense: Nat
Referee: Cam				Referee: Ora
	Offense: Ora, Taylor		Offense: Cam, Hadley	
	Defense: Raven, Val		Defense: Farah, Jackie	
	Referee: Padma, Quinn		Referee: Dana, Enu	
Offense: Dana				Offense: Padma
Defense: Enu				Defense: Quinn
Referee: Farah				Referee: Raven
		Full class discussion		
Offense: Gerry				Offense: Shay
Defense: Hadley				Defense: Taylor
Referee: Izzy				Referee: Udo
	Offense: Udo, Wei		Offense: Izzy, Kasey	
	Defense: Xia, Shay		Defense: Lashawn, Gerry	
	Referee: Mack, Nat		Referee: Akira, Bailey	
Offense: Jackie				Offense: Val
Defense: Kasey				Defense: Wei
Referee: Lashawn				Referee: Xia