



Escaping the Routine: Virtual Escape Rooms in Online Hospitality Courses

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Abstract. Virtual escape rooms (VER) are online educational games that place learners in the scenario of being locked in a specified environment and require them to collect clues, answer questions, or solve puzzles in exchange for an escape code. This paper documents the process of designing a VER for an online hospitality course using Google Workspace tools (i.e., Google Sites, Slides, and Forms). The paper walks the readers through the VER design process, which includes identifying the purpose of creating a VER, creating a storyline, preparing clues (e.g., puzzles and activities for students to solve), setting up an escape code, and collecting student feedback. This process may be followed by online instructors to create VERs that will meet the needs of their courses. The same process may be applied when developing VERs in other environments (e.g., Microsoft products, mobile apps, or metaverse). Based on the feedback of 21 students who participated in the VER described in this paper, the experience was engaging, fun, enjoyable, and helped them learn and understand the class material. This paper may be useful for hospitality and tourism instructors, industry training professionals, and instructional designers.

Keywords: Learner Experience · Online Education · Gamification

1 Introduction

Online learning has been growing rapidly in recent years, especially due to the COVID-19 pandemic, which forced many universities to shift to online modes of teaching and learning. This educational trend of remote learning continues to grow in post-pandemic times, with an annual growth rate of approximately 7% in 2025. The popularity of online learning is motivated by remote and flexible learning options as well as personalized and engaging learning experiences supported by advancements in technology [1]. Student expectations of online education raise a need for online teaching techniques and tools to facilitate student engagement and stimulate involvement in the learning process.

One of the approaches to engaging students in an active learning process is gamification. Gamification in education requires adding elements and mechanisms of games in the educational process [2]. This paper focuses on designing virtual escape rooms (VER) as one of the popular gamification tools in online education [3–5]. The carefully

designed VER can create an immersive and engaging learning experience to increase student involvement and motivation [3, 6–9]. Despite its advantages of enhancing educational experience, there is a research and utilization gap in incorporating VER into hospitality and tourism education. The extant academic literature documents a few studies investigating tourist experience at escape rooms (ER) [10–12]. While the industry applications of ERs have received some attention in research, there is a lack of research and guidance on creating ER and VER in hospitality and tourism education.

Therefore, this study aims to illustrate how a VER may be built using widely accessible tools (i.e., Google Sites, Google Forms, and Google Slides). The proposed VER design in this project includes various activities that not only entertain and engage students but also allow them to learn, test their knowledge, and apply what they have learned. In addition, this paper discusses possible implementations of the proposed VER design in the educational process. The contribution of this study is in documenting the method for designing and building a VER for a hospitality course. The goal of this paper was reached by illustrating how a VER was implemented in one of the courses in the hospitality curriculum. The approach documented in this paper may be used to expand the idea to other hospitality- and tourism-related courses.

2 Escape Rooms

The contemporary landscape of educational methodologies encompasses both teacher-centered and student-centered approaches. A discernible trend is emerging, marked by student inclination toward active engagement and participation in their educational experiences, in contrast to the traditional passive listening paradigm [5, 13, 14]. Active learning entails a teaching method where learners are actively involved in interacting with the material and putting their knowledge into practical use, as opposed to merely receiving information passively. Research has shown that Escape Rooms (ERs) can be an effective tool for facilitating active learning outcomes, such as critical thinking, problem-solving, and teamwork skills [3–5, 7, 8, 15].

ERs are live-action team-based games where players must solve challenges to complete a mission within a limited time frame. Originally, the mission was to escape from a room, but now, the missions can vary [16]. ERs have become very popular in the entertainment industry and are now being used as learning environments in various educational settings [9, 17]. They offer an enjoyable and efficient method for captivating students in the learning process while fostering the growth of problem-solving abilities and teamwork skills [9].

ERs have found utility across a range of educational applications, such as student recruiting [18], introducing students to institutional services [19, 20], facilitating learning processes within student teams [21], or promoting the utilization of teamwork and leadership skills among students [22]. Veldkamp and colleagues [9] present studies of ERs crafted to cultivate domain-specific skills and knowledge, spanning fields, such as nursing, medicine, pharmacy, physiotherapy, chemistry, physics, computer science, mathematics, history, and English. Furthermore, they are also employed to bolster the acquisition of generic skills.

ERs represent innovative, active, collaborative, and constructivist instructional methods that have the potential to influence learning more profoundly than traditional teaching approaches. These immersive experiences enable learners to grasp the importance of examining challenges from diverse angles, immerse themselves in collaborative teamwork, foster engagement and perseverance, fortify social connections, kindle team cohesion, and catalyze the advantages of deep learning through group discussions [7].

2.1 Key Elements of Virtual Escape Rooms

Virtual escape rooms (VERs) are digital versions of physical escape rooms that can be accessed remotely. They are designed to provide an immersive and engaging experience for learners and can be used to teach a variety of subjects. VERs have become increasingly popular in recent years due to their accessibility and flexibility [3]. The VERs rose to prominence in recent years, particularly during the COVID-19 pandemic when physical escape room visits were constrained. Although the precise origins of VERs lack comprehensive documentation, they are likely to have evolved organically as an extension of the popularity of physical escape rooms, propelled by the growing accessibility of digital technologies [3, 15].

These escape room experiences often incorporate thematic elements and storylines to enrich the overall player engagement. These themes span diverse settings, from historical settings to fantastical worlds, and narratives may encompass mystery-solving or mission completion. Developing a storyline for a VER involves the creation of an interactive experience where participants' decisions shape the route they follow to achieve specific educational goals [23]. This can be accomplished by utilizing a branching storyline approach within a platform such as Google Forms, where the answers selected by participants lead to different outcomes and scenarios [24]. The objective is to engage participants and offer them chances to tackle challenges and make choices within the VER setting [25]. The storyline should involve puzzles, clues, and riddles that the learner can interact with and solve to unlock doors and advance through the room [25, 26].

As participants explore VERs, they find clues that will help them to escape the room. Such clues usually include puzzles for participants to solve and at the end provide them with the escape code or parts of it to escape. Escape rooms employ various puzzle structuring techniques. The most prevalent approach is path-based, wherein participants encounter multiple puzzle pathways leading to a final resolution as an escape code. Another organizing strategy is sequential, wherein participants solve one puzzle sequentially, with each solved puzzle unlocking the subsequent one in a linear progression as a cue [16].

Different tools can be used to create VERs. Google Apps and Microsoft Office serve as valuable tools for both planning the learning objectives and designing the escape room. Google Drawing, Google Slides, and Microsoft PowerPoint are instrumental in crafting puzzles and concealing links to each puzzle within the room or environment's imagery. Additionally, a form can be established for students to submit their puzzle solutions, allowing them to unlock each of the locks. This setup can include response validation to ensure the submission of the correct response before advancing to the subsequent lock. Synchronous and asynchronous approaches can be applied to perform VER [27, 28].

Accordingly, students may be asked to either work through a VER on their own or in teams on their own time or at a class online meeting.

2.2 Benefits and Challenges of Using Escape Rooms

VERs can be an effective tool for incorporating gamification elements in education. They provide an immersive and engaging way for learners to develop critical thinking, problem-solving, and teamwork skills while also incorporating game-like elements to increase engagement and motivation [3]. Zhanni [2] provides a comprehensive definition of gamification in education, elucidating it as the strategic incorporation of game-design elements and mechanisms into non-gaming contexts to incentivize desired behaviors. VERs are a popular tool for gamifying instruction and engaging students in a variety of educational contexts [3–5]. VERs can use gamification elements such as points, badges, and leaderboards to increase engagement and motivation among students. These elements provide students with a sense of achievement and progress, which can help to increase their motivation and engagement. Moreover, it can incorporate gamification elements, such as storytelling, feedback, and rewards to create an engaging and immersive learning experience [3].

Adams and colleagues [6] created a VER as a teaching tool to facilitate active learning in nursing education. The VER was designed to help students develop critical thinking, problem-solving, and teamwork skills. The authors found that the VER was an effective tool for facilitating active learning outcomes. Students reported that the VER was engaging and helped them to apply their knowledge practically. The authors also noted that the VERs provided an opportunity for students to work collaboratively and develop communication and leadership skills. Pozo-Sánchez and colleagues [5] found that physical ER was more effective in terms of enjoyment, while VERs were more effective in terms of autonomy and creative thinking. Teachers need to consider an appropriate learning environment and gamification approach when planning their teaching and learning activities, while also taking into consideration students' specific needs and the dimensions that should be cultivated [5].

While VERs offer advantages, they also pose challenges. Designing VERs requires meticulous attention to user interface and experience, ensuring seamless communication and collaboration among learners. VERs may lack the physicality and tactile experiences of traditional ERs. A significant challenge lies in ensuring the accessibility and availability of necessary technology and equipment, particularly in educational settings [29]. Fotaris and Mastoras [7] conducted a systematic review of ER challenges, identifying issues such as deficient evaluation methods, substantial time and resource investment, limited facilitator availability, poor design, and limited playtesting, occasionally yielding games with imbalanced difficulty levels and a sensation of being either too brief or overly protracted.

Furthermore, designing VERs presents challenges in creating immersive gameplay experiences and maintaining consistent game contexts [9]. The absence of physical interaction, difficulty in generating a sense of urgency, and challenges in implementing complex puzzles in a digital format are additional hurdles. Technical issues or glitches can disrupt gameplay, and fostering teamwork and collaboration in a virtual environment

is challenging. Potential distractions and a lack of focus due to the digital format also complicate adapting educational objectives to a virtual setting [30].

3 Methods and Results

This paper documents an approach to building a virtual escape room using Google Workspace products, including Google Sites, Forms, and Slides. The process presented below was used for building a VER for a research methods course delivered to social sciences students (e.g., hospitality management, sport management, food and nutrition, and political sciences).

3.1 Purpose

The goals of incorporating this VER were:

- Engaging students with the material using an innovative and different approach,
- Assisting students with learning the materials by providing them with feedback as they moved through the escape rooms,
- Providing students with the opportunity to practice course concepts (e.g., aligning research questions with questions included on the questionnaire), and
- Checking students' understanding of the learned material.

In line with the goals, the VER was administered to students in one of the modules of an online asynchronous course as the last element in the module. Students were instructed to attempt the VER after studying all the materials provided in the module. This room was used as an assessment instrument where clues were designed as various activities, including multiple-choice and matching questions, as well as questions allowing students to apply the learned concepts. The VER was assigned as an individual untimed project and graded based on students' performance in answering questions presented in each clue. Even students who did not escape the room received credit for their answers.

3.2 Storyline

The storyline designed for a VER sets the theme and complexity of the experience. The story of the VER created for this project was set in a library. Graduate students taking the course read the scenario of them studying late in the library and falling asleep. When they woke up, the library was closed and students needed to use the clues hidden around the library to collect the secret code and escape. The pictured room included bookcases along the walls and a study area in the middle with desks, coffee tables, and armchairs. The escape room consisted of one room only. This activity was the first VER that the students experienced, and, therefore, it was decided to keep it simple to avoid any confusion with the story or format and focus on student engagement and learning.

The virtual room experience was built using Google Sites, which offers a variety of templates that instructors may choose from to build their VERs. For this project, the course instructor entered the title that was shown at the top of the webpage, then edited the text fields to provide students with the scenario and basic instructions for

navigating the escape room. Please refer to Fig. 1 to see the design of the website and the virtual escape room. Alternatively, instructors may choose to create two pages on their VER website: one for instructions and the call to action button to start the escape room experience and another one to host the VER itself.

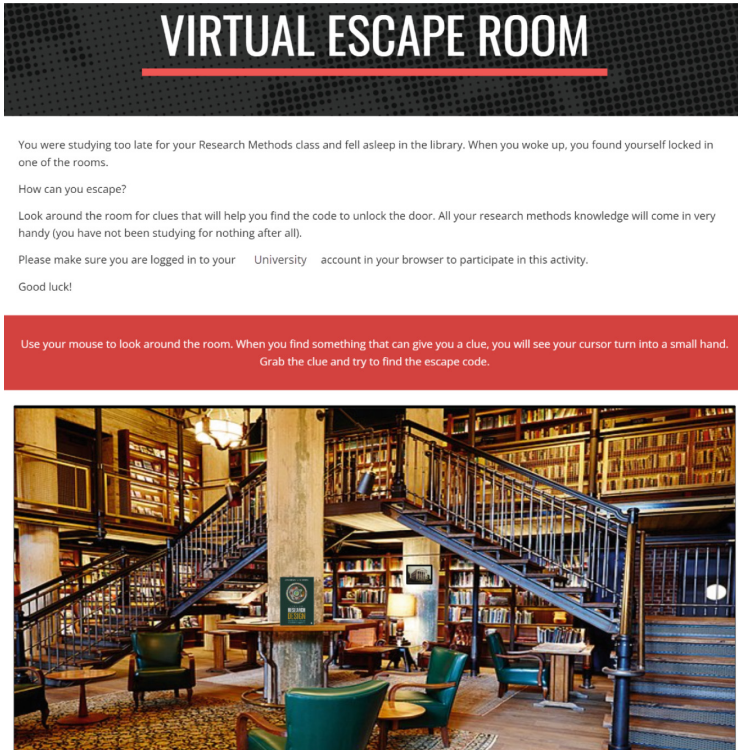


Fig. 1. Website hosting the virtual escape room.

If the university subscribes to Google services, the instructor may choose to limit access to the website and all elements of the VER only to those individuals who are affiliated with the university. This is the setting that was chosen for this project, therefore, the instructions instructed students that they need to be logged in to their university Google account to participate in this activity.

The VER itself was built using Google Slides and embedded on the webpage following the instructions. To create the virtual room, the instructor created a new Google Slides and selected a background that matched the theme, in this case, it was the library room. The background may be set using one picture that fits the theme of the VER or by changing the color of the background and placing different objects on the background. The background creates the overall atmosphere of the escape room. Once it is set, different clues may be added to it to send students on the hunt for an escape code.

3.3 Clues

In physical escape rooms, clues are different objects that are placed around the room and, when discovered, contribute to players' understanding of the secret code. When playing the game for entertainment, players may find some clues and still figure out the solution to escape. In the VER built for this project, the purpose was not only to entertain and engage students but to allow them to learn, test their knowledge, and apply what they have learned. For this reason, it was important that students discover and go through all the clues placed in the room.

There were four clues placed around the room. Each of them was designed around a certain topic of a learning module. When students found a clue, they were presented with different tasks to complete and receive a piece of the escape code. The activities presented to students may vary depending on the goals of the instructor when building a particular VER. In our case, the activities hidden under the clues presented students with multiple-choice and matching questions, as well as a research scenario to analyze (e.g., identify variables in the study, checking if a proposed survey matches the research questions proposed for the study). Each question was assigned a point value so that a grade for the escape room activity could be assigned to students.

All clues were built using Google Forms. Each clue was set up as a separate Google Form. To provide students with feedback and assign points for their answers to the challenges, the Google Form was set as a quiz (Settings → Make this a quiz). Each form was also restricted to the members of the university so that students would need to log in. Students' email addresses were recorded along with the accumulated point values for correctly answered questions, which allowed grading this activity. Also, the instructor set up feedback for correct and incorrect answers to all questions. Students were not shown the correct answer but were offered suggestions on how to think about a certain question/problem or which mini-lecture to watch to review the relevant material. The forms allowed students multiple attempts on each clue. This way, those students who were interested in retaking the quiz could do so after receiving the feedback on their initial submission.

Once each clue was created, it needed to be placed in the VER to be discovered by students. To do so, the form should be published first (Send → Link → Copy). After this, a special object should be placed on the slide with the virtual room. It may be a picture that matches the theme of the VER or an invisible shape that aligns with one of the objects on the background selected for the room. In this project, two clues were attached to added objects (i.e., the textbook used in the class and a picture of the university campus), and another two were attached to the images in the background. When students moved the mouse around the VER, the cursor would turn into a little hand when a clue was found indicating there was a link to click on.

The Google Forms may be set up with all questions being placed in one section. However, Google Forms also allows the creation of different sections. Such functionality may be used to send students on different routes depending on their answers. For example, Sect. 1 may contain a certain question that, once answered, creates branches. For the logic to work, this question should be marked as required in the settings. Then, those students who answered correctly may be directed to Sect. 2, and all others to Sect. 3. For example, in our project, such logic was used to make sure that the students correctly

identified the number of variables involved in the study described in the scenario. Those students who answered correctly were invited to proceed to the following questions. Those students who did not give the right answer were offered an opportunity to go back to the scenario, read it carefully, and think about the question one more time. Making sure that students could identify the variables correctly was important for this escape room because the following questions asked students to identify the appropriate questions to be included in the survey, which cannot be done without knowing all the variables that the survey needs to measure. After completing all exercises under a certain clue, students received a piece of the escape code.

3.4 Escape Code

The escape code could be a phrase or alphanumeric string that would unlock the door and allow students to escape the room. This may be a string of random characters, a word, or a phrase that means something to the class. It may be something funny or serious depending on the tone that the instructor chooses to maintain. For this project, the instructor chose an escape code similar to “ResearchMethodsRock!” (the original escape phrase contained the course number and was modified for anonymity). This phrase was randomly split into four segments and provided to students one at a time as they solved each of the four clues. Such an approach was taken to ensure that students discovered all the clues and attempted all corresponding activities. Each piece of the code was presented with a sequence number (e.g., 2 out of 4) to indicate where that piece of the code should be placed in the entire string. It is important to direct students to write down the piece of the code along with the sequence number so that they can correctly assemble the escape code when they collect all parts.

A separate Google Form was set up for the escape door. The link to this form was placed over the door in the background of the virtual room. It is intuitive for students to think that the escape should be where the door is. Alternatively, the escape could be set up through a window (if present) or any other object in the room that would serve as an escape portal. When students clicked on the door in the escape room, they were presented with a picture of the door lock and the following narrative:

“Oops! This door is locked. To open this door, please look around the room to collect the clues. The code has four parts. Once you find all of them, please come back here to unlock the door. If you do not have the code yet, please close this tab to return to the room.”

The instructions served several purposes: they indicated to students that they found the escape door, informed them that they needed to find a code, and shared that the code has four parts. If the students did not have all parts of the code yet, they were asked to return to the room. Providing such instructions is important because the instructor cannot predict at which step students will find and click on the door. Therefore, guidance should be provided for all possible scenarios so that students do not feel lost. Those students who already have the code were invited to enter it in the next question. This question was set up to accept only one answer that matches the escape code exactly. If the code did not match, students were given an error message and asked to keep looking. If the code

did match, the students were directed to the next section of the form with the picture of an open door and congratulations on their success. Once escaped, students were invited to submit their feedback on the VER activity.

3.5 Student Feedback

Graduate students in the research methods class provided feedback on the effectiveness of the VER assignment. A total of 21 students participated in the anonymous online survey. In line with the goals of this VER (engaging with the material, assisting students with learning, providing opportunities to practice, and checking students' understanding of the material), students were asked to indicate whether their experience in VER was interesting, fun, engaging, educational, and helpful for understanding the course material.

The scale for experience was a 5-point Likert scale from "1 - Strongly disagree" to "5 - Strongly agree." All respondents strongly agreed or agreed that their experience with the VER assignment was interesting ($M = 4.76$), fun ($M = 4.76$), engaging ($M = 4.81$), and helpful in understanding the material ($M = 4.81$). A total of 20 students strongly agreed or agreed that the experience was educational, and one student found the VER assignment "neutral" in this category ($M = 4.81$).

The majority of students indicated that they completed the VER assignment in 30 min to 1 h (71.4%), 23.8% completed the assignment in less than 30 min, and only one student completed the assignment in a time from 1 h to 2 h. Further, students were asked to describe the difficulty level of VER activity as "too easy," "as expected for homework," or "too difficult". All students described the difficulty of the activity as "as expected for homework." Also, all students, except one, recommended keeping the VER activity without changes in future classes.

The students also provided narrative comments about the VER assignment. The top five themes are summarized below.

- **Engaging and Enjoyable Learning Experience:** Students repeatedly expressed their enjoyment and engagement with the assignment. They found it fun and engaging, which helped them learn the course material better.
- **Effectiveness in Learning:** Students mentioned that the VER was a helpful way to learn the material in the course. They appreciated the hands-on approach and how it contributed to their understanding of the content.
- **Feedback and Review:** Students valued the feedback provided within the escape room. They appreciated the opportunity to review and correct their answers and the feedback given on questions they answered incorrectly.
- **Desire for Future Use:** Many students expressed a desire to see this assignment format used in future classes. They found it to be a creative and effective way to learn, indicating its potential for long-term use.
- **Appreciation for Variety in Assignments:** Several students mentioned that they enjoyed the change of pace from traditional assignments like writing papers. They appreciated the opportunity to engage in a hands-on activity that made the class more enjoyable.

3.6 Summary

This section showed an example of building a virtual escape room with Google Sites, Slides, and Forms. The authors hope that the presented process will assist other educators in making a decision whether they want to use escape rooms in their courses, and if so, provide relevant considerations for how to move through this process (Fig. 2). While the rooms built for different courses and different purposes may vary greatly, the questions to ask in the design process and the core elements will remain the same. Below is a diagram that summarizes the important considerations or helpful tools that may be used on the journey of building a virtual escape room.

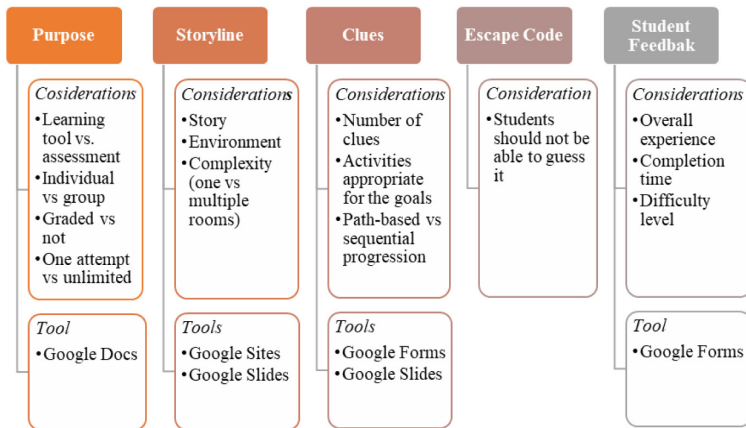


Fig. 2. Diagram describing the VER design process

4 Conclusions and Discussion

This paper documents an approach to building a virtual escape room (VER) using Google Workspace products, including Google Sites, Forms, and Slides. The Google Workspace tools are widely available and popular software that does not require additional knowledge or skills to work with it. Thus, the approach of building VER proposed in this paper is suitable for professors who do not have coding skills or access to specific software or applications.

However, the value of this project is not limited to those instructors using Google Workspace applications. Following the process and logic presented in this paper, instructors may use Microsoft products if their campuses provide access to these tools. Furthermore, the proposed approach for building VER may be used as a foundation for developing a VER in mobile applications or the metaverse. This paper proposes the logic for designing and creating a VER that can be used in different stages of teaching and learning processes, types of classes, and technology tools (See Fig. 2).

The proposed VER design incorporates gamification elements, such as storytelling, feedback, and rewards in the form of points for the answered questions to create an

engaging and immersive learning experience [3]. VER assignments offer a lot of flexibility to the instructors: they may be timed or untimed, graded or ungraded, providing text or video feedback. Many variations of VER assignment design can be used based on the needs of the course and the instructors' ideas.

However, instructors who want to incorporate VER activities in their courses should be aware of some weaknesses of these learning tools. The VER assessment is more time-consuming to create compared to traditional quizzes or assignments. It also requires skills in creating Google Sites, Google Forms, and other elements mentioned earlier in this article that may be time-consuming to learn for some people. However, once the VER is created, it can be recycled in future semesters or used as a base for other VER assessments for other topics of other courses.

The VER assignment received positive feedback from the students who completed the VER activity as a homework assignment. The students' feedback indicates that VER is an effective tool for students' engagement and supports the learning process in active learning. These results are in line with the previous research about the effectiveness of VERs and physical escape rooms [3, 6]. To verify the effectiveness of VER in the educational process, other researchers may consider surveying their students completing VER assignments for assessment and other types of learning activities in different subjects. In the future, the year-over-year effectiveness of VER assignments should be assessed as well.

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