



THE JOURNEY OF CME-CERTIFIED, CASE-BASED ESCAPE ROOMS IN MEDICAL EDUCATION

Introduction

With roots dating back to the 1980s, escape rooms have become a worldwide phenomenon in the last two decades. Initially developed for virtual play by individuals, in-person, team-based escape rooms have cropped up in cities around the world, with more than 50,000 experiences currently available.¹

Escape rooms typically involve live-action experiences where teams of individuals are asked to solve a series of challenges or puzzles in a set amount of time to complete a specific mission.¹ Typically, each successfully completed puzzle triggers the next challenge, testing participants' creativity, problem-solving ability, and teamwork.

As escape rooms became popularized throughout society, educational providers began incorporating some of their concepts into primary, secondary, and graduate education. In addition to offering hands-on, team-based, in-person experiences, many of these programs were adapted for game-based, online platforms.

In numerous studies, game-based learning has been shown to improve participants' knowledge acquisition, content mastery, and motivation. The time-limited, problem-solving challenges inherent in game-based programs such as educational escape rooms have been shown to promote engagement, teamwork, critical thinking, and development of social skills.² Game-based learning has been found to be particularly impactful among millennials and Generation Z, who have become accustomed to its methods throughout their educational training.³

Within healthcare, both in-person and virtual escape rooms have been used in undergraduate studies and advanced training to educate physicians, nurses, pharmacists, and other professionals.^{4,5} Education

tailored to the escape room design began creeping into continuing medical education (CME) in the late 2010s, typically as a nonaccredited, team-based activity. More recently, the latest leap brought virtual, interactive escape rooms to the accredited educational realm. This white paper describes the initial experience of the [Excalibur Medical Education](#) team with the design, development, and assessment of online, CME-certified, case-based escape rooms. It offers insight into the benefits and potential shortfalls of the escape room design and details potential opportunities for its future evolution.

Based on the Excalibur team's experience as casual participants in live, non-medically oriented escape rooms, we began exploring the possibility of adapting this experience into a virtual, CME-certified activity in late 2022. In partnership with the design team at [infograph-ed](#), we launched the first of our escape room activities in April 2022 geared toward rheumatologists—this activity was eventually given the 18th Annual Best Practice Award in Innovative Educational Methods by the National Association of Medical Education Companies (NAMEC). Three more activities were launched in the subsequent 9 months, targeting dermatologists, gastroenterologists, and rheumatologists; two of these activities were Gold award winners in the Digital Health Awards. The information included within this white paper contains design details and data from this series of four activities.

Steps to Developing a Medical Education Escape Room

Prepare: As with any educational experience, planning is critical. Create your learning objectives and tailor the experience to achieve specific educational goals.

1

Scene setting: This is where you can get creative. Create a storyline for each room. Do you need to save a patient? Or perhaps simply diagnose or treat appropriately? Once that is decided, you can determine some of the game parameters – will you need a facilitator to help participants through the room? Will you create time parameters?

2

Puzzle design: This is where you'll determine the flow of the room and the order of your challenges and clues. You may want to offer clues that help with diagnoses, disease staging, or treatment status. You should also consider the specific demographic characteristics of the patient.

3

Create your toolkit: If you are creating an in-person experience, you may need supplies to build out your room and help create your clues. If it is a virtual escape room, you'll need to partner with a graphic design team who can help bring the content to life.

4

Testing: This is where you'll need to test both internally and externally to make sure the flow of the room is logical and makes sense to participants. Often, those who create the room are too close to the process and benefit from a set of fresh eyes who can offer feedback.

5

Launch: This is where you get to have fun and see the data come in. Assessment of the success of your activity can take on a variety of forms depending upon the goals you set at the outset of development.

6

[CLICK TO GO BACK TO TITLE PAGE](#)


Waiting Room

It's 4 p.m. on Friday afternoon. You have three more patients left on your schedule before you can begin your weekend. Each patient is now in their exam room waiting to be seen. Can you successfully complete the unique challenges presented by each of these patients to beat the traffic home?

You will be timed in each room.

At the end of this activity, you will be given points for completing a room within 15 minutes. After 15 minutes, you can continue to interact with the elements in each room. You will also receive a score based on the number of questions you answer correctly on your first try.

CLICK ON BRIANA TO ENTER HER EXAM ROOM

Briana Simmons	Rachel Wilson	Victor Argueta
		
Age 29	Age 31	Age 66
Sex Female	Sex Female	Sex Male
Race Black	Race Caucasian	Race Hispanic

CLICK FOR

HELP

A-Z

YOU WILL ANSWER QUESTIONS TO UNCOVER FURTHER INFORMATION THAT INCLUDES CLUES RELATING TO:

Patient Chart



Patient Interaction



Physical Examination



Lab Results



SCENE SETTING

While an environmental scan provided examples of various ways escape rooms could be used, modified, and adapted for use within the CME setting, our team wanted to be true to the original intention of the escape room format. Recognizing that the escape room experience, in many ways, mirrors the patient-clinician encounter (i.e., a time-limited event where clinicians are presented with an evolving information base that they must synthesize quickly and efficiently), we designed our experience based on several principles:

1. There would be no advance “study guide” provided. Learners would need to fully immerse themselves in the experience from the start, using their inherent knowledge and analytic skills to respond to specific questions and challenges.
2. Because we wanted to ensure that learners were provided with a rich and varied learning experience, each room would combine a series of knowledge-based questions along with clues related to a clinical case study. Challenges would be multi-layered and require critical thinking skills to solve correctly.
3. Feedback would be provided along the way that would fill in learners’ knowledge and competence gaps, but learners would need to progress through each room without significant external guidance.
4. A small reference library would be made available within each room to provide additional insight into the disease state(s) covered within the activity and current standards of care.

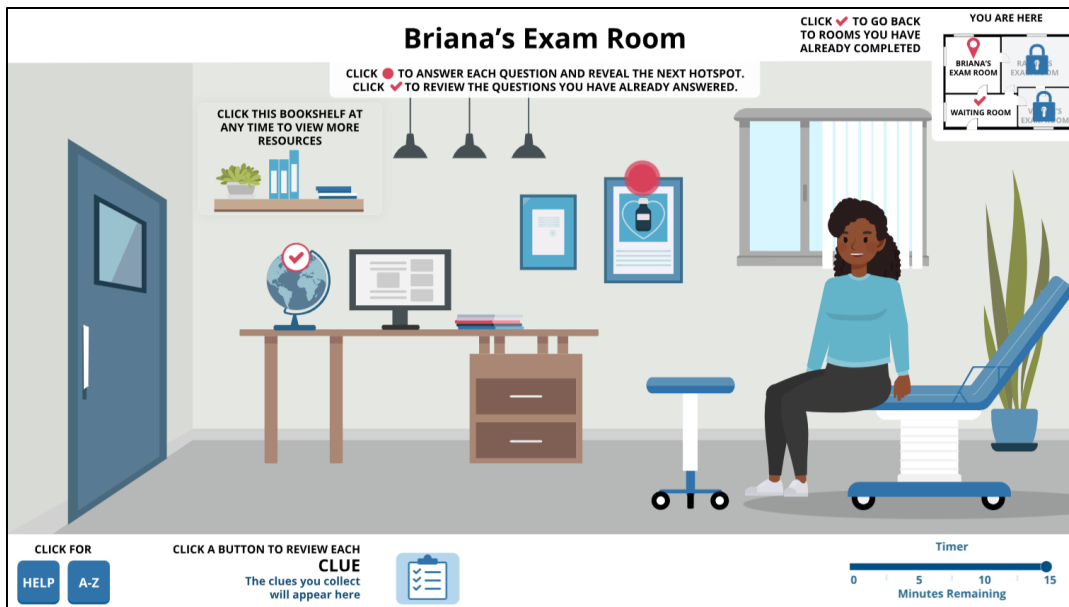
The number of rooms and amount of educational credit associated with any accredited escape room activity will typically be determined by your educational design team in alignment with your activity goals and available budget. Excalibur's initial four escape room activities, for instance, varied between 2-4 patient rooms. As patient cases were integral to the development of each individual room within our activities, the initial planning with our course faculty typically focused on the demographic characteristics of the patients we wanted

to present. Was it going to be more educationally valuable to design cases around more "typical" patients that a provider sees on a day-to-day basis, or would an unusual presentation that is less often encountered in the clinical setting be better? How would we try to vary the patient demographics (e.g., age, gender, ethnicity) that would perhaps drive different diagnostic and treatment decisions? Based on faculty guidance, we decided to present two patients who were seen at two separate visits spaced out by several years in our activity geared toward gastroenterologists; for our other activities, we designed cases with unique patients who were "seen" only once.

"Our award-winning work with the Excalibur team developing interactive escape rooms has been an exceptional experience. Their commitment to educational excellence makes for a fruitful partnership, allowing for productive conversations on both their content and our visual strategies. Their clarity of mission for each activity and openness to utilize innovative approaches make them perfect collaborators for our team."

Karen Roy, MSc
CEO and Co-Founder
infograph-ed





ACTIVITY DESIGN

After considering a variety of design and presentation options, the Excalibur team worked in collaboration with our design partners at infograph-ed to divide each escape room into two parts to optimize the educational experience for learners:

Part 1: An initial exam room where learners faced a series of four knowledge-based questions that, when answered correctly, triggered the appearance of one of a series of clues tied to a patient case. These clues were specifically tailored to the therapeutic area(s) covered within the activity. For instance, while every case included an initial patient chart and audio of his/her primary complaint(s) as clues, others might include a physical examination report, lab results, a completed disease activity form, biopsy results, or de-identified patient images.

Part 2: An escape room door where learners were required to synthesize the information presented within the patient clues to answer four competence-based questions related to the diagnosis, treatment, and/or long-term management of that patient. In this part of the activity, learners had the ability to revisit any/all of the clues presented in the exam room to help them respond to each question.

Learners were given multiple opportunities to select the correct answer to each question; once they did so, they were provided with the evidence-based rationale explaining why each possible option was correct/incorrect. A timer set at 15 minutes was displayed within each room to mimic a provider's customary patient visit and exert time pressure on each decision, although learners were able to complete all activities in the room after the time limit expired to help achieve the activity's primary function of conveying the educational content.

As part of each activity, we also developed a noncertified educational pocket guide that was available as a resource within each room on a virtual bookshelf (additional free resources such as published diagnostic and treatment guidelines were also included in this area).

TESTING AND ACTIVITY LAUNCH

Because of the unique nature of this activity, there was a bit more training/education than usual to get faculty up to speed on the general concept behind the escape room design, especially for our first activity where we only had some mockups and a short sample to illustrate the general concept. Once content was developed and approved by all stakeholders, the design phase began where we collaborated with the team at infograph-ed, explaining how we wanted each escape room to look and how we wanted learners to interact with materials. We then ran the activity through a series of beta tests from various internal and external stakeholders to evaluate functionality and activity flow. Tweaks were then made to the overall look and feel of the activity based on feedback.

It is important to recognize that a successful and **engaging** accredited escape room should not function as a didactic lecture shoehorned into a pretty little box. The creative possibilities of the format can also be applied to your marketing and promotional strategy to highlight novel aspects of your content. For example, in the Excalibur escape rooms, we used segments of our “patient” audio presentations paired with a graphic for social media marketing of the activity.

Your clue is: Briana's Experience

Briana Simmons



CLICK TO PLAY, PAUSE, OR STOP AUDIO

01 minutes 09 seconds

“ About 3 or 4 months ago, I just started feeling really tired at work and my hands started to ache. Then I started noticing these small rashes on my skin in a couple different places. I didn't think much about it until I started breaking out on my face. It's made me really self conscious about the way I look.

I don't know if it's related, but I started getting these bald spots about the same time. I changed up my hairstyle, but that didn't fix it, so now I've got the face rash AND the hair loss. In the meantime, the aching pain is getting worse in my hands and wrists. I was out walking around with my husband last weekend, and even holding hands was pretty painful.

I talked to this woman in my church who suggested I get a referral to a rheumatologist. I don't really feel like anything significant is wrong, but I thought I should come in and get it checked out just in case.”

CLICK TO RETURN TO THE EXAM ROOM AND FIND MORE CLUES

CLICK TO REVIEW QUESTION

BACK

CLOSE

Visit 1 CLICK TO REVIEW MAP 4 CORV'S Exam Room CLICK TO GO BACK TO ROOMS YOU ARE HERE

According to 2020 American College of Gastroenterology (ACG) guidelines, how long after diagnosis should screening and surveillance colonoscopy for colorectal cancer begin in individuals with ulcerative colitis and extent of disease greater than the rectum? CLICK TO CLOSE

THANK YOU FOR YOUR ANSWER

- ☐ 3 years after diagnosis
- ☐ 5 years after diagnosis
- ☒ 8 years after diagnosis
- ☐ 10 years after diagnosis

Correct: C

The incidence of colorectal cancer in patients with UC is 4.7 per 1,000 patient-years, with a cumulative risk of 1%, 2%, and 5% at 10, 20, and 20+ years of disease duration, respectively.

In addition, certain factors confer additional colorectal cancer risk in patients with ulcerative colitis, including disease duration, increased inflammatory activity, greater extent of colonic inflammation, younger age at diagnosis, and the presence of primary sclerosing cholangitis.

The ACG recommends initiation of screening and surveillance colonoscopy 8 years after diagnosis for individuals with ulcerative colitis and extent of disease greater than the rectum.

CLICK TO CONTINUE TO THE CLUE

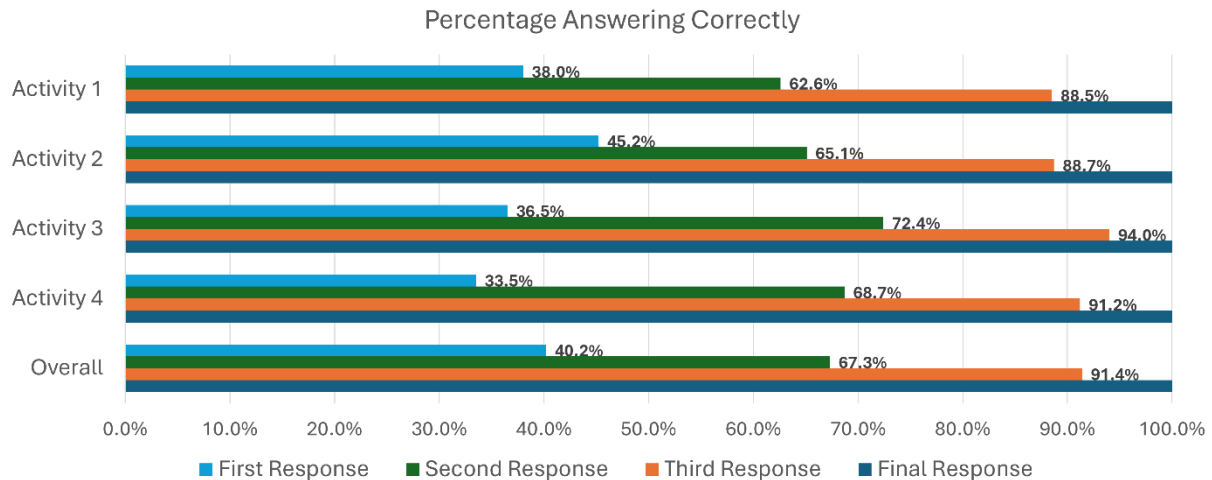
INITIAL ESCAPE ROOM DATA

While we included brief pre/post-tests as part of this education, the majority of our data came from the intra-activity questions as well as the post-activity evaluation. Here are some of the highlights that we noted:

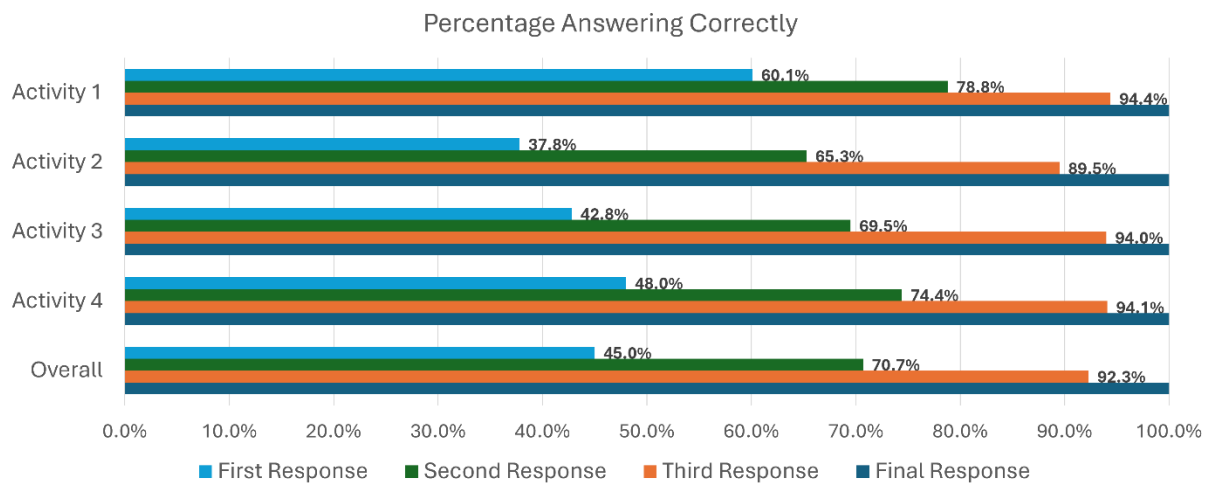
1. The majority of learners (78.4%) who entered the first escape room of an activity completed all of the rooms within the activity. This is a significantly higher rate of engagement than a typical didactic activity that often sees significant drop off as the education progresses.
2. Both the knowledge- and competence-based questions proved to be sufficiently challenging. As shown on the following page, 40.2% of learners answered knowledge-based questions correctly on their first attempts while 45.0% answered competence-based questions correctly on their first attempts. Across the four activities, learners' abilities to answer these questions varied from 33.5% to 45.2% on the knowledge-based questions and from 37.8% to 60.1% on the competence-based questions. The wider spread on the competence-based questions was largely due to the diagnostic questions on activities that focused on one specific disease state because the stated focus of the activity led learners overwhelmingly to the correct diagnosis.
3. The majority of learners chose the correct first response on either between 26-50% of all questions or between 51-75% of all questions, demonstrating that the escape room format was challenging but not overwhelmingly difficult.

Greater than 90% of learners reported that, compared to other instructional design formats, the escape room design better improved their understanding and comprehension of the information presented and that the gamification style of the activity enhanced their overall learning experience (see Appendix for more details). This finding was consistent across all four activities regardless of specialty audience.

Escape Room: Knowledge-Based Questions



Escape Room: Competence-Based Questions





CONCLUSION

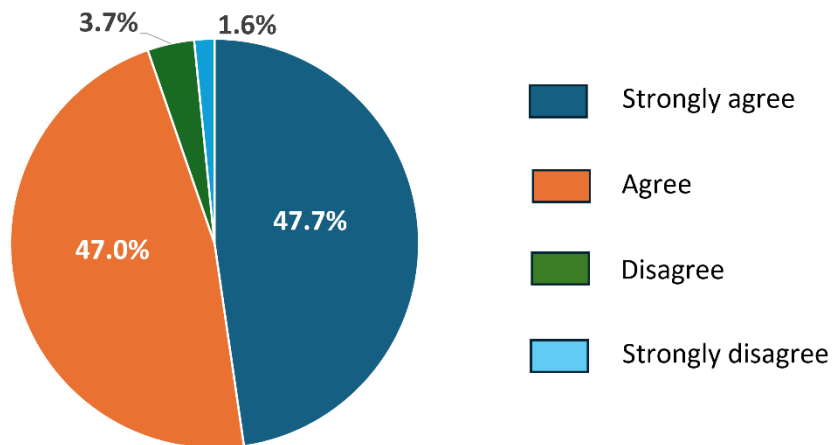
While the escape room format is relatively new to the world of CME-certified education, our team's initial experience with the platform demonstrates its effectiveness in engaging and challenging learners across a variety of therapeutic areas. Learners appreciated the opportunity to immerse themselves in a safe, reflective environment that allowed them to gain evidence-based knowledge and improve competence. Future enhancements to the platform include the addition of a leaderboard to introduce a more competitive nature to the activities as well as confidence-based wagering on individual questions to assess specific educational domains where learners may need additional reinforcement.

REFERENCES

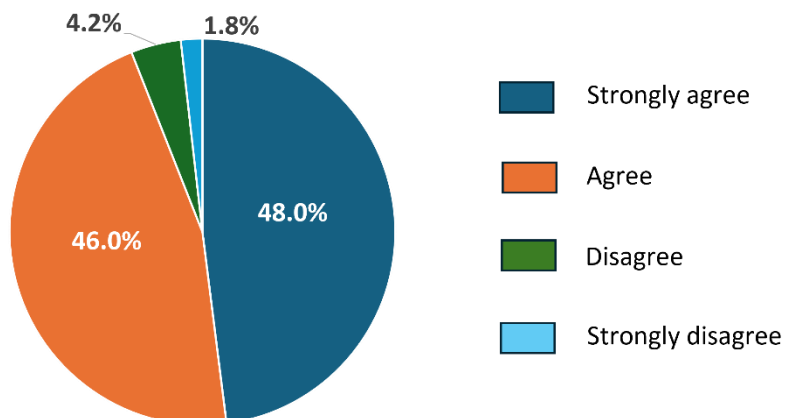
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ADDITIONAL DATA

The gamification style of this activity enhanced my overall learning experience



Compared to other instructional design formats, the elements of this activity improved my understanding and comprehension of the information presented





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