



Journal Homepage: - [www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/21645  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/21645>



**RESEARCH ARTICLE**

**APPLICATION OF EDUCATIONAL ESCAPE ROOMS IN MEDICAL TRAINING:  
TOWARD A MODEL ADAPTED FOR PATHOLOGY LABORATORY EDUCATION**

Miry<sup>1,3</sup>, M. Tbouda<sup>2,3</sup>, K. Oqbani<sup>1,3</sup>, H. Elagouri<sup>2,3</sup> and S. Abbaoui<sup>1,3</sup>

1. Pathology Department, Souss Massa University Hospital Center, Agadir, Morocco.
2. Pathology Department, Oued Eddahab Military Hospital, Agadir.
3. Faculty of Medicine and Pharmacy of Agadir, Morocco.

**Manuscript Info**

**Manuscript History**

Received: 18 June 2025  
Final Accepted: 20 July 2025  
Published: August 2025

**Key words:-**

Educational Escape Room ;Gamification  
;Medical Education ;Healthcare  
Education ;Pathology Education

**Abstract**

**Objective:**Educational escape rooms (EER) are increasingly being used in healthcare training as immersive and interactive approaches that foster the acquisition of both technical and non-technical skills. This article aims to explore their application in medical education, with a particular focus on anatomical pathology, a discipline that has so far received limited attention in this area. A review of the recent literature is combined with a specific scenario proposal designed for the training of pathology laboratory technicians.

**Methods:**A narrative literature review was conducted using international scientific databases and grey literature, to identify the uses, educational benefits, and limitations of EERs in healthcare training. The findings were combined with an original scenario proposal developed for pathology laboratory technicians at the Souss Massa University Hospital Center.

**Results:**EERs have been shown to enhance motivation, engagement, and knowledge retention, while also developing essential non-technical skills such as communication and teamwork. The proposed scenario allows the simulation of common laboratory errors, helping to strengthen quality culture and process safety.

**Conclusion:**EERs represent a relevant educational method for anatomical pathology, complementing traditional approaches. Their implementation in this field could enhance the practical training of laboratory technicians and contribute to a sustainable improvement in professional practices.

"© 2025 by the Author(s). Published by IJAR under CC BY 4.0. Unrestricted use allowed with credit to the author."

**Introduction:-**

Contemporary medical education is undergoing a shift toward more interactive and learner-centered methodologies. Among these, Educational Escape Rooms (EER) have gained significant momentum. These immersive learning environments require participants to collaborate in solving puzzles and achieving specific learning objectives within

**Corresponding Author:-** Miry

Address:- 1. Pathology Department, Souss Massa University Hospital Center, Agadir, Morocco.  
3.Faculty of Medicine and Pharmacy of Agadir, Morocco.

a set time. Originally designed as a form of entertainment, EERs have demonstrated great potential in educational contexts, particularly in healthcare training [1,2].

Their popularity stems in part from their ability to meet the expectations of new generations of learners, particularly Millennials and Generation Z. These students, who are well-versed in digital environments and playful pedagogical approaches, value educational tools that foster interaction, teamwork, and gamification [3]. The integration of EERs into medical, nursing, pharmacy, and physiotherapy curricula has grown rapidly, particularly during the COVID-19 pandemic, which accelerated the development of virtual formats [4,5].

However, certain disciplines remain underrepresented in this dynamic. Anatomical pathology, despite its central role in the diagnostic process, has rarely been the focus of EER initiatives. This article presents a review of the literature on the use of EERs in medical education, along with a reflection on their potential adaptation to the specific context of anatomical pathology, illustrated by a scenario designed for the training of laboratory technicians.

### **Methods:-**

A narrative literature review was conducted to explore the application of Educational Escape Rooms (EER) in healthcare training and to assess their potential adaptation to anatomical pathology education. The search covered articles published in English and French, identified through international scientific databases (PubMed, Scopus, Web of Science, CINAHL, Embase), as well as grey literature. Keywords included escape room, healthcare education, gamification, medical education, simulation, and anatomical pathology.

The selection strategy was exploratory, aiming to cover a broad range of disciplines and EER applications in healthcare education. Included articles presented concrete educational experiences, assessments of their impact on learners' skills, or theoretical analyses of their foundations and benefits. Particular attention was given to studies published since 2017, a period corresponding to the documented rise of EERs in medical education.

The findings from this literature review were then combined with an original EER scenario specifically designed for the training of pathology laboratory technicians, developed as part of an educational project at the Souss Massa University Hospital Center. This scenario served as an example of how the EER model could be adapted to meet the specific needs of this discipline.

### **Results:-**

#### **Use of Escape Rooms in Medical Education:**

The literature reveals that EERs are now widely used in nursing education (20 studies), pharmacy (13), medicine (6), and physiotherapy (3), with a notable increase since 2020 [1]. The educational objectives pursued vary by discipline. Most EERs aim to enhance clinical and procedural knowledge, develop communication skills, and foster teamwork [1,4].

The scenarios are typically built around realistic clinical cases or simulated emergency situations. For example, Fedorcsak demonstrated that integrating an EER into a clinical session on reproductive endocrinology strengthened diagnostic skills and stimulated interprofessional collaboration [2]. Other studies, such as that by Friedrich et al., highlighted the value of EERs in raising awareness among students about patient safety and human factors [12].

#### **Educational Impact:**

EERs positively impact multiple dimensions of learning. Many studies report improved knowledge scores following participation in an EER, although comparisons with traditional methods yield mixed results [1,2]. The most significant impact often occurs in non-technical skills, such as communication, stress management, and leadership, which are difficult to develop through more conventional approaches [3,6,7].

EERs also enhance learner engagement and motivation. Immersion in a game environment fosters emotional and cognitive involvement, consistent with the principles of Kolb's experiential learning theory [8]. Moreover, the autonomy and collaboration required within teams align with the basic needs identified by Self-Determination Theory [9].

**Application Proposals in Anatomical Pathology:-**

Given these benefits, adapting the EER model to anatomical pathology appears highly relevant. The scenario developed at the Souss Massa University Hospital, entitled Mission: Specimen in Peril! is designed to train laboratory technicians in sample management [11].

The scenario includes three key stages. The first focuses on receiving and identifying specimens, with tasks aimed at correcting labeling errors. The second stage involves detecting and correcting a fixation error, simulating the use of an incorrect fixative. The third stage requires participants to identify and correct a staining defect on an H&E slide. Each stage is designed to mobilize both technical skills and cross-disciplinary competencies such as critical analysis, rapid decision-making, and teamwork. A structured debriefing reinforces learning and highlights the potential diagnostic impacts of the simulated errors.

**Discussion:-**

Findings from the literature and the proposed scenario confirm the relevance of EERs as a complementary tool in anatomical pathology training. This type of approach allows key issues in specimen processing to be addressed in a concrete and engaging manner.

In a field where rigor and traceability are paramount, simulating errors in a controlled environment provides valuable opportunities to reinforce quality culture and process safety. Additionally, EERs offer an effective way to develop stress management, communication, and collaboration skills, which are often neglected in technical training [6,10].

However, implementing EERs in anatomical pathology requires certain adaptations. Logistical constraints, particularly in terms of space and specialized equipment, must be anticipated. The role of facilitators is also crucial to maintaining a balance between participant autonomy and pedagogical support [1,5].

While initial observations are encouraging, further studies—ideally randomized controlled trials—are needed to rigorously evaluate the impact of this approach on professional competencies and actual laboratory practice quality.

**Conflict of Interest Statement:**

The authors declare that they have no conflicts of interest related to this work.

**Acknowledgments:-**

The authors would like to thank the Faculty of Medicine and Pharmacy of Agadir for its support in the development and implementation of the escape room project for pathology laboratory education.

**Authors' Contributions:**

A. Miry: Conceptualization, Literature Review, Scenario Design, Draft Writing

M. Tbouda: Literature Review, Draft Writing, Scenario Design

K. Oqbani: Scenario Design, Data Collection, Draft Review

H. Elagouri: Data Collection, Draft Review, Final Editing

S. Abbaoui: Literature Review, Final Editing, Supervision

All authors read and approved the final version of the manuscript.

**Funding statement:**

This work received no specific funding.

**Conclusion:-**

Educational escape rooms represent an innovative and adaptable pedagogical method that can enrich training in anatomical pathology. Complementing traditional approaches, they promote a reflective approach to professional practices and strengthen essential skills for patient safety. The proposed scenario for training laboratory technicians demonstrates the potential of this model and warrants further exploration and systematic evaluation.

**References:-**

1. Quek LH, et al. Educational escape rooms for healthcare students: a systematic review. *Nurse Educ Today*. 2024;132:106004.
2. Fedoresak P. Moderate benefit of escape room game on learning outcome in medicine. *BMC Med Educ*. 2024;24:1353.
3. Guckian J, et al. The great escape? The rise of the escape room in medical education. *Future Healthcare Journal*. 2020;7(2):112-115.
4. Reinkemeyer EA, et al. Escape rooms in nursing education: an integrative review of their use, outcomes, and barriers to implementation. *Nurse Educ Today*. 2022;119:105571.
5. Anton-Solanas I, et al. An evaluation of undergraduate student nurses' gameful experience whilst playing a digital escape room. *Nurse Educ Today*. 2022;118:105527.
6. Friedrich C, et al. Escaping the professional silo: an escape room implemented in an interprofessional education curriculum. *J Interprof Care*. 2019;33(5):573-575.
7. Rhodes J. Students' perceptions of participating in educational escape rooms in undergraduate nursing education. *Kai Tiaki Nurs Res*. 2020;11(1):34-41.
8. Kolb DA. *Experiential learning: Experience as the source of learning and development*. FT press; 2014.
9. Deci EL, Ryan RM. *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media; 1985.
10. Backhouse A, Malik M. Escape into patient safety: bringing human factors to life for medical students. *BMJ Open Quality*. 2019;8:e000548.
11. Présentation: Escape Room, chambre d'erreur, application pour l'Anatomie Pathologique. Educationalproject, CHU Souss Massa.