

# Breaking the Code: Impact of Educational Escape Room on Students' Knowledge and Perception of Ethics and Legislation in Pharmacy

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## ABSTRACT

Pharmacy education has evolved significantly to meet the dynamic demands of the healthcare industry, requiring students to possess a broad range of knowledge and skills. Ethics and legislation are crucial aspects of this profession but often challenge student engagement and motivation. In response, we developed an escape room tailored to the Ethics and Legislation course in the Pharmacy programme. This study aims to evaluate the impact of this educational escape room on the knowledge and perceptions of third-year pharmacy students. The escape room involved puzzles focused on various Acts and Regulations in Pharmacy and its effectiveness was evaluated through pre-and post-assessments aligned with course objectives. The student's perceptions of the educational escape room were assessed at the end of the activity through a validated, 12-item survey. Additionally, demographic information and prior escape room experience were collected. All students successfully completed the escape room. The results demonstrated a significant improvement in students' knowledge ( $p < 0.001$ ), following the escape room activity. The students reported that the escape room facilitated enhanced learning and meaningful peer engagement in learning new materials. This study provides evidence for the efficacy of educational escape rooms as a valuable tool in teaching Ethics and Legislation in Pharmacy, enhancing student knowledge and fostering positive perceptions of the learning experience.

Keywords: Pharmacy education, Educational escape room, Ethics and legislation, Student engagement, Knowledge improvement.

## INTRODUCTION

Game-based learning has emerged as a powerful pedagogical approach to increase student engagement and foster collaborative teamwork (Badr, 2022; Oestreich & Guy, 2022). This concept has demonstrated a great impact on student engagement levels which further leads to improved academic performance and better retention of knowledge (Caldas et al., 2019; Hope et al., 2023). By incorporating activities that stimulate critical thinking, and problem-solving, game-based learning immerses learners in a dynamic educational experience, instead of mere entertainment (Korayem et al., 2022). Through the integration of gamified elements such as immediate feedback, active participation, repeated practice, motivation, and teamwork, learning outcomes can be greatly enhanced. These mechanisms align with a socio-constructivist pedagogy tailored to the requirements of modern learners (Hope et al., 2023).

Escape rooms emerged as popular educational tools designed to enhance students' learning experiences by challenging them to solve a series of puzzles collaboratively with a set timeframe to "escape" from a

themed room (Korayem et al., 2022). The escape rooms have been adapted to various pharmacotherapy topics like diabetes, heart failure, toxicology, cancer, non-sterile compounding, and geriatrics (Badr, 2022; Caldas et al., 2019). The findings from these studies have shown the efficacy of escape rooms in the improvement of knowledge with a positive impact on students' engagement and problem-solving skills. Despite these successes, there is yet to be any escape room focused on ethics and legislation in the pharmacy education domain.

This study addresses this gap by developing an escape room centered on the Ethics and Legislation course and evaluating its impact on the knowledge and perceptions of third-year pharmacy students.

## RESULTS AND DISCUSSION

All 51 enrolled students successfully escaped the room within the designated 45-minute timeframe, indicating a 100% completion rate. The fastest group managed to accomplish the task within 33 minutes. The analysis revealed no significant difference between the average time to complete the escape room and gender, with female

Perception statements	Median (IQR)		P value
	Male	Female	
The escape room encouraged me to think about the material in a new way.	5(1)	5(1)	0.990
I would recommend this activity to other students.	5(1)	5(1)	0.465
I learned from my peers during the ethics and legislation escape room.	5(1)	5(0)	0.744
The escape room was an effective way to review the topics in ethics and legislation module.	5(1)	5(1)	0.393
The escape room was an effective way to learn new information related to ethics and legislation in pharmacy.	5(1)	5(1)	0.465
<b>Knowledge Assessment</b>	<b>Mean ± SD</b>		<b>P value</b>
Pre-assessment	2.22 ± 1.22		<0.001
Post-assessment	5.10 ± 1.51	5(1)	0.487
Students better in a game format than in a didactic lecture.			
The escape room was an effective way to assist my learning of ethics and legislation in pharmacy.	5(1)	5(1)	0.911
I feel I was able to engage with my teammates to learn new material.	5(1)	5(1)	0.723
It was difficult for me to focus on learning because I was feeling stressed or overwhelmed.	5(1)	4(2)	0.152
The non-educational portions (e.g. cyphers, puzzles, etc) distracted me from learning about ethics and legislation in pharmacy.	4(4)	4(3)	0.982
I prefer assembling information from a variety of sources when learning new material.	5(1)	4.5(1)	0.247
In general, I enjoy playing games (video games, board games, social media games, etc).	5(1)	5(1)	0.805

(n=38) and male (n=13) students exhibiting similar performance ( $p = 0.115$ ). In contrast, this finding diverges from the results observed in the geriatric virtual escape room study, which showed that female students were faster than male students in completing the escape room (Badr, 2022). All students completed the knowledge pre- and post-assessments (Table 1), and the results demonstrated a significant improvement in ethics and legislation knowledge following escape room activity ( $p < 0.001$ ).

Table 1. Knowledge assessment pre- and post-escape rooms.

All students completed the perception survey. Overall, the students perceived positively regarding the educational escape room ( $p < 0.01$ ). Additionally, the analysis showed no significant difference in the perception of the escape room between male and female students ( $p > 0.05$ ). Besides, students' prior experience did not exert a significant influence on the time taken to escape the room ( $p = 0.169$ ), suggesting the escape room's effectiveness was consistent across students with varying levels of prior exposure to similar activities.

Table 2. Educational escape room perception versus gender. IQR: Interquartile range

The results demonstrate the efficacy of the educational escape room in both improving students'

knowledge of ethics and legislation and fostering positive perceptions among the cohort, irrespective of gender and prior experience. These findings highlight the potential of the escape room as a valuable instructional tool in pharmacy education, particularly in addressing complex subjects such as ethics and legislation.

## CONCLUSION

The implementation of ethics and legislation escape room proved to be effective, demonstrating its ability to support teaching and learning in pharmacy education domain. Further studies should consider exploring the potential of virtual escape room in pharmacy education and its impact on learning outcomes.

## ACKNOWLEDGEMENT

This study received financial support from the Academic Strategic Development Planning Department (ASDPD), formerly known as the Academic Development and Enhancement Centre (ADEC) under the UM Teaching Enrichment Grant (UM TERG). Would like to Intan Nurul Annisha Binti Suhaili for helping out in the educational escape room.

## REFERENCES

- Badr, A. F. (2022). The Geriatric Virtual Escape Room in Pharmacy Education: Female Students Escape Significantly Faster than Male Students. *Pharmacy, 10*(2), 36–44. <https://doi.org/10.3390/pharmacy10020036>
- Caldas, L. M., Eukel, H. N., Matulewicz, A. T., Fernández, E. V., & Donohoe, K. L. (2019). Applying educational gaming success to a nonsterile compounding escape room. *Currents in Pharmacy Teaching and Learning, 11*(10), 1049–1054. <https://doi.org/10.1016/j.cptl.2019.06.012>
- Hope, D. L., Grant, G. D., Rogers, G. D., & King, M. A. (2023). Gamification in pharmacy education: a systematic quantitative literature review. *International Journal of Pharmacy Practice, 31*(1), 15–31. <https://doi.org/10.1093/ijpp/riac099>
- Korayem, G. B., Alshaya, O. A., Kurdi, S. M., Alnajjar, L. I., Badr, A. F., Alfahed, A., & Cluntun, A. (2022). Simulation-Based Education Implementation in Pharmacy Curriculum: A Review of the Current Status. *Advances in Medical Education and Practice, 13*, 649–660. <https://doi.org/10.2147/AMEP.S366724>
- Oestreich, J. H., & Guy, J. W. (2022). Game-Based Learning in Pharmacy Education. *Pharmacy, 10*(1), 11–22. <https://doi.org/10.3390/pharmacy10010011>