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## Research Brief

# The Great Cookie Experiment as a Simulation-Based Experience

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Undergraduate nursing students continue to question the value of learning research and its application in evidence-based practice. Similar to other nursing concepts, research processes are difficult to understand, master, and apply and are viewed by students as boring (McCurry & Martins, 2010). Cultivating interest among students in learning the research process and the association of research with evidence-based practice is not an easy task. The American Association of College of Nursing Essentials of Baccalaureate Education (AACN, 2008) calls on faculty to “provide a basic understanding of how evidence is developed, including the research process” (pg. 15). Despite this, undergraduate nursing students often approach the topic with negative attitudes, and nursing faculty struggle finding teaching strategies that engage this group of learners (McCurry & Martins, 2010). Faculty using experiential learning techniques provide students with immersive experiences where active engagement compels students to address real-world scenarios while fully engaging in the experience (Kolb, 2015). Providing simulation-based experiential learning opportunities in large classroom settings may improve knowledge and attitudes while linking science and practice (Hill, 2017; Moyer, 2016; Walters, Potetz, & Fedesco, 2017). Faculty using simulation-based experiences (SBEs), defined as structured activities representing actual situations in research, allow students to “analyze and respond to realistic situations in a simulated environment” (INACSL Standards Committee, 2016, S45).

For over thirty years, academicians have used a learning strategy titled, the Great Cookie Experiment (GCE) (Long &

Reider, 1995; Morrison-Beedy & Cote-Arsenault, 2000; Sternberger, 2002; Thiel, 1987). The GCE was first developed and launched by Thiel (1987) as a desensitization technique teaching the research process to a group of undergraduate nursing students. Thiel (1987) had students compare chocolate chip cookies that differed in cholesterol content. Thiel’s original experiment included a discussion about the steps of the research process and ethical considerations including anonymity and consent. Students completed the Cookie Assessment Tool, a self-designed eight-item questionnaire, using a five-point Likert scale. After consuming the cookie snacks and completing the survey, a general discussion followed. Thiel analyzed the results of the survey and presented findings to the class during a subsequent meeting (1987). Over the last three decades, the GCE has undergone many transformations and has been linked to positive student outcomes (Long & Reider, 1995). Morrison-Beedy and Cote-Arsenault (2000) redesigned the GCE survey to include a qualitative section and visual analog scale. Similarly, Sternberger (2002) retooled the GCE for online distance learners using two different music selections instead of cookies. Sternberger modified the questionnaire to include a demographic section, a visual analog scale, and dichotomous and qualitative questions.

To increase student satisfaction and provide an opportunity for students to apply research theories in the absence of clinical or practicum opportunities, the GCE was again redesigned and implemented as an SBE by faculty. The purpose of this article is to describe the implementation of the GCE as a SBE occurring in an undergraduate nursing research course and report its impact on student satisfaction via course evaluations and improvements in mastery of content.

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## Method

The original GCE was redesigned, allowing for students to engage in real-time application of research processes in a large classroom setting: (a) formation of a hypothesis, (b)

### Key Points

1. Undergraduate students question the value of learning about research and evidence-based practice.
2. The Great Cookie Experiment has a thirty-year history as a learning strategy to teach research.
3. To increase student satisfaction, the experiment was implemented as a simulation activity in a large classroom setting.

preparation of research design (including tool development), (c) collection of data, (d) analysis of data, and (e) drawing conclusions from results. The research course is taught during the third year of a baccalaureate program with a key course objective of demonstrating a working understanding of how to study clinical issues or problems. The simulation is facilitated by two PhD-prepared faculty, one with expertise in quantitative methods and simulation and the other with qualitative approaches. Initially, students are provided the course outline. The SBE cookie experiment activity

is introduced during didactic portions of the course; however, the simulation is reserved for the last two class periods occurring at the end of the semester. At the start of the simulation, students are prebriefed and informed that similar to a “real” research participant, they are not required to participate in the actual consumption of the cookie or the associated survey; however, they must attend both sessions and engage in the debriefing. Students are aware that the simulated experiment and data collection will occur during the first-class period and review of results, during the second.

### Formation of a Hypothesis

Initially, while redesigning the GCE, two research questions and three directional hypotheses were formed. However, neither was shared with the students before the simulation in an effort to remove bias when students complete the survey. Research questions and hypotheses are discussed during the second-class period when results of the GCE are revealed, examined, and discussed.

### Preparation of a Research Design

To introduce random assignment, students enter the room and receive an index card with a printed number used for assignment via a random numbers table. Specific instructions for the simulated research study are presented via

PowerPoint in a manner they would be presented to any research participant. After the plan for the day is outlined and questions are answered, students become simulated study participants and are given a printed consent form to read, review, and sign. Much the same as a real study, participants are given cues allowing them to opt out at any time, thus ensuring a safe learning environment. Participants are informed that all data are kept confidential and responses are anonymous. A random numbers table (included in their required textbook) is projected on the screen at the front of the room. The simulation facilitator randomly directs a laser pointer light onto the random numbers table, indicating a starting point. As numbers are called, students move to a predetermined side of the lecture hall and are divided (approximately 50/50) into the experimental and control group. After random group assignment is made, the cookie snack is distributed. The chocolate sandwich cookies are alike in every detail except for the amount of filling used. The control group is given a thinly filled cookie while the experimental group receives a double stuffed cookie. Participants are asked to eat the cookie, and immediately after eating, they are provided a link to complete the survey using Qualtrics<sup>®</sup>. Qualtrics<sup>®</sup> is a simple-to-use Web-based survey tool used to conduct research. Participants have one-time access to prevent them from skewing results by accessing the questionnaire multiple times.

### Collection of Data

In the redesigned experiment, a mixed methods approach is used. First, participants are asked to create a unique identifier within Qualtrics<sup>®</sup>. A demographic questionnaire addressing age, race, height, weight, meal plan, athletic status, and grade point average is provided. Second, a facilitator developed a snack-satisfaction survey (eight-item Likert scale), and prediction of food addiction scale (five-item Likert scale) is supplied. Third, a qualitative question asking “How did you feel when you ate the cookie?” closes the survey. Once participants complete the survey they return to student status and are free to leave.

### Analysis of Data

Similar to Thiel’s (1987) classic experiment, the statistics are calculated after simulation, allowing facilitators to engage in more robust parametric tests and analysis. Quantitative data are transferred into SPSS<sup>®</sup> for examination, and qualitative remarks are moved to a spreadsheet allowing for data reduction and exploration.

Highlights of each of these activities, as well as study results, are shared with students via PowerPoint during the second-class period. In this interactive presentation, the background, method, results, and discussion framework are shared. Students typically dreading the use of the APA manual

are reminded that the book is not intended to be used only for citations, but it is a concise recipe book for conducting research and writing results. The study hypothesis, a clear picture of the method, and the reason for randomization are provided. A basic description of tool development and scale validity and reliability statistics are shared.

## Drawing Conclusions from Results

Simultaneously, the actual study results are provided to students. These include demographics and scale results, including reliability (cookie satisfaction/addiction) and calculation of body mass index for use as a predictor of addiction tendency via standard multiple regression. Similarly, qualitative approaches including analytic coding and discussion of emerging themes are shared. Finally, students are given an opportunity to ask questions, be debriefed over the process, and provide instructor feedback.

## Results

The purpose of this article is to describe the implementation of the GCE as a SBE occurring in an undergraduate nursing research course and report the impact on student satisfaction via course evaluations and improvements in mastery of content. An independent samples t-test was conducted to compare the overall course evaluation (specifically, course activities meet course objectives; 14-item Likert scale; range, 1-5 [1, not at all; 5, very high degree]) scores before and after the introduction of the SBE. There was a significant difference in course evaluations scores before simulation ( $n = 44$ ; mean  $[M] = 4.08$ , standard deviation  $[SD] = 1.04$ ) and after simulation ( $n = 31$ ;  $M = 4.72$ ,  $SD = 0.42$ ;  $t(71) = -3.87$ ,  $p = .00$ ). The mean overall course grades also increased slightly (2.53%); before simulation it was ( $n = 79$ ) 89.88% ( $SD = 2.61$ ; range, 81.93-95.47), and after simulation it was ( $n = 80$ ) 92.41% ( $SD = 3.28$ ; range, 81.98-98.33).

## Discussion

To date, 166 students have participated in this large-group SBE with a significant improvement in satisfaction scores and a slight increase in overall course grades. Implementing this SBE in large classroom settings requires minimum preparation. However, this simulation does require facilitators with experience in various research methods who are willing to rapidly analyze data and share results in a meaningful way. Analogous to the study by Long and Reider (1995), this simulation was purposely placed near the end of the semester as a culminating experience; however, students in this SBE do not critique research methodology as they lack depth of understanding at this level. Students require a strong theoretical foundation to engage

meaningfully in the analysis of results. Faculty facilitating the SBE institute an air of excitement before the simulation, aimed at potentially improving engagement.

Similar to the study by Sternberger (2002), improved student satisfaction is noted with this simulation. In addition to improved satisfaction, there was also a slight rise in course grades. Other changes and benefits should be acknowledged. First, students in this SBE are required to assume the simulated role of participant, engage in randomization procedures, and create a unique research identification number. This may improve understanding of the lived experience of an actual research participant (subject). Students may have a deeper understanding of the need to keep responses confidential and anonymous. Second, both facilitators have gained a better appreciation and understanding of methods they are not as familiar or comfortable with. Anecdotally, master's-prepared faculty have been asked to observe the simulation to "brush up on methods and analysis". Data generated from this simulation can be used for master's or PhD students completing research practicums or who wish to observe the simulation and engage in the research process. Finally, opportunities exist for faculty teaching PhD programs to create simulated research experiences for doctoral students to practice more advanced data collection and analysis.

There are few issues surrounding the SBE itself; however, there are limitations regarding the results of the student satisfaction scores and course grades. Satisfaction is self-reported and may not be considered reliable. The slight rise in overall course grades might be attributed to other factors including instructor-driven course changes. Future research should include presimulation and postsimulation knowledge tests specifically aimed at this SBE and potentially an analysis of simulation satisfaction and self-confidence. Other, more advanced research simulations should be examined at the senior level and include clinical experiments.

## Conclusion

Evidence-based practice and its translation to clinical settings must foundationally include a basic understanding of how new knowledge is generated, interpreted, and applied. The GCE is one experimental learning strategy to support this objective. Other course activities should be developed addressing elements including exploration of the use of various data bases, formation of a relevant PICOT (patient, intervention, comparison, outcome, and time) question, and a critical appraisal of literature. Students continue to find research courses challenging. Faculty should revisit, redefine, and create innovative experiential learning strategies including large classroom simulations. In this large-group setting, the redesigned GCE simulation improved student satisfaction. Opportunities exist for further exploration of this simulated research experience.

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