ORIGINAL RESEARCH

# Comparing effects of an escape room-style activity versus a traditional lecture on student learning outcomes in a graduate pre-licensure pediatric nursing course

Michelle E. Neuman*[1], Anne M. Simmons[1], Young-Me Lee[1], Jessica Bishop-Royse[2]

[1] School of Nursing, DePaul University, Chicago, IL, United States
[2] College of Nursing, Rush University, Chicago, IL, United States

**Received:** July 1, 2025 **Accepted:** July 30, 2025 **Online Published:** August 11, 2025
**DOI:** 10.63564/jnep.v15n9p1 **URL:** https://doi.org/10.63564/jnep.v15n9p1

## ABSTRACT

**Background and objective:** Interactive learning enhances nursing education by fostering critical thinking, problem-solving skills, and teamwork. Escape room–style instruction is an innovative but underutilized approach in nursing. Traditional lectures may not fully engage students or optimize content retention. Escape rooms offer many potential benefits; however, their effectiveness in didactic nursing education remains understudied. The aim of this study was to compare traditional lectures and escape room style instruction in a pre-licensure pediatric nursing course to determine differences in learning outcomes.
**Methods:** Comparative observational study compared outcomes in two sections of the same pediatric nursing course in the same quarter which covered identical content using different teaching methods. Content retention was measured through pre-/post-tests. T-test scores and frequency tables showing changes from pre-test to post-test are reported by modality.
**Results:** A total of 61 students participated, with 21 attending a traditional lecture class and 45 attending an escape room class. Escape room cohorts demonstrated significantly higher post-test scores, suggesting improved short-term retention.
**Conclusions:** Escape room style classes can help enhance students critical thinking skills and short-term content comprehension and retention versus a traditional lecture style class. Classroom-based escape rooms can also offer a low-tech, high-impact alternative to traditional simulation labs to actively engage students in learning. However, further research is needed to assess its long-term effects in nursing education.

**Key Words:** Escape room, Interactive learning, Nursing education, Simulation, Teaching methods

## 1. INTRODUCTION

### 1.1 Background

Innovative, interactive, and experiential learning is enhancing traditional lectures in many higher education fields including in nursing programs. Critical thinking and problem-solving skills are necessary for nursing students to learn in order to develop a strong foundation of nursing practice. Teaching nurses to think critically helps ensure that students provide quality patient care.[1] Critical thinking and problem-solving skills also enhance nursing student engagement and knowledge retention, which can be demonstrated and observed in interactive learning activities.[2–5] Research has demon-

*Correspondence: Michelle E. Neuman; Email: MNeuman4@depaul.edu; Address: DePaul University, School of Nursing, 990 W. Fullerton Ave, Suite 4400, Chicago, IL, United States.

strated that students who are actively engaged in learning beyond taking notes retain more content.[6]

One new method for actively engaging students with content is using elements of escape rooms in the didactic classroom, in lieu of traditional lecture. Traditionally, escape rooms are a setting in which participants are confined and must work together to solve a series of puzzles to escape the place in a given amount of time.[7] Escape rooms in educational settings are an adaptable teaching method, used across various disciplines and campuses, incorporating elements such as case studies, audience response systems, and collaborative work.[2,5] Nursing escape rooms can be implemented in both didactic and simulation settings. They involve students in solving content puzzles in teams by applying course materials to progress through the activity and by encouraging a collaborative approach to critical thinking and problem solving.[4,5]

Escape rooms have demonstrated the ability "to increase student content knowledge [and] immerse students in learning"[8] (p.2) as well as nurture "critical thinking, prioritization, problem-solving, and collaboration."[4] (p.56) Additionally, escape rooms help develop professional skills such as communication, teamwork, and leadership through collaborative efforts to complete the escape room.[9] Teamwork is especially important in nursing today, which is what makes escape rooms as an education tool so appealing since escape rooms depend on teamwork.[10] Finally, whereas traditional lectures often lack student engagement "as the student takes on a passive role in learning,"[5] (p.39) escape room style classes allow for a novel and innovative form of active learning, involving both physical and mental engagement.

Escape rooms can be facilitated in a regular classroom, instead of only in simulation labs with hi-fidelity manikins, as is common on many campuses.[10,11] Escape rooms have been used successfully in undergraduate nursing programs.[4,8] In Kubin's[4] study, the student groups solved puzzles and riddles and applied the learned content to complete the escape room activity. Content item test scores increased 5.9% over the previous cohort. Most of the students (97%) reported that the escape room activity improved both their overall knowledge of the content and their ability to prioritize.[4] In the Morrell and Eukel[8] study, an escape room activity analyzed pre and post-test scores, which showed a statistically significant improvement following the activity ($p < .05$). Both of these studies[4,8] provide evidence supporting the benefits of using an escape room style activity in the classroom setting to improve student retention of the content. However, both of these studies used control cohorts in different academic terms from the ones in which their escape rooms were conducted. By contrast, the authors of this current study compared head-to-head a traditional lecture with students taking notes and an escape room in the same graduate pre-licensure registered nursing program during the same academic term.

### 1.2 Purpose

The purpose of this study was to evaluate the effects of two teaching methods in a pediatric nursing course: 1) a traditional lecture-based class and 2) an escape room style class by determining any differences in student learning outcomes among graduate pre-licensure nursing students. Since the learning outcome was content understanding and retention, the goal was to evaluate which teaching method best helped the students achieve this.

## 2. METHODS

### 2.1 Study design

This comparative observational study employed a pre-test/post-test design to evaluate differences in learning outcomes across two different teaching methods. These methods were delivered in the same term in different sections of the same course in the same graduate pre-license nursing program. This is a post-baccalaureate program for individuals with a bachelor's degree in a non-nursing field called the Masters Entry to Nursing Program. While students are awarded a master's degree, they sit for the RN licensure exam, the NCLEX. This study was reviewed and approved by the authors' university's Institutional Review Board.

### 2.2 Sample/participants

For this study, convenience sampling was used to recruit students enrolled in a pre-licensure pediatric nursing course in 2023. Students participating in the course at one location received the lecture format while students at the other location received the escape room format. Demographic characteristics such as age and gender were not collected; however, consistent with the program enrollment, the majority of participants were female, and all were over the age of 22 years.

### 2.3 Study procedures

Two sections of the course were taught using a traditional lecture format with Power Point slides. Two sections of the course were taught in an escape room style format. Students in all sections had the same course readings and PowerPoint notes to review the course content prior to class. The content chosen for this study was traumatic brain injuries (TBI), focusing on concussions and seizures, which are common in a pediatric population (the focus of this course).

In addition to the same course readings and PowerPoint notes, the escape-room cohorts also had a set of preparation questions due prior to the escape-room day, the answers to which could be found in the PowerPoint and course readings. On the scheduled escape room day, students in those cohorts worked in small groups (4-5 students per group, randomly chosen by drawing colored paper out of a hat) for 60 minutes in order to solve a series of seven puzzles based on the week's TBI content. The correct answer of one puzzle led the group to their next puzzle. Each puzzle was delivered in a different style including a role play, crossword puzzle, and completing a diorama of seizure safety precautions. Full development and details of escape room puzzles as a teaching method has been reported previously.[12]

Each student in all cohorts completed a pre-test, received content by one of two methods above, and completed a post-test within 24 hours after the class. Since the pre-test and post-tests were considered learning activities, they were uploaded to the university's online learning management system. Only those students who also signed an "Agreement to Participate in Research" form had their scores used for the research in this study. Students who declined participation in the research, but who completed the pre-test and post-test instruments received grades for their work, but their responses were excluded from the study. Participation in the research study did not impact the students' grades in any way; participation, or lack thereof, was not incentivized or penalized.

Instrument data was downloaded and imported to Excel for data analysis. Pre-test and post-test scores were matched, then each case was assigned a number in lieu of the students' names and all student names were removed from the research data. The primary author taught three of the cohorts and the secondary author taught one cohort.

#### 2.3.1 *Measures*

The pre-test/post-test instruments created for this study were based on the specific course content. Both utilize the same ten multiple choice questions to assess content retention. Along with these ten questions, two additional questions were added to the post-test instrument to assess how the students perceived the instructional method they received. The additional questions were a 5-point Likert scale (strongly agree to strongly disagree) which asked the students, "I feel that this teaching method (including any assignments) helped me learn the content" and " I would like to see this teaching method used again in this course and/or other courses."

#### 2.3.2 *Data analysis*

Data were analyzed with IBM SPSS version 29. In addition to frequencies and percentages, we report related samples *t*-tests (see Table 1) to determine whether there were statistically significant differences between pre-test and post-test scores across lecture format, as well as escape room format. Table 2 shows actual scores on the pre-test and post-test instruments by modality. Table 3 is a frequency table showing the difference in scores from pre-test to post test for those participating in lecture and escape room formats.

**Table 1.** Comparison of knowledge scores (pre- test and post test) and knowledge improvement scores by modality

| | **Lecture Format Mean Score (n = 17)** | **Escape Room Format Mean Score (n = 45)** | ***t*-test, *p*-value** |
|---|---|---|---|
| Pre-test Total Score | 75.29 | 68.89 | $t = 1.917$; $p \leq .03$ |
| Post-test Total Score | 77.12 | 89.89 | $t = 3.545$; $p \leq .009$ |
| Change Score (post test-pre test) | -1.18 | 20.00 | $t = 4.982$; $p \leq .001$ |

## 3. RESULTS

### 3.1 Differences in learning outcomes between two teaching methods

A total of 61 students participated in this study, with 21 attending a traditional lecture class and 45 attending an escape room class. The mean score for students engaged in the lecture format (mean = 75.29) was slightly higher than escape room format (mean = 68.89) for the pre-test ($t = 1.917$, $p \leq .03$) (see Table 1). This difference increases substantially at post-test; while the lecture format average score increased by less than 2 points to 77.12, the increase for the escape room format participants was over 11 points (89.89). The post-test score for escape room participants was significantly higher than for those engaged with the lecture format ($t = 3.545$, $p \leq .009$). Moreover, change scores calculated by subtracting the pre-test score from the post-test score, are statistically different ($t = 4.982$, $p \leq .001$).

### 3.2 Student response to instructional methods

As noted above, students were asked the following two questions on the post-test to gauge their perceptions of the teaching methods: 1) "I feel that this teaching method (including any assignments) helped me learn the content" and 2) " I would like to see this teaching method used again in this course and/or other courses." For the first question relating to teaching method and content retention, the cohorts had nearly

identical means (lecture only mean = 3.938 and escape-room mean = 3.955). For the second question on teaching method replication, the lecture cohort had the higher mean (mean = 4.063) versus the escape-room cohort (3.705).

**Table 2.** Comparison of pre-test and post-test scores by modality

| Scores | Lecture Format | | Escape Room Format | |
|---|---|---|---|---|
| | Pre-Test n (%) | Post-Test n (%) | Pre-Test n (%) | Post-Test n (%) |
| 0 | 0 (0.0) | 1 (5.9) | 0 (0.0) | 0 (0.0) |
| 10 | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| 20 | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| 30 | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| 40 | 0 (0.0) | 0 (0.0) | 1 (2.2) | 0 (0.0) |
| 50 | 1 (5.9) | 1 (5.9) | 3 (6.7) | 0 (0.0) |
| 60 | 1 (5.9) | 1 (5.9) | 13 (28.9) | 0 (0.0) |
| 70 | 6 (35.3) | 3 (17.6) | 17 (37.8) | 5 (11.1) |
| 80 | 7 (41.2) | 6 (35.6) | 5 (11.1) | 11 (24.4) |
| 90 | 1 (5.9) | 4 (23.5) | 6 (13.3) | 13 (28.9) |
| 100 | 1 (5.9) | 1 (5.9) | 0 (0.0) | 16 (35.6) |
| Total | 17 (100) | 17 (100) | 45 (100) | 45 (100) |
| | $\chi^2 = 12.319$, $p \leq .055$ | | $\chi^2 = 12.971$, $p \leq .044$ | |

**Table 3.** Comparison of knowledge improvement scores by modality

| Improvements in Knowledge | Lecture Format n (%) | Escape Room Format n (%) |
|---|---|---|
| -50 | 1 (5.9) | 0 (0.0) |
| -40 | 0 (0.0) | 0 (0.0) |
| -30 | 1 (5.9) | 0 (0.0) |
| -20 | 0 (0.0) | 0 (0.0) |
| -10 | 2 (11.8) | 2 (4.4) |
| 0 | 7 (41.2) | 4 (8.9) |
| 10 | 4 (23.5) | 9 (20.0) |
| 20 | 2 (11.8) | 15 (33.3) |
| 30 | 0 (0.0) | 9 (20.0) |
| 40 | 0 (0.0) | 4 (8.9) |
| 50 | 0 (0.0) | 2 (4.4) |
| 60 | 0 (0.0) | 0 (0.0) |
| 70 | 0 (0.0) | 0 (0.0) |
| 80 | 0 (0.0) | 0 (0.0) |
| 90 | 0 (0.0) | 0 (0.0) |
| 100 | 0 (0.0) | 0 (0.0) |
| Total | 17 (100) | 45 (100) |
| | $\chi^2 = 21.402$, $p \leq .006$ | |

## 4. Discussion

Students in the escape room cohort demonstrated greater improvement in post-test scores compared to the lecture-only cohort, indicating enhanced short-term content retention that supports the current research.[2,4,8,9] These findings suggest that the interactive, team-based critical thinking engagement and physical engagement with course material may enhance short-term content retention. While both groups covered identical content, the escape room cohort had the additional benefit of applying material in a collaborative and experiential format.

Although the statistical data showed significant improvement on the post-test scores for the escape-room cohorts, demonstrating the effectiveness of the teaching method, the responses on the Likert-scale questions about the students' experience of the teaching method, as noted above, revels something different. Despite the improvement in the post-test scores, and the positive verbal responses during class as well as positive written comments on course evaluations, students in the escape room cohort did not necessarily want to see this teaching method utilized in other nursing courses. These perceptions are consistent with the findings from Woodworth,[5] who highlighted mixed student responses indicating that some students preferred lecture-based learning, perhaps for clarity and structure. Additionally, mixing in traditional lectures with more engaging, interactive activities also acknowledges and enhances different student learning styles.[5] Another possibility for this incongruent finding is that this activity was designed as a formative activity, that is teaching new content, versus escape rooms that are used as summative activities, which review already taught material such as Morrell and Eukel's[8] cardiac escape room.

### 4.1 Nursing education implications

This study supports previous research[3–5,9,10] on using engaging, active learning methods, such as escape rooms, to convey content knowledge to nursing students. As higher education, and nursing specifically, moves away from rote memorization to active learning with competency based exams, escape rooms can prepare students for their future nursing careers by engaging them in learning. Escape rooms, like other forms of simulation, can help enhance students critical thinking and problem solving skills if the puzzles reflect situations they may face in their roles as nurses. For example, one of the puzzles used in this research study which reflects a real life situation required students to give a parent advice for a child with a concussion who has new symptoms. The students needed to figure out what changed with the patient (critical thinking) and then based on that conclusion what to advise the parent, including if, when, and where to have the child seen by a healthcare provider (problem solving skills). Classroom-based escape rooms offer nursing faculty a low-tech, high-impact alternative to traditional simulation labs in order to reinforce critical thinking, teamwork, and clinical decision-making. Embedding escape rooms into the course curriculum, accompanied by structured preparation work and post-reflection, can help students prepare for real-world nursing challenges in a safe, engaging, and memorable way.

### 4.2 Limitations

The main limitation was the small sample size of 61 students at only one university. Another limitation is that the three of the cohorts were taught by one faculty member, while a fourth cohort was taught by another faculty member. Although both faculty members used the same textbook and Power Points to ensure consistency, having different faculty deliver the content created an additional variable. An additional potential limitation is that the pre-test/post-test design could itself help students retain more knowledge than students taking the final exam without having taken the pre-test/post-tests.[13] Finally, this study only measured short-term content retention. Ideally, the pre-test/post-test questions should have been asked again on the final exam to measure longer term content retention. Furthermore, future studies could also be designed to test not only content retention, but also teamwork, critical thinking, and problem-solving skills.

## 5. Conclusions

This study directly compared two distinct teaching methods, a traditional lecture and an escape room style class, in concurrent sections of a graduate, pre-licensure nursing course. The escape-room puzzles required the students to be actively engaged in applying the course material versus the students passively receiving the lecture on the course material. Results demonstrated that the escape-room students significantly retained more content knowledge in the short term versus the lecture students, suggesting that escape-room style classes can be effective active learning strategies for use in pre-licensure nursing courses, if not more effective than a traditional lecture. Finally, escape room style instruction offers a practical alternative to simulation labs by engaging students in active learning and teamwork, making escape rooms a good option for those programs with limited simulation lab access.

## Acknowledgements

N/A

## Authors contributions

Drs. Michelle E Neuman and Anne M. Simmons designed the study, conducted the intervention, and collected the data. Dr. Neuman wrote the first draft of the manuscript. Drs. Simmons, Bishop-Royse, and Lee all edited the manuscript. Dr. Jessica Bishop-Royse provided the statistical analysis and created the tables used in the manuscript. Dr. Young-Me Lee provided help as well with the statistical analysis.

## Funding

N/A

## Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

## Informed consent

Obtained.

## Ethics approval

The Publication Ethics Committee of the Association for Health Sciences and Education. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

## Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

## Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

## Data sharing statement

No additional data are available.

## REFERENCES

[1] Carvalho DPSRP, Azevedo IC, Cruz, FKP, et al. Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review. Nurse Educ Today. 2017; 57: 103-107. PMid:28783526 https://doi.org/10.1016/j.nedt.2017.07.010

[2] Eukel H, Frenzel J, Frazier K, et al. Unlocking student engagement: Creation, adaptation, and application of an educational escape room across three pharmacy campuses. Simul Gaming. 2020; 51(2): 167–179. https://doi.org/10.1177/1046878119898509

[3] Hebert D. Implementation of educational escape rooms in a nurse practitioner doctoral curriculum. J Prof Nurs. 2023; 45: 8–13. PMid:36889897 https://doi.org/10.1016/j.profnurs.2023.01.001

[4] Kubin L. Using an escape activity in the classroom to enhance nursing student learning. Clin Simul Nurs. 2020; 47, 52–56. https://doi.org/10.1016/j.ecns.2020.07.007

[5] Woodworth JA. Escape room teaching pedagogy in the didactic learning environment for nursing. Nurse Educ. 2021; 46(1): 39–42. PMid:32459707 https://doi.org/10.1097/NNE.0000000000000847

[6] Kas-Osoka CN, Bradley LJ, Coffman R, et al. Developing online modules for a "health and wellness" course: Adapting active learning strategies to the online environment. Pedagogy Health Promot. 2018; 4(4): 254-259. https://doi.org/10.1177/2373379917750167

[7] Merriam-Webster. Escape room. Merriam-Webster.com dictionary. 2005. Available from: https://www.merriam-webster.com/dictionary/escaperoom

[8] Morrell B, Eukel HN. Shocking escape: A cardiac escape room for undergraduate nursing students. Simul Gaming. 2020; 52(1): 1-7. https://doi.org/10.1177/1046878120958734

[9] Zhao X, Brand G, Kovach N, et al. Escape rooms in nursing education: A systematic review. Nurse Educ. 2024; 49(5): E238-E243. PMid:38691511 https://doi.org/10.1097/NNE.0000000000001641

[10] Daniel L, Valko J, McAtee TJ, et al. Using an escape room modality to teach mock code essentials. JContin Educ Nurs. 2021; 52(3): 118–122. PMid:33631021 https://doi.org/10.3928/00220124-20210216-05

[11] Anderson M, Lioce L, Robertson JM, et al. Toward defining healthcare simulation escape rooms. Simul Gaming. 2021; 52(1): 7–17. https://doi.org/10.1177/1046878120958745

[12] Neuman ME. Development of an escape room in a pediatric nursing course. Nurs Educ Perspect. 2025. PMid:40423550 https://doi.org/10.1097/01.NEP.0000000000001413

[13] Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice. 10th ed. Wolters Kluwer; 2017.